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CONFERENCE PROCEEDINGS

**International e-Conference On
New Horizons And Multidisciplinary
Applications In
Science And Technology
Date : 11th to 13 th October 2021**

Organised by

**Faculty of Science and IQAC, Shri Vitthal
RukhminiCollege, Sawana,
(Tq. Mahagaon Dist. Yavatmal Pin. 445205), Maharashtra, India**

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International e-Conference On New Horizons And Multidisciplinary Applications In Science And Technology

(ICMA-2021)

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श्री शिवाजी शिक्षण संस्था, पुसद

जि. यवतमाळ ४४५ २०४

विजयराव पाटील (घोंडीकर)
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जा. क्र.

दिनांक :- १०·८·२०२१

Shri Shivaji Shikshan Sanstha, Pusad is established by Late Deorao Patil Chondhikar with his contemporary friends to provide the rural children basic education. Now the Institution is slowly but gradually growing in this direction as a result in 1984 Shri V. R. College is established to make availble the facilities of higher education for the rural students especially the girls of the region.

I am very much pleased with the Pricipal Dr. H.S. Mahalle and all the faculty members that they are toiling very hard to uplift the rural students to face the challenges of the modern world by organizing this conference, to develop condfidence in them and inculcate the research attitude in them.

The organization of International e-Conference on the topic on of ' New Horizons Multidisciplinary Appication in Scinence and Technology' (ICMA-2021) 11 th to 13 th october 2021 is one more effort to open the doors of research among the students and faculty and they will surely be benefited by it.

It gives me immense pleasure to extend my best wishes for the conference and I am quite sure it will be a grand success.

Best regards

President
Shri Shivaji Skikshan Sanstha,
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INVITATION

Dear Sir/Madam

It gives us immense pleasure to cordially invite you to participate in an International e-conference on "New Horizons in Multidisciplinary Application In Science and Technology-2021" organized by Shri Vitthal Rukhmini Arts, commerce and science College Sawana, Tq-Mahagaon District Yavatmal.

ABOUT INSTITUTION

Shri Vitthal Rukmini Arts, Commerce and Science college Sawana is established in 1984 with Arts faculty and in 1985 Commerce. The mission of the college is to provide the facility of higher education for the economically backward class of the society especially the girl's students of the region. Keeping in mind the need and demands of the students, the college has started science faculty in 2009. The college is located in a small village which is surrounded by more remote villages. So from a humble beginning, the college has become a leading academic institution in the region. The college offers education in three disciplines viz. Art, Commerce, and Science. It is the greatest endeavor of the institution to build self-confidence in the students and inculcating in them and the confidence to accept the global challenges of the world, The college has been assessed and accredited by NAAC Bangalore.

ABOUT CONFERENCE

From Learning and knowledge management system to mobile social platforms, there are many technologies and knowledge from basic science that support formal and informal learning and the performance of an individual. The research in basic science, that transforms into technology, always helps society to live in a better environment. To inculcate the research atmosphere in campus and impart the benefits of science and technology to the last hut of the society. Scientists, teachers, researchers, and the students shall address challenges and share information regarding restoration projects, programs, and research across the world.

ICMA-2021 is a multidisciplinary e-conference aims to bring together scientist, faculties, researchers and students across the world to involve actively in the above said process.

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ABOUT COLLEGE

Shri Vitthal Rukmini Arts, Commerce & Science College, Sawana is the fulfillment of Late Balasaheb Deshmukh Sawanekar's long cherished dream to provide higher education to the rural people especially the girls of Mahagaon Taluka. As there was no facility of higher education for the girls in the region keeping this in mind the college was established in 1984 by Shree Shivaji Education Society Pusad under the able guidance of Shri Vitthalrao Deshmukh Sawanaker, Deoraoji Patil Chondhikar (Ex MLC) and Vijayraoji Patil Chondhikar (Ex. MLC).

The college, established in 1984 with 38 students had only Arts stream. Subsequently, commerce stream was started in 1985. To encourage the most rural Students for higher education the college constructed a small hostel for boys. The vision and zeal of late Shri Balasaheb Deshmukh Sawanekar founder of the college dedicated efforts of Vijayraoji Patil Chondhikar and Shree Shivajirao Deshmukh Sawanekar have contributed to the growth of the college. Due to the more demand for the admission the college has started section for B.A. First year in year.

In the year 2009 we have started the Science faculty to fulfill the need of the students in the region. Hon'ble Shri Shivajirao Deshmukh Sawanekar has taken utmost efforts to start the Science stream. The institution is engaged in Imparting education to students from different corners of Mahagaon Taluka and nearby region. Our approach also involves working with parents to meet the individual needs of every student, and supporting them to fulfill their academic and co-curricular goals.

The institution is engaged in the task of transmission of knowledge through organizing seminars, conferences, workshops, Science exhibition, Poster presentation, competitive examination classes, Extra coaching for weak students, Social work through NSS etc.
It is also my goal to make the rural students' responsible citizens of the country. This small college has been bestowed with a team of dedicated, efficient teaching and non-teaching staff. The college has separate library with more than 3000 books are available for the students, staff & local readers.

Its gives great pleasure for me to invite the rural Boys and Girls students in this Academic campus for their overall development.

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Internet of Things (IOT) : Exploration Defies and Future Solicitations

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ABSTRACT

As the Internet of Things (IoT) evolves as the next phase of the Internet's growth, it's becoming increasingly important to define the numerous possible areas for IoT applications, as well as the research issues connected with these applications. IoT is projected to infiltrate practically every facet of daily life, from smart cities to health care, smart agriculture, logistics and retail, and even smart living and smart ecosystems. Despite the fact that current IoT enabling technologies have vastly improved in recent years, there are still a slew of issues that need to be addressed. Many research issues are sure to occur because the IoT concept is based on heterogeneous technologies. IoT is an important research issue for studies in numerous related domains such as information technology and computer science because it is so broad and influences nearly every aspect of our life. As a result, the Internet of Things is paving the way for new types of research to be conducted. This paper highlights future uses and research issues as well as the recent progress of IoT technologies.

Keywords: Internet of Things (IoT), IoT applications, ecosystems, heterogeneous technologies.

I. INTRODUCTION

to The Internet of Things (IoT) is the networking of physical items with electronics built in their architecture that allow them to communicate and feel interactions with one another and with the outside world. IoT-based technology will deliver advanced levels of services in the next years, effectively changing how people live their lives. Medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a few of the categories where IoT is well-established.

In IoT, there are four main components:

1. Low-power embedded systems: When designing electronic systems, the inverse factors of low battery consumption and high performance play a crucial influence.

2. Cloud computing: The amount of data collected by IoT devices is enormous, and it must be kept on a dependable storage server. Cloud computing is useful in this situation. The data is analyzed and learned, which gives us more room to figure out where electrical faults/errors exist in the system.

3. Big data availability: We all know that the Internet of Things relies significantly on sensors, especially in real-time. As these electronic gadgets become more prevalent in many fields, their use will result in a large influx of big data.

4. Internet access is required for communication, as each physical object is represented by an IP address. According to IP naming, however, there are only a limited number of addresses available. This naming method will become obsolete as the number of devices increases. As a result, scientists are seeking for a new naming system to represent each physical thing.

Two approaches to IoT development:

1. Create a distinct internetwork that solely contains physical items.
2. Expand the Internet, but this will necessitate hard-core technologies like rigorous cloud computing and quick massive data storage (expensive).

IoT Characteristics:

1. Effortlessly scalable and scalable
2. IP-based addressing will become obsolete in the near future.
3. IoT is made possible by the profusion of physical items that do not require IP.
4. Devices usually use less energy. They should be set to sleep automatically when not in use.
5. A device that is currently connected to another device may or may not be connected in the future.
6. Connectivity isn't always available — IoT devices aren't always online. When devices are not in use, they will be turned off periodically to save bandwidth and battery life. Otherwise, connections may become unreliable, resulting in inefficiency.

II. APPLICATIONS

(A) Houses with Smart Technology

Smart homes are one of the best and most practical IoT applications because they take both convenience and home security to the next level. Though IoT can be used at several levels for smart homes, the finest is the one that combines intelligent utility systems and entertainment. Your electricity metre with an IoT device that gives you insights into your daily water usage, your set-top box that allows you to record shows from a distance, Automatic Illumination Systems, Advanced Locking Systems, and Connected Surveillance Systems are all examples of smart homes. As the Internet of Things progresses, we can expect the majority of gadgets to become smarter, enabling us to do more with less.

(B) City of the Future

Smart cities are expected to be made up of not just internet connection for people in a city, but also access for the city's devices. And we can happily report that we're on our way to making this idea a reality. Efforts are being made to integrate linked technology into infrastructural requirements as well as certain critical concerns such as traffic management, waste management, water distribution, and electricity management, among others. All of these things help to alleviate some of the problems that people experience on a daily basis while also adding convenience.

(C) Autonomous Vehicles

There has been a lot of talk about self-driving automobiles. Google experimented with it, as did Tesla, and Uber even developed a self-driving car that was ultimately shelved. Because we're dealing with human lives on the roadways, we need to make sure that the technology has all it needs to improve passenger and road safety.

The automobiles use a variety of sensors and embedded technologies that are connected to the Cloud and the internet to continuously generate data and send it to the Cloud for Machine Learning-based decision-making. Though it will take a few more years for technology to mature fully and governments to adjust their laws and policies, we are currently experiencing one of the best IoT applications.

(D) Shops that sell IoT products

You should see the video of Amazon Go — the e-Commerce giant's concept store – right away if you haven't already. Perhaps the best application of technology for bridging the gap between an online store and a physical store is this. By deducting money from your Amazon wallet, the retail outlet allows you to go cashless. When you select items from the shelves, it also adds them to your cart in real time.

If you change your mind and choose another item, the prior one is removed from your cart and replaced with the new one. The concept store's best feature is that there is no cashier to bill your purchases. You don't have to wait in line; simply walk out after picking up your items from the shelves. If this technology proves to be beneficial in attracting more customers, it will undoubtedly become the norm in the coming years.

(E) Farming

One of the industries that will benefit the most from the Internet of Things is agriculture. With so many advancements being made in agricultural gear, the future looks bright. Drip irrigation, crop patterns, water distribution, drones for farm surveillance, and other tools are being developed. These will enable farmers to produce a higher-yielding crop and better address their concerns.

(F) Smart Grids are a type of grid

A smart grid, for example, is a holistic system that employs a wide range of Information Technology resources to enable current and new gridlines to reduce electricity waste and costs. Electricity efficiency, reliability, and economics will all benefit from a future smart grid.

(G) Internet of Things in Industry

The Industrial Internet of Things is made up of interconnected sensors, instruments, and other devices that are linked to industrial computer applications such as production, energy management, and so on. While the industrial internet is currently unpopular in comparison to IoT wearables and other uses, market research firms such as Gartner, Cisco, and others feel it has the greatest overall potential.

III. RESEARCH CHALLENGES

The internet of things attracts scientists and researchers for research because of its huge scale and scope. IoT is still in its early stages of development, which means that much more work is required to bring this concept to fruition. A lot of work has been done in the recent decade in the various sectors of IoT, including

application development, security, privacy, connection, protocols, architecture, and so on. However, several research difficulties in the above-mentioned IoT sectors must be prioritized for future effort.

There are numerous research issues associated with IoT application development. The IoT application should be capable of handling real-time data and communicating with other devices. Furthermore, it should not only deal with sensing and actuation, but also with human collaboration, such as Human to Human (H2H), Human to Machine (H2M), and Machine to Machine (M2M) (M2M). It also meets the requirement of IoT, which is distributed and heterogeneous in nature, by including more about application development. In the future, some of the prospective application kinds, based on IoT viewpoints, are as follows: Those who forecast natural calamities can use this app. Simulations, monitoring the performance of various phenomena, and other industrial uses Apps for water security monitoring, applications for constructing smart houses, and Medical uses include activity and health parameter monitoring, as well as medical ingestion. Other agricultural uses include smart packing, text message warnings regarding land defects, intakes, and so forth. More on future applications: applications for intelligent transportation system design, such as traffic monitoring, law enforcement, and pollution management. Future applications will also touch on topics such as smart cities, smart meetings, and smart security.

(A) Networks/Connectivity

We must concentrate on the connectivity or network difficulties of IoT because connectivity is a fundamental component of this technology and we want to connect anything, anytime and anywhere. In order to develop an effective addressing policy for IoT enabling devices and IP standard integration, an IoT unique identity for all communication devices is required. Because billions and trillions of devices are connected around the world, an identity management system that offers efficient addressing for devices that work globally is required. Mobility in the IoT also necessitates the use of an appropriate mechanism. Traffic characterization and merging the concepts of traffic characterization and modelling for implementation of quality of service in IoT is one of the research difficulties that remains unsolved. Another problem for IoT scientists is ensuring high-quality service.

(B) Computing on a Cellular Level

In the Internet of Things, mobile phones are active agents. Participatory sensing, Eco feedback, Actuation, Health, Sports, Gaming, Transportation, Contact with things, and Social interaction with people are all enhanced by mobile phones and their applications [18]. This field of research needs to be targeted due to its broad applicability domain. There are several unresolved difficulties in this area. In an IoT, heterogeneity among devices and users is a major concern that must be addressed in the near future. Because standards for application layers have been defined, we need to focus on the lower level interactions. We need continuous sensing in some IoT applications, which allows us to create mechanisms that meet the demands of signal processing, continuous sensing, and, most significantly, storage devices. The third issue is connected to crowd sensing, which covers issues such as measurement quality, coping with unreliable, noisy, and incomplete data, and individual preferences for locations. The fourth challenge is the context problem, which emphasizes the

need of context when collecting data, especially when we are only exposed to an event for a brief time. Another difficult area of research in mobile phone computing is security, particularly security for shared resources in the Internet of Things.

(C) Safety and security

In the Internet of Things, nearly trillions of devices are connected and share data with one another, including sensitive data such as PINs for accounts and personal information, which must be secured for secure communication. In order to overcome these eventualities, IoT security is critical. Normally, we use encryption mechanisms to safeguard data or information, but because IoT devices have significantly less processing power and energy resources than traditional Internet devices, there is a need to develop encryption algorithms that suit IoT needs. Furthermore, identity management is an aspect of security because it introduces a unique identification for each device and provides a mechanism to safeguard it. A technique for authentication and data integrity is required for secure IoT connectivity. Physical attacks as well as a proxy attack on the devices or links are possible in some cases where IoT devices are exposed to the open environment or left unattended for a length of time during their operation.

(D) Privacy

There are trillions of people connected to each other on the Internet of Things, and we may share a tremendous quantity of data on this platform, however there is a privacy issue. There should be a method in place that states that data about a certain user can only be utilisedwith the user's permission. Furthermore, this information can only be utilised for a limited number of reasons and in a limited domain, and it cannot be viewed by the general public. To do this, we must create a privacy policy for all devices, protocols, and applications that adheres to the aforementioned guidelines.

IV. CONCLUSION

By combining the internet and things, the internet of things improves human lives. IoT will not only improve human comfort, but also improve the efficiency and intelligence of things. IoT will become the most rising technology in the near future due to its diversified nature. We have explored many IoT applications in this paper, as well as how these applications contribute to society. This study will also assist scholars and practitioners in comprehending prospective IoT research issues that will become future research trends.

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Traditional Phytomedicines and Their Antibacterial Activities from Mahur Forest

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ABSTRACT

Ethnomedicinal survey with traditional herbal practitioners from tribal communities has been conducted in mahur forest during 2018-19. It is found that, some of the forest plant species are used as ethnomedicines by the practitioners to overcome the health issues locally. This paper mainly focused on the ethnomedicinal (Traditional) uses and antibacterial activities of some forest plants. Traditional phytomedicines of *Wrightia tinctoria, Sapindus emarginatus and Cyathocline purpurea* are recorded. Among these *Wrightia tinctoria* proved the highest antibacterial activity against tested bacteria.

Keywords: Traditional Phytomedicines, Antibacterial activity, Mahur forest.

I. INTRODUCTION

India has a rich heritage of herbal medicine. The modern Indian authors worked on Indian medicinal plants. The valuable work has been done by many of workers including Nadkarni (1995). In course of time the knowledge of traditional phytomedicine is on decline. The rapid progress in modern research coming forth are seen a setback for the production and use of local traditional phytomedicines which is a part of one of the discipline 'Ethnobotany'. Ethnobotany is a totally natural and traditional relationship and interaction between man and his surrounding (Harsberger 1895).

In Marathwada region of Maharashtra, Mahur tahesil is a hilly remote, tribal area and is surrounded by dense forest in Nanded district. Five tribal communities are native of this region. The traditional practitioners belongs to these communities, they have much of knowledge about phytomedicines of the area and maintain the health of the society. The floristic survey of different ranges of Mahur forest has been done by various workers (Zate,1983; Naik,1998; Chavan,2002), with some ethnomedicinal notes. The use of phytomedicines by the local traditional practitioners indicates the significant medicinal value of the local flora against health ailments. Many of the workers reported the antibacterial activities of plant extracts against pathogenic bacteria (Gibbon, 2005 ; Bharat, 2015). To considering all these facts the present topic has been undertaken.

II. METERIAL AND METHODS

a)   Ethnobotany: Ethnomeidicobotanical survey of mahur range forest was conducted in 2018-19 during the study. For the collection of ethnomedicinal information's and plant parts used as a medicine the traditional practitioners were interviewed by visiting their houses and also on fields. Interviews, enquiries and cross questioning was conducted with the practitioners. A special questionnaire was made in the proforma and it has been adopted for interviews. This type approach and communication skill yields valuable information about ethnomedicinal plants.

b)   Preparation of Extract: The plant material in the form of leaves collected from the forest during exploration trips and brought to the laboratory. They were washed thoroughly with tap water to remove contaminants and dried under shade about 8-10 days separately. The dried leaves can be grind into powder and store in airtight container at room temperature till the extraction. The extracts were prepared by extraction 10mg of leaf powder with 100ml of ethyl alcohol by soxhlet extractor for about 90-120min. separately. These extracts were used for antibacterial activity.

c)   Antibacterial activity: Antibacterial activities of plant extracts against human pathogenic bacteria were carried out during the study. The antibacterial activities of the extract evaluated by well plate agar diffusion method (Collins, 1967; Godkar, 1996) against tested bacteria. The bacteria grown on nutrient agar medium at pH7.6. The cups were made with the help of sterilized 8mm cork borer. The 100mg/ml of extracts were poured in each cup of plates. The plates were inoculated at 30°C for 24hours. The bacterial activity was measured in diameter of inhibition zone in mm. of the samples and campare in with control and a standard antibiotic streptomycin.

III. RESULT AND DISCUSSIONS

1.   **Morphological description of Ethnomedicinal plants:**
a.   **Wrightia tinctoria** R. Br. in Mem. Wern. Nat. Soc. 1: 74. 1811.
Trees, Leaves acuminate at apex, rounded at base, pubescent along midrib below, occasionally glabrous. Flowers white. Follicles paired, drooping, apices connate. Seeds pointed.
Fls. & Frts.   : March-May.
Distrib. : Common in dry deciduous forests; Datta shikhar, Mahur.
b.   **Sapindus emarginatus** Vahl, symb. Bot. 3: 54. 1794.
Trees, bark rough with grey scales. Leaves paripinnate; leaflets 3-5 (7) pairs, oblanceolate or ovate-oblong, glabrous above. Flowers dull white. Drupes ovoid, lobed, fleshy, fulvous hairy when young.
Fls. & Frts. : February-May.
Distrib.: Common in villages; Iwaleshwar.
c.   **Cyathocline purpurea** (Buch.-Ham. Ex D. Don)O. Ktze. Rev. Gen. Pl. 333. 1891.
Suberect herbs, viscid and glandular, silky hairy, basal leaves radial and cauline, sessile, segments toothed. Heads 0.3-0.6cm across, in terminal corymbose-panicles; acute, hairy on margins. Achenes oblong.

Fls. & Frts. : September- March.

Distrib.: Common throughout in wet places: Pandav caves, Mahur.

2. <u>Ethnomedicinal importance of Plants:</u>

a.   **Wrightia tinctoria**

1.   Tooth ache: leaves chewing 5 to 10 minutes twice for cure tooth ache.

2.   Lactation: One inch stem bark powder taken orally with one cup of water daily once for three days.

3.   Cold and Cough: One leaf taken orally daily twice for three days.

4.   Kidney stone: 10gm stem bark powder taken orally with curd daily once for 7 days.

5.   Stomach ache: One small glass decoction of stem bark taken orally once only.

6.   Eye Infection: Latex mixed in 'Ghee', apply on infection daily once till cure in animals.

7.   Curd preparation: Fruit latex mixed in milk to prepare curd.

b.   **Sapindus emarginatus**

Fish Poison: Fruit pulp crush and prepare juice and pore in water as a fish poison.

c.   **Cyathocline purpurea**

Head ache: leaf paste apply externally till cure.

3.   **Antibacterial Activity of the Plants:**

The antibacterial screening of ethnolic extracts of leaves of the plants has been done against pathogenic bacteria and the results are mentioned in table no 1. During screening the antibacterial activity of each extract measured in terms of inhibition zone. The ethnolic leaf extracts showed inhibitary action against all tested bacteria with some exceptions.

As noted in the table the ethnolic extract of *Wrightia tinctoria* showed highest i. e.   near about 70% as compared to standard inhibitory action against all tested bacteria. It occurs maximum against *S. aureus* and *B. subtilis* followed by *P. aeurogenosa* and *E coli.* It is very significant that, the activity of the *Wrightia tinctoria* against all tested bacteria is good as compared to Standard. The activity of *S. emarginatus* and *C. purpurea* extracts against all tested bacteria is poor. It shows near about 20% activity as compared to the standard (Streptomycine).

Table-I: Antibacterial activity of ethnolic extracts of leaves of ethnomedicinal plants.

S. No.	Name of the plant with sample code	Part used	Zone of Inhibition (mm).			
			Staphylococcus aureus	*Pseudomonas aeurogenosa*	*Bacillus subtilis*	*E. coli*
1.	*Wrightia tinctoria* (D4)	Leaf	19mm	18mm	19mm	17mm
2.	*Sampindus emarginates* (D5)	Leaf	07mm	08mm	08mm	02mm
3.	*Cyathocline purpurea* (D6)	Leaf	08mm	07mm	07mm	01mm
4.	Control	--	00mm	00mm	00mm	00mm
5.	Standard(Streptomycin)	--	25mm	28mm	26nn	27mm

*Photographs of petri plates showing zone of inhibition in bacterial growth.
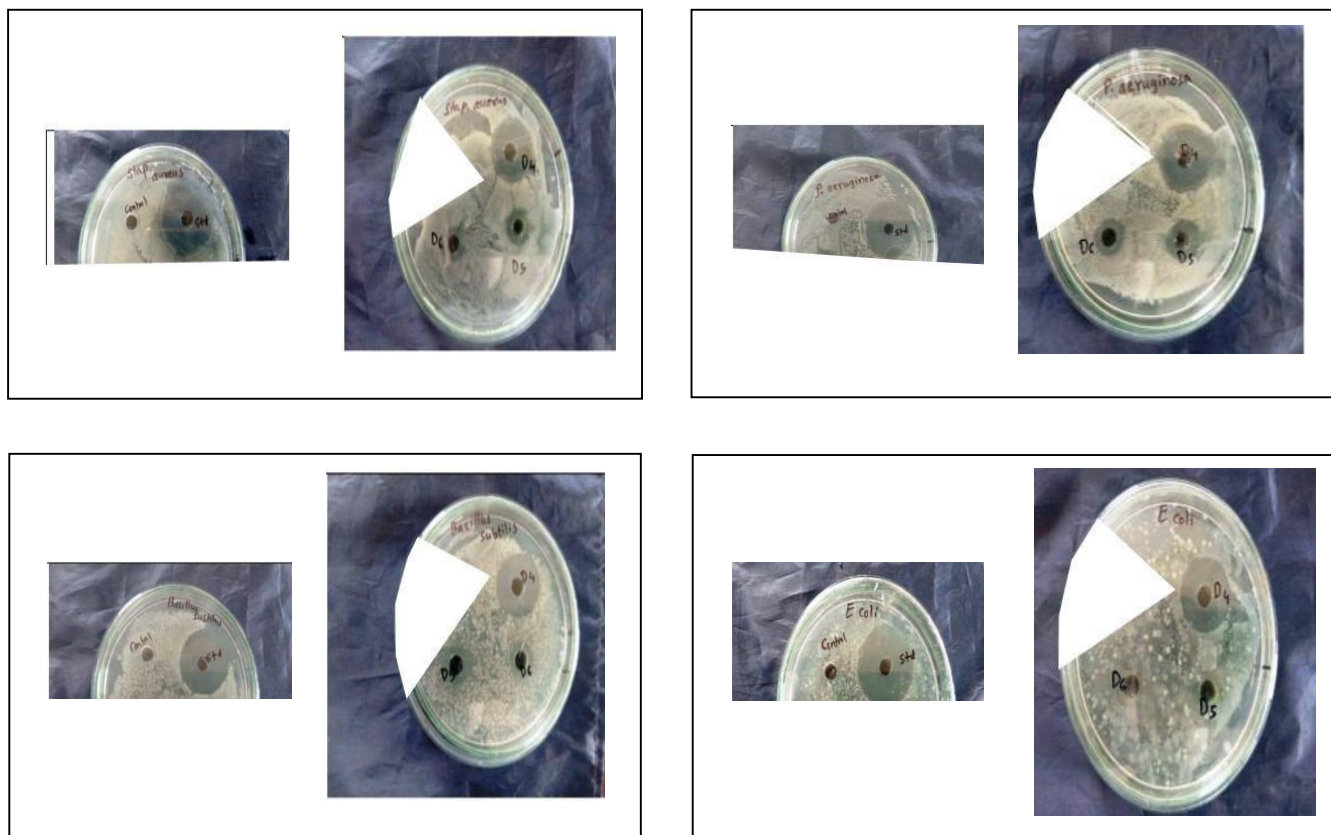
IV. CONCLUSION

During exploration it is observed that, the Mahur forest is rich in wild medicinal plants. They are used as traditional phytomedicines against health issues. This work yields important ethnomedicinal uses of noted plants i. e. traditional phytomedicines during the survey. *Wrightia tinctoria* proved the highest antibacterial activity against all tested bacteria followed by *S. emarginatus* and *C. purpurea* as mentioned in table no1. This type of study is   important for further drug extractions and pharmacological research. It is also helpful to draw the attentions of researchers for further advanced studies.

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An Application of Cloud Base Data Storage with Data Integrity

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ABSTRACT

Cloud computing has been envisioned as the de-facto solution to the rising storage costs of IT Enterprises. With the high costs of data storage devices as well as the rapid rate at which data is being generated it proves costly for enterprises or individual users to frequently update their hardware.Cloud storage moves the user's data to large data centres, which are remotely located, on which user does not have any control. However, this unique feature of the cloud poses many new security challenges which need to be clearly understood and resolved. One of the important concerns that need to be addressed is to assure the customer of the integrity i.e. correctness of the data in the cloud. This paper provides a scheme which gives a proof of data integrity in the cloud which the customer can employ to check the correctness of the data in the cloud.To support efficient handling of multiple auditing tasks, and further explore the technique of bilinear aggregate signature to extend that main result into a multi-user setting, where TPA can perform multiple auditing tasks simultaneously. Extensive security and performance analysis show that the proposed schemes are highly efficient and provably secure.

Keywords: aggregate, cloud, CSP, paradigm, TPA

I. INTRODUCTION

Cloud computing has been envisioned as the next-generation information technology (IT) architecture for enterprises, due to its long list of unprecedented advantages in the IT history: on-demand self-service, ubiquitous network access, location independent resource pooling, rapid resource elasticity, usage-based pricing and transference of risk.

One fundamental aspect of this paradigm shifting is that data are being centralized or outsourced to the cloud. From users' perspective, including both individuals and IT enterprises, storing data remotely to the cloud in a flexible on-demand manner brings appealing benefits: relief of the burden for storage management, universal data access with location independence, and avoidance of capital expenditure on hardware, software, and personnel maintenances, etc.,

Since cloud service providers (CSP) are separate administrative entities, data outsourcing is actually relinquishing user's ultimate control over the fate of their data. As a result, the correctness of the data in the cloud is being put at risk due to the following reasons. First of all, although the infrastructures under the cloud are much more powerful and reliable than personal computing devices, they are still facing the broad range of both internal and external threats for data integrity.

Second, there do exist various motivations for CSP to behave unfaithfully toward the cloud users regarding their outsourced data status.The task of allowing a third party auditor (TPA), on behalf of the cloud client, to verify the integrity of the dynamic data stored in the cloud. With the establishment of privacy-preserving public auditing, the TPA may concurrently handle multiple auditing upon different users' delegation. The individual auditing of these tasks for the TPA can be tedious and very inefficient.

II. STATEMENT OF THE PROBLEM

It ensures the integrity of data stored in the cloud computing. The introduction of TPA eliminates theinvolvement of the client through the auditing of whether the users data stored in the cloud is indeed intact, which canbe important in achieving economies of scale for Cloud Computing. The problem of providing simultaneous publicauditability and data dynamics for remote data integrity check in cloud storage.

To ensure cloud data storage security, it is critical to enable a TPA to evaluate the service quality from anobjective and independent perspective. Public audit ability also allows clients to delegate the integrity verification tasksto TPA while they themselves can be unreliable or not be able to commit necessary computation resources performingcontinuous verifications. Another major concern is on construction of verification protocols that can accommodatedynamic data files.

III. OBJECTIVE OF THE PAPER

Providing simultaneous public auditability and data dynamics for remote data integrity check in Cloud Computing. The paper construction is deliberately designed to meet these two important goals while efficiency beingkept closely in mind. To achieve efficient data dynamics, this work improves the existing proof of storage models bymanipulating the classic Merkle Hash Tree construction for block tag authentication.

To support efficient handling of multiple auditing tasks, this work further explore the technique of bilinearaggregate signature to extend the main result into a multiuser setting, where TPA can perform multiple auditing taskssimultaneously. Extensive security and performance analysis show that the proposed scheme is highly efficient andprovably secure.

It motivate the public auditing system of data storage security in Cloud Computing, and propose a protocol supporting for fully dynamic data operations, especially to support block insertion, which is missing in most existing schemes.

Extend the scheme to support scalable and efficient public auditing in Cloud Computing. In particular, thescheme achieves batch auditing where multiple delegated auditing tasks from different users can be performedsimultaneously by the TPA.

It proves the security of the proposed construction and justifies the performance of the scheme through concreteimplementation and comparisons with the state-of-the-art.

IV. LITREATURE REVIEW

➤ **"Data security in cloud computing and outsourced databases"**

Authors introduce a model for provable data possession (PDP) that allows a client that has stored data at an untrusted server to verify that the server possesses the original data without retrieving it. The model generates probabilistic proofs of possession by sampling random sets of blocks from the server, which drastically reduces I/O costs. The client maintains a constant amount of metadata to verify the proof. The challenge/response protocol transmits a small, constant amount of data, which minimizes network communication. The main method being used is homomorphic encryption. The method proposed here provides a cheating detection mechanism to verify computational results from previous algorithm iterations. Matrix vector multiplication is used to design a batch result verification mechanism.

➤ **"Enhancing data and privacy security in mobile cloud through quantum cryptography"**

Authors have proposed a security model for mobile cloud computing based on quantum cryptography. BB84 Quantum Key Distribution protocol and Near Field Communication (NFC) technology has been used. The working and key generation process is shown in the figure and table above.

➤ **"A comprehensive evaluation of cryptographic algorithms in cloud computing,"**

Authors have used three different algorithms namely AES (Advance Encryption Standard), RSA and MD5 (Message Digest 5) and mapped them. The experimental evaluation is done on different input sizes: 2kb, 5kb, 20kb, and 50kb. They found that AES and MD5 uses the least time and memory usage is also low.

➤ **"Efficient privacy preserving integrity checking model for cloud data storage security"**

Authors have proposed a scheme that is able to detect the corrupted data by an active adversary. Their auditing protocol uses digital signature algorithm in association with certificates. The proposed scheme is very much effective in privacy preserving.

➤ **"A short review on data security and privacy issues in cloud computing"**

Authors have presented a review and literature analysis of various papers about the data security. Authors have focused on issues like data confidentiality, data integrity, data availability and data privacy. Methods like provable data possession, third party auditing and public auditing have been used to provide data security. While using the above mentioned methods to provide data security various issues are found. To provide data integrity PDP and auditing schemes are used that lifts the issues like time complexity, data management, computational complexity and trust. To provide data confidentiality methods being used are encryption, layer based security and concealment of data. This give rise to issues like key count cost, time and computational complexity and large size data.

➤ **"Ensuring data storage security in cloud computing based on hybrid encryption schemes,"**

Authors have proposed a hybrid encryption scheme to secure the data at rest. This scheme provides a mechanism of securing the stored data. No specific methods are discussed by the authors to secure the data during data transfer. An algebraic summation method is used for key generation. An attacker can easily break the system if small prime numbers are used and it becomes slow and complex if large prime numbers are used.

➤ **"Scheme for ensuring data security on cloud data storage in a semi-trusted third party auditor,"**

The authors have used ECC and AES algorithms to secure data and prevent leakage in the cloud.AES encryption is used during auditing so that the third party auditor will not be able to get the original content of data.ECC encryption is used during the transmission of data and it prevents the attack like Man In The Middle (MITM)attack. The proposed scheme consists of four algorithms, namely, KeyGen, MetaGen, SigGen and

Verify Proof. KeyGen is run by the client and the third party auditor (TPA) to configure the scheme. Client uses MetaGen to generate metadata using SHA-256 during auditing so as to ensure data integrity. SigGen is used by the client to generate signature or tag for authentication. Verify Proof is used to generate a proof of data storage correctness by the TPA top verify the received file from the cloud server.

V.   REQUIREMENT ANALYSIS

Requirement Analysis and Input Output Specification

Requirement analysis is a software engineering task that bridges the gap between system level requirement engineering and software analysis design. The job of requirement analysis is to understand the specific requirement that must be achieved to build high quality software. The customer is too told at the same time what is technically possible and what plans he had to left under this software. Software requirement analysis is divided into five areas of efforts. These are the problem recognition, synthesis, modeling, specification, review. It is also important to review the 'software scope' in order to estimate the planning estimates.

Requirement analysis consists of two parts:

1. User Requirements
2. System Requirements
    a. Functional Requirements
    b. Non-functional Requirements

VI. TECHNOLOGY USED

- **Apache Tomcat**

ExerTran uses Apache Tomcat to dynamically generate web pages. The current system uses Tomcat 5. In a standard, or original, Tomcat installation, a web application, or *webapp* would be stored in the *webapps* directory of the Tomcat installation in a directory whose name defines the application's name. Instead of this the application directory is kept within the ExerTran directory structure and this directory is linked to Tomcat via an entry in the context file that is created for each coursework application: the context file tells Tomcat all about the application and this file is created and installed when a build of the coursework is performed.

- **Java Development Kit (JDK)**

The Java Development Kit (JDK) provides the foundation upon which all applications that are targeted toward the Java platform are built. The JDK includes a variety of tools and utilities that perform a variety of tasks, which include compiling source code into bytecode, packaging applications, spinning up Java virtual machines (JVMs) and managing the runtime environment of Java applications.

- **MySQL**

MySQL is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL). MySQL runs on virtually all platforms, including Linux, UNIX and Windows. Although it can be used in a wide range of applications, MySQL is most often associated with web applications and online publishing.

MySQL is an important component of an open source enterprise stack called LAMP. LAMP is a web development platform that uses Linux as the operating system, Apache as the web server, MySQL as the

relational database management system and PHP as the object-oriented scripting language. (Sometimes Perl or Python is used instead of PHP.)

Originally conceived by the Swedish company MySQL AB, MySQL was acquired by Sun Microsystems in 2008 and then by Oracle when it bought Sun in 2010. Developers can use MySQL under the GNU General Public License (GPL), but enterprises must obtain a commercial license from Oracle.

Today, MySQL is the RDBMS behind many of the top websites in the world and countless corporate and consumer-facing web-based applications, including Facebook, Twitter and YouTube.

- **Cloud Storage**

Cloud storage is a service model in which data is maintained, managed, backed up remotely and made available to users over a network (typically the Internet). Users generally pay for their cloud data storage on a per-consumption, monthly rate. Although the per-gigabyte cost has been radically driven down, cloud storage providers have added operating expenses that can make the technology more expensive than users bargained for. Cloud security continues to be a concern among users. Providers have tried to deal with those fears by building security capabilities, such as encryption and authentication, into their services.

There are three main cloud-based storage architecture models: public, private and hybrid.

Public cloud storage services provide a multi-tenant storage environment that is most suited for unstructured data. Data is stored in global data centers with storage data spread across multiple regions or continents. Customers generally pay on a per-use basis similar to the utility payment model. This market sector is dominated by Amazon Simple Storage Service (S3), Amazon Glacier for cold storage, Google Cloud Storage, Google Cloud Storage Nearline for cold data and Microsoft Azure.

Private cloud, or on-premises, storage services provide a dedicated environment protected behind an organization's firewall. Private clouds are appropriate for users who need customization and more control over their data.

Hybrid cloud is a mix of private cloud and third-party public cloud services with orchestrationbetween the platforms for management. The model offers businesses flexibility and more data deployment options. An organization might, for example, store actively used and structured data in an on-premises cloud, and unstructured and archival data in a public cloud. In recent years, a greater number of customers have adopted the hybrid cloud model. Despite its benefits, a hybrid cloud presents technical, business and management challenges. For example, private workloads must access and interact with public cloud storage providers, so compatibility and solid network connectivity are very important factors. An enterprise-level cloud storage system should be scalable to suit current needs, accessible from anywhere and application-agnostic.

Cloud storage is based on a virtualized infrastructure with accessible interfaces, near-instant elasticity and scalability, multi-tenancy and metered resources. Cloud-based data is stored in logical pools across disparate, commodity servers located on premises or in a data center managed by a third-party cloud provider. Using the RESTful API, an object storage protocol stores a file and its associated metadata as a single object and assigns it an ID number. When content needs to be retrieved, the user presents the ID to the system and the content is assembled with all its metadata, authentication and security.

In recent years, object storage vendors have added file system functions and capabilities to their object storage software and hardware largely because object storage was not being adopted fast enough. All backup applications use the object storage protocol, which is one of the reasons customers first tried backing up their data to the cloud.

VII.SYSTEM DESIGN

- **Proposed system**

Cloud Base Data Storage with Data Integrity paper is a web based application which is used for helping users to share their files and photograph on cloud to secure then. Also user can view and download whenever they want.

- **List of modular description**

There are 2 Modules are used in this paper like,

- User
- Admin

User

- New Registration: Create registration for new user.
- Update Login Details: Update all personal details and upload profile picture.
- Photos Sharing: Upload, View photos.
- Messaging: Write message to friends.
- Change Password: User can change the password.

Admin

The admin helps the admin to do work on database and handle the database of all the users also maintain the security of the database and files of the users.

VIII.   CASE DIAGRAM
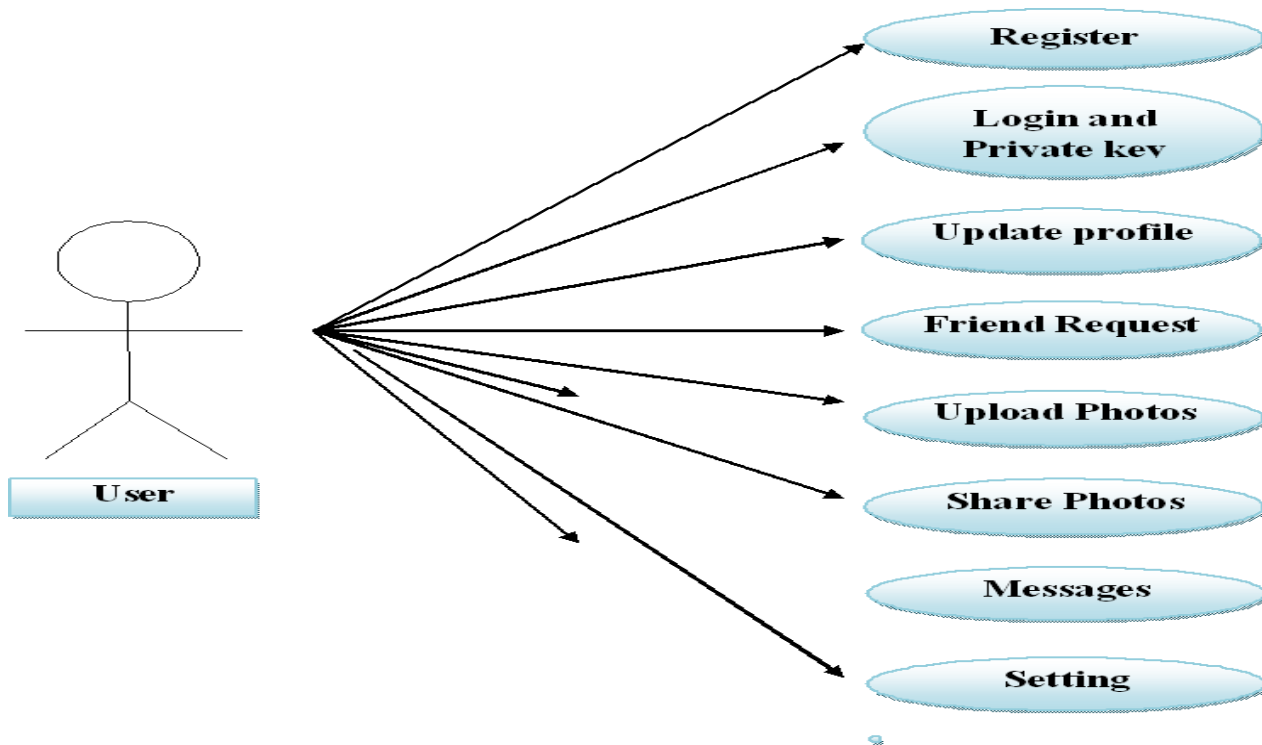
Figure 1: Case Diagram

IX. TEST SPECIFICATION

Testing is a process of executing a program with the interest of finding an error. A good test is one that has high probability of finding the yet undiscovered error. Testing should systematically uncover different classes of errors in a minimum amount of time with a minimum amount of efforts.

Two classes of inputs are provided to test the process

1. A software configuration that includes a software requirement specification, a design specification and source code.
2. A software configuration that includes a test plan and procedure, any testing tool and test cases and their expected results.

Testing is divided into several distinct operations.

Strategic approach of software testing

a. Unit Testing
b. Integration Testing
c. Validation Testing
d. Recovery Testing
e. Security Testing
f. Stress Testing
g. Black Box Testing
h. Test Data Output

X. RESULTS

Figure 2: Home Page
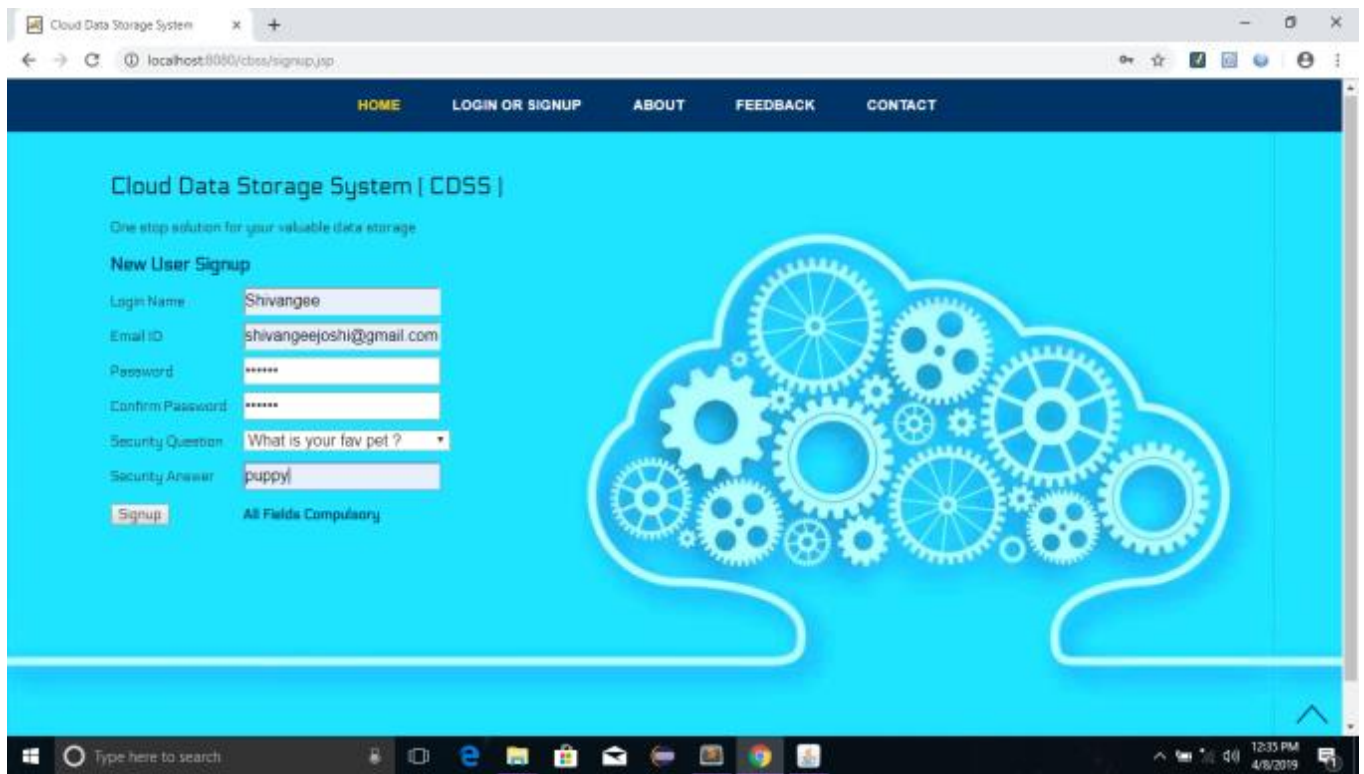
Figure 3: New Registration Page

Figure 4: User Login Page

Figure 5: Profile & Profile Picture Updating Page
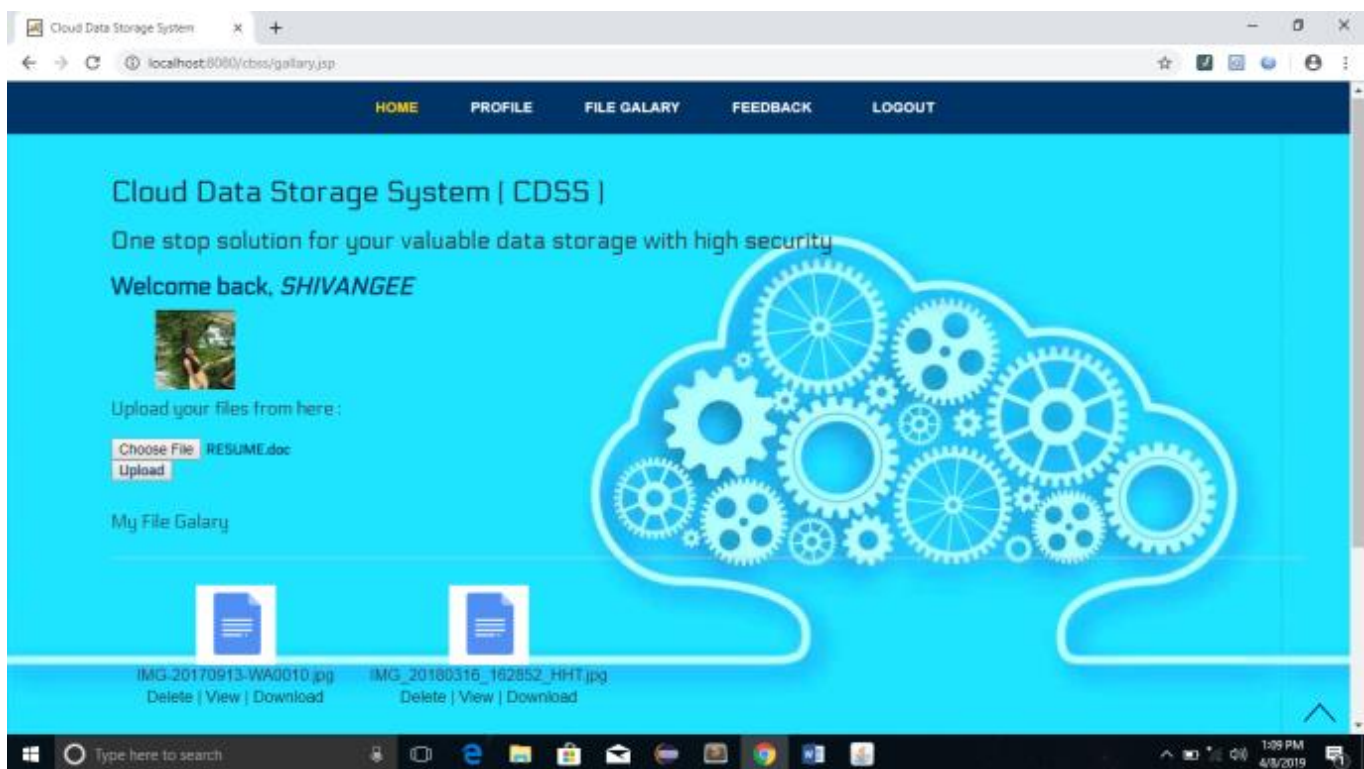
Figure 6: File Upload Page
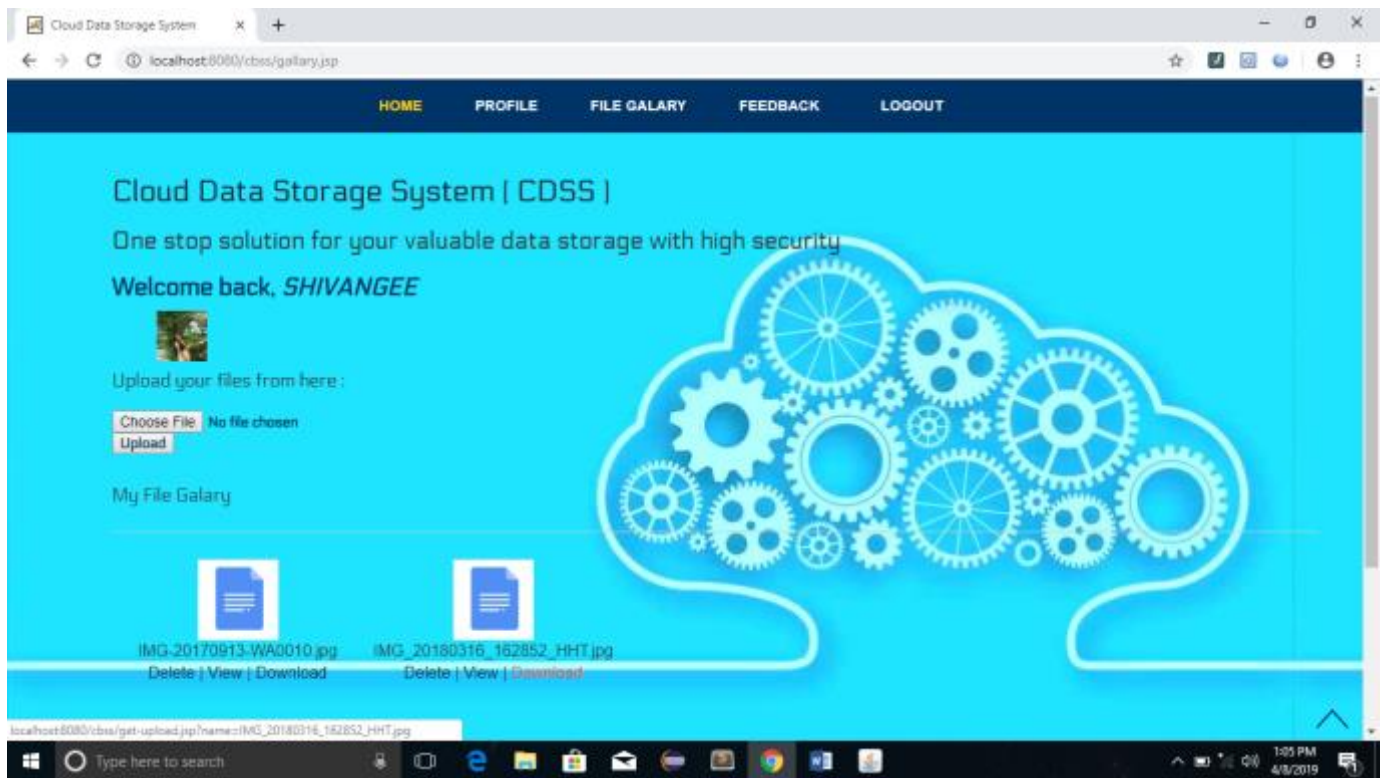
Figure 7: Selecting File Download
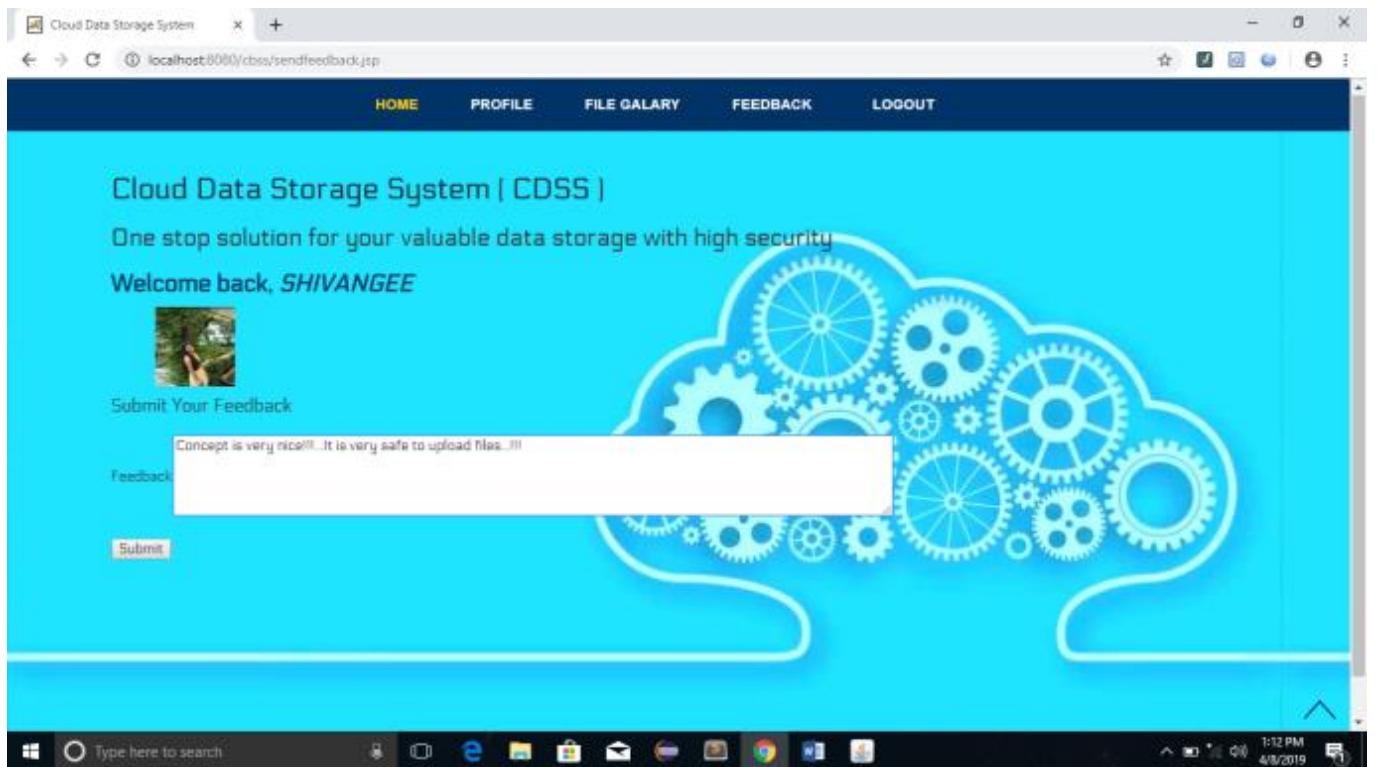
Figure 8: User Feedback Page

Figure 9: Change Password Page

XI. CONCLUSION

When a resource constrained mobile device stores its data on the cloud, there is always a big concern of whether the cloud service provider stores the files correctly or not. Security is the main concern in mobile cloud computing. The proposed mechanism provides a security mechanism for securing the data in mobile cloud computing with the help of DES algorithm and hash function.

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An Analysis of a Two Dimensional Continuous Non-Linear Dynamical Systems

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ABSTRACT

The prediction of physical phenomenon commonly observed in nature has been a tough challenge before the scientists and mathematicians all over the world. A careful mathematical modeling of such events has helped us to predict the physical state of a system given the current state. Non-linear dynamical systems like mass-spring systems, electrical circuits, chemical reactions, predator-prey models, Lorenz equations, damped driven pendulum, Van der Pol oscillator, and many more have been studied by many mathematicians and physicists and the strange behavior, so called chaos, has been observed in such systems. As an example of a chaotic dynamical system, we have considered the Duffing oscillator, which is an extremely forced and damped oscillator. In this paper, we have analyzed the dynamics of the Duffing oscillator. We have constructed the differential equation of the motion of the Duffing oscillator, obtained its critical points and classified them in reference to their stability. Also, we have obtained the solutions for different initial conditions and different ranges of parameters and concluded that the system exhibits chaotic behavior.

Keywords: Dynamical systems, nonlinear oscillators, equilibrium points , period doubling, chaos.

Mathematics Subject Classification: 37, 37C, 37C05, 37C10, 37C20, 37C25, 37C27, 37C35, 37D, 37G.

I. INTRODUCTION

First we will have a brief discussion and references about the general notions and definitions we will need to understand that come across this paper. Among many definitions of a dynamical system, we prefer a general definition as suggested by Edward R. Scheinerman. [10]

1.1 Dynamical System [10]:

A *dynamical system* is specified by a state vector $X \in R^n$, which is a list of numbers which may change as time progresses and a function $F : R^n \rightarrow R^n$ which describes how the system evolves over time. A continuous time dynamical systems has a state vector $X(t) \in R^n$ and we are given a function $F : R^n \rightarrow R^n$ which specifies how quickly each component of $X(t)$ is changing, *i.e.*, $X'(t) = F(X(t))$, or in brief notation, $X' = F(X)$, which is a system of differential equations.

It is well known that many physical phenomena can be mathematically modeled in terms of differential equations and the difference equations and the long term effects can be studied over time. Differential equations can be used to describe the motions of objects like satellites, water molecules in a stream, waves on strings and surfaces, etc. In this section we will take a review of some basic terminology associated with a system of differential equations.

1.2 System of Differential Equations [9]:

Let $x_1, x_2, \ldots, x_n$ be differentiable functions of a variable t, usually called as time, on an interval I of the real numbers. Let $f_1, f_2, \ldots, f_n$ be all functions of $x_1, x_2, \ldots, x_n$ and t. Then the set of n differential equations

$$\frac{dx_1}{dt} = f_1(x_1, x_2, \ldots, x_n, t),$$

$$\frac{dx_2}{dt} = f_2(x_1, x_2, \ldots, x_n, t),$$

.

. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ (1)

.

$$\frac{dx_n}{dt} = f_n(x_1, x_2, \ldots, x_n, t)$$

is called as a *system of differential equations*. This system can also be expressed as $X' = F(X, t)$, where

$$X = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}, X' = \begin{bmatrix} x_1' \\ x_2' \\ \vdots \\ x_n' \end{bmatrix} \text{ and } F = (f_1, f_2, \ldots, f_n).$$

The system $X' = F(X, t)$, where F can depend on the independent variable t is called as a non-autonomous system. Any non-autonomous system (1) with $X \in R^n$ can be written as an autonomous system

$$X' = F(X) \qquad\qquad\qquad\qquad\qquad\qquad\qquad (2)$$

with $X \in R^{n+1}$ simply by letting $x_{n+1} = t$ and $x_{n+1}' = 1$. The fundamental theory for the systems (1) and (2) does not differ significantly.

1.3 Phase-Plane Analysis[11]:

If $X: I \to R^n$ is defined by $X(t) = \begin{bmatrix} x_1(t) \\ x_2(t) \\ \vdots \\ x_n(t) \end{bmatrix}$, and if $X(t)$ satisfies the system (1), then $X(t)$ is said to be a solution

of the system (1). If $t_0 \in R$ and X is s solution for all $t \geq t_0$, then $X(t_0)$ is an initial condition of a solution X. As $x_1, x_2, \ldots, x_n$ are functions of the variable t, it follows that as t increases, $X(t)$ traces a curve in R^n called as the *trajectory* or the *orbit* and in this case, the space R^n is called as the *phase space* of the system. The phase space is completely filled with trajectories since each point $X(t_0)$ can serve as an initial point. The system $X' = F(X)$ is said to be a *linear system* if the function F is linear. In this case, the system can be expressed as $X' = A.X$, where A is an $n \times n$ matrix. The function F is also called as a *vector field*. The vector field always dictates the velocity vector X' for each X. A picture which shows all qualitatively different trajectories of the system is called as a *phase portrait*. A second order differential equation which can be expressed as a system of two differential equations can be treated as a vector field on a plane and hence called as a *phase plane*. The general form of a vector field over the plane is

$$x_1{}' = f_1(x_1, x_2),$$
$$x_2{}' = f_2(x_1, x_2),$$

which can be compactly written in vector notations as $X' = F(X)$, where $X = (x_1, x_2)$ and $F(X) = (f_1(X), f_2(X))$.

For non-linear systems, it is quite difficult to obtain the trajectories by analytical methods and though the trajectories are obtained by explicit formulas, they are too complicated to provide some information about the solution. Hence qualitative behaviors of the trajectories obtained by numerical solution methods are often studied. To obtain a phase portrait, we plot the variable x_1 against the variable x_2 and study the qualitative behavior of the solution.

1.4 Fixed Point (or Stationary Point or Equilibrium Point or Critical Point) [2]

A *fixed* point or an *equilibrium* point of a system of differential equations is a constant solution, that is, a solution X such that $X(t) = X(t_0)$ for all t.

If X is an equilibrium point, then we identify the equilibrium point with the vector $X(t_0)$. From the definition, it is clear that X is a fixed point of the system (1) if $X'(t) = 0$.

1.5 Classification of Fixed Points Depending Upon Their Stability [1]

Let X^* be a fixed point of a system $X' = F(X)$.

(i) We say that X^* is an attracting or stable fixed point if there is a $\delta > 0$ such that $\lim_{t \to \infty} X(t) = X^*$ whenever $\| X(0) - X^* \| < \delta$.

This definition implies that any trajectory that starts near X^* within a distance δ is guaranteed to converge to X^* eventually.

(ii) X^* is said to be Liapunov stable if for each $\epsilon > 0$, there is a $\delta > 0$ such that $\| X(t) - X^* \| < \epsilon$ whenever $t \geq 0$ and $\| X(0) - X^* \| < \delta$.

Thus trajectories that start near X^* within δ remain within ϵ for all positive time. Liapunov stability requires that the nearby trajectories stay close for all the time.

(iii) The fixed point X^* is said to be asymptotically stable if it is both attracting and Liapunov stable.

II. THE DUFFING OSCILLATOR

In the field of nonlinear equations, van der Pol equation[5] is extensively studied. The equation is a mathematical modeling of the oscillating charge of the van der Pol oscillator. A strange dynamical behavior is observed in nonlinear oscillators with varying parameters. In this section, we will study the Duffing oscillator. Consider a periodically driven pendulum as shown in the figure 1.
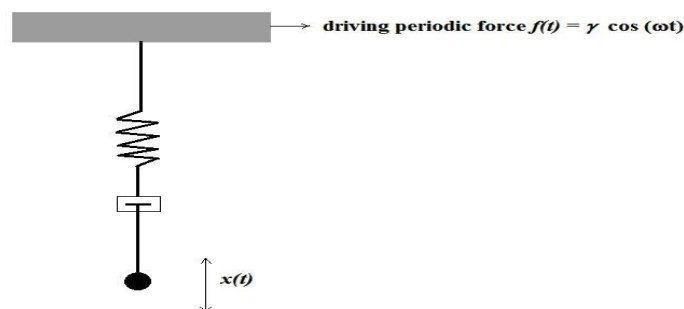
Figure 1.

Let $x(t)$ denote the displacement at time t from the rest position of the bob of the pendulum and let $\frac{dx}{dt} = x'(t)$ denote the speed. Let $f(t) = \gamma \cos(\omega t)$ represent the driving periodic force, where γ is the driving amplitude and ω is the frequency of the driving force. Let q denote the damping coefficient and assume that the pendulum has a cubic restoring force. Then the Duffing equation representing the motion of the oscillator is given by

$$\frac{d^2x}{dt^2} + q\frac{dx}{dt} + (x^3 - x) = \gamma \cos(\omega t) \tag{3}$$

A wide range of oscillators of this type are extensively studied so far and their behavior in terms of the nature of the solutions, their stability, chaotic nature and its control, etc. is examined. The authors Kulkarni P. R. and Borkar V. C.[8] have analyzed the oscillations in a damped driven pendulum and proved the chaotic nature of the pendulum oscillations. In this paper, we will study the solutions of the equation (3) by varying the damping amplitude γ while keeping the other parameters q and ω constants. For the sake of convenience we will choose $q = 0.3$ and $\omega = 1.25$. Despite of the equation (3) being two dimensional, it is not linear as it contains the periodic term $\cos(\omega t)$. Such a periodically forced non-autonomous differential equation can be represented by an autonomous differential equation by the introduction of a third variable $\theta = \omega t$. In this case, equation (3) can be expressed as a system of three first order differential equations given by $\frac{d\theta}{dt} = \omega, \frac{dx}{dt} = y,$
$\frac{dy}{dt} = -ky + x(1 - x^2) + \gamma \cos(\omega t).$

The theory for autonomous and non-autonomous systems with reference to the nature of the solutions and their long term effect, the stability of fixed points, the nature of the trajectories and the phase portraits, etc. does not differ on a large scale. We will consider only the non-autonomous system.

Defining $x(t) = x_1(t), \frac{dx}{dt} = x_1' = x_2 = y$, equation (3) can be expressed as a system of differential equations

$$x_1' = x_2 \tag{4}$$
$$x_2' = -0.3x_2 + x_1 - x_1^3 + \gamma \cos(1.25t) \tag{5}$$

This system can be expressed in the form $X'(t) = F(X, t)$, where

$$X'(t) = \begin{bmatrix} f_1(x_1, x_2, t) \\ f_2(x_1, x_2, t) \end{bmatrix} = \begin{bmatrix} x_2 \\ (1 - x_1^2)x_1 - 0.3x_2 + \gamma \cos(1.25t) \end{bmatrix} \tag{6}$$

The system (6) is a nonlinear nonautonomous system.

Taking $\gamma = 0$, the system of equations (4)-(5) can be expressed as

$$X'(t) = F(X) = \begin{bmatrix} f_1(x_1, x_2) \\ f_2(x_1, x_2) \end{bmatrix}, \tag{7}$$

where $f_1(x_1, x_2) = x_2$ and $f_2(x_1, x_2) = (1 - x_1^2)x_1 - 0.3x_2$.

Solving the equation $X'(t) = 0$ we get three equilibrium points $O = (0,0)$, $P = (1,0)$ and $Q = (-1,0)$. We will verify the nature of these equilibrium points in reference to their stability. The derivative $DF(X)$ of the function F at $X = (x_1, x_2)$ is given by

$$DF(X) = \begin{bmatrix} \frac{\partial f_1}{\partial x_1} & \frac{\partial f_1}{\partial x_2} \\ \frac{\partial f_2}{\partial x_1} & \frac{\partial f_2}{\partial x_2} \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 1 - 3x_1^2 & -0.3 \end{bmatrix}$$

The linearized form of the system near the origin $O = (0,0)$ takes the form $X' = AX$, where $A = DF(O) = \begin{bmatrix} 0 & 1 \\ 1 & -0.3 \end{bmatrix}$. The eigenvalues of the matrix A are -1.1611 and 0.8611. Since the eigenvalues are real with

opposite signs, the equilibrium point $O = (0,0)$ is a saddle point of the linearized system $X' = AX$. Similarly the matrices $DF(P) = DF(Q) = \begin{bmatrix} 0 & 1 \\ -2 & -0.3 \end{bmatrix}$ have eigenvalues $-0.15 \pm 1.40i$. As all the eigenvalues of both the matrices have negative real part, it follows that the equilibrium points $P = (1,0)$ and $Q = (-1,0)$ are both sinks for the linearized system $X' = AX$. As the fundamental theory for a linearized and a nonlinear system are qualitatively the same, by the Hartman-Grobman theorem, the origin $O = (0,0)$ is a saddle point and the points P and Q are the sinks for the system (7).

The solutions for different initial conditions near the origin is as shown in Figure 2 and the phase plane portrait is as shown in the Figure 3. It can be observed that the orbits near the origin are moving away from the origin, in fact they are converging to the other two fixed points $P = (1,0)$ and $Q = (-1,0)$.
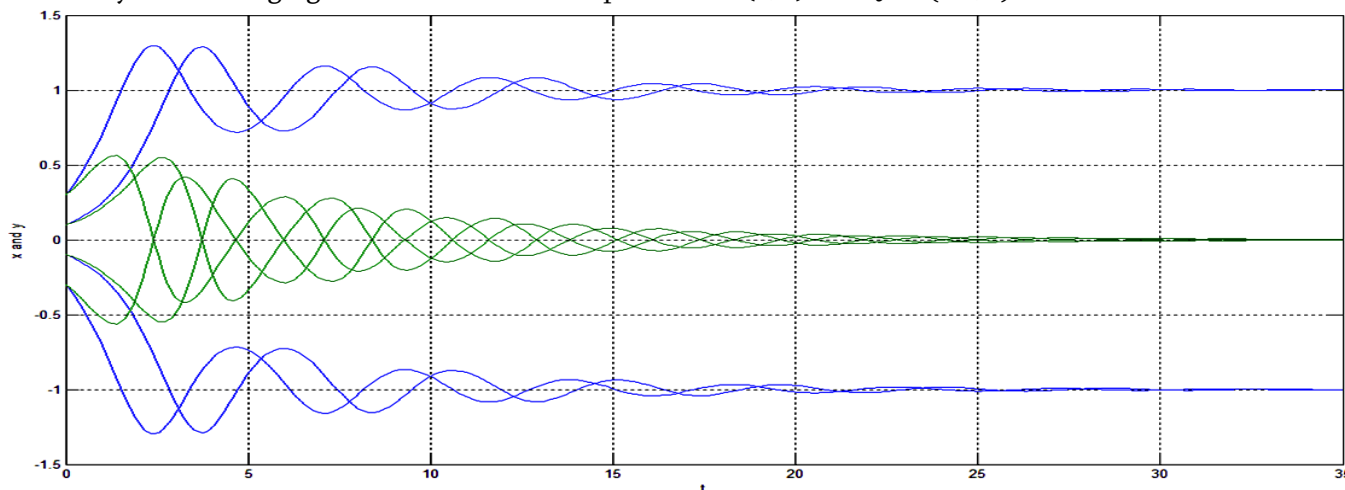
Figure 3. Trajectories starting at $(x,y) = (\pm 0.1, \pm 0.1)$ and $(x,y) = (\pm 0.3, \pm 0.3)$
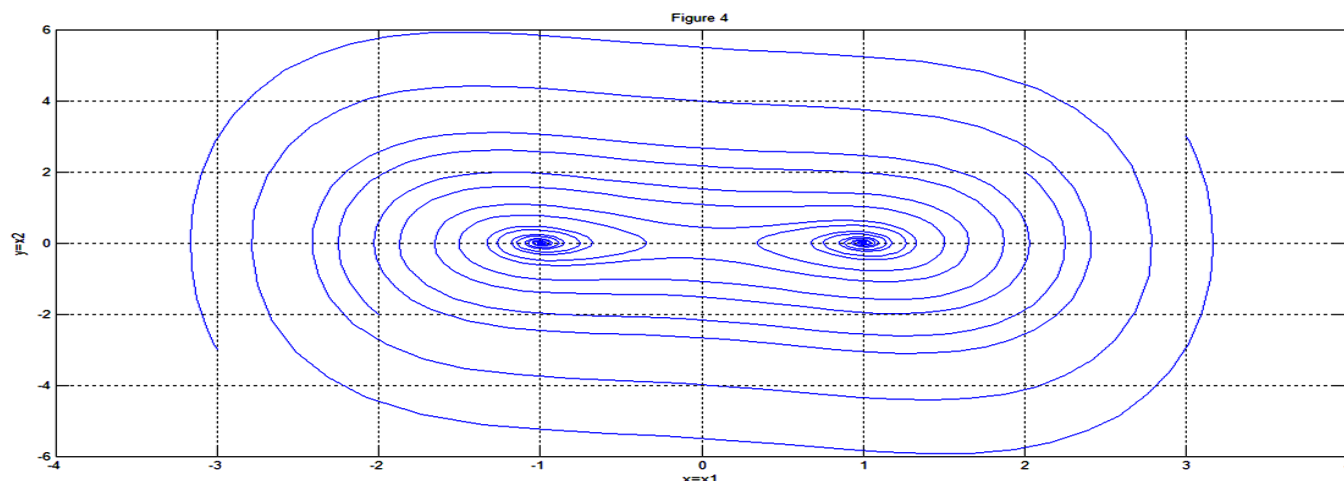
Figure 4. Phase plane portrait with initial conditions $(x,y) = (2, 2), (-2, -2), (3, 3), (-3, -3)$

In search of chaos, let us keep varying γ. We will now study the behavior of the system for $\gamma = 0.2$. In this case, solving the system of equations (4)-(5), after the initial transient is settled, it can be observed from Figure 4 and Figure 5 that the solution curves are harmonic with period equal to that of the driven force $i.e. \frac{2\pi}{\omega} \cong 5.026$. Figure 4 and Figure 5 are obtained by using different mathematical softwares.
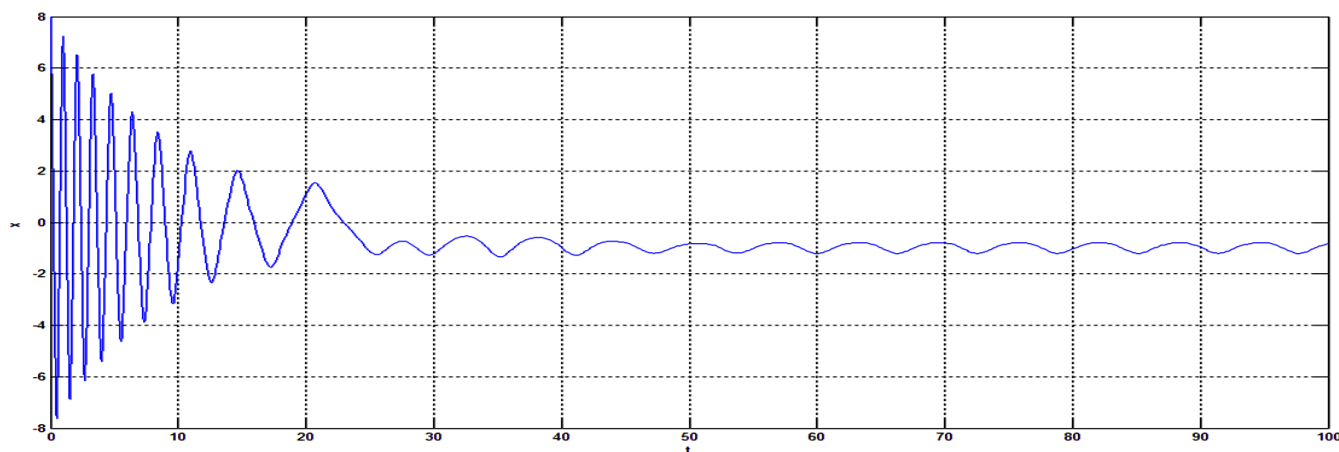
Figure 4: period-one harmonic solution for $\gamma = 0.2$
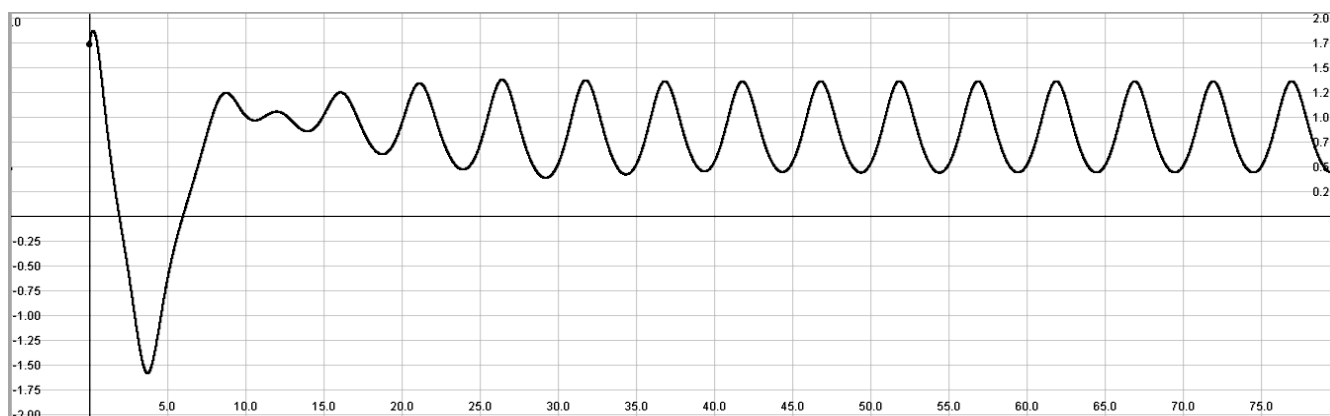
Figure 5: t v/s $x(t)$

For non-linear systems, sometimes exact solutions may not exist, and so we use numerical methods to obtain the solutions. It is quite difficult to obtain the trajectories by analytical methods, and though the trajectories are obtained by explicit formulas, they are too complicated to provide any kind of information about the solution itself. Hence qualitative behaviors of the trajectories obtained by numerical solution methods are often studied. To study the qualitative behavior of the solution, we obtain a phase portrait in which we plot the variable x_1 against the variable x_2 as the time t varies. The phase portrait and the vector field for $\gamma = 0.2, x_1 = 1.7, x_2 = 1.2$ is as shown in the Figure 6. The period-one harmonic solution can be verified by means of a closed curve in the phase portrait.
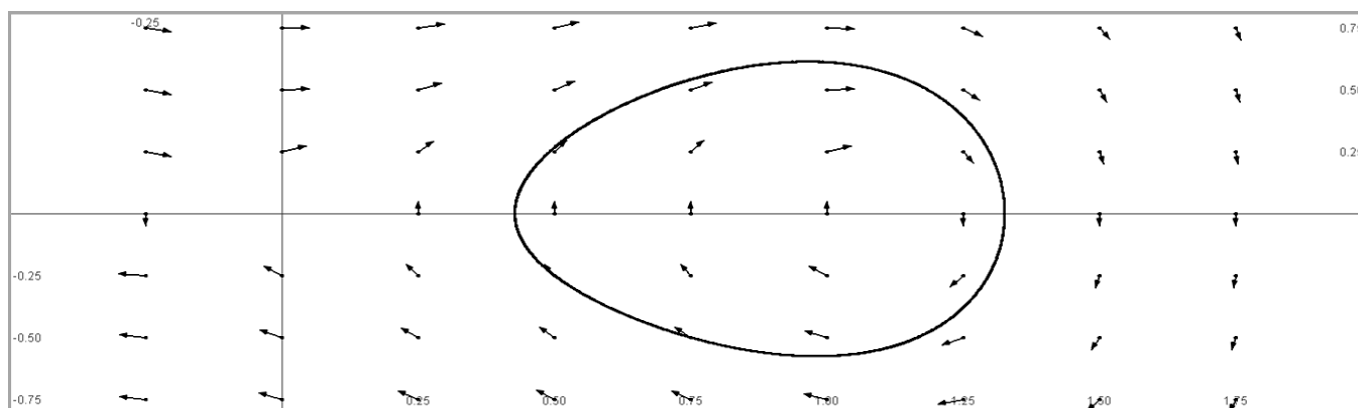
Figure 6: The phase portrait and the vector field for $\gamma = 0.2, x_1 = 1.7, x_2 = 1.2$

When we plot solution curves of some nonlinear system, the trajectories may cross each other and it becomes very difficult to draw any conclusions from them. Poincare sections of the phase portraits are often used in such situations. Poincare sections help us to observe the flow under consideration is a better way. The Poincare section in this case is as shown in the Figure 6a. A single point can be observed in the Poincare section.
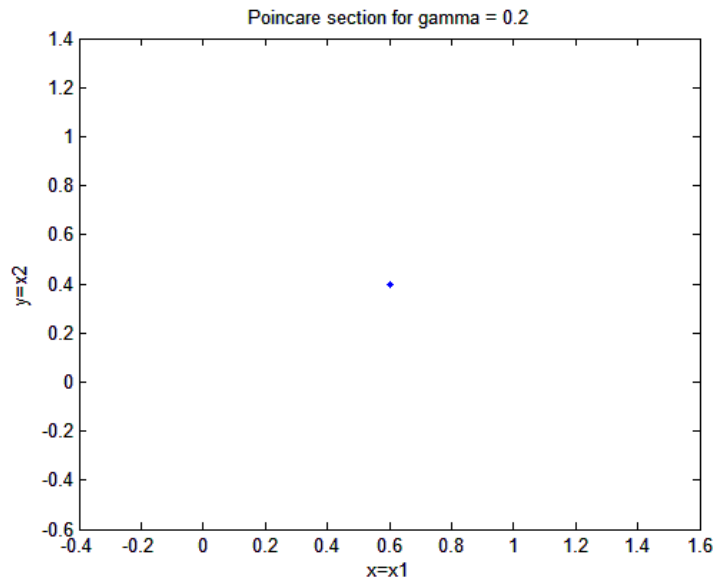
Figure 6a

For $\gamma = 0.3$, solutions harmonic with period equal twice the period of the driven force $i.e. 2. \frac{2\pi}{\omega} \cong 10.0531$ as can be observed from the Figure 7. A period two cycle can be observed in the phase portrait in this case as can be observed from the Figure 8. Note that the two trajectories crosses itself. The Figure 8a shows the Poincare section in which two points can be observed.
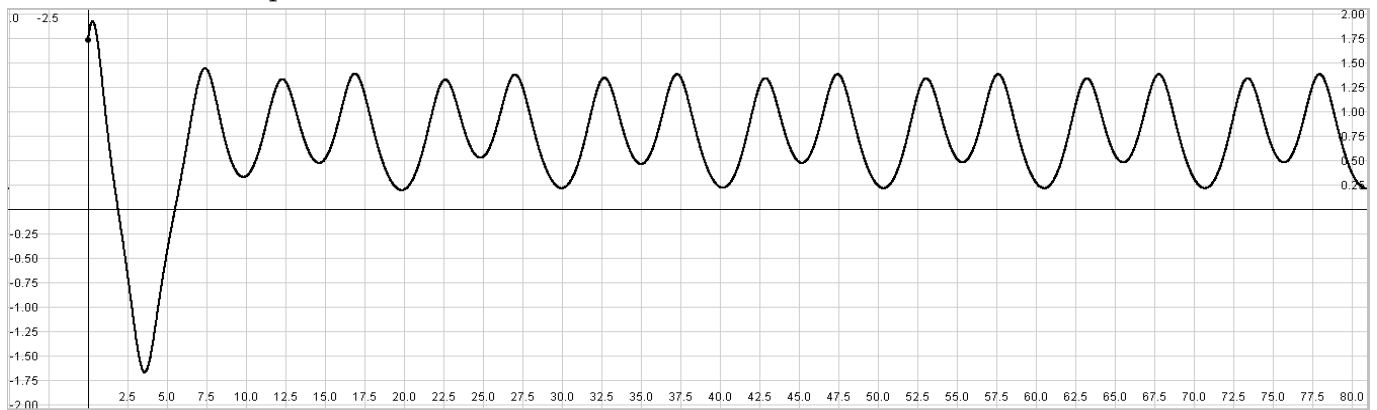
Figure 7: t v/s $x(t)$
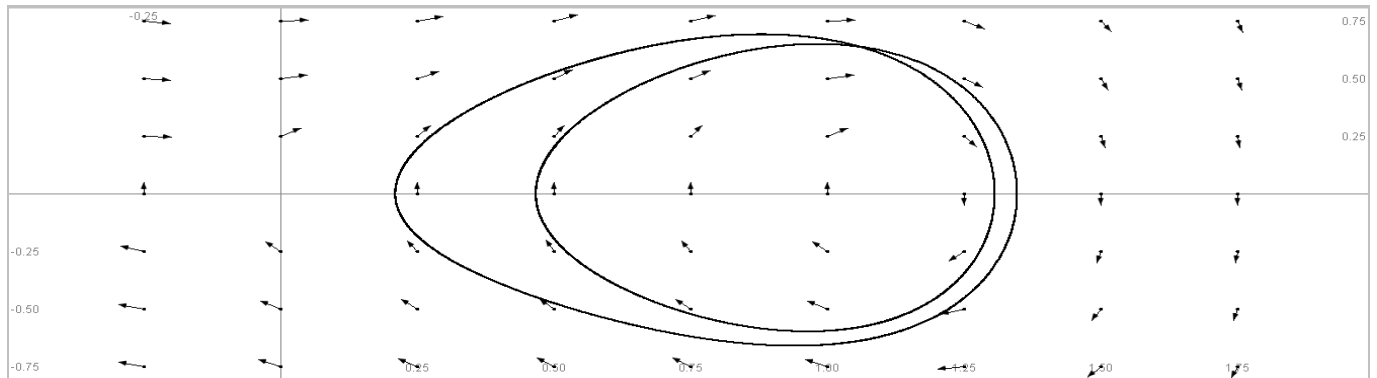
Figure 8: The phase portrait and the vector field for $\gamma = 0.3, x_1 = 1.7, x_2 = 1.2$

Poincare section for gamma = 0.3
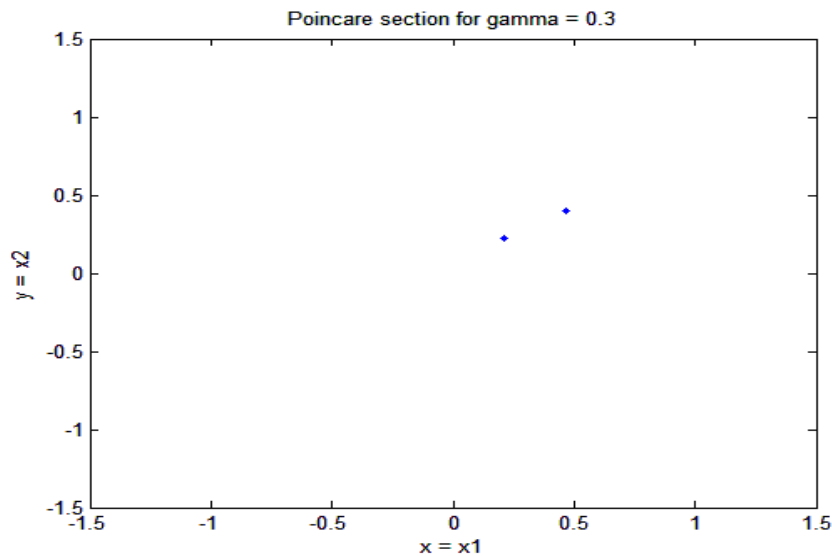
Figure 8a

Considering the value $\gamma = 0.31$, a period four cycle of period $4.\frac{2\pi}{\omega} \cong 20.106$ is observed as can be verified from the Figure 9. The phase portrait is shown by the Figure 10, where we can see a period four loop. Figure 11 shows the zoom in picture in this case. The Figure 11a shows the Poincare section in which four points can be observed.
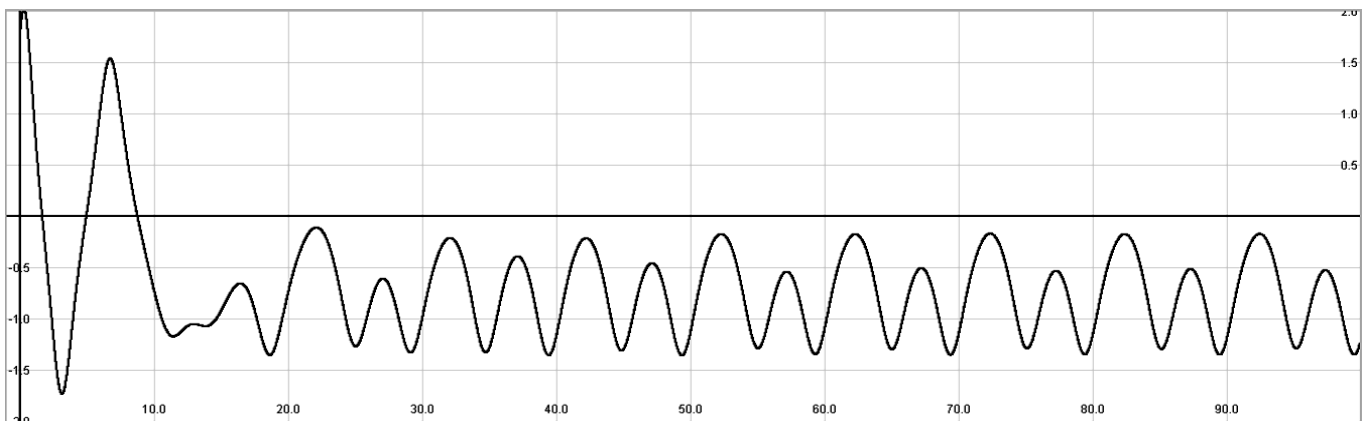
Figure 9: time t v/s x for $\gamma = 0.31, x_1 = 1.8, x_2 = 1.5$
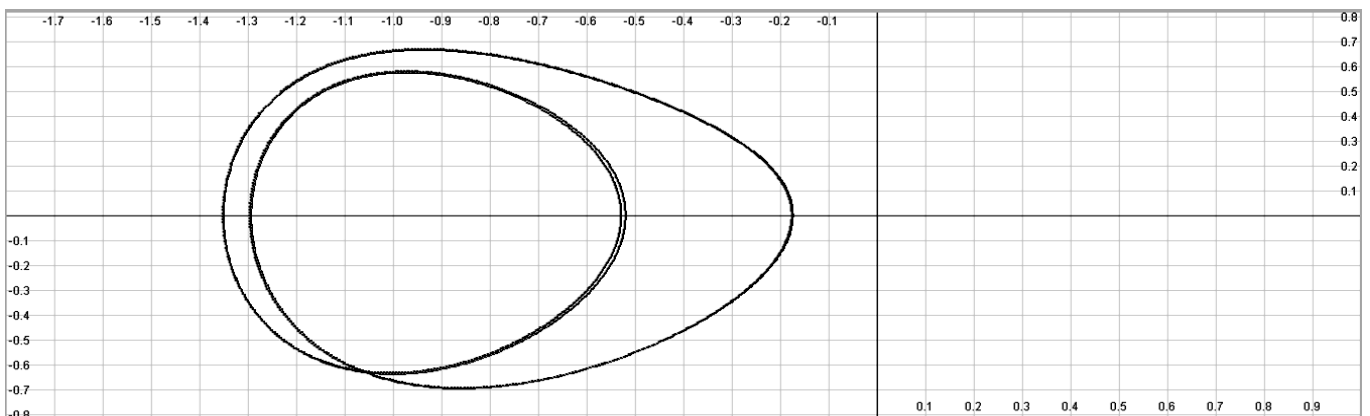
Figure 10: The phase portrait and the vector field for $\gamma = 0.31, x_1 = 1.8, x_2 = 1.5$
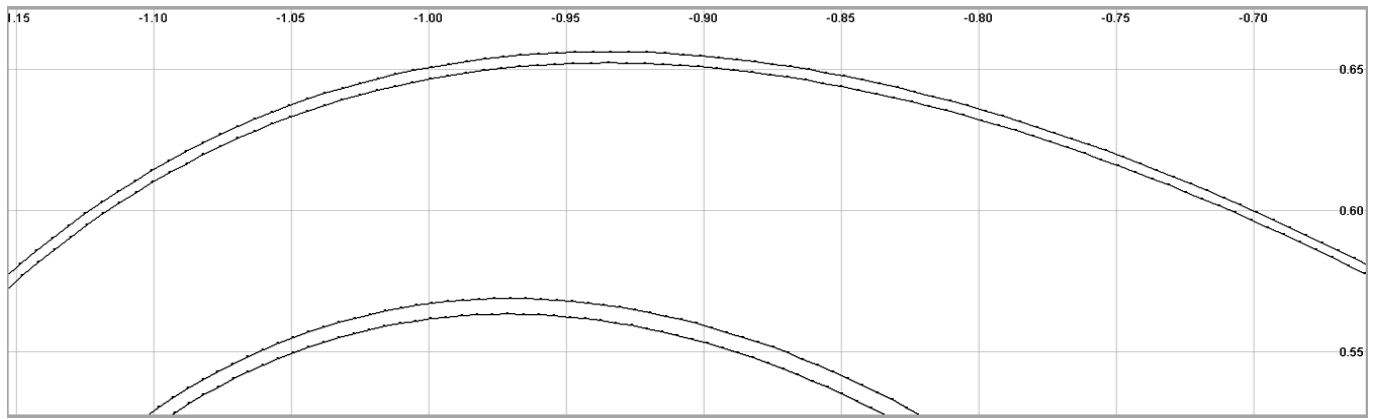
Figure 11: Zoom in on the phase portrait for $\gamma = 0.31, x_1 = 1.8, x_2 = 1.5$
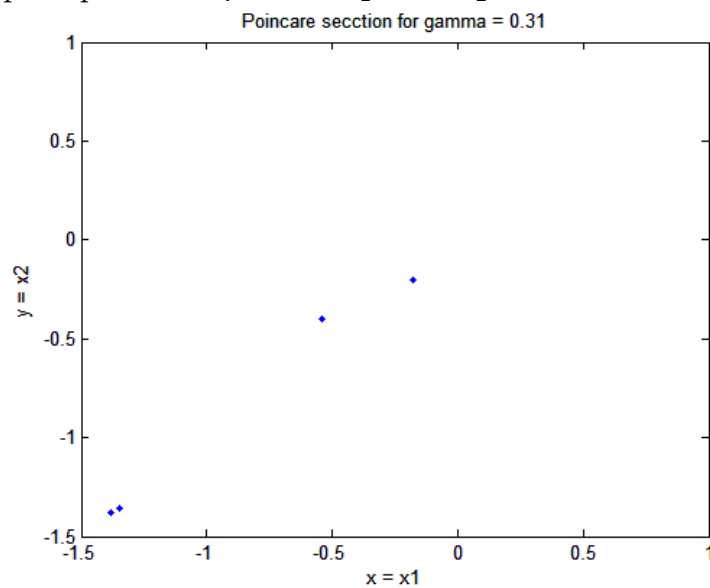
III. RESULTS

The term *chaos*[6,7] is used when there is predictability in a system, but a kind of randomness or uncertainty for certain parameter ranges also. Chaotic behavior is quite observed in so many nonlinear systems representing a natural phenomenon. There are many definitions of chaos given by different authors including measure theoretic notions, topological concepts, etc. However, in accordance with the definition given by Devaney R. L. [3], the concepts involved in its definition are sensitive dependence on initial conditions, topological transitivity, and the denseness of the periodic orbits. One of the major characteristics of a chaotic system is the so called period doubling phenomenon[8] for certain range of the parameter. Note that for $\gamma = 0$, the solution curves are quite predictable. There are three equilibrium points and all the trajectories converge to only two equilibrium points $P = (1, 0)$ and $Q = (-1, 0)$ without crossings between them. For $\gamma = 0.2$, solution curves are harmonic with period equal to that of the driven force *i.e.* $\frac{2\pi}{\omega}$, $\gamma = 0.3$, solutions harmonic with period equal twice the period of the driven force *i.e.* $2.\frac{2\pi}{\omega}$. Thus there is a period doubling of the cycles. For $\gamma = 0.31$, there is a period four cycle, again a period doubling! As we go on increasing the values of the parameter γ, this period doubling phenomenon is not observed and the system enters in the chaotic regime. For $\gamma = 0.5$, the system becomes chaotic and a solution curve intersects itself many times. This can be observed from the phase portrait for as shown by Figure 12. However, this phase portrait is not the actual portrait as the system is

nonautonomous. The actual phase portrait should be three dimensional depending on (x, y, t) co-ordinates and not only upon (x, y) co-ordinates. In fact, the Figure 12 is a projection of the actual phase portrait on the xy-plane.
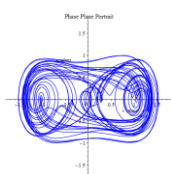
Figure 12: Phase portrait of the chaotic system

The Poincare section of the phase portrait is as shown in the following Figure 13. This section has fractal dimension which is a cross section of the strange attractor.
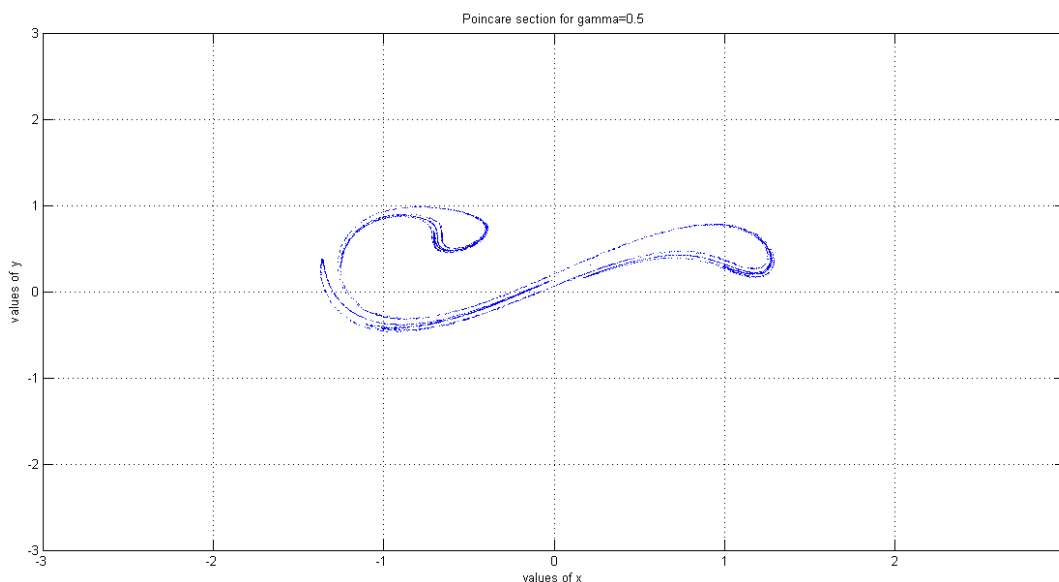
Figure 13: Poincare section of the strange attractor

The period doubling phenomenon can also be observed by means of the bifurcation diagram. By means of a bifurcation diagram, we can observe the values of the parameter γ at which the dynamical system bifurcates. This kind of diagram enables us to understand the behavior of the system at higher iterates at arbitrary initial conditions for all values of the parameter. In such a diagram, the values of the parameter γ are plotted on the horizontal axis and the higher iterates are plotted on the vertical axis. The bifurcation diagram of the system of equations (4)-(5) is as shown in the Figure 14.
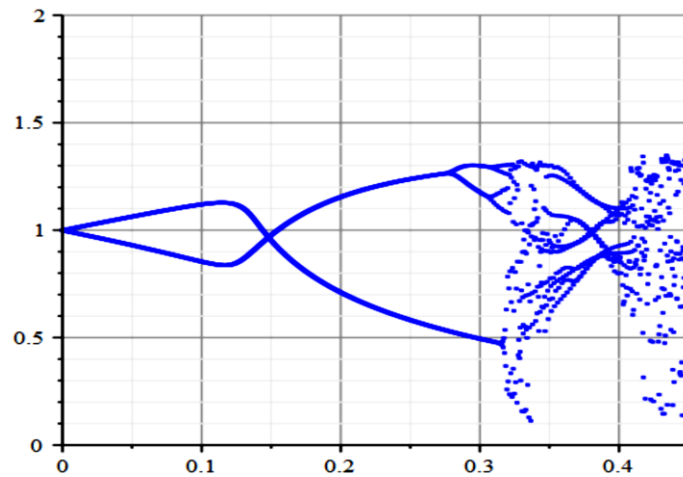
Figure 14: Bifurcation diagram

IV. CONCLUSIONS

From the bifurcation diagram, we can observe that there is a period-1 harmonic solution in the approximate range $0 < \gamma < 0.27$ and a period-2 harmonic solution in the approximate range $0.27 < \gamma < 0.32$. As γ increases further, an unpredictable behavior and then again, a periodic behavior is observed. It is very difficult to have predictions about the state of the system at a particular instant in case of such dynamical systems in chaotic region as there is a sensitive dependence on the initial conditions.

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Study of Physicochemical Parameters of Drinking Water from Degloor Tehesil, District-Nanded (MS)

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ABSTRACT

As water plays essential role in human life, so it is very important to know the quality of water. In view of this, we have collected 10 drinking water sample from different villages of Degloor tahesil, district Nanded (MS), having different sources such as bore well, well, River, ponds, hand pump to study it's suitability for drinking purpose. Physico-chemical Parameter such as Temperature (T), P^H, Total Dissolved Solid (TDS), Total Hardness (TH), of drinking water was determined. Result shows that most of the parameters are within permissible limit given by WHO, but some samples requires some purification process.

Keywords: Physico-chemical Parameter, Water Samples, Water quality standards.

I. INTRODUCTION

Water covers 71% of the Earth's surface. It is predictable that 96.54% of earth water is found in seas, ocean, bays. 1.69% is groundwater, and 1.74 % is present in glaciers and ice caps in the Arctic and Antarctic region and 0.76 % is fresh water. only 3% freshwater is available on earth and about 1.2 percent can be used as drinking water [1]. Most of the diseases are water born like cholera, diarrhea, typhoid, amebiasis, hepatitis, gastroenteritis, giardiasis, campylobacteriosis, scabies. 38 million Indians suffer from above said waterborne diseases every year. water is one of the most important, abundant & precious compound on earth, although statistics, the WHO reports that approximately 36% of urban & 65% of rural were without access to safe drinking water [2,3,]. Ground water is the major source of drinking water. Quality of drinking water affected day by day due to various man made activities like uses of insecticides, fungicides, herbicides, agriculture fertilizers, production of chemicals, industrial effects, domestic sewage, urbanization and natural activities like acid rain, climate change, weathering of rock, floods, droughts, earthquakes . As various type of pollutant like harmful chemicals, toxic metal like mercury, lead & several other poisonous and non poisonous substances are dissolved in ground water [4,5]. The concentration of particular dissolved substances is useful for human body but in specific range. In this research paper an attempt has been made to estimate Physico-chemical Parameter of drinking water having different sources & to compare the observed value with standard value of WHO.

II. MATERIAL & METHOD

Water sample were collected in clean and dry polythene bottle of one liter capacity. Sample are collected from different sources like bore well, well, hand pump, river Ponds. P^H, conductance, TDS, salinity are measured by potable water analysis kit and TH is determined by complexometric titration. Color, odour, temperature were determined at the point of sample collection. Observed value for different parameter has been compared with standard specified by world health organization (WHO).(Table no.1)

Table no 1. Different water sources and their observed physiochemical parameter

Name of Region	Sample No. & Source	P^H	Total Dissolved Solid(mg/lit)	Total Hardness(mg/lit)	Temperature ^oC
	STANDARD WHO	6.5 to 8.5	2000	600	--
Lakkha	S_1 (Bore Well)	7.0	510	475	25
	S_2 (Manyad River)	7.1	615	390	25.5
Ibrahimpur	S_3 (Bore Well^1)	7.3	545	340	23.9
	S_4 (Bore Well^2)	7.9	570	520	24.0
Eklara	S_5(Bore Well)	7.5	480	455	24.5
	S_6(ponds)	6.9	610	660	23.5
Vannali	S_7(Bore Well)	7.3	750	690	25.5
	S_8(hand pump)	7.3	830	680	24.8
Sugaon	S_9(Bore Well)	8.0	470	530	24
Degloor	S_{10} (Lendi river)	6.6	680	575	23

Graphical Representation of various water sources and their observed physiochemical parameters
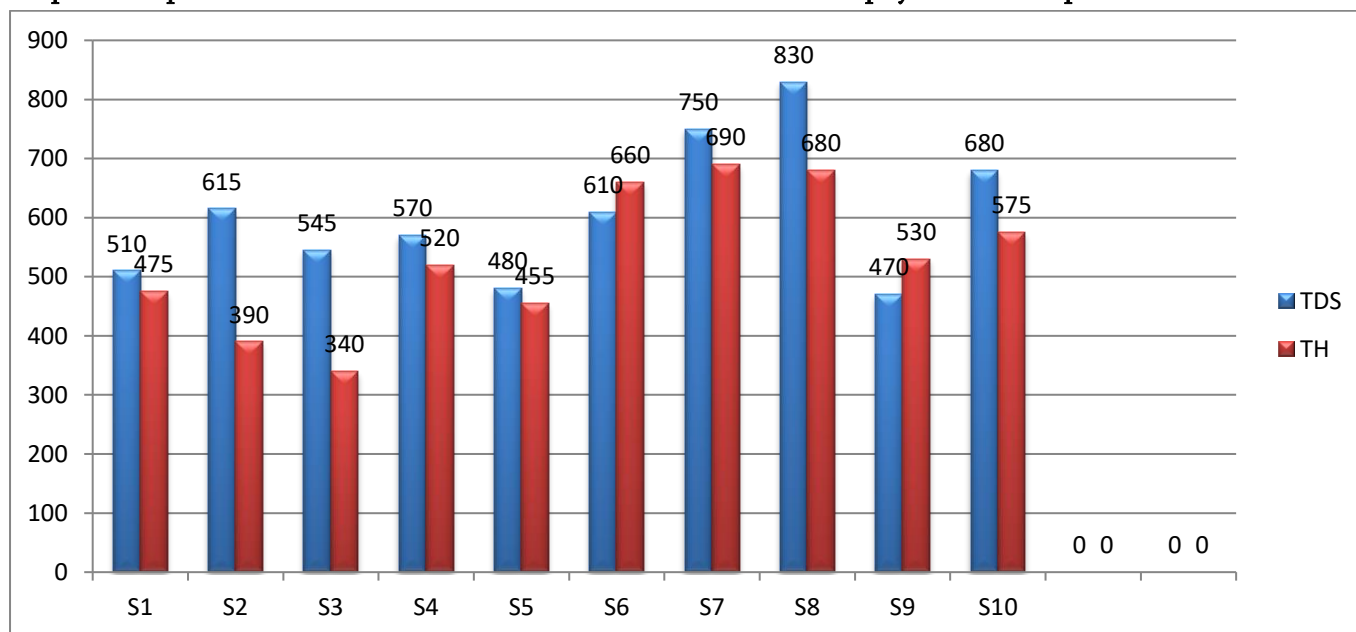
Abbreviations- Total Dissolved Solids (TDS), Total Hardness (TH)

III. RESULT AND DISCUSSION

The Value of P^H was within the permissible limit and P^H value fluctuated in between 7.0 to 8.0. Temperature was found to be in the range between 23 to 25.5°C during study. Temperature was measured using thermometer. Maxima of total dissolved solid (TDS) and total hardness (TH) were found to be 830 mg/lit and 510 mg/lit [7]. Observed value of TDS are within the permissible limit. Hardness of water is due to the Calcium and Magnesium ion, value of total hardness is exceeding the permissible limit in samples no S6,S7,S8 High concentration of hardness may cause kidney problem [8,9].

IV. CONCLUSION

The present paper undertaken to account to bring an acute awareness among the people about the quality of water. The result shows that most of the parameter are within the permissible range. It can be conclude that water is safe for drinking purpose, but in some samples requires further purification processes.

V. ACKNOWLEDGEMENT

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Effects on Ultrasonic Velocities, Densities, Viscosities & Refractive Indies of Nicardipine Hydrochloride at Different Temperatures

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ABSTRACT

Densities, viscosities, refractive indices and ultrasonic velocities of the Nicardipine hydrochloride drug were measured over the entire mole fractions at (88.210, 74.561, 72.157& 68.108) K. From these experimental results, excess molar volumes VE, viscosity deviation Δη, refractive index deviation ΔnD, deviations are calculated. It was found that in all cases, the data obtained fitted with the values correlated by the corresponding models very well. The results are interpreted in terms of molecular interactions occurring in the solution.

Keywords: Viscosity; Density bottle, Refractive Index; Ultrasonic Velocity; Molecular interactions.

I. INTRODUCTION

Measurements of physico-chemical properties such as viscosity, density, ultrasonic velocity and refractive indices of pure components and their mixtures are being increasingly used as tools for investigations of the properties of pure components and the nature of intermolecular interactions between the components of liquid mixtures Singh et al., (2011) &Pradhan et al., (2012).Ultrasonic studies have found wide applications owing to their ability to characterize the physico-chemical behavior of solutions. The measurement of ultrasonic velocity can provide useful information regarding the degree of deviationfrom ideality, internal structure, complex formation and molecular interaction in liquids because there accuracy,Palani & Balakrishna, (2010). Viscosity is one of the important properties of liquid. It relies on its molecular size, shape and intermolecular attraction. The viscosity measurement like other transport properties of electrolyte provides useful information about the solute-solute and solute- solvent interaction. There are certain acoustical parameters which rely on viscosity, Sharma et al., (2008).

Ultrasonic and density studies have found wide application owing to their ability to characterize the physicochemical behavior of solutions Naik, (2015).The measurement of various parameters; density, viscosity, refractive indices and ultrasonic velocity of materials are important for process control in most of industrial processes Mandakmare et al., (2014). The substantial work also has been reported by many researchers Muley et al., (2014); Muley et. al., (2014).Studies were also made on viscosity, surface tension and volume flow rate in

some of the medicinal oils to determine environmental influences, compositional, structural and physiological alterations and aging factors by Nazima Siddiqui, et al (2013).

Hence, in the present studies focused on the various aspects like ultrasonic velocities, densities, viscosities & refractive Indies of organic compounds. Unfortunately there is very little literature is available to correlate our obtained results. For this we select drugs like Nicardipine hydrochloride, are the organic compound which is widely and commonly used in the treatment of different types of disease. The Nicardipine is used with or without other medications to treat high blood pressure (hypertension).Lowering high blood pressure helps prevent strokes, heart attacks, and kidney problems. Nicardipinehydrochloride is called a calcium channel blocker. It works by relaxing blood vessels so blood can flow more easily. Nicardipinehydrochloride is also used to prevent certain types of chest pain (angina). It may help to increase your ability to exercise and decrease the frequency of angina attacks. This medication must be taken regularly to be effective. It should not be used to treat attacks of chest pain when they occur. Literature survey showed that no measurements have been previously reported for the drugs studied in this paper.

II. EXPERIMENTAL SECTION

Materials and Methods

All the chemicals used in this study were of analytical grade and obtained from Lobo Chemicals, India. The claimed mass fraction purity for the chemicals was ≥0.998. These chemicals were dried over molecular sieves and partially degassed prior to use. The purity of these experimental chemicals was checked by comparing the observed densities, viscosities, refractive indices and velocities with those reported in the literature. The measured values are included in Table 1 along with the available literature values.

Preparation of aqueous solutions for present study: for present study were prepared in triply distilled deionized water by weight-by weight method in airtight stoppered glass bottle. Dhona balance to an accuracy of $\pm 1 \times 10-5$ g was used to record the masses. Density and viscosity measurements at different temperatures were undertaken by using glass-walled water bath. The Bi-capillary Pycnometer, Ubbelohde Viscometer, and Ultrasonic Interferometer were calibrated with triply distilled deionized water (conductivity 0.054 μS) before the measurements of density, viscosity, ultrasonic velocity, and refractive indices. Uncertainties in the density, viscosity, ultrasonic velocity, and temperature measurements were 5.8 ×10–2 kg m–3, 4.71 ×10–7m–1 kg s–1 , 0.23 m s–1 , and 0.006 K, respectively.

Density:

Densities were determined by using a 25 cm3 bicapillary pycnometer and calibrated with deionized double distilled water with a density of 996.0 kg ·m-3 at a temperature of 303.15 K. The pycnometer was thermostatted in a transparent walled water bath (maintained constant to ± 0.01 K) for 15 min to attain thermal equilibrium, and the liquid level in the two arms was obtained with a traveling microscope which could read to 0.01 mm. The precision of the density measurements was estimated to be ± 0.0003 g ·cm-3.

Viscosity

The kinematic viscosities were measured with Mansingh surviemeter previously calibrated using water. The time was measured with a precision of 0.01s, and the uncertainty in the viscosity was estimated to be less than 0.0003 mPa·s. The kinematic viscosity was obtained from the working equation

v=at-b/t

Ultrasonic Velocity: Ultrasonic Velocity Measurements the three experimental techniques used for the measurements of ultrasonic velocity are interferometer method,for present study, a single crystal variable path interferometer has been employed for the measurements of ultrasonic velocity of aqueous solutions.The test solution in the cell is allowed to thermally equilibrate. The micrometer was rotated very slowly so as to obtain a maximum or minimum of anode current. A number of maximum readings (n) of anode current were counted. The total distance (d) travelled by the micrometer for n =10 were read. The wave length (λ) was determined by the equation

$$\lambda = \frac{2d}{n}$$

Refractive Indices: Refractive Index Measurements For pure solvent, the refractive index, n, is a constant. It can be defined as the ratio of the speed of a wave either light or sound in a reference medium to a second medium.

$$n = \frac{\text{Speed of light in medium 2}}{\text{Speed of light in medium 1}}$$

The incident light is in material 1 and the refracted light is in material 2. Abbes refractometer was used for the measurements of refractive indices of aqueous solutions. Refractive index range of refractometer was 1.3000 – 1.7000. Accuracy in the refractive index measurements was ± 0.0002. Refractometer operates on the critical angle principal. For measurements of refractive of the liquid/solution, the liquid/solution sample was added on the surface of the refracting prism with a clean dropper. The refracting prism was covered by light entering prism and both prisms were locked with hand wheel Kharat and Nikam, (2003).For the measurements of refractive indices at different temperatures water at different temperatures was circulated through the refractometer by pump. Before the measurements refractive indices of aqueous solutions, the refractometer was calibrated with piece of glass of known refractive index provided with the instruments. To check the calibration, the refractive indices of distilled water were measured at different temperatures.

III. RESULTS AND DISCUSSION

Measured values of densities, viscosities, refractive indices and ultrasonic velocities of Nicardipinehydrochloride at temperatures of (99.321, 93.361, 83.153 & 61.108) K are listed in Table 1.

Sr.no.	Temp (k)	Conc. mol	ultrasonic velocity (U),	density (ρ)	viscosity (η)	Refractive indices
1	99.321	0.01	1.6512	0.9441	8.4517	1.3684
2	93.361	0.02	1.6541	0.9472	8.5687	1.1156
3	83.153	0.03	1.6713	0.9457	8.4763	1.1564
4	80.342	0.04	1.6511	0.9423	8.5631	1.1224
5	84.102	0.05	1.6423	0.9378	8.5614	1.2341
6	81.394	0.06	1.6567	0.9389	8.5674	1.1348
7	77.421	0.07	1.6648	0.9349	8.6342	1.1634
8	79.210	0.08	1.3641	0.9457	8.8231	1.1863
9	71.103	0.09	1.6478	0.9486	8.7531	1.1623
10	61.108	0.1	1.6842	0.9487	8.3542	1.2142

Table no.1 Showing the fluctuation of ultrasonic velocity, density, viscosity & refractive indices of Nicardipinehydrochloride against concentration
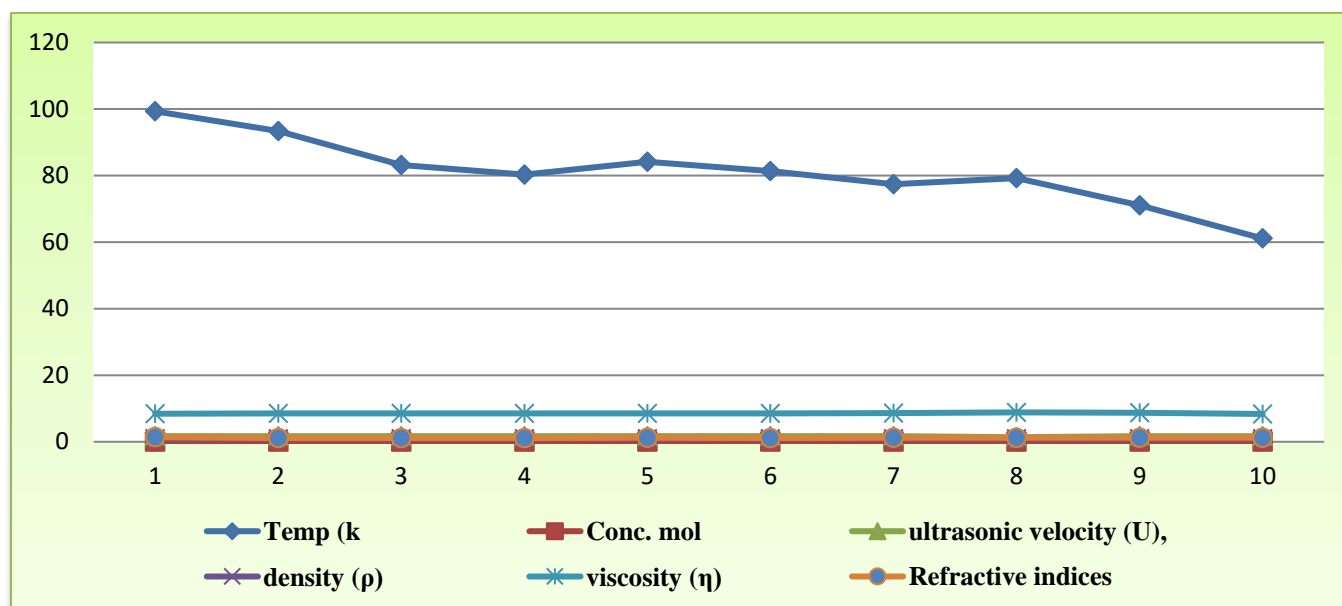
Graph no.1 Showing thefluctuation ultrasonic velocity, density, viscosity & refractive indices of Nicardipinehydrochlorideagainst concentration

Density (ρ): The density of the drug is measured throughout the experimental period and concentration at various temperatures. The density was highly increased in 0.1m at 61.108(k), followed by 0.09m at 71.103(k) & 0.05m at 84.102(k) &0.02m at 93.361(k). The highest density was decreased in the 0.04m at 80.342 (k) followed by 0.01 m at 74.561 (k) was observed.

Ultrasonic velocity (U): The ultrasonic velocity is highly increased in the 0.1 m at 61.108 (k) followed by 0.03 m at 83.153 (k). The ultrasonic velocity is highly decreased in 0.08m at 79.210 (k) was observed.

Viscosity (η): The viscosity is highly increased in the 0.08m at 79.210 (k) followed by 0.09m at 71.103 (k) 0.07m at 77.421 (k). The viscosity is highly decreased in 0.1 m at 61.108 (k) was observed.

Refractive indices: The refractive indices is highly increased in 0.01m at 99.321(k) while it was highly decreased in 0.02 m at 93.361 (k) followed by 0.04 m at 80.342 (k), 0.06 m at 81.394 (k).

In the present studies in both the drugs the increase in density is due to increase of solute particles in solution and decrease in density is due to rise of volume of solution with increase temperature Patil & Dudhe, (2015); Patil & Dudhe (2015). Also the decrease in density with increase in temperature might be due to decrease in intermolecular forces due to increase in thermal energy of the system Praharaj et al., (2012).

At lower temperature, viscosity is found greater because of intermolecular forces due to the increase in solute which causes attraction between the solvent and solute it shows the structure making capability of solute in the solution Patil, Singh, (2018). With increasing temperature there is weakening of cohesive forces that result in decrease in viscosity Patil & Dakhane, (2018).The ultrasonic velocity in the present investigation increases with concentration and temperature increases. The closed-packed structure forms stiff material medium for the propagation of ultrasonic wave due to which ultrasonic velocity increases Talukdar et al., (2013).This indicates that there is significant interaction between ion and solvent molecule suggesting a structure promoting behavior solute. Tayadeet al.,(2014).In the present investigation in Nicardipine hydrochloride the temperature is increases all the parameters get changed. Similar results was obtained in another studies and reported that

asthetemperature is increased, available thermal energy facilitates the breaking of the bonds between the associated molecules. Moreover, increase of thermal energy weakens the molecular force which tends to decrease ultrasonic velocity Raj et al.,(2009).The ρ, η and U values increased linearly with concentration (C). The densities of the solutions increase with C. Thus, the rule of additivity of density is observed. The ρ, η and U data were correlated with the concentration C and found to have a fairly good-to-excellent correlation between a given parameter. The variation of η and U with C is considerably more than that of ρ due to specific molecular interactions. Molecular interactions depend on the strength of the repulsive forces acting amongst solvent and solute molecules and hence intermolecular motion is affected accordingly.

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Toxic Effect of Aqueous Extract of Curry Leaves on Erythrocyte Sedimentation Rate in Fish, Channa Punctatus

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ABSTRACT

In the present investigation, the effect of sub- lethal concentration of Curry leaves aqueous extract on fish *Channa punctatus* was studied after 24 hrs, 48 hrs, 72 hrs and 96 hrs exposure. Different concentrations of Curry leaves 5ppm/ lit, 20ppm/lit) were used against erythrocyte sedimentation rate (ESR) and results showed the gradual increase in the ESR, ranging (7.22-8.00 mm\hrs) for 15 pm/lit for (24 hrs - 96 hrs) and (7.46-8.36/lit) for 20ppm/lit, respectively.

Keywords: Curry leaves, Erythrocyte Sedimentation rate, *Channa punctatus.*

I. INTRODUCTION

The presence of predatory and weed fishes in culture pond is a serious problem for culturing edible freshwater fishes in India. This has adversely affected the development of fish production and to solve this problem the use of synthetic pesticides is most common practice in many aquaculture farms. Due to their long-terms persistence in the water bodies and fish body, it adversely affects the quality of fish and their status leads the contamination of aquatic environment. In order to over these problems studies were being carried out on the feasibility of using bio-pesticides or plant extract. Now-a-days, use of medicinal plant is as effective alternatives for synthetic pesticides and fertilizers. In the present investigation, the toxicity of aqueous extract of Curry leaves has been observed on erythrocyte sedimentation rate (ESR)(mm\hr) in fish Channa punctatus.

II. EXPERIMENTAL ANIMAL

Healthy specimens of fish (Channa punctatus) were collected from the local fish market and were transferred into glass aquaria containing 25 lit. Of chlorine free water for acclimatization after dipping them into low concentration of potassium permanganate for a few seconds in order to check microbial infection. The determi nation of Lc50 was analyzed statistically by log dose/probit regression line method.

III. PREPARATION OF AQUEOUS CURRY LEAVES EXTRACTS

The leaves of Curry leaves (Murraya koenigii) were collected local market of Nanded city. Plant material was dried and grind. To prepare the aqueous extract, the powder was dissolved in water at a concentration for 5g per litre for 24 hours at room temperature. The mixture was filtered and the extract (5g\l) was used immediately in the experiments in different dilutions. Many significant changes were induced by the Curry leaves aqueous extract toxicity in the hematological parameters like erythrocyte sedimentation rate (ESR) of fish, Channa punctatus as show in Table 1.

The ESR (mm\hr) increase, in ESR (mm\hr) from 7.22 mm\hr to 8.00mm\hr for 24 hrs to 96 hrs, respectively was recorded in 15 ppm of Curry leaves aqueous extract concentration and similar increase in ESR (mm\hr) form 7.46 mm\hr to 8.36 mm\hr for 24 hrs to 96 hrs, respectively Table 1: ESR (mm\hr) in the blood of channa punctatus after Curry leaves aqueous extract treatment in different exposure periods.

Conc. in ppm	Control	24 hr.	48 hr.	72 hr.	96 hr.
15ppm	7.10-0.07	7.22-0.56	7.42-0.80	7.74-0.12	8.00-0.64
20ppm	7.10-0.09	7.46-0,15	7.74-0.45	8.10-0.88	8.36-0.28

Each reading is a mean of six observations +- S.D. ppm=parts per million.

was recorded in 20 ppm of Curry leaves aqueous extract concentration

(fig.1 and 2.)
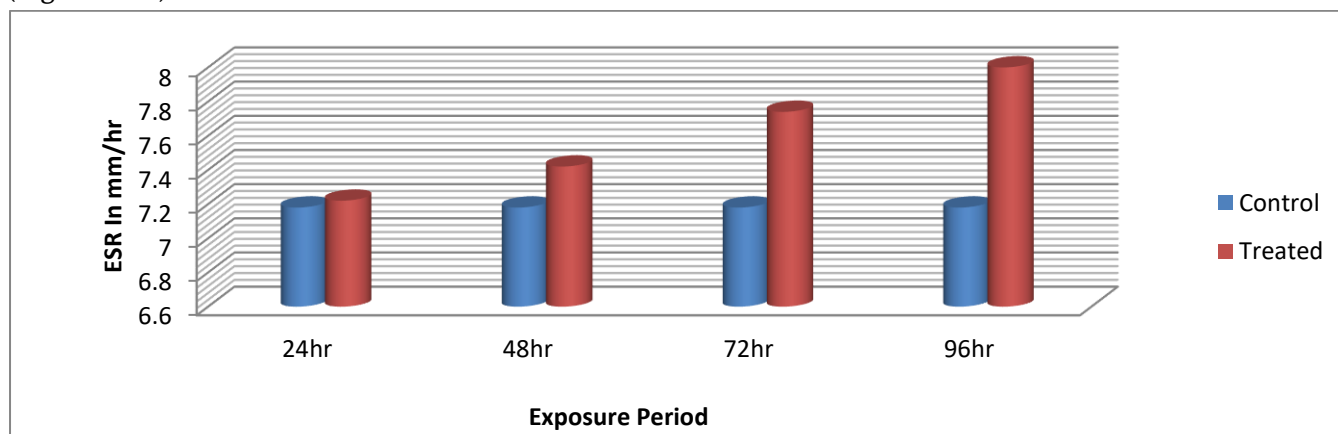
Fig.1 ESR in blood of Channa punctatus after exposure to Curry leaves aqucous extract at 15 pmm conentration.
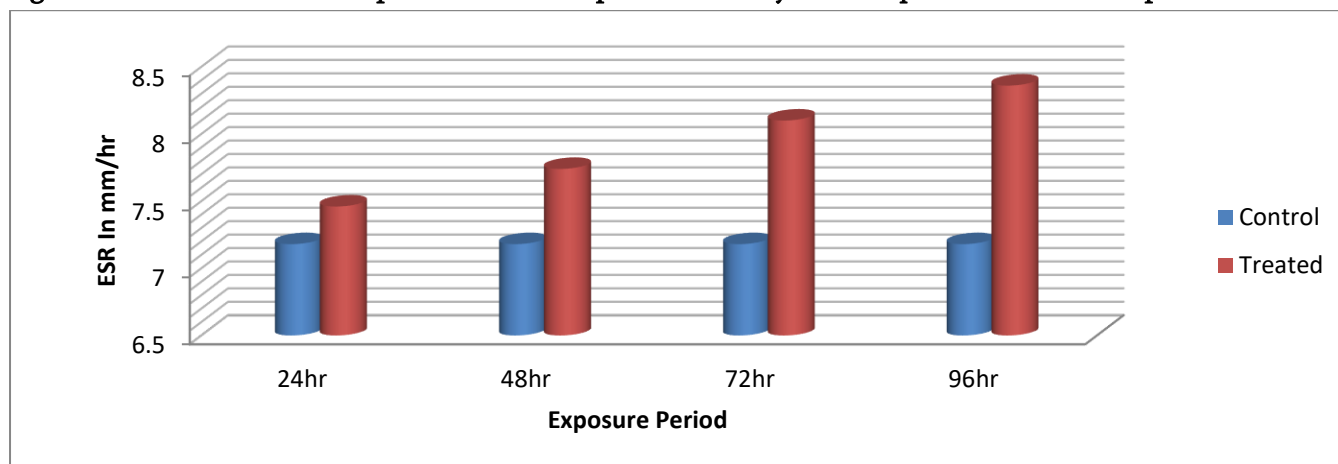
Fig. 2 ESR in blood of channa punctatus after exposure to Curry leaves aqueous extract at 20 ppm concentration.

An increase in the ERS (mm\hr) for both 15pmm and 20 ppm concentration was due to Curry leaves toxicity and exposure time. An increase in ESR (mm\hr) has been reported in channa punctatus after exposure to chloropyrifos (Malla et. al., 2009) and in Clarius batrachus after exposure to seven (Kumar and Benerjee, 1990). An increase in ESR(mm\hr) may be due to increase in the concentration due to Curry leaves exposure or may be due to chemical compound like sulphur. Singh and Bhati (1991) also conducated study on the effect of zinc chloride on the morphology of blood in channa punctatus and in Heteropneustes foddills.

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Assessment of Water Quality - A Case Study of Umarkhed Area

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ABSTRACT

A study of physico-chemical and microbial properties of water sample is done in the regions of Umarkhedtehesil of district Yavatmal state Maharashtra. Some water samples were collected from different regions having different sources and physico-chemical properties were analyzed like hardness, TDS, pH, conductivity, Chloride, Sulphate, D.O. & C.O.D etc. The MPN count resulted from the bacteriological study of these samples has given the information regarding the suitability of the water for drinking and other domestic applications. The results are studied comparatively and conclusions regarding the use of such waters are made.

Keywords: COD, DO, TDS, Physico-chemical properties

I. INTRODUCTION

Water is a very important part of our life and it plays vital role in our, animals, and in plants life. Due to the urbanization and industrialization it effects on spoilage of the water. For the agriculture purpose farmers use ground water in rural areas and mainly where there is lack or dam, river or a canal. In few years it is observed that the ground water get polluted due to increased human activities in nature [1,2], so that's why water born diseases has been increased that effects very badly [3,5.6]. So, basic monitoring on water quality is necessary to reduce the pollution level of ground water and make it safe and clean [4]. Some of water sample analyzed. The present work is an try to see the water quality of various water sources *viz.* ground water at patilnagar, ground water at nathnagar, tape water, painganaga river water in Yavatmal district. All the samples where college in the month of June 2021, and all the samples were collected in sterilised bottle. The procedure is done by Standard method of analysis of water and waste water [11]

II. MATERIAL & METHOD

Water sample were collected in clean and dry sterilised bottle of one liter capacity. Sample are collected from different sources (bore well, well, hand pump). P^H, conductance, TDS, Sulphate, Chloride, D.O. and C.O.D etc are by kit and TH is determined by complexometric titration. Color, odour, temperature were determined at

the point of sample collection. Observed value for different parameter has been compared with standard specified by world health organization (WHO) and Bureau of Indian standard (BIS).

III. RESULTS AND DISCUSSION

The physical, chemical parameters exhibited with variations from sample to sample. All the process were carried at temperature 26^0C The observations are in the table shown below.

Sr. no	Parameter	Sample 1 Patil nagar	Sample 2 Nath nagar	Sample 3 Borban	Sample 4 Shrinagar	Sample 5 Penganga River	Sample 6 Mineral water
1.	Temperature ^0C	26	26	26	26	26	26
2.	pH	7.5	7.1	7.3	7.2	8.2	7.5
3.	TDS, mg/L	123	214	176	264	492	44
4.	Ca hardness mg/L	114	116	112	204	141	25
5.	Mg hardness mg/L	41	43	44	104	66	12
6.	Total hardness mg/L	155	160	155	310	204	37
7.	Chloride mg/L	76	97	86	204	71	17
8.	Sulphate mg/L	34	46	43	88	54	23
9.	D.O mg/L	7.2	5.6	6.8	5.6	5.5	7.2
10.	C.O.D mg/L	10.6	11.5	10.7	12.8	14.1	02
11.	E.C mho/cm	1224	1180	1182	830	1290	180
12.	Coliforms/100ml	260	320	270	370	480	Nil

On the basis of above chart the , following observations are made, it is seen that the pH of the water was slightly alkaline (7.2 to 8.3) and only minor changes in pH was observed . The pH levels of most of the samples were within the permissible limits for domestic use as given by APHA [11]

The WHO has given a limit of value of 500mg/L for TDS, potable water. In the present work this limit is not crossed on either side by any of the samples. In the Sample-6, the TDS value is about to reach the maximum limit. These values are good for domestic use and agricultural purposes. The total amount of calcium hardness and magnesium hardness is said as the total hardness of water. In the observation, it has been observed that the calcium concentration is at least two folds greater than that of magnesium. The limiting values prescribed by ISI are much less than reported. Presence of anions like chloride and sulfate is also seen in the water samples. It has been observed that much amount of sulfate in drinking water leads to diarrhea. Here it is observed that the sulfate concentration in the samples fall well in given limit but the chloride content is much greater than the given values by WHO and ISI. Dissolved oxygen present in drinking water adds taste. In this study dissolved oxygen content varies in a range of 5.6 to 7.2. The higest given value of chemical oxygen demand (COD) is 10 mg/L for drinking water. The present samples have registered a range of 10 to 14 mg/L. Most of the water samples contain some amount organic matter that gives nutrition for the growth and multiplication of microorganisms.

IV. CONCLUSION

From the present work we conclude that the quality of water samples subjected to study was acceptable from majority of physico - chemical parameters while as per the bacteriological standards, the water needs to be treated before using it in domestic uses. So as far as sample waters are concerned the risk of getting infected by water borne diseases is there if used without disinfections. The water can be used after practicing suitable disinfections system. The mineral water is to be safe for drinking purpose

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Report of a Fossil Wood of Mimosoideae from the Latest Cretaceous Sediments of Maharashtra, India

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ABSTRACT

I. INTRODUCTION

A petrified fossil wood described in the present paper is collected from Mahurzari of Nagpur District and lies at 21° 14' N., 79° 1' E. which is about 20 kms from Nagpur. So far there are fossil records from the Deccan Intertrappean sedimentary of Mahurzari which is of uppermost Cretaceous to lower Eocene age.

Various Wood fossils are reported from Deccan Intertrappean beds includes *Chitaleoxylon deccaneses* (Sheikh, 1971). Previous workers have been collected and described in detail many fossil woods from the exposure of Mahurzari resembling the family Burderaceae/ Burseraceae, Simarubiaceae, Lecithidaceae, Tiliaceae, Guttiferae etc were worked out in detail by Uttam Prakash (Prakash, 1962) and Shallom (Shallom, 1959). Fossil megafloral records from this locality, that include a monocot fruit *Viracarpon sahnii* (Chitaley *et al.,* 1969), a monocot wood *Palmoxylon eocenum* (Prakash, 1962a), few dicot leaf impressions (Trivedi, 1956), Dicot wood like *Ailanthoxylon mahurzariense* (Shallom, 1959a; Idem, 1961), *Anacardioxylon semicarpoides*(Prakash and Dayal, 1965a), *Aeschynomene tertiara* (Prakash, 1962b,c; Idem 1962), *Dryoxylon mahurzarii, D. intertrappea,* and *D. filiacoides* (Trivedi, 1976),Wood ofBurseraceae(Shallom, 1958),Wood ofRutaceae(Chitaley and Shallom, 1962), *Elaeocarpoxylon antiquum* (Prakash and Dayal, 1964), *Grewioxylon mahurzariense* (Prakash andDayal, 1963), *G.indicum* (Prakash and Dayal, 1965), *Simarubaceoxylon mahurzarii* (Idem, 1959; Shallom, 1959b), *S. indicum* (Prakash, 1962d), *Leeoxylon multiseriatum* (Prakash and Dayal, 1964), *Barringtonioxylon eopterocarpum* (Prakash and Dayal, 1965b), *Hibiscoxylon intertrappeum* (Trivedi and Ambwani,1971)*, Perrottelioxylon mahurzarii* (Chitaley *et al.*1971), *Shoreoxylon mahurzarii* (Paradkar, 1972), *Rutaceoxylon mahurzarii* (Chitaley and Khubalkar, 1974), *Sterculioxylon baradense* (Sheikh and Kolhe, 1980), and Erythroxylon mahurzarii (Kapgate, 2007), Ochnaceoxylon tertiera (Ramteke 2016) However, the present specimen is also the record of fossil wood resembling the living genus *Albizia* of family Mimosaceae from this locality.

II. MATERIAL & METHOD

A wood specimen is collected during the field visit in situ condition. It is petrified and well preserved. The specimen is cut in Transeverse, Transeverse Longitudinal and Radial longitudinal plane. Cellulose acetate peel sections are taken after etching with Hydroflouric Acid were prepared along transverse, transverse longitudinal and radial longitudinal plane (Darrah, 1936). The peels were mounted in DPX as mountant and observed under microscope for detail study.

III. DISCUSSION

The specimen described here measures about 12 inches in diameter and 23 inches in length. The primary tissue is absent. The secondary wood is decorticated, diffused porous and without growth rings. It consists of vessels, wood parenchyma, wood rays and wood fibers.

Vessels

Vessel are medium sized and can be seen with naked eyes. They mostly solitary as well as radial in multiples of 2-3 and some seen obliquely placed (Plate Fig. B). Each vessel measures 130 to 170 μm in diameter. Their walls are moderate thick. The solitary vessels are circular to sub-circular in transverse plane. The vessel frequency 5 to 75 per sq. mm. Rays are seen uniseriate contiguous with vessels at places (Plate Fig.B). Vessel members are long and measures 2.4 to 2.8 mm. Perforation plates are simple and oblique (Plate Fig. D, E). The intervascular pits are simple, alternate, bordered and hexagonal and measures 5 to 6 μm in diameter. Pit pores are oval in shape (Plate Fig.-F). Tyloses are absent.

Xylem parenchyma

Xylem parenchyma cells are thin walled with transverse diameter 23 μm and height 58 μm. Paratracheal, vescicentric and in single tyre around the vessel. Medullary rays are not seen with naked eyes. They are larger and 22 to 27 cells in height, 125 μm broad and 16 to 18 per sq. mm. The rays are uni to multiseriate. They are long, broad and homogenous made up of procumbent cells. The uniseriate ones are 75 to 125 μm high and 20 μm wide. Pits to ray cells are very clear and are seen to be bordered and fine.

Fibers

The fibers are short, broad, thin walled to moderately thick walled. In transverse section they are completely arranged in regular bids of 3 to 7 in between xylem rays. The aseptate, non-storied nature of these fibers are very well seen in RLS of the specimen. They are 0.4 to 0.5 mm long and varied from 38 to 76 μm in radial diameter and 45 to 90 μm in tangential diameter. The inter fiber pits seems to be in spiral arrangement. Inter cellular spaces are visible in transverse section.

IV. DISCUSSION AND IDENTIFICATION

The above described specimen revealed following important details for its identification
- ➢ Wood diffuse porous.
- ➢ Vessels mostly solitary as well as radial in multiples of 2-3.

➢ Rays uniseriate contiguous with vessels.

➢ Perforation plates simple and oblique.

➢ Intervascular pits simple, alternate, bordered and hexagonal.

➢ Xylem parenchyma cells paratracheal, vescicentric and in single tyre around the vessel.

➢ Rays uni to multiseriate, long, broad and homogenous made up of procumbent cells.

➢ Fibers short, broad, aseptate and non-storied.

Comparison with fossil woods

Following fossil woods of Leguminoceae have been described from the different localities. *Acacioxylon indicum* (Ramanujam, 1954), Another wood from Tertiary of Madras *Ceasapinioxylon sitholeyi* (Ramanujam, 1954), differs from the fossil specimen. *Acacioxylon mohgaonense* (Shallom, 1963), from the Deccan Intertrappean beds of Mohgaonkalan.

By considering above features, for identification of the present fossil wood, key given by Records and Chattaway (1939), Metcalfe and Chalk (1950) and Shallom (1963) were used. Taking into consideration of the characters observe following modern families are comparable- Celastraceae, Hippocrataceae and Caesalpinaceae & Mimosaceae of Leguminosae (Metcalf & Chalk, 1950; Esau, 1970; Fahn, 1989).

It is comparable with Celastraceae in paratracheal parenchyma, simple perforation plates, bordered & alternate pits and multiseriate, homogeneous and aseptate fibers but differs in having typically small vessels.

With Hippocrataceae it is comparable in medium sized vessels, paratracheal, simple perforation plates and homogeneous aseptate fibers but differs in exclusively uniseriate rays.

In Caesalpinaceae the living wood of *Cercidium* and *Zuccanginia* differ from the fossil wood in medullary rays which are 4 to 7 cells wide in *Cercidium* and numerous uniseriate in *Zuccanginia* (Metcalf & Chalk, 1950). The typical characters of fossil wood are the presence of intercellular spaces in the fibers which character is absent in modern woods of Caesalpinaceae but is present in Mimosaceous woods. Hence the present specimen is come closer to the family Mimosaceae. Further the comparisons are made with Mimosaceous woods. *Pithocelebium dulce* differs from the fossil specimen in nature of vessels and in nature of medullary rays. In *Pithocelebium dulce* uniceriate medullary rays are predominant which character is absent in present specimen. *Albizzia labbeck* differs in vessels diameter, vessels frequency (5 to 75 per sq. mm) and typically uniseriate rays. The present specimen resembles more with *Albizzia labbeck* in having medium sized vessel diameter (130 to 170 μm), vessel frequency 5 to 75 per sq. mm, uni to multiseriate rays, homogeneous, 16 to 24 cell high, paratracheal, vescicentric parenchyma, pit pairs alternate, bordered and hexagonal, aseptate and non-storied which characters are matched with present specimen in great extent than the characters of other members.

From the above comparison it is clear that the fossil wood under consideration does not shows any resemblance with any of the reported fossil woods but shows much resemblance with genus *Albizia labbeck* of modern family Mimosaceae. Thus it is included under family Mimosaceae under a genus *Albizia* and named as ***Albizioxylon mahurzarii*** sp. nov. The generic name after the genus *Albizia* of modern family Mimosaceae and specific name after the locality from where it is collected.

V. DIAGNOSIS

Albizioxylon gen. nov.

Vessel solitary with radial multiples of 3-4, medium sized. Perforation simple; intervascular pits alternate, bordered; parenchyma paratracheal vasicentric. Rays mostly multiseriate with few uniseriate, homogeneous, procumbent, fibers long, non-septate, moderately thick with intercellular spaces.

Albizioxylon mahurzarii gen. et sp. nov.

Wood dicotyledonous, diffuse porous. Vessel 130 to 170 μm in diameter. 14 to 16 per sq. mm. solitary to radial multiples of 2-3. Perforation simple, transverse and oblique. Intervascular pit pairs alternate, bordered. Parenchyma paratracheal vasicentric. Medullary rays mostly homogeneous multiseriate, composed of procumbent cells, uniseriate, 15 to 20 cells in height, 125 μm wide, 16 to 19 per sq. mm. Fibers long moderately thick walled, aseptate with intercellular spaces 30 to 70 in t.d. and 0.5 –0.6 mm in length.

Holotype:-	Deposited Deccan Flora Museum and Research center, Sakoli, Dist-Bhandara, Maharshtra, India.
Horizone:-	Deccan Intertrappean Series of India.
Locality:-	Mahurzari
Age :-	Uppermost Cretaceous

VI. ACNOLEDGEMENT

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EXPLAINATION OF PLATE FIGURES

Figure:

A.   Locality of Mahurzari
B.   T.S. of Wood showing Vessels (45X).
C.   T.L.S. showing Parenchyma (450X).
D.   T.L.S. showing rays and fibers (90X).
E.   R.L.S. view of wood (45X).
F.   Intervascular pit pairs (450X).
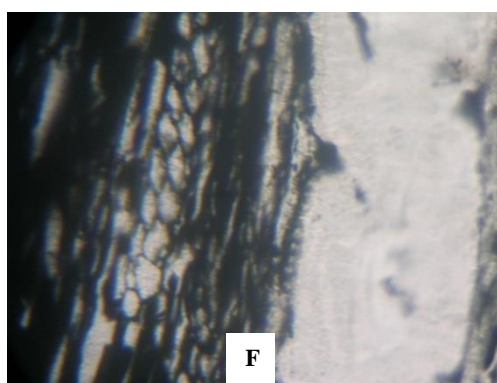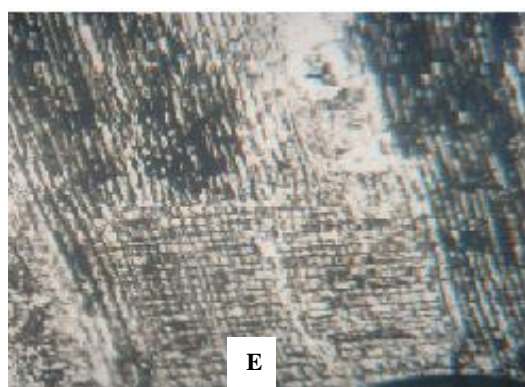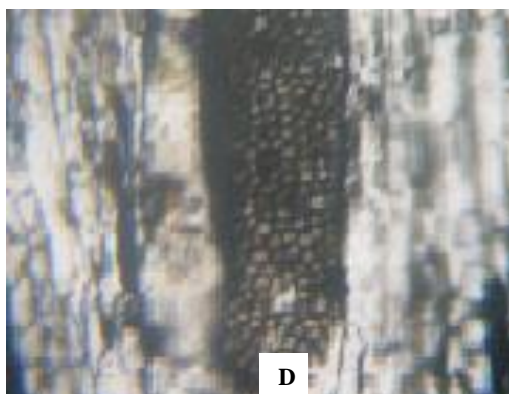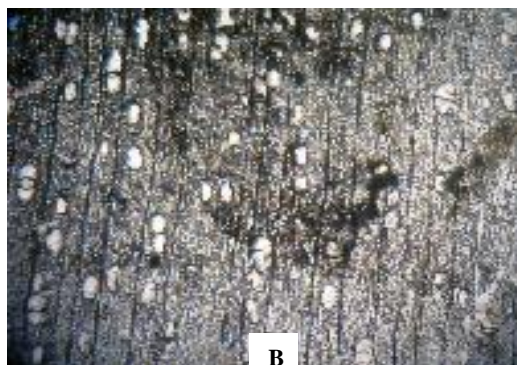
PLATE FIGURES

Physicochemical Analysis of Soil from Some Farms of Ghatanji Region of Yavatmal District in Maharashtra

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ABSTRACT

The yield of the crop is dependent of the type of the soil and proper cultivation. Hence it is necessary to study some parameters of the soil. So in the present study is undertaken to determine the physico-chemical characterstics of some samples of soil from some farms of nearby village of Ghatanji region, Dist Yavatmal. The soil characterization was carried out for the parameters like pH, conductivity, chloride, sulphate, sodium, potassium. The variation of values were observed in the different Parameters due to the soil quality in different places.

Keywords : Conductivity, Chloride, Sulphate, Sodium, Potassium, Carbon.

I. INTRODUCTION

The soil word is derived from latin word, 'Solum' meaning the earthy material in which plant growth occurs1. Soil is mixture of minerals , organic matter gases, liquids and myriad of micro and macro organisms, that can support plant life. Soil is the natural material spread in different layer2. It differ in physical, chemical and mineralogical characteristics. Soil as a general term usually denote the unconsolidated thin, variable layer of mineral and organic material usually biologically active that covers rest of the earth land surface. Soil property that are sensitive to change in the management can be used as indicators. In India, now a day's large numbers of fertilizers are used instead of manures. Due to this the crop productivity is increases speedily but the quality of soil support decreases. So it becames essential to analysis the soil parameters. It is a real time to carry out the physicochemical analysis of soil because as with the increasing use of chemical fertilizers to the soil, it is difficult to control the adverse effects of the chemical fertilizer to the soil, plants, animals and human being The status of available micronutrients in the soil and their relationship with various physicochemical properties have been attempted by Several investigators In, Yavatmal district and hence in Ghatanji Taluka region, ths soil is not getting polluted as their is no Industrial waste probblem in the region. All samples were collected in summer season. Analysis of soil is carried out for the studies of various parameters like pH, conductivity, chloride, sulphate, sodium, potassium.

II. MATERIAL & METHODOLOGY

The soil samples were collected from Ghatanji taluka in the month of March-April 2020 from different sampling stations. Soil samples G1, G2 , G3 , G4 and G5 were collected in the depth of 0-30 cm from the surface of soil from Khapri, Kumbhari, Dangargaon, Belora, SakharaVillages were collected for analysis as shown in the table 1.

<center>Table-1: Soil samples from different sampling stations</center>

Sample Site	Name of village
G1	Khapri
G2	Kumbhari
G3	Dangargaon
G4	Belora
G5	Sakhara

The soil samples were preserved in polythene bags for further analysis. The chemicals and reagents used for analysis were of A. R. grade3,4. Method use for Estimation of parameters Physicochemical analysis were carried out in the laboratory of department of chemistry, collage of Engineering & Technology District, Akola, (M.S.), India.are shown in the table-2

<center>Table-2: Method use for Estimation of parameters.</center>

Parameter	Method
Colour	By viewing soil
Alkalinity	Volumetric method
Chloride	Volumetric method
Sulphate	Gravimetric method
pH	pH metry
Conductivity	Conductometry
Sodium	Flamephotometry
Potassium	Flamephotometry

III. RESULTS AND DISCUSSION

The values of physicochemical parameters are presented in table-3. The colour soil sample was observed visually. Soil sample G1, G2 and G3 are faint black and G4 and G5 are dark black in colour. Alkalinity is a measure of saline or salt effected soil, the pH of these soil is greater than 7. These soils occur most extensively in aired climates and as the villages is aired the alkalinity value is ranging from 25 to 84 meq/100gm. Chloride in the soil samples was found by titration method. The chloride content was very variable at all the places, it ranged from 1.10 to 1.96 g/100gm. The values of pH showed that they lie in the alkaline side of the pH scale. Many workers have reported the values of pH in their investigations. The value of conductivity is lying within the range of 1.3 to 1.9 m mohs. The value of conductivity is the measure of ions present in the sample. The conductivity values can vary with the chemical properties of soil, if the soil is contaminated by chemicals or if it is saline,

Table-3: Values of physicochemical parameters

Sample No.	Color	Alkalinity	Chloride	Sulphate	pH	Conductivity x 10-3 Scm-1	Sodium (ppm)	Potassium (ppm)
G1	Faint black	25	1.23	0.158	7.28	1.4	40.4	120.6
G2	Faint black	30	1.42	0.186	7.35	1.5	100.7	123.2
G3	Faint black	20	1.10	0.134	6.85	1.3	114.8	100.7
G4	Dark black	54.0	1.96	0.432	7.41	1.9	112.5	128.5
G5	Dark black	50.0	1.84	0.228	7.28	1.7	127.3	122.3

1. pH: The most significant property of soil is its pH level, Its effects on all other parameters of soil. Therefore, pH is considered while analyzing and kind of soil. If the pH is less than 6 then it is said to be an acidic soil, the pH range from 6-8.5 it's a normal soil and greater than 8.5 then it is said to be alkaline soil5.

2. Electrical conductivity : Electrical conductivity is a very important property of the soil, it is used to check the quality of the soil.It is a measure of ions present in solution The electrical conductivityof a soil solution increases with the increased concentration of ions. Electrical conductivity is a very quick, simple and inexpensive method to check health of soils. It is a measure of ions present in solution. The electrical conductivity of a soil solution increases with the increased concentration of ions5,6.

3. Phosphorus: Phosphorus is a most important element present in every living cell. It is one of the most mportant micronutrient essential for plant growth. Phosphours most often limit nutrients remains present in plant nuclei and act as anenergy storage5,6.

4. Potassium : Potassium plays an important role in different physiological processes of plants ; it is one of the important elements for the development of the plant. It is involved in many plant metabolism reactions, ranging from lignin and cellulose used for the formation of cellular structural components, for regulation of photosynthesis and production of plant sugars that are used for various plant metabolic needs5,6.

5. Sulfur : Sulfur is as necessary as phosphorus and is considered an esential mineral. Sulphur in plants helps from important enzymes and assists in the formation of plant proteins. It is needed in very low amount, but dificiency can cause serious plant health problems and loss of vitality6.

6. Organic Carbon : Soil organic carbon is the basis of soil fertility. It release nutrient for plant growth, promotes the structure, biological and physical health of soil, and is buffer against harmful substances. Increasing soil organic carbon has two benefits as well as helping to mitigate climate change, it improves soil health and fertility6,7.

IV. CONCLUSION

The conclusion can be drawn that this study of physicochemical parameters of soil samples showed dissimilar values at different places. This can be due to the irregular distribution of different parameters present in soil. Physicochemical parameters values suggest no any pollution effect. The fertilizer used by farmer of this reason use well combination of chemical and manure fertilizers.

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Review on Corona Virus, Pandemic, Precautions and Treatment; Current Situation in India

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ABSTRACT

There is a new public health crises threatening the world with the emergence and spread of 2019 novel coronavirus (2019-nCoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus originated in bats and was transmitted to humans through yet unknown intermediary animals in Wuhan, Hubei province, China in December 2019. There have been around 97,000 reported cases of coronavirus disease 2019 (COVID-2019) and 3400 reported deaths to date (05/03/2020). The disease is transmitted by inhalation or contact with infected droplets and the incubation period ranges from 1 to 14 d. The symptoms are usually fever, cough, sore throat, breathlessness, fatigue, malaise among others. The disease is mild in most people; in some (usually the elderly and those with comorbidities), it may progress to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction. The case fatality rate is estimated to range from 2 to 3%. Diagnosis is by demonstration of the virus in respiratory secretions by special molecular tests. Common laboratory findings include normal/ low white cell counts with elevated C-reactive protein (CRP).

Keywords: 2019-nCOV, SARS-CoV-2, COVID-19, Pneumonia, Review

I. INTRODUCTION

Under the coronoviridae family , coronavirus possesses enveloped , single – stranded, gram-positive RNA genome which has been detected in avian hosts and mammals ,including bats, camels, clogs and cats. Among previously known several coronaviruses , most are mild pathogenic to humans, but severe acute respiratory syndrome coronavirus (SARS-CoV) and the middle east respiratory syndrome coronavirus (MERS-CoV) caused severe human infection. (Md. Saiful Islam, et.al April 2020)

First case of corona virus was notified as cold in 1960. According to the Canadian study 2001, approximately 500 patients were identified as flue-like system. 17 to 18 cases of them were confirmed as infected with corona strain due to polymerase chain reaction.

Several case of severe acute respiratory syndrome caused by corona and their mortality more than 1000 patient was reported in 2003 and this year was the black year for the microbiologist. And when microbiologist started focused to understand these problems. After a deep exercise they conclude and understand the pathogenies of

disease and discovered as coronavirus, and till total 8096 patient was found as affected by corona virus. So in 2004, world health organization (WHO) and centers for disease control and prevention declared as " state emergency". Another study report of Hong Kong was confirmed 50 patients of severe acute respiratory syndrome while 30 of them were confirmed as corona virus infected. Covid-19 was first identified and isolated from pneumonia patent belongs to wuhan, china. (Dharmendra Kumar .et al, 2020).

Covid-19 was declared as a **'public health emergency of international concern'** by who on 30 January 2020. The name coronavirus disease is shortened to as covid-19. Coronavirus disease 2019 (covid-19) is caused by novel severe acute respiratory syndrome coronavirus 2 (sars-cov-2) and was first reported to the who as pneumonia of unknown aetiology in the Wuhan China on 30 December 2019. Corona virus is an RNA virus consisting of positive-sense single-stranded RNA of approximately 27-32 kb. Corona virus is spherical, RNA enveloped with club shaped glycoprotein. Corona viruses are four sub type such as alpha, beta, gamma and delta corona virus. Each of sub type corona viruses has many different serotypes. Same of them were affect human of other affected animals such as pigs, birds, cats, mice and dogs. (Jaideep C. Menon, et al, July 2020). There are six known corona viruses that typically cause infection in humans. Among these, coronavirus 229E, OC43, NL63 and HKUI generally cause mild cold-like symptoms, whereas severe acute respiratory syndrome – coronavirus (SARS-CoV) in 2003 and middle east respiratory syndrome-coronavirus (MERS-CoV) in 2012, caused severe respiratory diseases such as pneumonia and death. (Nivedita Prasad, et al , 2020).

The novel corona virus (COVID-19) earlier known only as the Wuhan virus, And then in south Korea, japan, Italy, Iran and finally spreads in India. It is given the name novel because it is a never seen before mutation of animal coronavirus. COVID-19 has spread across the globe and a pandemic was declared on 11 march 2020 by the WHO. Covid-19 is transmitted through respiratory droplets and contact routes respiratory droplets are defined by the WHO as >5um in diameter and can be either aerosols (<50um) or spatters (>50um). Although airborne transmission by droplet nuclei (<5um) has not been ruled out , it is unlikely to be the main route of transmission. Hence face shields, and use of mask was recommended. Aerosol-generating procedures are routinely performed in dentistry as SARS-CoV-2 has been found in saliva, it is also possible that COVID-19 can be transmitted by aerosolized saliva (precautions for dentists during covid-19 – Adrian H. Shi, et al, 2020).

It is believed that the virus may be attached with a wet market (with seafood and live animals) from Wuhan that was not complying with health and safety regulations. The Wuhan wet market has since been closed down indefinitely, the covid-19 is very similar in symptomatology to other viral respiratory infections. Cases very from very mild forms to very severe ones that can lead to serious medical condition or even death. It is believed that symptoms may appear in 2 to 14 days as the incubation period for the novel coronavirus has not yet been confirmed. As it is novel virus specific modes of transmission is not known. Originally emerged as animal source but now spreading from one person to other person. There has been speculation about the virus spreading while the carrier is not showing any symptoms, but that has not been confirmed as a scientific fact. Currently symptoms known are cough, acute onset of fever and difficulty in breathing. Out of all the cases that have seen confirmed, upto 20% have been declared to be severe. Complication that may arise as a result of being infected are pneumonia, sepsis, septic shock and ARDS (acute respiratory distress syndrome) suspicion should arise with the above mentioned symptoms and recent travel history to countries being affected by covid-19 or now more crudely travel to any foreign country. (Varsha Kachroo, Novel coronavirus (covid-19) in India : current scenario, March 2020).

Approximately 67, 780, 361 covid-19 case and 1, 551, 214 death were reported by WHO as of December, 09, 2020 with cases reported in more than 220 countries (covid-19 update, who, 2020). The number of people

infected by the corona virus in India crossed 9.74 million ; nearly eleven-month after the country reported it's first case in the state of Kerala on January 30,2020 (Kumar et.al.2020).

In India, Kerala was the first state which is being affected by covid-19 and the first Covid-19 case was confirmed in Thrissur district on 30 January 2020. By early march the state soon had the highest number of active cases in India mainly due to huge number of cases imported from other countries and states. And Kerala is that states, that has high recovery rate, low death rate and slow progression, of covid-19 cases in India. (Jaideep C Menon, et.al, may 2021). Subsequently, the pandemic has so far claimed more than 141360 lives in india. The national recovery rate has reached 95.66% and the cause fatality rate is down to 1.45% deu to "increasing to test '', tracking, timely and effective clinical management of the patients in critical care. "according to ministry of health and family welfare" (MOHFW) on December 08, 2020 (covid-19 update, covid-19 india,2020), India tested 149,836,767 cumulative sample by December 07 and 1,022,712 samples were tested on December 08,2020. Current status of reported positive corona virus disease cases in India are for more than expected. (Christianne de faria coelho-Ravagnani, et.al,2021).

This novel corona virus outbreak has burdened India's economic, medical and public health infrastructure. The gross domestic product (GDP) shrank by the steepest pace ever, 23.9% of the April -June period when the corona virus brought the country to a standstill. Apart from this, health related consequences caused by covid-19. Combined global public health and economic crises (Sugin Lal Jabaris S.et al, 2021). The entire health care organization will eventually need to adjust to black chain technology application to support and fight covid-19 outbreaks. Block chain technology application to the health line industry can improve information security management; health care data can be analyzed and transmitted while maintaining data privacy and security (Mohamed Torky and Aboul Ella Hussanien).

To solve such health related consequences Indian government has encouraged strictly the practice for social distancing and implemented complete nation-wide lockdown to contain the spread of virus (S. Sharma et.al,2020). As soon as few symptoms may extend from mellow to extreme or even dangerous. The symptoms start within 2 to 14 days after one gets tainted; this period is known as the incubation period. The subject showing symptoms or found positive are being kept under active monitoring or quarantine either in isolation words or comps under active medical custody. The key symptoms of the disease include fever, chest pain, rapid heartbeat, cough, sore throat and shortness' of breath. In the worst infected cases, severe acute respiratory syndromes and kidney failure were also . (corona virus-sars-cov-2 : an insight to another way of natural disaster, Sunil Chawla, et.al, 2020),

Some typical recommendation for preventing infection spread are

- Educate the population about the importance of prevention of infection. (postured med j , may 1 , 2020)
- Maintaining at least 1-meter distance with anyone.
- Covering face with an elbow while coughing or sneezing..
- Washing hands with soap regularly.
- Avoid face, eye and nose touch.
- Avoiding unnecessary animal contact.
- Staying quarantine if you are unwell.
- Refrain from smoking.
- Practice social distancing.
- Avoid large gatherings.
- Use alcohol-based sanitizer for cleaning hands and public surfaces and objects.

- Stay home if it is not much necessary to go out.

As per latest data (7th april 2020) by john Hopkins university and other tracking websites, there are currently more than 1.5 million people infected by the novel corona virus all around the world and near about 85 thousand deaths reported from different parts of the world. The top 10 countries with maximum number of infected cases are the united states of America, Spain, Italy, Germany, France, china, Iran, united kingdom, Turkey and , Switzerland . And maximum number of death are reported from Italy, Spain, united states of America , France and united kingdom.

Indian accounts for almost one-fifth of the world's population and is second leading country in terms of population in the world. India's good camaraderie with majority of the nations in the world and its helpful nature makes it a perfectly for other countries. Therefore , the analysis of covid-19 outbreak in India region is closely watched and monitored by the world. India has been following a nationwide lockdown since 22-march-2020 till today may-2021 to overcome this pandemic situation. (Rajan Gupta ,et.al, April 2021).

II. MATERIALS AND METHOD

in the study, they proposed a new CNN-based method of classifying covid-19, pneumonia , and no-findings chest x-ray images.

X-ray image dataset

In this work, they used 500 chest x-ray images of covid-19 obtained from the open-source GitHub repository, shared by Dr. Joseph C., and the covid-19 Radiography dataset. They also used the chest x-ray 8 database on no-findings and pneumonia images.

Table.1. Summary of the dataset use covid-19, coronavirus disease 2019.

Class	Number of images
No-findings	500
Covid-19	500
Pneumonia	500

Table.1 show the summary of the dataset they used, which was split into three folders : no-findings, covid-19, and pneumonia.

Proposed model –

To detect covid-19 cases, they had created a very simple CNN model composed of 10 convolution layers followed by batch normalization, maxpooling, a soft max layer, and three fully connected layers. The convolution layers have 32 filters, each of which has a kernel size of 3x3. They had used a batch normalization operation to normalize the input ; this operation has other advantages, notably reducing the training time and increasing the stability of the model. The activation function used was Leaky ReLU, which is a variant of the RELU operation used to prevent neuron death.

The Maxpooling method is used in the all pooling operations. It reduces an input by taking the maximum of a area determined by its filter. Neurons of that layer were connected to all the activation functions of the

previous layer. The main responsibility of the maxpooling layer is to classify the convolution features extracted from the images datasets into the defined classes.

The softmax layer is simply used to interpret the probability values of the results of the activation functions of the previous layer. In cases of diagnosed disease, the values can be interpreted in three classes finally, the three fully connected layers act as classifier . They use extracted features and evaluate the probability of an object's presence in the image. Usually, activation functions and a dropout layer are used to establish non-linearity and minimize overfitting, respectively (Amira Echtioui, et.al,2020).

As searched and analyzed targeted evidence-based guidelines issued in various countries affected by this pandemic up to date. The recommendation for the prevention and control of other epidemics caused by other pathogens belonging to the same family of coronavirus or others that present the same mechanisms to transmission also were searched and analyzed. Moreover , they checked and analyzed different scientific papers related to pharmacological approaches, clinical assessment of various personal protective equipment (PPE) of the respiratory tract and epidemiological data regarding this virus. In detail, they looked into all the best reports of the world health organization , the U.S.Food and drug administration , the Italian society of pharmacology, and the centers for disease control and prevention (CDC). Furthermore, they had identified more than 100 articles that use two primary sources to classify relevant information (Luigi Cirrincione, et.al,2020).

III. OBJECTIVES

The goal is to minimize the infection risk based on the latest scientific understanding of the virus by spreading awareness to people. The cases of positive patients i.e. covid-19 positive patient increasing day by day, to stop this government and doctors and paramedics are working to the best of their services. And people should follow and adhere to government advisories strictly. And we all Indians should take lessons from china and Italy that what have this novel virus can create. And to stop such things happening in India , our Indian government has putted many districts under lockdown keeping in view the rise in the number of case and keeping the condition in the phase 2 of the outbreak our government made same typical recommendations for protecting infection spread are :

- Maintaining at minimum 1-meter distance with anyone.
- Covering face with an elbow while coughing or sneezing
- Washing hands with soap regularly
- Avoiding face, eye and nose touch.
- Avoid less-cooked or raw meat.
- Avoiding unnecessary animal contact.
- Staying quarantine if you are unwell.
- social distancing.
- Avoid large crowds.
- Use alcohol-based sanitizer for cleaning hands and public surfaces and objects.
- Stay home if it is not much necessary to go out.
- Use face shield or mask after taking vaccines also.

Now , we should understand our responsibility positively that it is not for others or for government, it is for ourselves and for our families COVID-19 impacts the elderly and those with pre-existing health conditions most severely. In a spirit of the solidarity, we all have to be ready to contribute our part to protect those people

at highest risk. As individuals, practicing good hygiene and prevention measures as well as applying measures of social distancing, including avoiding crowded places, continue to be very important.

For all countries, the final aim is the same: stop transmission and prevent the spread of the virus to save lives.

IV. RESULT

It has been proved by (Amira Echtioui , et al) that a simple but effective cnn model of the detection of covid-19 disease from chest x-ray images. It demonstrates, their model classified the covid-19 and no-findings classes slightly better than the pneumonia class in terms of all the performance criteria, the classification of no-findings of covid-19 yields better results than the no-findings classes, hence it is simple but effective CNN model for the detection of covid-19 disease from chest x-ray images. Although they achieved a fairly high detection accuracy, precision, and recall of covid-19 this does not mean that it is a production-ready solution, especially with the limited number of images currently available.

The classification accuracies are 94.14%, 90.97% and 88.925 for the categories of covid-19 positive, pneumonia and no-findings, respectively.

The covid-19 Pandemic requires a more risk-benefit analysis with deciding the modality of respiratory support for patients, the risk for healthcare worker infection, nosocomial spread, availability of resources, and clinical spectrum of disease must all be considered.

The recommendations set out so for the prevention of covid-19 for from us. And it can be implemented by integrating the information based on the degree of the spreading risk of this virus in the country, determined by its location in relation to the areas of greatest risk and by the type of work carried out, as suggested by the guidance on preparing workplaces for covid-19.

Considering the lack of knowledge about the sars-cov-2 is transmitted, our goal is to develop a guide on the application of prevention and protective measures, after analyzing the latest publications on sras-cov-2 and the other corona viruses and on the prevention of respiratory diseases.

There is evidence of SARS- Cov-2 presence in patient stools, however, fecal-oral route transmission is still unclear previous reports revealed the capability of SARS and other corona viruses of surviving on an inanimate object and environmental surfaces. However, there is no report of sars-cov-2 presence in the environment except human market. The effectiveness of travel restriction, maintaining social distance, wearing a mask in the general public, hum or self quarantine is not clear although there are same studies an the treatment of covid-19, more study needed, several studies are focusing on the influence of environment parameters, such as temperature and humidity , an SARS- like viruses transmission. The seasonality of the outbreak is also required to study. More studies are needed to explore the role of environment in the spread of the virus and its viability that are crucial for adopting strategies to control covid-19 outbreak. Besides the environment, more studies are required to identify the intermediate host (s) of covid-19 because bats are known to be a reservoir of SARS - Cov-2.

V. DISCUSSION

India's healthcare system has limited capacities and a strong focus on primary health care delivery. The country's healthcare expenditure is 3.5% of the national GDP. However, only 1.28% of government public expenditure to the total government revenue is used for health care expenditure, indicating a high oop burden.

The country's limited health infrastructure capacities, as indicated in this paper, might result in higher case-fatalities, according to khan et.al, when adjust for healthcare expenditure , existing burden of non-communicable disease, the demographic profile of the country and population density , capacity of the health care negatively correlated with casefatalities. there are further implications of limited bare facilities and capacities, including the provision of primary health services.

After detecting the first case on 30 Jan 2020, India experienced a delayed growth in the case-count. However, there are indices that community transmission prevailed by March 2020, subsequently, India recorded a constantly increasing daily incidence date. As of 9 June, India's cumulative prevalence exceeded 300,000 COVID-19 cases with a doubling clime of eight days. The majority of cases being men and under 40 years of age.

Several mathematical projections modeled the outbreak according to different scenarios accounting for quarantine measures. However, early projection of the spread of COVID-19 in India appeared to overestimate the trajectory when compared with the reported outbreak development. The effectiveness in point – of entry screening was delaying the spread of COVID-19.

As indicated, the point –of-entry screening strategy by thermal scanning of only symptomatic passengers may be inefficient. this is supported by the finding in their baseline showing an estimate of 46% of travelers with COVID-19 would not be detected.

In March, India implemented visa restrictions for countries with a high COVID-19 burden and advised home quarantine for asymptomatic travelers entering India. On 25 March, the Indian government imposed a complete 21 day lockdown, including the suspension of domestic travel, closure of recreational places, gathering restrictions, and closure of nonessential business. In addition. The government released a relief fund with a volume of 20 lakh crore rupees (265 billion dollars). The government started deco fining by easing domestic travel restrictions on 25 May and implementing a deconfinement strategy with several lockdown phases according for regional epidemiological differences. Along with the WHO's social media awareness campaign via Whatsapp, India also released as Indian-centric version of the COVID-19 campaign to provide evidence-based information and curb the regulation of myths and false news and contact tracing Smartphone application mandatory for domestic travelers.

The magnitude of the economic impact is still unfolding as cases are increasing, and the government is compelled to take drastic measures for the management of COVID-19. Forecasts predict a plunge in GDP growth for India to the extent of 3.3% compared to estimation prior to the COVID-19 outbreak. As a law-middle income country, the challenge of fiscal responsibility on the growing demand of medical supplies added to the already low government public expenditure on health in a major concern not to be overlooked as it might slow the recovery rate of the Indian economy. The global slowdown in supply and production might have far-reaching consequences for the Indian pharmaceutical industry, notably as essential driver of the Indian economy moreover, Indian pharmaceutical companies therapeutic medical products crucial to the global response in tracking COVID-19.

VI. CONCLUSION

India is an immensely – populated country and hence, the country needs to take watchful steps. The cases are rising very fast and they need aggressive control strategies from the administrative units of India. Corona viruses are enveloped RNA viruses that cause respiratory illness of varying severity from the common cold to

fatal pneumonia it is more than just a common cold ranging from respiratory diseases to severe pneumonia. In the age of technology, due to the fast development of genome sequences of the novel virus, the research community was engaged rapidly in providing analysis, simultaneously developing antidotes and diagnostic tests. This is the first time any epidemic was so quickly and so accurately analyzed and predicted using machine learning and artificial intelligence paradigms. Many biotech companies are coming to fight against the corona virus global outbreak. The unique circumstances of the epidemic have made a tremendous interest in online clinical administrations and information, confinement to homes especially for kids is a serious matter of concern and will `have major impact on their mindset if the epidemic gets prolonged same superstitious aspects of corona virus researches have been unfolded and many aspects of the corona virus researches have not been unfolded ; such as predicting the impact and spread of the pandemic in upcoming days in the major countries of the world on different scales and different parameters. Effective containment can flatten the exponential growth curve of infection due to the pandemic. Mental health and stress level patterns during such pandemics can be detected and analyzed using artificial intelligence and deep learning.

Corona virus is spreading human to human to transmission by close contact via airborne droplets generating by coughing, sneezing, kissing and smooching, so avoid these activities with infected partners and family members. Corona virus may transmit through pet animal such as dog, cat, pig, cow, turkeys, so avoid content and separate them if observed any infection activities like diarrhea, cold, fever. As per WHO and ECDC guidelines avoid the contact with sick people and also avoid the market or public places as per possible. The use of masks, frequent hand-washing, proper sanitization, social physical distancing, avoiding crowds and a healthy life style must be the new normal life.

The cases are rising very fast and they need aggressive control strategies from administrative units of India. These are six different aspects covered up into relation to presenting the growth trends of infected cases in India, prediction for the number of infected cases for next few days, impact of social distancing on the citizens of India, impact of mass events on the number of infected cases in India, network analysis and mining of pollens on the patients suffering from corona virus, and analyzing the strategies for uplifting lockdown in India. The current study implemented various technique to present the data analysis and the results are in sync with few limited studies available in the literature. This study will be useful for the government of India and various states of India, frontline health workforce of India. Researchers and scientists. This study will also be favorable for the administrative units of other countries to consider various aspect related to the control of COVID-19 outspread In their respective regions.

To contain the spread, foremost emphasis is essential on the rigorous testing, necessary equipment, ventilators, and research and development activities. Regular counseling of people is also imperative to reduce the mental-stress which is inevitable in such difficult situations, it is vital to come up with the sustained advance mental policies after the COVID-19 experience to deal with such unprecedented circumstances with a holistic approach. One has to win this war quite intelligently with the public support and alertness. In a way , COVID-19 has taught people the highest discipline of life.

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Variation in Total Dissolved Solids (TDS) Of Groundwater of Arni Town, District-Yavatmal (Ms) India during Period of June 2020-May 2021

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ABSTRACT

Water is life. Groundwater is considered as purest and majorly available source of water. It is used to fulfill 50% urban and 80% ruler water demand in India besides irrigation. Total Dissolved Solids, also known as TDS, are inorganic compounds that are found in water such as salts, heavy metals and some traces of organic compounds that are dissolve in water. Total dissolved solids (TDS) are a measure of the combined total of organic and inorganic substances contained in a liquid. This includes anything present in water other than the pure H_2O molecules. These solids are primarily minerals, salts, and organic matter that can be a general indicator of water quality. Arni is a town (Taluka) with (Administrative Division) & Tahsil in Yavatmal district of Maharashtra State in India. As groundwater is prominently used to fulfill domestic demands hence quality of groundwater must be checked time to time in order to supply safe drinking water. In this paper, one attempt has been made to study of variation in total dissolved solids of water of Arni Town, District-Yavatmal (MS) India over a period of 1 year from June 2020 to May 2021. TDS range of groundwater in Arni city is found to be acceptable and fair.

Keyword- water, total dissolved solids, groundwater, variation in total dissolved solids of water of Arni Town, District-Yavatmal (MS) India.

I. INTRODUCTION

Water is colourless, odourless and transparent substance. Water is the important, precious and indispensable natural resources of the earth, covering approximately three-forth of the earth surface. Water is life. Water is an essential element of human being. Approximately 60-65% of human body is composed of water (1). A man can survive for 20 days without food but cannot survive even for 20 hours without water. The earth has a reserve of 75% water of which 97% is of saline water and only 3% is fresh water. Out of the 3%, a little over 2% is tied up in ice caps and glaciers and along atmospheric and soil moisture, is not accessible and only 0.003% is readily available to us in the form of groundwater and surface water. Surface water is mostly polluted so it becomes unfit for use. Groundwater has excellent natural quality, usually free from pathogens, color and turbidity and can be consume directly without treatment. It does not require large storage, treatment and distribution system, can be frequently developed incrementally at point near water demand. Generally,

groundwater is mostly chemically and microbiologically non-polluted so it is safe for drinking and cooking in addition to agriculture or industrial use. Groundwater is used to irrigate around two fifth of India's total agricultural land. Groundwater is considered as purest and majorly available source of water. It is used to fulfill 50% urban and 80% ruler water demand in India besides irrigation (2).

1. Total Dissolved Solids, also known as TDS, are inorganic compounds that are found in water such as salts, heavy metals and some traces of organic compounds that are dissolve in water. Excluding the organic matters that are sometimes naturally present in water and the environment, some of these compounds or substances can be essential in life. But, it can be harmful when taken more than the desired amount needed by the body. The total dissolved solids present in water are one of the leading causes of turbidity and sediments in drinking water. When left unfiltered, total dissolved solids can be the cause of various diseases. Total dissolved solids (TDS) are a measure of the combined total of organic and inorganic substances contained in a liquid. This includes anything present in water other than the pure H_2O molecules. These solids are primarily minerals, salts, and organic matter that can be a general indicator of water quality.

2. Arni is a town (Taluka) with (Administrative Division) & Tahsil in Yavatmal district of Maharashtra State in India. It is situated on the banks of the Arunavati River. It Connected with National Highway-361. Nearest Railway Station is a Dhamangaon which is located 90 km approximately & Nearest Airport is a Dr. Babasaheb Ambedkar International Airport, Nagpur is around 187 km from Arni. Location of Arni in Maharashtra, India Coordinates: 20°07′40″N 77°55′39″E. In Arni town, main source of drinking water is groundwater. As groundwater is prominently used to fulfill domestic demands hence quality of groundwater must be checked time to time in order to supply safe drinking water (3).

Fig. - Yavatmal distric map

In this paper, one attempt has been made to study of variation in total dissolved solids of water of Arni Town, District-Yavatmal (MS) India over a period of 1 year.

II. METHODOLOGY

Water samples were collected from different location of Arni town during investigation period of June 2020 to May 2021. Sample is collected in polyethylene bottle. Within 1 hour, its temperature, pH, total hardness is measured. For measurement of hardness of the sample, used Tds meter whose details are as follows:

Brand   •   : HM
Model Number   •   : AP-1
Type   •   : Digital
Range   •   : 0-5000 ppm
Temperature Range •   : -5+50 degree C degree C
Accuracy   •   : +-2%
Battery Life   •   : 1000
Power Features
Power Requirement •   : 3v
                               •
Dimensions
Width   •   : 3 cm
Height •   : 15 cm
Weight •   : 0.1 kg
Manufacturer   : HM DIGITAL PVT LTD SOUTH KOREA
Importer   : HM DIGITAL INDIA PVT LTD DELHI
Source-www.Flipkart.com

For the study purpose, we had selected six different groundwater sources of Arni. Water samples are collected every week (four in a month) and Tds is measured with the help of digital Tds meter. Following table shows details of the water sample source:

Sr. No.	Sample	Area of sample	Groundwater source	Depth
1.	Sample 1	Madhav Nagar	Borewell	125 ft
2.	Sample 2	Old Tahsil Area	Borewell	100 ft
3.	Sample 3	Datta Nagar	Borewell	125 ft
4.	Sample 4	Mathura Nagar	Borewell	110 ft
5.	Sample 5	Sambhaji Nagar	Borewell	150 ft
6.	Sample 6	Swami Samarth Nagar	Borewell	200 ft

Following table shows Tds of different samples under study-

Sr. No.	Month	Week	Sample 1 TDS (in ppm)	Sample 2 TDS (in ppm)	Sample 3 TDS (in ppm)	Sample 4 TDS (in ppm)	Sample 5 TDS (in ppm)	Sample 6 TDS (in ppm)
1	June 2020	I	545	803	621	453	444	343
2		II	514	800	610	500	475	400
3		III	510	808	603	480	514	301
4		IV	502	805	610	495	415	410

5	July 2020	I	535	800	566	485	526	406
6		II	504	803	645	500	511	396
7		III	518	801	618	506	544	348
8		IV	520	800	601	522	511	400
9	August 2020	I	511	721	620	522	499	394
10		II	521	820	675	514	534	320
11		III	547	804	615	554	520	330
12		IV	546	810	610	511	543	324
13	September 2020	I	604	720	598	499	600	410
14		II	600	659	600	458	558	333
15		III	611	698	570	501	578	404
16		IV	602	710	601	430	586	406
17	October 2020	I	500	705	510	506	605	346
18		II	613	732	498	50	640	344
19		III	605	804	507	500	614	354
20		IV	645	841	512	500	611	356
21	November 2020	I	611	854	524	455	600	400
22		II	560	644	503	451	631	400
23		III	605	800	501	436	649	322
24		IV	531	807	500	407	648	304
25	December 2020	I	505	730	476	456	624	401
26		II	493	789	509	550	627	319
27		III	488	784	480	475	506	302
28		IV	500	805	510	506	550	359
29	January 2021	I	508	700	455	505	604	319
30		II	503	631	411	503	600	303
31		III	488	655	450	500	601	330
32		IV	535	600	440	516	581	390
33	February 2021	I	508	601	500	458	498	380
34		II	414	608	498	497	550	406
35		III	511	700	506	507	506	308
36		IV	407	645	447	531	502	347
37	March 2021	I	508	600	413	503	495	303
38		II	444	611	403	445	503	322
39		III	405	466	444	498	556	301
40		IV	400	600	504	507	552	420
41	April 2021	I	431	522	355	500	446	301
42		II	474	600	423	418	315	322
43		III	401	500	400	406	400	301
44		IV	510	515	410	414	310	401

45		I	401	565	421	411	380	396
46	May	II	386	458	411	406	303	314
47	2021	III	401	541	421	420	321	300
48		IV	403	459	401	411	320	300

According to World Health Organization (WHO) and Bureau of Indian Standard some parameter are as follows:

Sr. No.	Water quality parameter	Bureau of Indian Standard (IS-10500:1994)	WHO International Standard (1983)
1.	pH	6.5-8.5	7.0-8.5
2.	Total Dissolved solids (ppm)	500-2000	500
3.	Total hardness (ppm)	300-600	100

TDS- The mineral constituents dissolved in water constitute total dissolved solids. The concentration of dissolved solids in natural water is usually <500 ppm while water with more than 500 ppm is undesirable for drinking and industrial use. It is reported that TDS value of 500 ppm is desirable limit and 2000 ppm is the maximum permissible limit and that water containing more than 500 ppm of TDS causes gastrointestinal irrigation (4). High value of TDS influences taste, hardness and corrosive property of water (5, 6). Drinking water should contain sufficient minerals to keep you healthy and should not contain excess minerals that become overloaded in the body. In this article, we will provide details about the acceptable minimum and maximum TDS (Total dissolved solids) Limits for drinking water.

Following table summarize portability of TDS amount of water:

TDS Level (ppm)	Palatability of Water
Less than 300	Excellent
300-500	Good
600-900	Fair
900-1200	Poor
Above 1200-2000	Unacceptable

III. CONCLUSION

From the variation of hardness table it is observed that the minimum TDS of groundwater Arni city is 303 ppm and maximum is 890 ppm. Out of six samples, five samples have TDS more than 500 ppm and below 1000. These samples have acceptable value according to Bureau of Indian Standard (IS-10500:1994) which has range 500-2000 ppm. One sample has value below 500 ppm which has acceptable value according to WHO International Standard (1983). TDS range of groundwater in Arni city is found to be acceptable and fair.

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Viscosity Behaviour of 2-Aryl-2-Dihydronaptho (1, 8-Ef) (1, 2, 4)-Triazepine-3(4H) Thiones in Different Percentages of Solvent

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ABSTRACT

The viscosities and densities of several 2-Aryl-2-dihydronaptho(1,8-ef)(1,2,4)-triazepine-3(4H) thiones(VI a-e) have been obtained in good yield after the isomerization N-(1H-naptho) (1,8-cd) thiadiazepine-3(4H)-ylidene anilines (Va-Ve). The viscosities and densities of these synthesized compounds (VI a-e) in different percentages of acetone- water, ethanol-water, dioxane-water mixtures have been measured. From the data obtained the relative viscosities have been calculated which are used to measure the molecular interactions in the solutions and to study the viscosity behavior of substituted 2-aryl-2-dihydronaptho(1,8-ef)(1,2,4)-triazepine-3(4H) thiones on the basis of the presence of different substituents.

Key words – Viscosity, Substituted triazepine-3(4H) thiones

I.   INTRODUCTION

Triazepinethiones are shown to have utility as a black toning agent for laminated photographs[1]. They have also been shown to possess superior bone resorption-inhibitory action and are useful as therapeutic agents for osteoporosis[2]. The present work deals with the study of molecular interactions of substituted triazepine-3(4H) thiones (VI a-e) in different percentages of acetone-water, ethanol-water and dioxane-water mixtures at (29±0.1°c) and their viscosity behavior on the basis of presence of different substituents. Viscosity is one of the important properties of liquids. It implies resistance to flow. Viscosity measurements, like other transport properties of electrolytes, provides useful information about solute-solute and solute-solvent interactions in non aqueous and aqueous solutions[3-5]. Molecular interactions of binary mixtures have also been studied by many workers[6-9]. Many attempts have been made to study viscosities of binary liquid mixtures, but no satisfactory results seems to have been reported[8].

II.   EXPERIMENTAL

Synthesis of 1-(8-Amino naphthalene-1-yl)-3-(4-methyl phenyl) thiourea (IIIa):

1-8-Diamino naphthalene (0.01 mole) was added to phenyl isothiocynate (0.01 mole). To thisn mixture 10 ml chloroform was added as solvent. The reaction mixture was reflux for 1 hr. After completion of reaction the

solvent was vaccum distilled when granular solid was obtained. It was crystallized from ethanol m.p. 214^{0}C, other thiocarbamides were prepared by following similar procedure.

Synthesis of 4-Methyl-1-N-(3Z)-1-H-naptho(1,8-cd) (1,2,6) thiadiazepine-3(4H)-ylidine aniline(Va):

1-(8-Amino naphthalene-1-yl)-3-(4-methyl phenyl) thiourea (IIIa) was made into paste with ethanol. To this iodine solution in ethanol was added dropwise with stirring the reaction mixture. The addition was continued till violet colour of iodine persisted. The reaction mixture was left at room temperature for overnight. The granular solid (IVa) was obtained. On basification of (IVa) with dilute ammonium hydroxide offorded free base (Va).

Isomerization of 4-Methyl-1-N-(3Z)-1-H-naptho(1,8-cd) (1,2,6) thiadiazepine-3(4H)-ylidine aniline(Va) to2-4(methyl phenyl)-1,2-dihydronaptho (1,8-ef)(1,2,4)-triazepine-3(4H) thione was done by refluxing (Va) with 10 ml 5% ethanolic sodium hydroxide solution for 1 hr. The mixture was poured in cold water. The isolated solid (VIa) was filtered, dried and crystallized from ethanol.

The other compounds (VIb-VIe) were obtained by isomerization of related thiadiazepines(Vb-Ve). Where,a-(4-methyl), b-(3-methyl), c-(2-methyl), d-(H), e-(4-chloro) are substituents.

The structure of these compounds were established on the basis of elemental analysis, equivalent weight determination, IR and PMR spectral data. The solvents used were of AR grade and doubly distilled water was used. Weighing was made on Shimadzu Japan BL-2204 balance (±0.001g). The densities of ligand solutions and solvents were determined by a bicapillary pyknometer (±0.2%). The viscosities were measured by means Ostwald's viscometer (±0.11% Kgm^{-1}s^{-1}) which was kept in equilibrium Elite thermostatic water bath (±0.1°c). The solutions were prepared in different percentages (70,80,90 and 100%) of acetone-water, ethanol-water and dioxane-water mixtures. For each measurement sufficient time allowed to maintain constant temperature by attaining thermal equilibrium in a thermostat.

III. RESULTS AND DISCUSSION

The relative viscosity of each of the ligand solution is determined by using the impirical formula,

$n_r = d_s \times t_s / d_b \times t_b$

Where n_r indicates relative viscosity of ligand solution, d_s is density of ligand solution and d_b is density of respective solvent; t_s is time of flow for ligand solution and t_b is time of flow for respective solvent.

The relative viscosity and density data for ternary mixtures in different percentages of solvents are obtained in Table 1 to 3. It can be seen that relative viscosity increases with decrease in the percentage of acetone, ethanol and dioxane, which may be due to increase in molecular interactions. Also change in the structure of solvent or solution as a result of hydrogen bond formation or disruption leads to decrease or increase in interactions. Solutes can occupy interstitial spaces in the solvent. The increase in viscosity arises from the fact that solute particles lie across the fluid stream lines and are subjected to torsional force[11,12].

Acetone-Water > Ethanol-Water > Dioxane-Water

This may be due to the effect of greater polarity of acetone as compared to the less polar ethanol and non-polar dioxane solvent. The polar compounds are having more viscosity than non-polar compounds. In polar compounds cohesive forces attributed to the presence of different types of intermolecular forces which results increase in viscosity.

It can be seen from Tables 1 to 3 that the order of relative viscosities in compounds is VIe>VIa>VIc > VIb>VId.

Also as molecular weight increases, viscosity increases and is related to density. Molecular weight is directly proportional to density as the density increases distance between ligand molecules decreases. That result cohesive forces between molecules increases and viscosity of liquid increases.

Table-1 Viscosity Data for Substituted Triazepine-3(4H)-thiones (VIa-VIe) Acetone-Water Mixtures

Compounds/Relative viscosity (n_r) at (29 ± 0.1°c).				
Percentage of acetone	VIa	VIb VIc	VId	VIe
70	1.2615	1.2412	1.2448	1.2310	1.2941
80	1.2334	1.2110	1.2123	1.985	1.2549
90	1.1825	1.1771	1.1882	1.1620	1.2013
100	1.1189	1.1028	1.1030	1.1022	1.1238

Table-2 Viscosity Data for Substituted Triazepine-3(4H)-thiones (VIa-VIe) Ethanol-Water Mixtures

Compounds/Relative viscosity (n_r) at (29 ± 0.1°c).				
Percentage of ethanol	VIa	VIb VIc	VId	VIe
70	1.1532	1.1321	1.1449	1.1120	1.1648
80	1.1270	1.1112	1.1123	1.1079	1.1383
90	1.1069	1.1012	1.1023	1.0076	1.1114
100	1.0117	1.0103	1.0108	1.0094	1.0125

Table-3 Viscosity Data for Substituted Triazepine-3(4H)-thiones (VIa-VIe) Dioxane-Water Mixtures

Compounds/Relative viscosity (n_r) at (29 ± 0.1°c).				
Percentage of dioxane	VIa	VIb VIc	VId	VIe
70	1.1421	1.1301	1.1336	1.1217	1.1598
80	1.1224	1.1202	1.1210	1.1122	1.1367
90	1.1172	1.1022	1.1092	1.1036	1.1223
100	1.1075	1.1021	1.1026	1.1002	1.1125

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Evaluation of Antibacterial and Antioxidant Properties of Indigenous Cow Urine

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ABSTRACT

The article was emphasized on evaluation ofantibacterial and antioxidant potential of indigenous cow urine.Cow urine collected from rural area undertaken for analysis to establish antibacterial and antioxidant activity using agar well diffusion as well as DPPH assay. The zone of inhibition against test bacterial strains and DPPH assay hasrevealed promising results which confirms that the cow urine as a potent therapeutic agent. The presence of lipase enzyme in urine makes it highly potential anticancer agent which can be detectedby performing thin layer chromatography (TLC) and titrimetric method.

Keywords: Cow urine, antibacterial activity, antioxidant activity etc.

I. INTRODUCTION

The medicinal importance of cow urine (Gomutra) is well described in Ayurveda. Cowpathy is a treatment (in Ayurveda medicine) based on products obtained from cows called Panchagavya[1]. The use of Panchgavya in preparing medicinal and agricultural products are effective, eco-friendly and free form toxic effect to mankind. Recently cow's urine is being used as an effective medicine under cowpathy which is capable of curing blood pressure, thyroid, blockage in arteries, asthma, constipation, diabetes respiratory diseaseand certain types of cancer [2-5].

Cow urine contain N, S, Fe, Si, Cl, Mg, Na, citric salt, succinic salt, calcium salt, vitamin A, B, C, D, and E, lactose, creatinine, harmones ,urea and enzymes. It heightens the fact that cow urine is free from toxicity and contains 95% of water, 2.5% urea and remaining 2.5% a mixture of salts, hormones, vitamins and enzymes [6]. The main component in urine is urea known as micro-organismskilling agent thus is used as effective antiseptic for skin diseases, wounds andbeside this enzymatic action of urine can cure the various diseases including cancer [7, 8]. Cow urine enhances secretion of interleukin-1 and interleukin-2, as well as phagocytic activity of microphages and thus helps in the control and prevention of infections [9].Nowadays, different preparation of cow urine like photoactivated urine, urine distillate and fresh urine have been marketed as a reedy to get rid of various infections[10].

Cow urine is believed to have used in many drug formulations and also as a radical scavenging activity. The free radicals in our body damage the cell and its cellular components therefore it causes genetic disease.

Antioxidants are the substances that scavenge these harmful free radicals and prevent the damage to the cellular components [11]. The cow urine and its distillate have the ability to prevent, delay or ameliorate many of the effects of free radicals [12] and thus show antioxidant activity [13].These properties of indigenous cow urine develop our interest to study antibacterial activity against different pathogenic human bacterial strains and antioxidant activity.

II. MATERIALS AND METHODS

Urine extract collected early in the morning about 5:00 am as first urine micturition from local cow of urban area of Akola district situated in Maharashtra. The sample was filtered and stored in refrigerator in closed sterilized container preventing light oxidation. The boiling point of sample was recorded using digital melting point apparatus (Veego DMP) and is uncorrected.

The antimicrobial activity also investigated against some selected pathogenic human bacterial strains using agar-well diffusion method. The zone of inhibition recorded in mm and compared with streptomycin as a standard. The DPPH free radical scavenging activity of cow urine also carried out at 517nm. The lipase enzyme detection was done by performing thin layer chromatography using ninhydrin spraying agent and titrimetric method.

Antimicrobial Activity

The antibacterial action of cow urine against selected pathogenic bacterial strains such as *E. coli, K. pneumonia, P. aerugionasa, S. aureus and B. subtilis* was performed by agar well diffusion method.[9 x14]. The 20 ml of sterile Muller Hinton agar was poured in sterile petri plates and allow solidify. The 8 mm wells were made using sterile borer and 100μg of cow urine sample was micropippetted into wells. The zones of inhibition were recorded in mm after incubation for 24 h at 37°C. The inhibition zone of the urine sample compared with the streptomycin as a standard reference.

Table 1: Antibacterial activity of cow urine against selected pathogenic bacterial strains

Bacterial strain	Zone of inhibition in mm		
	Fresh urine	Urine distillate	Streptomycin
E. coli	16	12	16
Klebsiella pneumonia	15	11	17
Pseudomonas aeruginosa	17	13	19
Bacillus subtilis	20	15	29
Staphylococcus aureus	18	13	26

Antioxidant Activity

The free radical scavenging activity of the cow urine was determined using DPPH (2,2-diphenyl-1-picrylhrazyl) assay[16]. To a set of test tubes, 2.9 ml of DPPH solution (100μg/ml in methanol) and 0.1 ml of varying concentrations of test urine samples were added. After mixing the content, it was allowed to dark for 30 minutes and the absorbance was recorded at 517 nm. A control was prepared by using 0.1 ml of methanol and 2.9 ml of DPPH radical solution. Percentage scavenging of DPPH radical was calculated by comparing the absorbance between the sample and control.

$$\% \textbf{ Scavenging of DPPH radical} = \frac{[(Acontrol - Asample)]}{Acontrol} \ 100$$

Table 2: The DPPH free radical scavenging activity urine samples (µg/ml).

	% Scavenging of DPPH at 517nm					
	100	200	400	600	800	1000
Fresh cow urine	18.3±0.14	28.8±0.27	46.2±0.10	54.8±0.16	58.20±0.10	68.4±0.3

Detection of Lipase Activity

1) Titrimetric Method

A mixture of olive oil emulsion (5ml), tris hydrochloride buffer (5ml) at PH-8.5 and urine samples (2ml) incubated at 35^0C for 20 mins. After incubation addition of acetone (10ml), free fatty acid liberated in the reaction mixture was titrated against 0.05 M NaoH using phenolphthalein as an indicator. The blank titration was performed, in order to calculate lipase activity in a unit.One unit lipase activity was defined as amount of enzyme liberated 1 mole of fatty acid per minute.

Similar experiment was carried by addingurine sample and repeated two times to get constant readings. Formula for calculating lipase activity is given below.

$$\text{Lipase enzyme} = \frac{[\textit{Exp. titration reading (ml)} - \textit{Blank titration reading (ml)}] \textbf{x } \textit{Molarity of NaOH} \textbf{ x 1000 x 2}}{\textit{Volume of test urine sample}}$$

2) Thin Layer Chromatography

The cow urine sample was spotted on this slides of silica-gel-G-plates were prepared by using silica gel of thick broth on clean glass slides andimmersed in developing solvent comprising of chloroform and acetic acid (ml) in proportion of 4:1. Slide wasremoves after 30-40 min. and sprayed with ninhydrin solution, dried it using hot air oven.The pink color spot was observed on the plates indicated the presence of proteins which confirmed the presence of lipase enzyme.

a)   Volumetric analysis   b) Thin layer chromatography

III. CONCLUSION

From the above study, it can be concluded that cow urine exhibit remarkable antibacterial activity against selected pathogenic bacteria which helps further studies of bioactive component of cow urine which may address to unmet therapeutic needs. Cow urine may showlipase enzymatic action which collaborates with its antimicrobial action as well as good antioxidant activity.

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Deltamethrin Pesticide Residues: Extraction by QuEChERS Method and Analysis by GC-MS/MS

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ABSTRACT

To ensure low pesticide levels in food the present studies was undertaken wherein samples of pigeonpea seeds procured from the field of experiments at the time of harvest of kharif crop of 2013-14 were studied for the residues of deltamethrin, a widely used insecticide in Vidarbha belonging to class synthetic pyrethroid. Pesticide residues were extracted using QuEChERS method and then analyzed through GC-MS/MS. Residues of deltamethrin in pigeonpea seeds in the samples of crop sprayed with 0.0014, 0.0028 and 0.0042 per cent deltamethrin were found below detectable limit (BDL) of 0.01 ppm for all the three concentrations .Considering the maximum residue limit (MRL) 1 mg/kg for pulses as specified by CODEX, the evaluated spray treatments of deltamethrin 2.8 EC can be considered most safe to the consumers.

Keywords: Deltamethrin, GC-MS/MS, Insecticides, MRLs, QuEChERS, Residues

I. INTRODUCTION

Pesticides are used by farmers to fight insects, increase the yield and improve the quality of food crops [1]. Pigeonpea (Cajanus cajan) is one of the important pulse crop grown in Vidarbha region of Maharashtra. Due to heavy infestation by pod borer *Helicoverpa armigera, farmers* use deltamethrin which is prominent and widely used insecticide belonging to class synthetic pyrethroid recommended against a broad spectrum of insect pests [2].For the control of *Helicoverpa armigera*, deltamethrin 2.8 EC @ 1ml/lit is recommended [3]. When good agricultural practices are not followed during pesticide application , residues can reach plant parts .Since dietary intake of pesticides is one of the main routes of exposure to different pesticides, analysis and monitoring of pesticide residues is tremendously an important process to secure consumers. In India, the Food Safety and Standards Authority of India (FSSAI) is responsible for setting the MRLs which have been registered by Central Insecticides Board and registration committee (CIBRC).Many international organizations such as the Codex Alimentarius Commission and European Union as well as different countries have issued their own pesticide maximum residual limits (MRLs) in food commodities [4]. The MRL is the maximum level of a pesticide residue (expressed in mg/kg) which is legally permitted in or on food or feed of animal [4]. In the absence of

established MRLs, CODEX Alimentarius MRLs are followed. Exceedance of MRLs could pose threat to population health.

There is a dearth of studies related to these issues in India especially on pigeonpea in Vidarbha hence in present investigation the pesticide residue content in pigeonpea seeds were analysed for deltamethrin .Pesticide residues were extracted and cleaned up by QuEChERS i.e.Quick, Easy, Cheap, Effective, Rugged and Safe method developed by [5] and then cleaned up residues were analyzed through GC-MS/MS to estimate the possible health risk on consumers.

II. MATERIAL AND METHODS

2.1 Field operations for raising the crop

The field experiments were conducted in Nagpur area during kharif season for consecutive two years. Four treatments including control with three replications were taken up using Randomized Block Design (RBD). Each treatment plot was of 3 x 3m with inter plot and inter replication distance of 1.2 and 1.8 m respectively (**Fig.1**).Deltamethrin 2.8 EC was evaluated against *H.armigera* pod borer on pigeonpea at the concentration of 0.0014, 0.0028 and 0.0042 per cent. Two sprays were applied at an interval of 15 days, first spraying at 50 per cent flowering stage of the crop and another 15 days thereafter. Thus two sprays were applied. Residue study was conducted on the samples of crop produce from the field trials conducted for studying the bioefficacy of deltamethrin 2.8 EC during kharif season 2013-14.
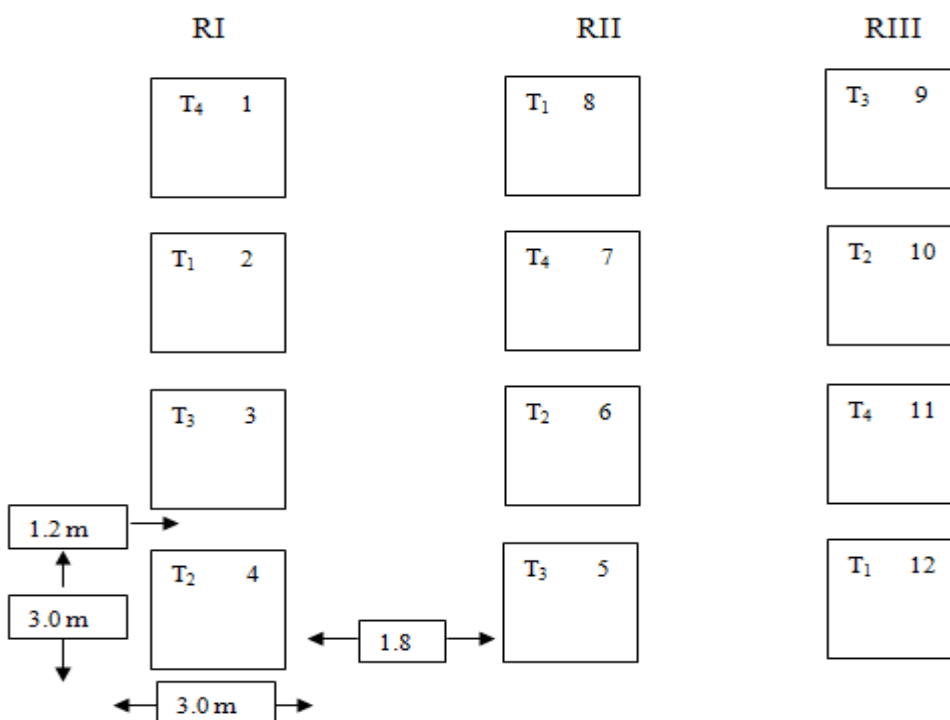
Figure 1: Plan of Layout of Pigeonpea (Year: 2013-2014)

Treatments
T$_1$- Deltamethrin 0.0014%
T$_2$- Deltamethrin 0.0028%
T$_3$- Deltamethrin 0.0042%
T4 -Untreated control

2.2 Residues analysis of deltamethrin in pigeonpea seeds

The pesticide residue content in pigeonpea seeds were analysed for deltamethrin .Pesticide residues were extracted and cleaned up by QuEChERS method and then cleaned up residues were analyzed through GC-MS/MS. The flow chart for residue analysis is shown in **(Fig: 2)**

Sampling and Sample preparation	Samples of Pigeonpea seeds were randomly drawn at the time of final harvest of the experimental crop
Extraction	• Water • Ethyl Acetate • Sodium sulphate
Clean up	PSA (primary secondary amine)
Preparation of certified reference material (CRM) Standard Solution	• Standard stock solution • Intermediate solution • Working solution • Standards for calibration
Identification Quantification & Confirmation of Pesticide Residues	GC-MS/MS

Figure 2: Residue analysis of deltamethrin in pigeonpea seeds

2.2.1. Procedure

Step 1: Sample preparation and extraction

Samples of seeds were randomly drawn at the time of final harvest of the experimental crop. After collection of samples in polythene bags it was brought to the laboratory for further processing. Samples of pigeonpea seeds were ground to powder using mixer at high speed .Out of 1Kg homogenized sample, 200 g representative samples were homogenized for 2 minutes after which samples were kept in deep fridge (-21℃) for 5 minutes. Then 10 grams of each sample was taken in 50 ml centrifuge tube. To this, chilled water (5 ml), Ethyl Acetate (10 ml) and sodium sulphate (10 g) were added and the mixture was homogenized for 5 minutes at 4000 rpm using high speed homogenizer. This led to phase separation.

Blank was also prepared by taking water (5 ml), Ethyl acetate (10 ml) and Sodium sulphate (10 g). The mixture was homogenized at 4000 rpm for 5 minutes

Step 2: Sample extract cleanup

The supernatant extract (1ml) was transferred to 2ml Eppendorf tube containing 25 mg PSA (primary secondary amine). The tube was centrifuged at 4000 rpm for 5 minutes and passed through 0.2μm sized pore PTFE membrane filter. 1μl extract was injected into the GC-MS/MS for deltamethrin analysis.

Step 3: Estimation

The residues of deltamethrin were estimated using GC-MS/MS operated under the following conditions. Residues were estimated by comparison of peak area of the standards with that of the unknown or spiked samples run under identical conditions.

The samples were injected at the following GC conditions:

GC Conditions

Column	:	HP-5MS, (30m x0.25mm x 0.25 micron)
Oven temp	:	Oven temp:70^0C hold 2.0 min
		-15^0C/min to 160^0C
		-3.0^0C/min to 200^0C hold 1.0 min
		-2^0C/min to 230^0C hold 1.0 min
		-8^0C/min to 285^0C, hold 6.0 min
Carrier Gas -He-1.2 ml/min	:	He
Carrier flow rate	:	1.2 ml/min
Injection mode	:	Pulsed spitless
Injection port temperature	:	120^0C
Transfer line temp:	:	280^0C
Detector Source	:	EI Positive
Scan Type	:	MRM
Sample injection volume	:	1µl

MS Conditions

Ionization mode	:	ESI
Polarity	:	positive

Identification and confirmation of target analytes

The identification of the pesticides was based on the retention time that was defined as per the injection made of the certified reference material. Blank sample and sample spiked at LoQ level i.e. 10ppb (0.01ppm) were injected and was compared against the spectra obtained on injection of the certified reference material.

Identification and Quantification

The pesticide was identified by comparing its retention time with respect to technical grade reference standard. The quantitative determination was carried out with the help of calibration curve drawn from chromatographic experiments with standard solutions. The standard solutions for the calibration curve were prepared in control matrix. For quantification an external calibration curve with five different concentrations of each pesticide, with matrix match were made.

Observations and Calculations

From the chromatograms, residues of deltamethrin in pigeonpea seeds were measured and recorded. The residues of deltamethrin were compared with CODEX MRL [4]

The following formula was used to derive the residues level in test sample

$$\text{Residue } \mu g/g = \frac{\text{Area of sample}}{\text{Area of standard}} \times \frac{\text{Conc of standard in } \mu g/ml}{\text{Weight of sample in gm}} \times \text{Dilution Factor}$$

III. EXPERIMENTAL FINDINGS

3.1 Harvest time residues of deltamethrin in pigeonpea seed

Levels of deltamethrin residues in samples of pigeonpea seeds from the field trial of kharif season 2013-14 is presented in the **table 1.** In pigeonpea seeds from the crops sprayed with 0.0014, 0.0028 and 0.0042 per cent deltamethrin, residues were found below detectable limit of 0.01 ppm.

Table 1. Residues of deltamethrin 2.8 EC in pigeonpea seeds in kharif 2013-14 experiment

Sample Component	RPL	Residue level in ppm			
		Spray concentration of Deltamethrin (% a.i)			
		0.0014	0.0028	0.0042	Control
Seed	i	BDL	BDL	BDL	BDL
	ii	BDL	BDL	BDL	BDL
	iii	BDL	BDL	BDL	BDL
	mean (±SD)	BDL	BDL	BDL	BDL
BDL = Below detectable limit 0.01 ppm					
RPL =Replication					

The chromatograms of residues of deltamethrin 2.8 EC obtained for pigeonpea seeds are presented below

Seed Sample – T1-X (0.0014% deltamethrin)
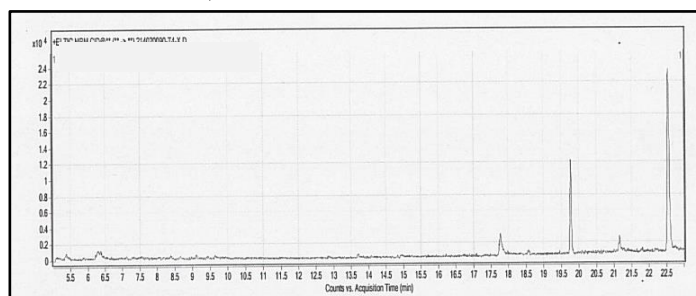
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	36	181.0 - > 152.0	0.001	mg/kg

Seed Sample – T1-Y (0.0014% deltamethrin)
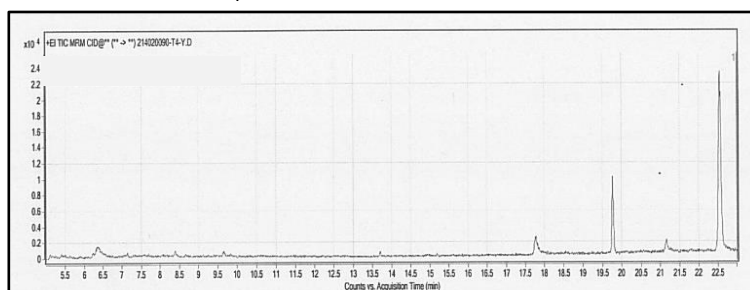
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	75	181.0 - > 152.0	0.001	mg/kg

Seed Sample – T1-Z (0.0014% deltamethrin)
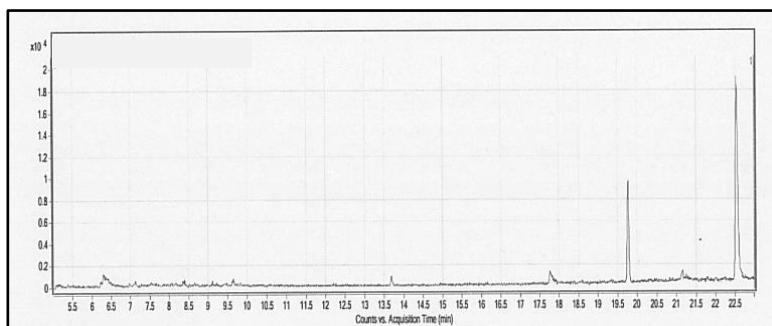
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	132	181.0 - > 152.0	0.003	mg/kg

Seed Sample – T2-X (0.0028% deltamethrin)
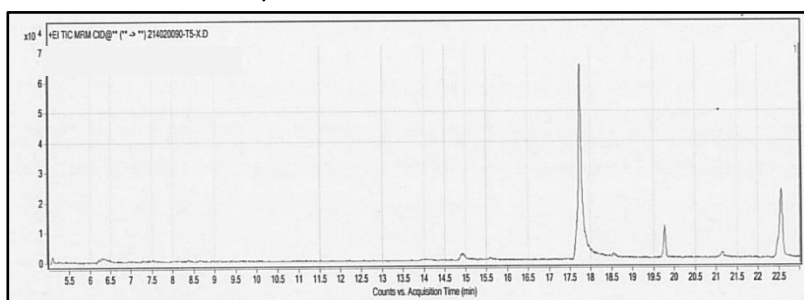
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	154	181.0 - > 152.0	0.001	mg/kg

Seed Sample – T2-Y (0.0028% deltamethrin)
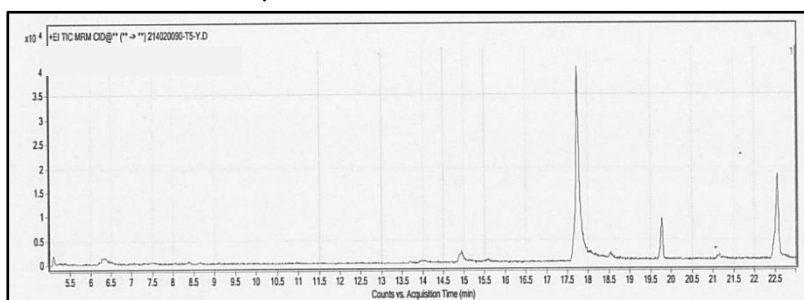
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	261	181.0 - > 152.0	0.003	mg/kg

Seed Sample – T2-Z (0.0028% deltamethrin)
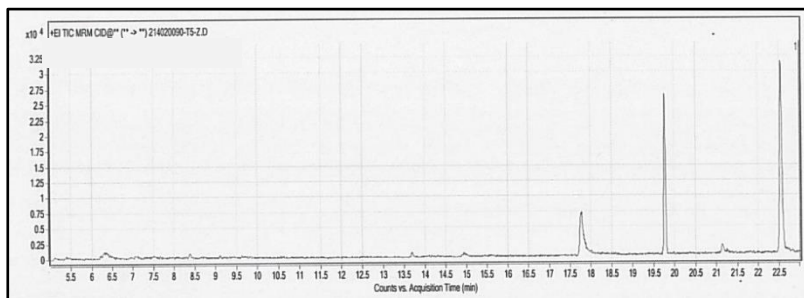
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	154	181.0 - > 152.0	0.000	mg/kg

Seed Sample – T3-X (0.0042% deltamethrin)
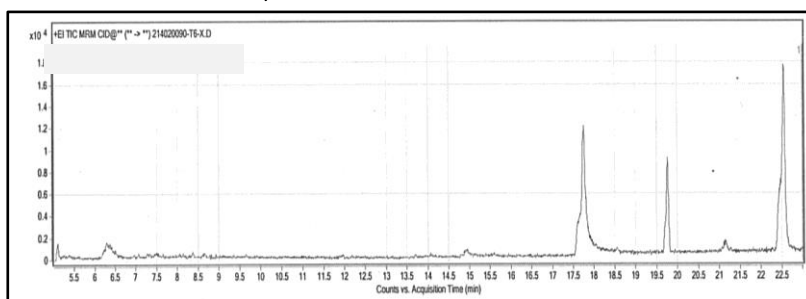
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	36	181.0 - > 152.0	0.001	mg/kg

Seed Sample – T3-Y (0.0042% deltamethrin)
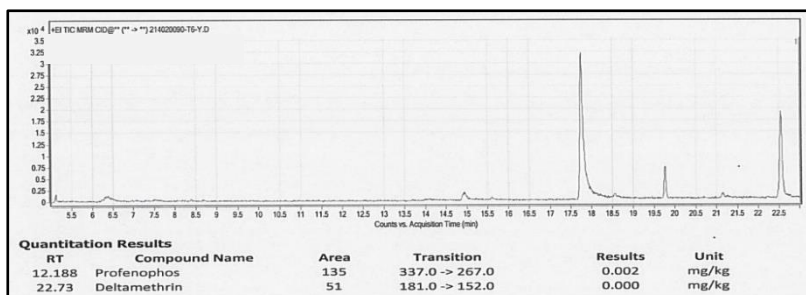
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
12.188	Profenophos	135	337.0 -> 267.0	0.002	mg/kg
22.73	Deltamethrin	51	181.0 -> 152.0	0.000	mg/kg

Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	51	181.0 - > 152.0	0.000	mg/kg

Seed Sample – T3-Z (0.0042% deltamethrin)
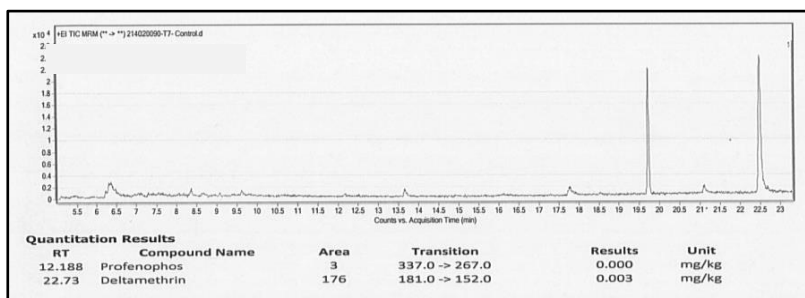
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	176	181.0 - > 152.0	0.003	mg/kg

Seed Sample - T4-Control
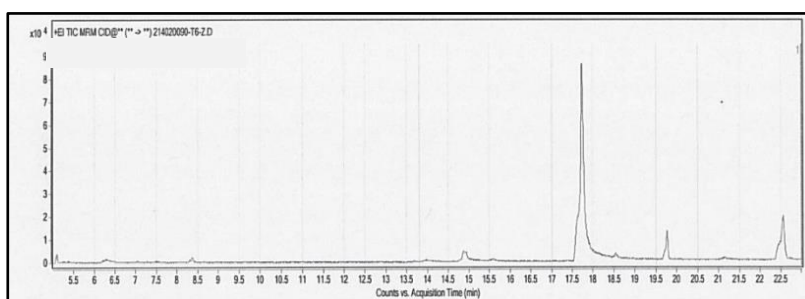
Quantitation Results					
RT	Compound Name	Area	Transition	Results	Unit
22.73	deltamethrin	146	181.0 - > 152.0	0.000	mg/kg

IV. RESULTS AND DISCUSSION

The samples of seed from the treated crop collected 15 days after final spray were studied for the residues. In the present investigations residues of deltamethrin in pigeonpea seeds were found to be below detectable limit of 0.01 ppm for the spray concentration of 0.0014, 0.0028 and 0.0042 per cent. Considering the maximum residue limit of 1 mg/kg for pulses as specified by CODEX, the evaluated spray treatments of deltamethrin 2.8 EC can be considered most safe to the consumers. Similar studies on other crops with slight variations in the doses or concentration has been used by researchers. Panickar *et al.* (2005) [6] in their studies reported that deltamethrin (0.0014%) on cowpea dissipated to 0.002 µg g⁻¹on the 10th day.Prem *et.al.* (2003)[7] found that deltamethrin persisted for 7 days on leaves and fruits of tomato when applied at the rate of 0.0028 per cent. Battu *et al.* (2003) [8] observed that the residues of deltamethrin were not present in cotton seed when deltamethrin was applied as per recommended practices.Reddy *et al.* (2001) [9] reported that the residues of deltamethrin (0.004%) were found below the maximum residue limit in grains of pigeon pea at harvest. The present findings corroborate with the results of these research workers.

V. CONCLUSIONS

It is concluded that pesticide residue monitoring is effective tool to control the quantity of pesticides on food and that the determination of pesticide residues at harvest time is designed to ensure the safe consumption of food. QuEChERS method is the modern extraction technique to analyze a wide range of pesticides residual levels in food. In order to minimize the accumulation of residues in edible plant parts, it is advocated to restrict the spray concentration of deltamethrin at 0.0028 per cent active ingredient which is equal to 28 g a.i /ha using the spray fluid of 500L/ha by manually operated high volume sprayer.

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Protein Profile Pattern in Gamma Irradiated Wild Pea

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ABSTRACT

Genetic Variation in germplasma has important role in identification of varieties. Electrophoreticpattern of protein fraction are directly related to the genetic background of the protein and be used to certify the genetic make-up SDS-PAGE (SDS-Polyacrilamide gel electrophoresis) is valid technique increasingly being utilized as an approach for species identification, Each variety or an approach for species identification .Each variety or a group of varieties exhibit characteristic protein banding Pattern thus on the basis of the pattern they can be identified accordingly.

Keywords: SDS- PAGE, Protein, Banding pattern

I. INTRODUCTION

In recent year grain legume play important and primary role in the search for vegetable sources of protein owing to the high protein content of seed ranging from 20% in pea to 40% lupin. They can therefore , be considered a good substitution to animal protein of these legume containing amino acid and plant breeding have to consider this problem in any improvement programme (summerfield and Roberts 1985). Mutagenesis started utilizing experimental mutagen in altering seed protein in many cereals both quantitatively and qualitatively with a view to bridge protein gap cause of malnutrition (Amirsh and tavakloi 1970).

Field pea is significant pulse crop in both India and Australia. There are number of similarities that include nationally co-ordinate breaking programmer, moisture stress in rained crops low yield. Significant of powdery mildew and an intrest in developing lodging resistant varities. (Barum et.al 2000). Peas are of great nutritional importance due to their high content of protein, complex carbohydrate, dietary fiber minerals, vitamins and antioxidant compound. Although pea widely used in animals nutrition (Hedly,2001). Human consumption of pea is lower than that of other traditionally more accepted pulses (Hedly, 2001, Schneider 2002). Nevertheless in year the wealth of nutrient available from the pea and its beneficial functional properties have prompted increasing interest and demand for this legume for the food preparation oriented to generative and infant nutrition (Davidson et,al 2001).

II. METHODS AND MATERIAL

Preparation of Seed Sample:

For extraction of proteins individual seeds, irradiated with particular gamma dose were ground to fine powder with mortal and pestle. To extract protein in 0.01 gm of seed flour, 400 ml of the protein extraction buffer (0.05M, Tris-HCL, 0.2%) SDS, 5M urea and 1% b-mercaptoethanol, was added to the tube and mixed well by vortex. Then centrifugal at 15,000 rpm for 5 min at room temperature. The extracted crude protein was recovered as clear supernatant and was stored at 20 C for further use.

SDS-page (Sodium dodecyl Sulphate-Polyacryalamide gel electrophoresis.)

The components used in the formation of this gel are known to be neurotoxic thus the care has to be taken while preparing gel. The most commonly used components to synthesis the matrix are acrylamide monomer and N-N methylene these free radical can activate acrylamide monomers inducing them to react with other acrylamide molecules forming long chain is the process. Theses chain become cross linked the presence of bis-acrylamide. TEMED acting as a cataylst for gel formation.

Material:

a)   Sample buffer(Lamnilli buffer):

1.5 M Trisc HCL - 417 ul

Glycerol   - 800 ul

10% SDS   - 200 mg

β – mercaptoethanol   - 362 ul

0.002% bromophenol blue -0.2 mg

(make the volume 10 ml pH-7.0± 0.2

b)   Gel buffer (tris glycine buffer)

Tris base   - 1.514

Glycine   -7.207

SDS   - 500 mg

 (make up the Volume 500 ml and adjust pH 8.6±0.2)

c)   Acrylamide Gel

Acrylamide   - 297

N-N methylene bis acrylamide – 1%

TEMED   -

APS (Ammonium per Sulphate) – 10%

A)   Resolving buffer 1.5 M tris- HCL

B)   Stacking gel 1 M tris HCL

d)   Staining Dye

Methanol   - 40 ml

G-Acetic acid   - 10 ml

Distilled water   - 50 ml

Coomassive brilliant blue R-250 dye- 0.2 gm

e)   Destainer-

Methanol   - 40 ml

G.Acetic acid   - 10 ml

Distilled water   - 50 ml

f)   SDS (10%) – Dissolve 1 gm SDS in 10 ml D.W

Preparation of Gel:

Seed protein were analyzed through slab type SDS-PAGE followed by Lammli (1970) using 11.2% polyacrylamide gel. Electrophoresis was carried out at 100v for two and half hours. In order to check reproducibility of the method two separate gels were run under similar conditions. After electrophoresis gels were stained with 0.2% (w/v) Coomasive brilliant blue for 5 hrs and then distained for 2 days on gyratory shaker.

Properly distained gels were read on gel read on gel documentation system and molecular weight of individual bands calculate with respect to marker band using ALPHA imager softwear. Consistency of result was ensured by analyzing a minimum of 7 seed sample irradiated with different doses from one accession. Further electrophoresis was repeated at least twice on each protein extract only constant bands were taken into account.

Data Analysis:

The gels were analyzed on gel documentation system for its position. On (releative mobility) values, molecular weight determination. The gels were scored as presence (1) or absences (0) of band of comparable size. Pair wise similarities betweenaccessions were calculating using Jaccards coefficient. The cluster analysis was performed on similarity matrix by UPGMA method (Sneat and Sokal 1973).

III. RESULT AND DISCUSSION

SDS- Gel Electrophoresis

The protein samples were subjected to SDS- PAGE to the band pattern in mutant seeds of wild *Pisum* variety. The separated pattern of protein bands were observed for each set. The Rm is relative mobility of each protein was determined using following formula.

$$Rm = \frac{\text{Distance between origin and protein bands}}{\text{Distance between origin and tracking dye}}$$

The molecular weight and Rm value of each protein sample was determined on the gel documentation system taking protein markers as standard. The molecular weight and Rm value of each protein sample was determined on the using standard protein marker.

The results are shown in **Photoplate 3**

Table a) Rm for standard protein markers

Sr.No	Bands	Positions	Molecular Wt	Rm
1	1	320	97,400	0.667
2	2	341	66,000	0.710
3	3	357	43,000	0.744

| 4 | 4 | 397 | 29,000 | 0.827 |
| 5 | 5 | 412 | 18,400 | 0.858 |

Table b: Band similarity in *Pisum* mutants

Sr No.	Position	Similar bands in Protein samples	Rm
1	251	5 KR, 10KR	0.523
2	252	20 KR, 25 KR	0.525
3	268	15 KR, 20 KR	0.558
4	270	5 KR, 25 KR	0.562
5	274	15 KR, 25 KR	0.571
6	280	10 KR, 25 KR	0.583
7	281	15KR, 20KR	0.585
8	287	15KR, 20KR	0.598
9	290	5 KR, 25 KR	0.604
10	293	10 KR, 30 KR	0.610
11	294	Control, 20 KR	0.613
12	299	5 KR, 15 KR	0.623
13	300	10KR, 20KR, 30KR	0.625
14	301	5KR, 25KR	0.627
15	304	10 KR,15 KR	0.633
16	310	5 KR, 30 KR	0.646
17	311	10 KR, 15 KR	0.648
18	324	20 KR,25 KR	0.675
19	330	20 KR, 25 KR	0.688
20	337	5KR,10KR,15KR,25KR	0.702
21	345	5 KR,10 KR, 25 KR	0.719
22	350	10KR,20KR	0.729
23	355	10 KR, 25 KR	0.740
24	363	15KR, 20 KR	0.756
25	366	5KR, 25KR	0.762
26	373	10 KR, 25 KR, 30 KR	0.777
27	374	5 KR, 20 KR	0.779
28	380	10 KR, 15 KR, 20 KR	0.792
29	384	5KR, 30KR	0.800
30	387	10 KR, 20 KR	0.806
31	390	5 KR, 10 KR, 25 KR	0.812
32	398	5 KR, 15 KR	0.829
33	404	25 KR, 30 KR	0.842
34	406	5 KR, 15 KR	0.846

35	411	15 KR, 25 KR	0.856
36	412	20KR, 30KR	0.858
37	415	5 KR, 10 KR	0.865
38	418	15 KR, 25 KR	0.871
39	424	25 KR, 30 KR	0.883
40	425	15 KR, 20 KR	0.885
41	430	10 KR, 15 KR, 20 KR	0.896
42	440	5 KR, 10 KR, 15 KR	0.917

Table c: Band variability in *Pisum* mutants

Sr No.	Position	Variable bands in Protein samples	Rm
1	271	10 KR	0.565
2	272	Control	0.567
3	273	20KR	0.559
4	276	Control	0.575
5	279	5KR	0.581
6	284	30KR	0.592
7	285	25KR	0.594
8	286	Control	0.595
9	288	10KR	0.600
10	292	15KR	0.608
11	305	30KR	0.635
12	306	20KR	0.637
13	307	25KR	0.640
14	312	20KR	0.650
15	314	25KR	0.624
16	316	30KR	0.658
17	317	5KR	0.660
18	318	15KR	0.663
19	319	20KR	0.665
20	320	30KR	0.667
21	323	10KR	0.673
22	325	15KR	0.677
23	327	5KR	0.681
24	328	30KR	0.683
25	329	10KR	0.685
26	333	15KR	0.694
27	335	30KR	0.698
28	340	20KR	0.708

29	342	30KR	0.712
30	343	15KR	0.715
31	344	20KR	0.717
32	348	15KR	0.725
33	349	25KR	0.727
34	351	30KR	0.731
35	352	5KR	0.733
36	353	15KR	0.735
36	356	20KR	0.742
37	357	30KR	0.744
38	358	15KR	0.746
39	359	5KR	0.748
40	360	10KR	0.750
41	361	25KR	0.752
42	365	30KR	0.760
43	367	10KR	0.765
44	368	20KR	0.767
45	372	15KR	0.775
46	381	25KR	0.794
47	386	15KR	0.804
48	391	15KR	0.815
49	393	30KR	0.819
50	401	20KR	0.835
51	402	10KR	0.837
52	403	15KR	0.840
53	405	20KR	0.844
54	409	10KR	0.852
55	416	20KR	0.867
56	417	30KR	0.869
57	419	20KR	0.873
58	420	10KR	0.875
59	423	5KR	0.881
60	426	10KR	0.887
61	429	5KR	0.894
62	433	25KR	0.902
63	437	20KR	0.910

The **Table b** and**c** represent the band similarities and variability obtained amongst the variable gamma doses.

UPGMA (Unweighted Pair Group Matrix of Arithmetic Mean

i.   Open the programme 'neighbor'. Type the name of the file distance

ii.   Type N and enter .This will change the option Neighborhood join to UPMA
iii. Type Y and enter. This will run the programme and give the   Output.
iv.   Again two output file will be created as outfile and outree rename these file as a upgmaout and upgmatree
v.   Open these in notepad or textpad . Observe these file. You find the distance matrix, input file data, branch length and tree.
vi.   Open this file in Treeviev software and observe the tree in different form.

Table- Populations

```
Neighbor-Joining/UPGMA method version 3.65
 Neighbor-joining method
 Negative branch lengths allowed
 +KR-B
 !
 ! +KR-E
 1--3
 ! !+KR-A
 ! +-5
 !  !+-KR-C
 !  +-4
 !   !+-KR-D
 !   +-2
 !      +--KR-F
 !
 +CONTROL
remember: this is an unrooted tree!
Between      And      Length
-------      ---      ------
  1      KR-B      -0.00629
  1       3       0.04788
  3      KR-E       0.00838
  3       5       0.02520
  5      KR-A       0.00513
  5       4       0.02232
  4      KR-C       0.03292
  4       2       0.02633
  2      KR-D       0.03192
  2      KR-F       0.04374
  1      CONTROL      0.00629
(KR-B:-0.00629,(KR-E:0.00838,(KR-A:0.00513,(KR-C:0.03292,(KR-D:0.03192,KR
F:0.04374):0.02633):0.02232):0.02520):0.04788,CONTROL:0.00629);
```

In the present investigation the cluster analysis was performed on similarity matrix by UPGMA method and Neighbour- hood joining, the distances were calculated by using the algorithm by Nie and Li (1997).

The results can be analyzed as from the above data obtained The control set of seeds are having similar protein profile as compare to gamma dose 10 KR, as they exhibit the same position in one cluster viz. A, as they have coefficients of similarity nearby same (Shown in **Fig- 2**). While the other sets of seeds irradiated with 25 KR; 5 KR; 15 KR, 20 KR and 30 KR are grouped into different cluster viz. B.

While the other cluster which shows the same positions of seeds irradiated with 20 KR and 30 KR dose of gamma. As they are in structural position equivalence, they had they have identical ties, with each other. In matrix terms, both the row and column vectors of an equivalent pair have identical elements. But these protein bands are in far distance as compare to control and 10 KR set of protein patterns. This indicates the higher rate of mutation spectrum from control set. As results can also be alined with phenotypic variations as it has most divergence from the control set i.e low germination Percentage and lower yield and short height etc.

The protein pattern in set of seeds irradiated by gamma dose viz. 25 KR has the lower distance as compare to control; while 5 KR, then 15 KR has lower distance to 25 KR. The results indicate that they are having declining divergence from control set of seeds.

Here the genetic divergence can be observed in changed patterns observed with loss of original bands and appearance of novel bands in case of 5KR dose, which shows fruitful results in terms of morphological characters and yield. Over all it is seen that the cluster B, revealed more genetic variation than the cluster A. The predicted homology helped in significant homology for the protein bands in each cluster.

IV. CONCLUSION

The plenty of information on genetic fortification through applied mutagenesis of future varieties for higher protein content and quality has been published. Variation in range of total protein, protein sub fractions and band pattern in the parental line of wild pea mutant varieties indicate that the improvement in production with in pea is possible and this is supported by our findings in the mutants deriving from mutational treated by gamma irradiation, where appreciable increase as in their total seed protein has been demonstrated. Nevertheless, protein mutants in exhibit negative correlation between total protein and yield has been reported in cereals (Johnson et al., 1970; Kaul, 1980a) as well as in legumes (Wood et al., 1979; Sjodin et al., 1981a). Such observations reflect difficulty in selecting high protein mutant associated with no change in yield (Gridley and Evans, 1971). The induction of high protein mutant may be attributed to micro mutations with positive effects and low seed yield to micro mutation with negative effect.

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Analysis of Physico-Chemical Parameters and Ground Water Quality of Some Villages in Lonar Taluka of Buldana District, Maharashtra, India

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ABSTRACT

The ground water quality and some of its physico-chemical parameters were analyzed of different localities in some Village of Lonar Taluka, district Buldana, Maharashtra. The water samples analysis involved pH, TDS, temperature, Alkalinity, nitrate, total hardness. The water samples were collected from different localities of the village and analyzed for the suitability of drinking purposes. It was found that the water samples were found not suitable for drinking and domestic purposes directly without prior treatment.

Keywords: Ground water quality, physico-chemical parameters, etc.

I. INTRODUCTION

Healthy environment is fundamental right of every human being. But recently, it is observed that human activities affect the environment, due to which it is mostly affected. It may due to some deforestation for civilization or by means of water pollution [1]. In contrary, different parts of the country are experiencing severe conditions of drought and decrease in water level due to drastic climatic changes. Ground water plays a pivotal role in everyday life of the living beings, and it forms a major source of drinking water. Water is also called as 'Universal solvent' [2], it contains many chemicals like nitrates, sulphates, fluorides in dissolved state. Some, harmful chemicals like Arsenic, ammonia and calcium and magnesium salts if present above the permissible limits makes the water bodies toxic in nature [3-5].

Therefore, it is of great importance to study the ground water quality, especially in those regions, where water level is less due to low rainfall. The present paper describes the analysis of some physico-chemical parameters and ground water quality of some villages of Lonar, Taluka Sindkhed Raja, district Buldana, Maharashtra, India. The water sample analysis involved pH, temperature, Alkalinity, sulphate, nitrate, total hardness. The water samples were collected from five different localities of the village and analyzed for the suitability of drinking purposes during the period of 13th March to 17th May 2018. The Five villages chosen for water analysis were Sultanpur, Palaskhed, Gaikhed, Hirdav and Ardav. According to Census 2011 information, the Geographical details of villages are as follows:

Table No. 1:   Geographical locations and Population of selected villages of Lonar Taluka.

Name of the Village	Geographical Location		Total Population
	Latitude	Longitude	
Sultanpur	76.5184	20.0875	8688
Palaskhed	76.5806	20.0033	1478
Gaikhed	76.5632	20.0078	1422
Hirdav	**76.6008**	**20.0136**	**2795**
Ardav	76.6123	19.9911	1065

II. MATERIALS AND METHODS

Sampling : The water samples of the Five selected villages were collected from the Hand Pumps/ bores/ wells (from 13th March to 17th May, 2018) when the shortage of direct rainwater normally raises pressure on the water resources. All samples were collected on same day and kept in Plastic bottles, which have been previously washed with distilled water and 10% HNO3 and 1:1 HCl for 48 hr. The Plastic bottles were labeled and immediately few drops of HNO3 were added in order to prevent loss of metals and the growth of any micro-organisms. Temperature and pH of water samples were measured at the time of collection.

Chemical Analysis: The collected samples were estimated for Alkalinity, sulphate, nitrate, total hardness and pH. The method used for the determination of these physico-chemical parameters was described by A.O.A.C. International [6] and using standard procedures by APHA[7] and EPA[8].The chemicals and reagent used for analysis were of analytical grade.

Statistical Analysis: All generated data was analyzed statistically by calculating the mean and compared the mean value with the acceptable standards. pH meter Equiptronics model was used to determine the pH of the samples; titrimetric procedures were followed for the analysis of total hardness, alkalinity, nitrate. Borosilicate Glassware was used for all the estimations.

III. RESULT AND DISCUSSIONS

The results of the physico-chemical parameters obtained from analysis of water samples from the hand pumps/bores/ wells are presented in the Table No. 2. The various physico-chemical characteristics were analyzed for ground water from five different sampling locations. The details of the average results were summarized in table 2.

pH: The pH[9] value of water source is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkalinity. Most of the biological and chemical reactions are influenced by the pH of water system. If pH is beyond the permissible limit, it damages the mucous membrane of cells. In the present study all the ground water samples have pH values between 6.5 -7.4. Which is within the permissible limit laid down by WHO (7.0 - 8.5).

Total dissolved solids (TDS): The total dissolved solids in water are due to presence of all inorganic and organic substances. The solids can be iron, manganese, magnesium, potassium, sodium, calcium, carbonates, bicarbonates, chlorides, phosphates and other minerals. The high values of TDS causes gastrointestinal irritation to the human beings but long time use of water with high TDS can cause kidney stones and heart diseases[10]. In the present analysis, the TDS values were observed from 390 to 510 mg/l. The most desirable

limit of TDS is 500 mg/l and maximum allowable limit is 1500 mg/l. The TDS value for all the ground water samples are well within the permissible limit of 500-1500 mg/l.

Total alkalinity (TA): Alkalinity [11] of water is the measure of the ability to neutralize a strong acid. The bases like Carbonates, bicarbonates, hydroxides, phosphates, nitrates, silicates, borates etc are responsible for alkalinity of water. Alkalinity provides an idea of natural salts present in water. Alkalinity is a parameter, which is not harmful to human beings. The alkalinity values were recorded below the desirable limit. So, all samples are within the desirable limit for drinking water 100 mg/l (WHO).

Total hardness (TH): Hardness[12] of water is an important quality of water and is caused by dissolved carbonates, bicarbonates, sulphates and chlorides of calcium and magnesium. It prevents the lather formation with soap and increases the boiling point of water. The maximum permissible limit of total hardness for drinking purpose is 300 mg/l (BIS). The water having hardness up to 75 mg/l is classified as soft, 76 - 150 mg/l is moderately soft, 151-300 mg/l as hard and more than 300 mg/l as very hard. Hardness more than 300 mg/l may cause heart and kidney problems. The total hardness in ground water samples listed in the present article is beyond the desirable limit. All the ground water samples are very hard and hence require suitable treatments before use.

Nitrate (NO3-):

Nitrate is an inorganic chemical that is highly soluble in water. Major sources of nitrate in drinking water include fertilizers, sewage and animal manure. Most nitrogen containing materials in natural waters tend to be converted to nitrate. Nitrates also occur naturally in the environment, in mineral deposits, soil, seawater, freshwater systems, and the atmosphere. High nitrate content may lead into Irritability, lack of energy, headache, dizziness, vomiting, diarrhea, labored breathing, and a blue-gray or pale purple coloration to areas around the eyes, mouth, lips, hands and feet. The Nitrate levels in the findings as mentioned in Table No. 2 are quite higher than the permissible limit.

Table No. 2: Average results obtained for the different parameters and comparison with WHO (2004) Standards

Sr. No	Spots	pH (1)	Temperature (oC) (2)	Total Alkalinity (3)	Nitrates (4)	Total Hardness (5)	Total Dissolved Solids (6)
1	Sultanpur	7.1	32.1	69.4	55.4	534.35	440
2	Palaskhed	6.3	31.5	74.6	51.5	576.32	392
3	Gaikhed	6.8	31.4	76.5	56.4	542.22	421
4	Hirdav	6.5	30.4	68.9	48.1	534.26	465
5	Ardav	6.9	31.3	75.3	58.2	531.23	510
6	WHO standard	6.5 - 8.5	30-34	100	20-45	100-500	500-1500

*All the results in the entries from (3) to (6) are in mg/l

It is observed that from the above data, ground water quality of the village is not so good and not suitable for domestic purposes without prior treatment as it contains more nitrates and total hardness beyond the permissible limits as recommended by WHO[13-14] and Indian standards.

IV. CONCLUSION

From these results analysed from the testing of the water samples examined were consistent with World Health Organization standard for drinking water (WHO). And for such parameters that had mean values above the recommended WHO standard, water treatment plant should be built for these people to correct these anomalies. In addition, bacteriological determination of water from these different hand pumps/ bores/ wells be carried out to be sure if the water was safe for drinking and other domestic application.

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New Image Processing Technique for Automatic Detection of Nitrogen in Cotton Plant

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ABSTRACT

This paper proposes method for nitrogen estimation using color image analysis from cotton plant. In this study we developed new image processing technique to estimate nitrogen content in cotton plant. We collected images of cotton leaves with the camera and applied image processing techniques. We applied different function for estimation and find (R+B)/G gives good correlation of r=0.98 within minimum time and less cost than other methods.

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Keywords: Color Image Processing, RGB Functions, Regression Analysis, Nitrogen Estimation, Cotton

I. INTRODUCTION

India is one of the developing countries in the world; one of the reasons behind this is its ruler demand. The demand of the ruler India depends entirely on the agricultural sector. If there is a good monsoon, it results in good crop yield. The productivity and the quality of cultivated crops mostly depend on natural factors like nutrients, water, etc. But to meet the food requirement of a large population, it is necessary to increase crop yield. If natural resources do not meet the requirements of the crop then it needs to be externally provided. This increases production costs. Because of this, nowadays it is seen that agriculture is not a profitable business, the reason behind this, there is a difference between the cost of production and the market value of the crop. In agriculture, some of the major expenditure is on seeds, fertilization, and pesticides. Technology can help here to reduce the production price by using novel techniques in agriculture. Fertilization is the key factor and it fulfills the nutrient requirements of crop. It is important to identify the need and managing fertilization with the help of computer. Nitrogen, Potassium and Phosphorus are the three important nutrients required to plants.

II. ROLE OF NITROGEN IN COTTON PLANT

Nitrogen is one of the most important nutrients needed by plants. It is found in the chlorophyll of the leaves and is used to transfer solar energy to carbohydrates, which provide plant energy. It also focuses on growth and

productivity. Nitrogen deficiency can affect the process of photosynthesis; can reduce leaf size, number of fruiting nodes, yield, and fiber quality [1]. This can also limit the absorption of water and nutrients and cause excessive cutting.

Excess nitrogen can delay maturation, overgrowth, reduce boll storage, low fiber quality, increase pest problems and contaminate soil and surface water [7] It is therefore necessary to have automated ways to obtain Nitrogen concentrations and to detect deficiencies. There are many advanced techniques to identify N deficiencies present in the cotton plant such as digital image processing, remote sensing, and neural network processes and so on. This article reviews the techniques used to detect N deficiency in a cotton plant.

There are various methods of Nitrogen detection such as color analysis using a different color analysis model, remote sensing, and neural network etc [13]. This paper introduced the process used to detect Nitrogen deficiency in a cotton plant using color images with RGB imagery features.

III. METHODS AND MATERIALS

• **Image Acquisition**: - Cotton leaf pictures collected from different farms of Beed district from Maharashtra (India). Main stem Leafs from mid upper nodes are collected as a random sample from various fields.

Images are taken by using Sony cyber shot w830 camera of twenty megapixels with CCD device. Samples of leaf pictures are taken from 15cm height with black background and resized to 1764*768 pixels.

• **Laboratory Analysis**: - Samples containing 15 leaves are collected together and analyzed in laboratory using kjeldhl method.

• **Preprocessing**: - Interference will create a variety of noise during image detection, which will significantly affect image quality [17]. It is therefore necessary to process the image, so it is needed to preprocess the image, such as removing noise and enhancing image. Thus first step in the image processing is to remove the noise if present in the captured image, so that further operation can be performed.

The enhancement techniques like Gaussian filter, wiener, median, bar graph effort, weighted median, hybrid filters, multiscale retinex with color restoration and Lee filtering ,Homomorphic filtering unit are applied on cotton leaf photos to reinforce their rummage around for identification purpose and additionally the results unit like those unit recorded in figures one. To match noised and de-noised pictures, parameters like Peak Signal to Noise magnitude relation (PSNR), Mean sq. Error (MSE), Mean Absolute Error (MAE), MAXERR values area unit accustomed assess best answer. Mean values of those parameters calculated.

It is clear that median filter provides clear look of leaf image and removes noise [18]. Such noise reduction can be a typical preprocessing step to reinforce the results of later method. Median filtering is primarily utilized in digital image method as results of, below positive conditions; it preserves edges whereas removing noise.
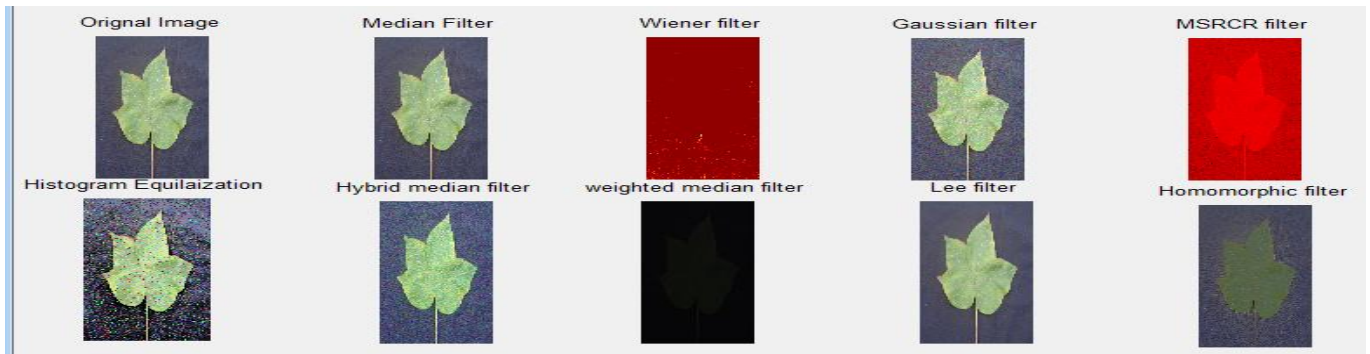
Fig. 1 filtering results

• **Segmentation**: - In this we prepared fully automatic method, in which we can segments leaf blade from dark black background and also eliminates petiole from it. This method includes two steps: first by using global threshold method, we segmented leaf blade from background and second by applying sequence of morphological operations petiole removed from leaf blade as shown in following figure 2. Experiments have been carried on 90 leaves and we got success rate of 93.33%. Compared with other methods, the pro-posed method here is simple and suitable for leaf blade segmentation [19].
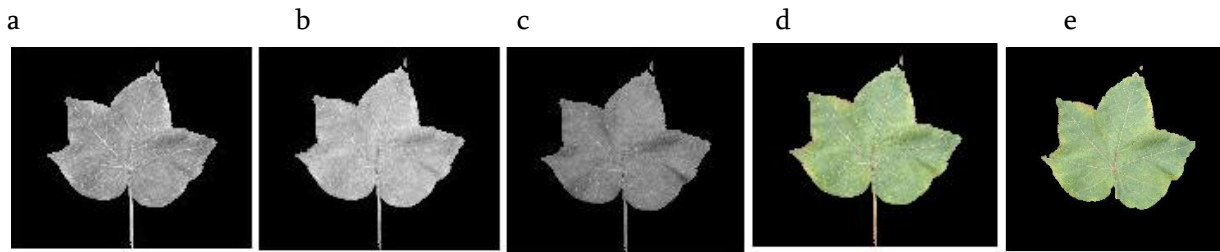
Fig. 2 (a) Masked Red Image (b) Masked Green Image (c) Masked Blue Image (d) Segmented Image (e) petiole removed image

• **Feature Extraction of Image and calculation of N :-**

Cropped images of cotton leaf blade are used for further processing. Images are separated in three different planes of R, G and B. In kjeldhal chemical analysis, we have used 15 images as one sample for N calculation; so we have calculated avg(R), avg(G) and avg(B) from15 leaf images for each sample. These normalized values of R, G and B are placed in formulas and compared.

Parameters collected from image are used to correlate with nitrogen values calculated in laboratory. The values obtained from equation and laboratory values are curve fitted to find best fitted curve with polynomial value 4. The equation (R+B)/G give more accuracy than others as shown in Table 1.

Table 1: Shows the Correlation in the Functions and Nitrogen

Function	R
(R-B)/(R+B)	0.63
2G*(R-B)/(R+B)	0.69
2R*(G-B)/(G+B)	0.65
2B/(R+G+B)	0.68
(R+G)/B	0.84
(R+2G)/B	0.93
(R-B)/G	0.920

(R+B)/G	0.98
(R-B)/(R+G+B)	0.78
(R-B)/(R+B)	0.94

Table 2: N estimation

(R+B)/G	N lab	N estimated
1.609873	3.55	3.578607798
1.562899	3.3	3.327024102
1.605502	2.94	2.968457222
1.575292	3.05	3.077434391
1.594696	3.4	3.428087652

a   b
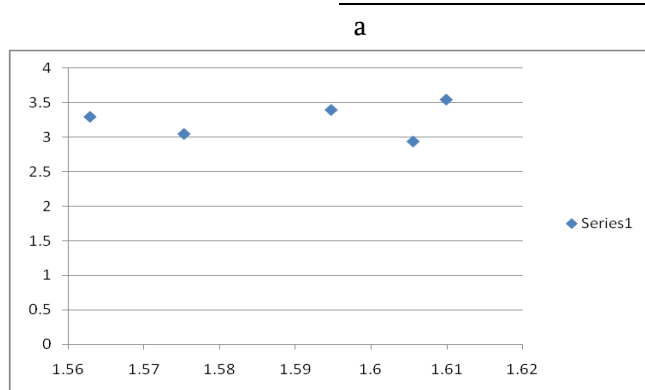
Figure 3: Scattered Plot of Nitrogen (Lab) and (R-B)/G   Figure 4: Fitted Curve for the Data
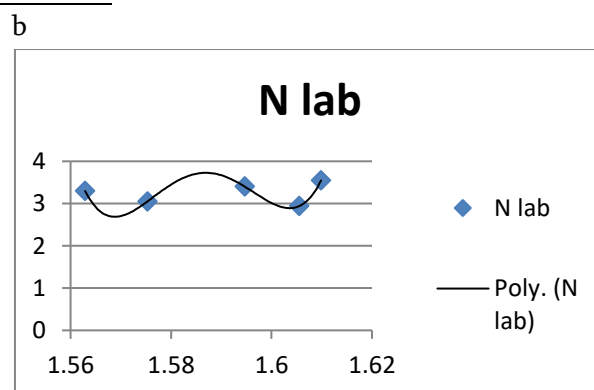
IV. RESULT AND CONCLUSION

Non linear regression was applied for estimation and observed that (R+B)/G shows good results.
The regression analysis equation obtained for (R+B)/G using smoothing with moving average
at the span of 4. The regression of y on x is as shown in following equation.

$$P1*X^4 + P1*X^3 + P1*X^2 + P1*X + P1 \qquad (1)$$

This regression gives the best fitted curve of 0.98. So we can conclude that images taken in natural light and conditions shows good correlation with the nitrogen and can be used to calculate nitrogen in less cost and time.

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Role of Librarian in the 21st Century in the Changing World of Digital Environments

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ABSTRACT

Today, the walls of a library are giving way to digital environments to establish the links with information and virtual. Information is a valuable resource. The traditional libraries should be transformed into hybrid libraries focused on providing information collected in the form of books and electronic sources to survive and meet the need of end users. In this paper describes the role of librarian in libraries, which have collection in form of e- books, digital documents and various databases and common access to the internet. Modern libraries are creating the society of knowledge. The librarians are constantly open to any changes in their field and eager to improve their skills and knowledge.

I. INTRODUCTION

Information Technology is rapidly changing the whole world and creation new challenges and opportunities. The Global changes particularly in digital environment/ ICT have had an impact on the functioning of libraries. The development in ICT has changed the user expectations from the libraries in many ways. In this age of information, the LIS plays not only just an important learning supporting function but the library itself is emerging as site of learning sometimes more important than even the class-room. The library and Information services of higher education institutions play a central role in enhancing the quality of academic and research environment. The digital environment has changed the functions and duties of LIS Professionals; they are not only to extend assistance to users in searching information in a placed called library but also to provide services and instruction regardless of place, time or format. Now librarian acts as information provider, Website designer, Database developer, Services provider, Collection developer, Consortia manager, Information consultant, content manager and so on.

II. INFORMATION SOCEITY

The information age has arrived and modern society is commonly referred to as the "Information Society". Still, this term does not have a commonly accepted interpretation. Information society is described by the modern researchers as "the society in which the information is intensely used in economic, social, cultural, and political life it is a society with abundant means of communication and of information processing, the society being the

basis for serving as a major part of the national income and ensuring the source of income for majority of the population. This information society, the popularity of the internet and electronic mass media is spreading very fast. The use of internet and e-resources created a new type of society and the analog technology has been abandoned in favor of digital technology within a couple of year. This new society is also referred to as the digital, Web, Internet or computer society. Information is the most sought-after and valuable merchandise in the society. It becomes indispensable for one social and professional's development to keep up with information constantly, to gain and use it in practice, due to changes taking place in the modern world.

III. CHANGING LIBRARIES

The user expectations to the libraries to deliver high quality, comprehensive, user-friendly new generation services. As the world advances, the library must also evolve and redesign their activities in order to deliver highly quality, need based, and value added services according to the expectations of today's library user. The concept of library has been described by several different terms such as automated library, computerized library, digital library, electronic library, virtual library, library without walls and internet library. 21st century libraries have a lot in difference with the traditional model their dominant elements are changed.

Why are Librarians for Change?

The explosion of information, the movement away from the use of textbooks the increased concern for learning styles, advances in instructional and information technologies, advocacy for cooperative learning and collaborative teaching are factors that increase the complexity in planning for instruction. These factors bring a need for teamwork with a librarian. There is no one better able to bring about change than a librarian working in partnership with administration, staff and students. With more sources of information, both print and electronic. The critical issue for institution in the face of these changes is implementation. Faculties have to attempt to include curriculum integration, resources-based learning, new evaluation practices and technology into their daily teaching. Faculties cannot implement such changes without support comes through collaborative processes. Librarians can contribute to these process by drawing on knowledge and skills gained in implementing library programs. They are in good position to nurture collaborative working relationships among staff, across the grads and the curriculum.

What Should the 21st Century Librarian be Like:-

21st century libraries heap new task upon a librarian. Modern librarians are crucial now for not only their high level of expertise, but also for being able to associate with the modern individuals' personality. A 21st century librarian must be modern, with acquiring psychological, social and professional capabilities. A modern librarian is open to innovations and change. He/ She has an eager and interested attitude towards solutions because of the fast-paced, constantly evolving nature of changes in libraries. A modern librarian, can develop modern characteristics throughout ones professional career even after many years of work, one does not need to be young to be modern. A librarian must be aware of technological developments and be proficient in new technologies. Librarians play a role of psychologists, because they are challenged to distinguish the users need appropriately and help the user specify them. A modern librarian should also be qualified in terms of sources of information and using them, not to mention keeping up with constantly changing information sources. A librarian should also be equipped with general knowledge, to enable him to be conversant in a multimedia

subjects. The current model librarians' university training is directed towards improvement in the scope of scientific information. Self-improvement and training.

IV. ROLE OF LIBRARIAN IN INFORMATION SOCIETY

Technology is changing the nature of libraries and librarians and it continues to exert a major influence on the strategic direction of libraries in society. Librarians are important as a professional group and their role is not limited to passing books. Modern library staff works towards winning new readers, similar to commercial organizations winning customers. Readers may or may not to be aware of their information needs. The role of librarian consists in comforting the users inland supporting them so that they can overcome their own fears about being in the library. The knowledge of psychology pertaining to customer services is extremely important in the process of the librarian's in-service training.

Librarians must be computer literate and knowledge about internet to fully participate in the planning, design and implementation of future library services. The way, librarian goes about their work and the tools that they use have changed in the decade. Today librarian plays many roles in order to accomplish these goals-as a teacher, as a curriculum leader, as a instructional leader, as a information specialist, as a collaborator. Followings the roles of librarian.

1. **The role of librarian as a Information Specialis**t:- Librarian possess a unique knowledge of breadth and depth of information resources in various subjects specialist. By facilitating access to information finding it, analyzing, synthesizing and packing-librarians, would move to beginning of the information production cycle, playing a more substantial role in the information creation possess?

2. **The role of librarian as Knowledge Manager**:- the librarian should have following types of knowledge.
- Knowledge about the emerging library trends and technologies
- Knowledge about library information sources, products and services.
- Knowledge about where these sources stored and what is its use.
- What is current usage of these sources and how to increase its uses?
- Knowledge about users including teaching staff and researcher and who is using their information sources

3. **Role of the librarian in E-Trends**:- librarian purchase different types and varieties of electronics publication taking in view their nature and characteristics and for all this library need special skill which includes knowledge in the fields of computer, networking, digital sources, web sites and organization of data.

4. **Role of librarian as a Marketing Officer**:- librarian will have to bring the user and the information together which can be successfully done by the marketing of information products and services. Today's many ways to put marketing program by keeping on-line bulletin boards and displaying the new acquisition on the internet.

5. **Information Literacy and librarian**:- Information literacy is the ability to recognize the need for information and to identify, locate, access, evaluate and effectively use the information to address and help resolve personal, job related or broader social issues and problems.

6. **Role of the librarian as a Manager**:- Libraries are the centers for information, librarians should have acquired management skills, so that the interpersonal relationship should be maintained.

V. CONCLUSION

Libraries and librarian can play a critical role both in making their users information literate and bridge the digital divide that exists at local, regional or national levels. In the changed environment, the librarian's role has to shift from that of information locater to that of an information evaluator and instructor in the use and evaluation of information sources. Librarians are compelled to update their knowledge & IT skills in advanced IT environment. It implies the fact that man can only develop after have been acquired an ideal education. In addition, it is the result of IT that the role of librarian was totally changed.

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Synthesis, Characterization and Antimicrobial Study of Manganese (II) Complex of 2-(Furan-2-Yl)-5-Hydroxy-4 H-Chromen-4-Ones

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ABSTRACT

The synthesis of Manganese (II) metal complex has been synthesized by using novel 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand. The ligand was prepared by the Claisen-Schmidt condensation method of 2,6-dihydroxy acetophenone and 5-methylfurfural. The structure of the complex has been characterized by the analytical data, conductivity measurement, magnetic moment, UV-Vis spectra, IR and XRD analysis. Analytical data shows 1:2 stoichiometry and the magnetic moment, suggests that Mn (II) complex has octahedral geometry. The conductivity data revels that the complex is non electrolyte. Antimicrobial study of complex with selected bacterial strain and fungal strain carried out and the results have been compared with commercial standards. The Mn (II) complex shows moderate to good Antibacterial and Antifungal activity.

Keywords: IR, XRD study, Physico-chemical property, Magnetic Susceptibility and Conductivity, Antimicrobial activities.

I. INTRODUCTION

Chalcone is a generic term given to compounds bearing the 1, 3-diphenyl-2-propen-1-one framework and belong to the flavonoid family[1-3]. Chalcones constitute an important group of natural products, which has two aromatic rings joined by α, β unsaturated carbonyl system. The name chalcone is given by Kostanecki and Tambar[4]. The α, β-unsaturated carbonyl group in chalcone is found to be responsible for their antimicrobial activity [5]. The metal complexes possess interesting biochemical properties, such as antitumor, antioxidant, and antimalerial, anti-fungal and antimicrobial activities [6]. All crystals of a substance possess the same elements of symmetry. The computer program, used for indexing data was powder-X [7]. The X-ray powder diffractogram of the metal complex was used for the structural characterization and determination of lattice dimensions.

II. MATERIALS AND METHODS

2.1 Synthesis of Chalcone:

The reagents used for preparation Chalcone are of A.R. grade. A mixture of 2,6-dihydroxy acetophenone (0.01 mol) and 2-furaldehyde (0.01 mol) are dissolved in ethanol (20 mL) and then solution of potassium hydroxide

10 mL (15%) were added to it. The mixture was stirred for overnight. The progress of the reaction was monitored by TLC. It was then poured on ice cold water and acidified with dilute HCl. The coffee brown solid was precipitates, filtered and washed with water and recrystallized from ethanol it gives chalcone [8].

2.2 Synthesis of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand:

Take Chalcone (0.01 mol) and then it was dissolved in 20 ml DMSO, to this catalytic quantity of iodine was added. Contents were refluxed for one hour, the progress of the reaction was monitored by TLC and the reaction mixture was left overnight. It was then poured on ice cold water, the separated solid was filtered washed with cold water followed by a dilute sodium-thiosulphate solution. The product was crystallized from ethanol it gives a flavones [9].

2.3 Synthesis of Metal Complex:

The solution of 0.02 mole of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was taken in round bottom flask containing 30 ml of anhydrous methanolic solution and boiled for 10 minutes. A hot solution of 0.01 mole, of Mn Acetate, in 20 ml of methanol was added drop wise to the solution of the chalcone of 2-furfural to this reaction mixture, 10% alcoholic ammonia was added up to slightly alkaline pH. The complex was precipitated at 8 pH range. The pH 8-10 range was definite for these complexes [10]. The content was stirred on magnetic stirrer for one hour. The solid metal complex separated out and washed with methanol three to four times. The melting point of the complex was determined by Thiele's melting apparatus. The reactions of formation of Mn (II) complex is shown in **Figure-1**.
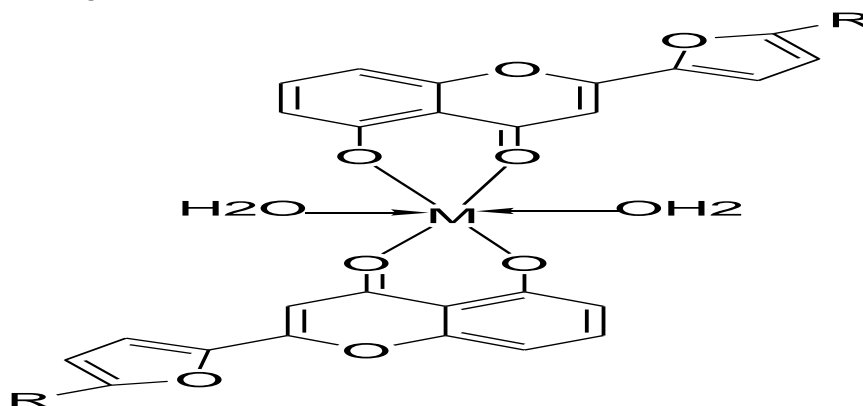
Figure-1: Metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand
R= -H,   M= Mn (II)

III. RESULTS AND DISCUSSION

3.1 Physical parameters:

Metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was Blackish brown in color. The complex was precipitated at 8 pH range, having Melting point 320^0C. The complex is insoluble in water and soluble in DMSO, DMF [11].

3.2 CHO analysis:

The carbon, hydrogen, oxygen, Manganese metal percentage in Mn (II) complex of chalcone measured at SAIF Cochin, Kerala. The calculated and measured values of CHO analysis are matching and are given in the **Table-1**.

Table-1: Study CHO analysis synthesized Mn (II) complex

Metal complex	Chemical formula	Mol. Wt.	Elemental analysis : % found (calculated)						
			C	H	N	O	S	X(Br)	M
Mn (II) Complex	$[C_{26}H_{18}O_{10}Mn]$	545	57.30 (57.26)	3.32 (3.33)	-	29.30 (29.34)	-	-	10.09 (10.07)

3.3 Magnetic susceptibility, solution conductivity and electronic absorption spectral data Magnetic susceptibility:

The magnetic moment of Mn(II) complexes in the present investigation are in the range which is almost close to the spin only value of 5.92 B.M. These values are in good agreement with the moment reported for mononuclear high spin octahedral Mn(II) complexes by earlier workers.

Mn(II) Complexes	Molar Conductance $Ohm^{-1} cm^2 mol^{-1}$	μ_{eff} (B.M.)	Absorption Maxima cm^{-1} (nm)		
			$^6A_{1g} \rightarrow ^4T_{2g}$ (G)	$^6A_{1g} \rightarrow ^4A_{1g}$ (G), ^4E_g	Charge Transfer
Flavone	6.97	5.97	24154(414)	27624(362)	29673(337)

Solution conductivity and electronic absorption spectral data:

The solution conductivities of 10^{-3} M solution of metal complex in DMSO were measured on EQUIPTRONICS digital conductivity meter EQ - 660 with 20 $\mu\Omega$ to 200 $\mu\Omega$ at 298K temperature. They are insoluble in water and soluble in DMSO, DMF. The low solution conductivity of 10^{-3} M solutions of Mn(II) complexes in DMSO indicates their non-electrolytic nature.

The electronic absorption spectra of Mn(II) complexes were showed three bands at 19,120 to 25000 cm^{-1}, 25125 to 27700 cm^{-1}, and 28993 to 30581 cm^{-1} assignable to $^6A_{1g} \rightarrow ^4T_{2g}$(G), $^6A_{1g} \rightarrow ^4E_{1g}$ or $^6A_{1g} \rightarrow ^4T_{1g}$ (G) and charge transfer indicating octahedral geometry around the metal ion[12-13].

3.4 Infra red spectrum:

The IR spectrum of α, β-unsaturated carbonyl group has characteristic bands of chalcone at prominent bands between 1625 to 1650 per cm. The characteristic peaks in infra red spectrum give the presence of particular functional group. The region at which other absorption bands appear depends on the type of aromatic / hetero-aromatic rings as well as the substituent present on these rings. The infrared spectrum of metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was recorded on a Perkin- Elmer Spectrum RX-IFTIR Spectrophotometer in the range 4000-400 cm^{-1} (**Table-2**) using potassium bromide pellet at CIL, Chandigarh, Punjab. The stretching frequency of metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand is represented in table number (2) and the IR spectrum in **Figure-2.**
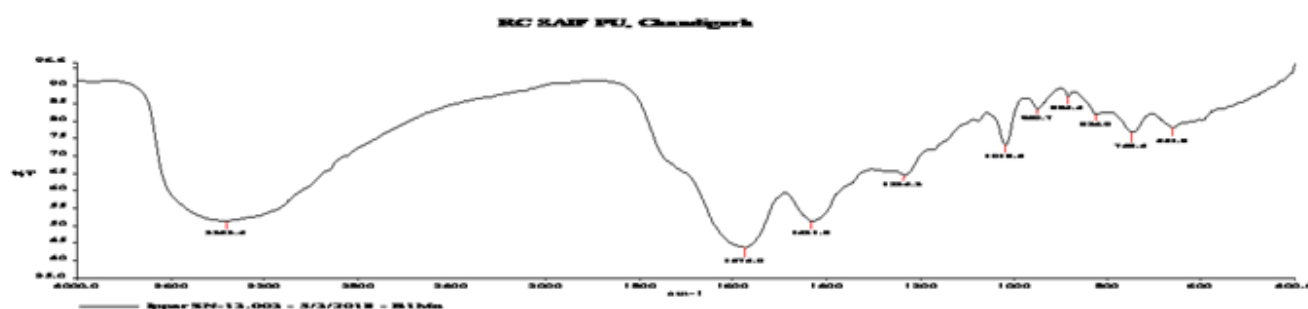
Figure-2: IR spectrum of metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand

Peak No	2θ observed	2θ calculated	d observed	d calculated	Miller Indices of Planes			Relative Intensities (%)
					h	K	L	
1	16.413	16.345	5.39657	5.67843	0	0	1	100
2	18.223	18.324	4.86422	4.85438	0	-1	0	62.63
3	18.238	18.248	4.86032	4.54789	-1	0	0	14.80
4	23.901	23.894	3.72000	3.45873	-2	-1	0	19.18
5	23.932	23.432	3.71526	3.56739	-1	0	1	13.77
6	23.965	23.119	3.71021	3.54893	1	-1	0	5.9
7	24.083	24.345	3.69229	3.76593	1	-1	1	8.37
8	25.145	25.438	3.53828	3.86739	0	1	1	4.5
9	33.323	33.659	2.68664	2.56789	1	1	1	7.75
10	36.929	36.547	2.43231	2.47632	0	-2	0	23.71
11	46.135	46.432	1.96599	1.94678	-1	-2	1	13.19
12	48.158	48.321	1.88016	1.45680	1	2	1	4.9
13	49.057	49.489	1.85550	1.85409	-2	2	0	2.31

Table-2: IR spectral data Manganese (II) complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand:

3.6 X-ray diffraction spectral studies of metal complex of Mn (II) complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand:

The XRD spectral study has been done at SAIF, Cochin Kerala. The standard deviation observed for Mn(II) is 0.042 which is within the permissible limit of 2%. The observed and calculated densities are 0.8615 gcm^{-3} and 0.8609 gcm^{-3} respectively. The volume is found to be 1546.5 $Å^3$ and complex crystallizes in the monoclinic system with 1 atom per unit cell. The lattice parameters are a = 7.9163 Å, b = 4.9165Å, c = 8.4089Å, α=90˚, β= 102˚, γ=90˚.

3.7 Indexed X-ray Diffraction Data of Mn(II) Complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand. Table-3:

Ligand/Metal complexes	υ (OH) cm^{-1}	υ (H2O) cm^{-1}	υ (-CO-CH=CH-) cm^{-1}	υ (-C=O in pyron ring) cm^{-1}	υ (C-O-C) cm^{-1}	υ (C=C) cm^{-1}	Aromatic Ring (C=C) cm^{-1}	υ (M-O) cm^{-1}
[Mn(B1)2]	-	3363	-	1574	1019	1431	1234	661

Unit cell data and crystal lattice parameters for Mn (II):

Unit cell data and crystal lattice parameters

a (Å) = 7.9163   Volume (V) = 1546.5 $Å^3$

b (Å) = 4.9165   Density (obs.) = 0.8615 gcm^{-3}

c (Å) = 8.4089   Density (cal.) = 0.8609 gcm^{-3}

α = 90˚ Z = 1

β = 102˚   Crystal system= Monoclinic

γ= 90˚ Space group = P2/m

Standard deviation (%) = 0.042
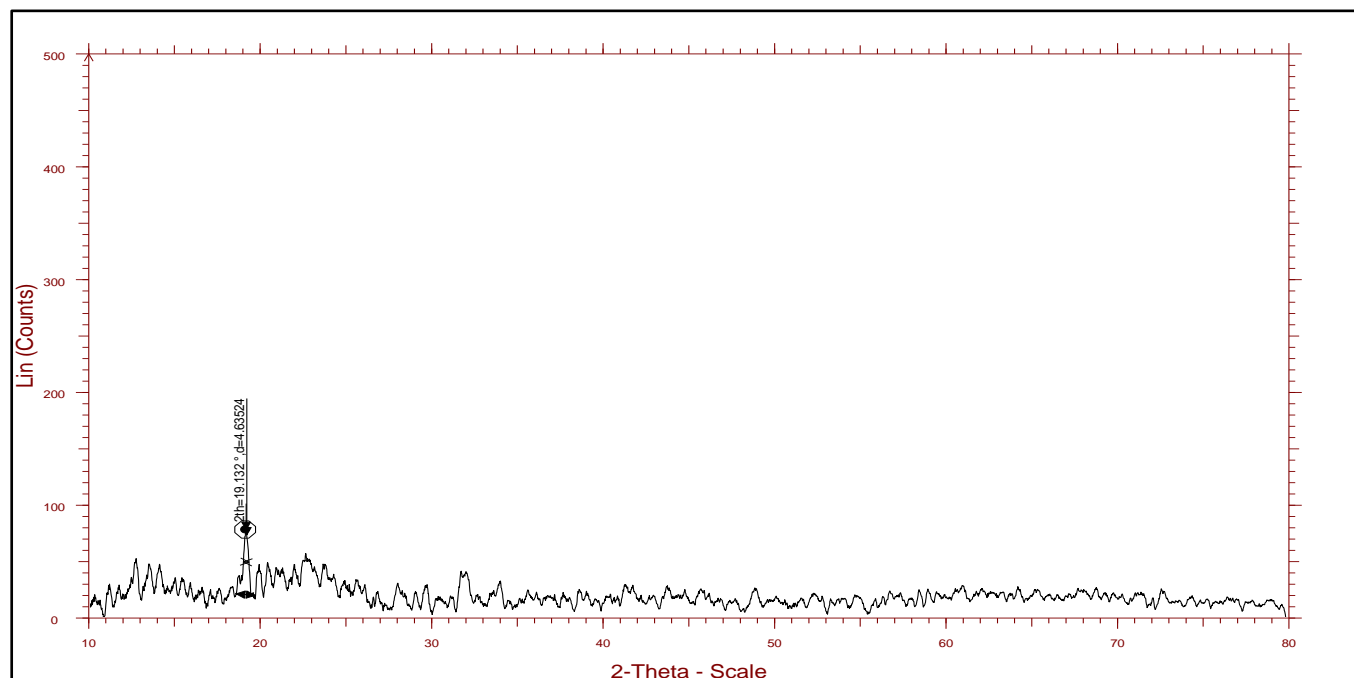
Figure-3: X-ray diffractogram of Mn (II) complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand

3.8 Antimicrobial activity:

Antimicrobial activity was assayed by cup plate agar diffusion method by measuring inhibition zones in mm. In vitro antimicrobial activity of all synthesized compounds and standard have been evaluated against strains of The fungal toxicity of Mn (II) complex was studied *in vitro* against *Aspergillus niger* ATCC 16404, *Saccharomyces cerevisiae* ATCC 9763, *Candida albicans* ATCC10231 fungal pathogens at fixed 1% concentration.

The antibacterial activity of Mn (II) complex was studied, for evaluating antibacterial activity Gram positive and Gram negative bacterial pathogens were used. *Staphylococcus aureus* ATCC 6538, *Bacillus megaterium* ATCC 2326, *Bacillus subtilis* ATCC 6633 were Gram positive pathogens used in this study. *Escherichia coli* ATCC8739, *Salmonella typhi* ATCC9207, *Shigella boydii* ATCC 12034, *Enterobacter aerogenes* ATCC13048, *Pseudomonas aerogenosa* ATCC9027, *Salmonella abony* NCTC6017 were the Gram-negative pathogens used in this study.

From the results of antimicrobial activity of ligands and complex it is clear that the complex shows enhanced activity than ligand. The increase in antimicrobial activity is due to faster diffusion of metal complexes as a whole through the cell membrane or due to the combined activity of the metal and ligands [14].

IV. CONCLUSION

The Mn (II) complex was colored, soluble in most of the organic solvent. The stoichiometry ratios of the metal complexes are obtained has been found to be 1:2.Solution conductivity of this metal complex reveals

nonelectrolytic nature. The electronic spectral data, magnetic moment, TG-DTA suggests that Mn (II) has Octahedral geometry. The CHO analysis gives C, H, and O percentage in the metal complex. The XRD parameters shows that the structure of Mn (II) is Monoclinic and has space group = P2/m. From the antimicrobial activity of ligand and complex it is clear that the complex shows enhanced antimicrobial activity than ligand.

Acknowledgement:

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Effect of Water Pollution of an Organism Godavari River Nanded District Maharashtra State

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ABSTRACT

Water Pollution is the major problem in Maharashtra as well as other states in India. Due to the water pollution a large number of aquatic plants and animals are affected. They suffer from various diseases and also respiratory problems. The term water pollution control is used to indicate the control of pollution of water from any source. The man requires clean water for drinking purposes to promote healthy living. Near about 71% of earth's surface is covered by water. The total Volume of water on the earth is 1011 million cubic kilometers; only 2.5 to 3% is fresh water which is able for drinking purposes.

Water contains various types of different inorganic and organic substances that are harmful for living organisms including also human beings. Domestic sewage industrial wastes, oily wastes, radioactive wastes, and also agricultural wastes etc affects pure water and water become polluted. Role of human beings is to control water pollution by avoiding supply of unwanted wastes.

Key words: Godavari River, different pollutants, aquatic Organism (plants and animals)

I. INTRODUCTION

Water is one of the most important factors of living organisms and also basic components. Water is called a Universal solvent because all living organisms like plants, animals and also microorganisms need water for growth. development and without water we can not prepare.

Water occupies 71% of the earth and 29% land. Out of 71% of water 97 to 97.5% marine water and 2.5 to 3% fresh water. Fresh water is very useful. Its main source is damp, Ponds, lakes, streams, rivers and melting ice caps. In Maharashtra mostly drinking water for agriculture, industries supplied by mostly rivers.

Godavari is the second largest river in India after Ganga. Its source is in Trimbakeshwar in Maharashtra. It flows east from 1465 km. draining the state of Maharashtra (48.6%). Fair *et al.* [1]. Support element of water supply and waste disposal.

Most of river of Maharashtra specially Godavari river supplies large number of chemical wastes, agricultural wastes drainage water pesticides different elements in water supply and ashes of dead bodies due to this source water become totally polluted, such water is not useful for drinking and its effect on flora and fauna.

In Nanded more than 75% people supplies domestic wastes Industrial wastes drainage water in Godavari river due to this process pure water quality change becomes impure and liable to drinks the fresh water pollutants are harmful to environment and public health. Due to supplying these components in water its results killing aquatic animals like fish, crabs, toads and also harmful hydrophytic plants like hydrilla, lotus. Maximum water borne disease like amoebiasis, cholera, dysentery produces due to water pollution. Richman [2] Studied water pollution and waste water.

II. HARMFUL EFFECT OF WATER POLLUTION

Goel [3] supports water pollution effect and control. various harmful effects of water pollution are described as below.

1.   **Toxic Effects:-**

Harmful substances like heavy metals, Organic and inorganic compounds, cyanides and biocides are harmful to aquatic organisms (flora and fauna) specially animals that create respiratory problems.

2.   **Physicochemical Effects:-**

Many water pollutants produce Undesirable taste, odour and colour in water and make it unpleasant and non-useful for drinking and domestic use. The changes in nature of temperature, oxygen content and pH of water affects the physiochemical nature of water. In addition, plant nutrients to the water bodies result in alga and other biological growth. The alga photosynthesis produces an increase in pH of water by consuming. The carbon dioxide dissolved in water produces carbonates.

3.   **Biological effects:-**

Excess harmful pollutant affects aquatic flora and fauna Excess of nutrients in water promotes algal growth and formation of water blooms by Cyanobacteria. Most of the freshwater algae are highly sensitive to pollutants and their elimination modifies the prey predator relationship by breaking down the food chain and affecting its life cycle. Maduka, Hugh,[4] supports the relation between water pollution and human health and creates gastric problems.

4.   **Pathogenic effects:-**

Specially swage contain several pathogenic bacteria, viruses and fungi. This pathogen causes various types of food poisoning, pathogen of water causes several water borne diseases and produces various diseases like typhoid, cholera, jaundice, dysentery etc.

III. ANALYSIS DATA AND SUGGESTION

Water of Godavari river contains large amounts of sewage by industrial wastes. agrochemical wastes, domestic wastes, drainage water etc.

Analysis of sewage:-

After sewage analysis, the nature of polluted water was cleared. These tests can be divided into physical and chemical tests.

I)   **Physical test:-**

It clears the nature of water by colour and odour. If the colour of sewage is yellowish gray or light brown It indicate fresh sewage. If the colour changes to black or dark it indicates industrial wastes supplies in the river.

The normal fresh domestic sewages there are no odour but polluted water shows like the smell of hydrogen sulphide.

II) Chemical test:-

These tests were carried out to examine sewage by chlorine residual test and oxygen.

III) Chlorine residual test:-

After sewage treatment chlorinate to kill the bacteria present in it. If

residual chlorines come out after 15 minutes of its application and it is cleared that the reduction of bacteria from sewage is sufficient.

Oxygen: oxygen in a sample of sewage is reported in oxygen demand.

IV. OXYGEN DEMAND

The demand of oxygen by organic matter in sewage is called B.O.D. (Biochemical Oxygen demand). The bacteria get energy by decomposing organic matter into simple form carbon dioxide and water in presence of oxygen due to this process dissolved oxygen (Do) depletion takes place. The concentration reduces from 7-8 mg/lit to 2-3 mg/lit. The Do depletes, the flora will be subjected to decompose. Dissolve oxygen is essential in aquatic animals Do goes depletion Biological oxygen demand (BOD) and chemical oxygen demand (COD) increases.

V. SUGGESTION

The main suggestion is the people who live nearby Nanded and Nearest Village Not supplied domestic wastes, drainage water, chemical wastes etc due to water will not pollute and save aquatic life like flora, fauna and maintain biodiversity.

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Effect of Extracts of Various Plant Parts on Seed Mycoflora and Seed Germination of Brinjal Var. Manjri Gotya

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ABSTRACT

The common and dominant seed borne fungi were found to be inhibitory for seed germination and caused great loss in seedling vigor, seed and seedling rots of the **Brinjal var. Manjri Gotya**
The root stems, leaf and bark extracts of some common and easily available plants were screened for the Bio-control of the seed mycoflora of the Brinjal.
Root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination

Key words: *Solanum melongena,* seed mycoflora, seed germination, seedling vigor, seedling emergence, leaf extract.
Short running title- Bio control of seed mycoflora and seed germination

I. INTRODUCTION

Solanaceae family includes a large number of annual or perennial herbs, shrubs, small trees and climbers. More than seventy species belonging to twenty-one genera are found in India. Economically the family is fairly important, as it comprises several crops of food value, medicinal value, vegetables and ornamentals. Several plants of this family are cultivated all over the world for their economic importance.

Brinjal – Egg Plant (*Solanum melongena*) is grown commonly in almost all the parts of the country and fruits are liked by both the poor and the rich as vegetables. It is available more or less throughout the year. It also contains many medicinal properties in ayurvedic medicines.

It has been found that due to hot and humid conditions in the region the fruits and their seeds of these crop plants may be covered with fungal mycelial mats, which are black orange or white in colour depending upon the specific fungus present. These fungal infections are known to cause heavy damages and impair the quality of fruits and seeds.

In the present studies ten local and easily available plants in the near by area were selected for their root, stem, leaf and bark extracts and the effects of these extracts on seed mycoflora and seed germination was studied.

II. MATERIALS AND METHODS

1. Collection of seed samples

The methods described by **Paul Neergaard (1973)** have been adopted for the collection of seed samples. Accordingly, seed samples of different var. of Brinjal (Half kg each) were collected from ripe dried fruits from field, storehouses, market places and research centers. A composite seed sample for each of the var. was prepared by mixing the individual seed samples together and preserved in gunny bags at room temperature during the studies.

2. Detection of seed mycoflora:

The seed-borne fungi of different varieties of seeds of Brinjal were detected by moist blotter (B) and agar (A) plate methods as recommended by **ISTA (1966), De Tempe (1970), Neergaard (1973) and Agarwal et al. (1976).** The procedure of moist blotter (B) and agar (A) plate methods are described as below.

3. Identification of seed-borne fungi

The seed-borne fungi were preliminary identified on the basis of sporulation characters like asexual or sexual spores or fruiting structures. Detailed examination of fungal characters was done under compound microscope and their identification was confirmed with the help of latest manuals [**Subramanian (1971), Neergaard and Mathur (1980), Jha (1993) and Mukadam et al (2006)**]. Pure cultures of the identified fungi were prepared and maintained on PDA (Potato Dextrose Agar) slants for further experiments.

4. Effect of culture filtrates on percent seed germination, root length, shoot length and seedling emergence.

Production of toxin was studied by growing some common and dominant seed-borne fungi of plants like *Alternaria tenuis, Aspergillus flavus, Curvularia lunata* and *Fusarium moniliforme* on liquid GN medium of pH 5.6 for ten days.

Twenty-five ml of the medium was poured in 100 ml borosil glass conical flasks, autoclaved and inoculated separately with 2 ml spore suspension of the test seed-borne fungus that was maintained on PDA slants for seven days. The flasks were incubated at room temperature $(27\pm1{}^{o}C)$ for ten days. After incubation, the culture filtrates were collected in pre-sterilized culture bottles from the flasks by filtering the contents through Whatman filter paper No.1 and treated it as crude toxin preparation.

5. Collection of plant material for extracts

During the present studies, ten common and easily available plants in the vicinity like *Acacia nilotica, Adhatoda zeylanica, Annona squamosa, Azadirachta indica, Curcuma longa, Lawsonia inermis, Murraya koenigii, Ocimum sanctum, Terminalia bellerica* and *Terminalia chebula* were selected. Their identification was confirmed using the **'Flora of Marathwada' (Naik, 1998)**. The roots, stems, leaves and barks of the selected plants were collected separately, surface sterilized with 0.1 % $HgCl_2$ and washed repeatedly with sterile distilled water for several times and kept for drying in hot air oven (Metalab) at 60°C temperature for 48 hours. After drying, the roots, stems, leaves and barks were preserved separately in polythene bags at room temperature (27± 1°C) during the studies.

The dried roots, stems leaves and bark of selected plants were crushed separately in to fine powder with the help of blender (Remi). 5 gm powder each of the plant parts was dissolved separately in 100 ml sterilized hot

distilled water in 250 ml borosil glass conical flasks. The flasks were kept in oven (Metalab) for 24 hours at 60°C and the content was filtered through Whatman filter paper No.1. The filtrates were used as 5% aqueous plant extracts.

6. Effect of extracts of various plant parts on seed mycoflora and seed germination

During the present studies, the seeds of different varieties of Brinjal were placed on blotters in Petri plates as described earlier and irrigated just enough to keep blotters moist separately with the root, stem and leaf extracts (5%) of the selected plants. Percent seed germination and associated seed mycoflora were recorded on seventh day. Seed plates irrigated with sterile distilled water served as control.

III. RESULT AND DISCUSSION

In the present studies, the seeds of Brinjal var. Manjri gotya were placed on blotters in Petri plates and irrigated with root, stem and leaf extracts of different plants (Total ten plants). The plates were incubated for seven days at room temperature and the incidence of seed mycoflora and seed germination was studied. The plates irrigated with sterile distilled water served as control. The results are presented in Table

From the results it is evident that, the root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination.

The seeds treated with leaf extracts of *Azadirachta indica,* leaf and root extracts of *Ocimum sanctum* and leaf extracts of *Murraya koenigii* showed very reduced incidence of seed mycoflora and maximum seed germination while, the seeds treated with the stem and root extracts of *Lawsonia inermis* and *Acacia nilotica*, leaf extract of *Curcuma longa* showed maximum incidence of seed mycoflora and reduced seed germination.

Table: Effect of extracts of various plant parts on percent seed mycoflora and percent seed germination of Brinjal var. Manjri gotya on blotter paper (after seven days)

Sr.No.	Source plant	Part used for extracts	% Seed mycoflora	% Seed germination
1	*Acacia nilotica*	Root	71	37
		Stem	81	36
		Leaf	67	40
		Bark	62	39
2	*Adhatoda zeylanica*	Root	51	30
		Stem	59	43
		Leaf	42	62
3	*Annona squamosa*	Root	51	48
		Stem	39	51
		Leaf	22	71
4	*Azadirachta indica*	Bark	18	85
		Leaf	08	89
		kernel	15	96
5	*Curcuma longa*	Dried rhizome	34	72
		Leaf	51	36

6	*Lawsonia inermis*	Root	48	44
		Stem	83	28
		Leaf	36	57
7	*Murraya koenigii*	Root	17	86
		Stem	19	74
		Leaf	10	92
8	*Ocimum sanctum*	Root	08	91
		Stem	06	92
		Leaf	07	91
9	*Terminalia bellerica*	Root	48	38
		Bark	51	49
		Leaf	44	23
10	*Terminalia chebula*	Root	35	37
		Bark	39	53
		Leaf	31	29
	Control (sterile distilled water)	--	100	31

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Synthesis of Heteryl Amino Derivatives of Bis[5-Cyano-1,6-Dihydro-6-Imino-2-Isopropyl-4-(Methylthio) Pyrimidine] Diazene

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ABSTRACT

Study of the synthesis of heteryl amino derivatives of bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(methylthio) pyrimidine] diazene we have obtained low yield at room temperature than the reaction carried out at the reflux condition.

I. INTRODUCTION

The understanding of principles of drug design and development of the drug molecules is important study the physicochemical properties of chemical compounds used to develop novel pharmacologically active compounds. The biological activities, mechanism of actions, possible biological activities of the metabolites and significance of stereochemistry for molecules are important factors for new drug design [1]. All these principles are based on the basic organic chemistry, physical chemistry and biochemistry. Heterocyclic compounds contain, one or more atoms of other elements apart from carbon, common hetero atoms are sulphur, nitrogen and oxygen [2]. The heterocyclic compounds having less common atoms suchsilicon, bromine, phosphorus, tin, boron aremuch investigated in recent years. The heterocycles with five or six atoms in the ring are the most important [3]. The practice of medicinal chemistry is devoted to the research in development of new diseasetreating agent. The process of finding a new drug is complex and involves talent of people from variety of disciplines [4]. The important aspect of medicinal chemistry is to establish a relationship between pharmacological activity and chemical structure [5].

Pyrimidine is a six membered cyclic compound containing 2 nitrogenand 4 carbon atoms which is pharmacologically inactive howeveritssubstituted derivatives shows an important place in modern medicine [6]. Pyridazine 1, oxygenated derivative-pyridazinone 2 and benzfused pyridazine or phthalazine 3 are heterocyclic compounds that contain two adjacent nitrogen atoms (1,2-diazine) in the ring structure [7]. They show a high range of pharmacological activities and are found in different natural compounds with different biological activities [8]. Many heterocyclic compounds obtained from synthetic as well as natural sources, generally in practice have one or more nitrogen in the heterocyclic ring system. Diazines (1,2/1,3/1,4) are important heterocylic rings. Recently, much attention has been focused on diazine derivatives for their broad-spectrum pharmacological activities [9].

II. PRESENT WORK

The newly synthesised molecule possesses two methylthio groups which can be easily substituted with heteryl amines that can bemarked.

Heteryl amino derivatives ofcan be prepared by reacting it with substituted heteryl amines in 1:2 proportion using DMF solvent and anhydrous K_2CO_3 catalyst to yield compounds .
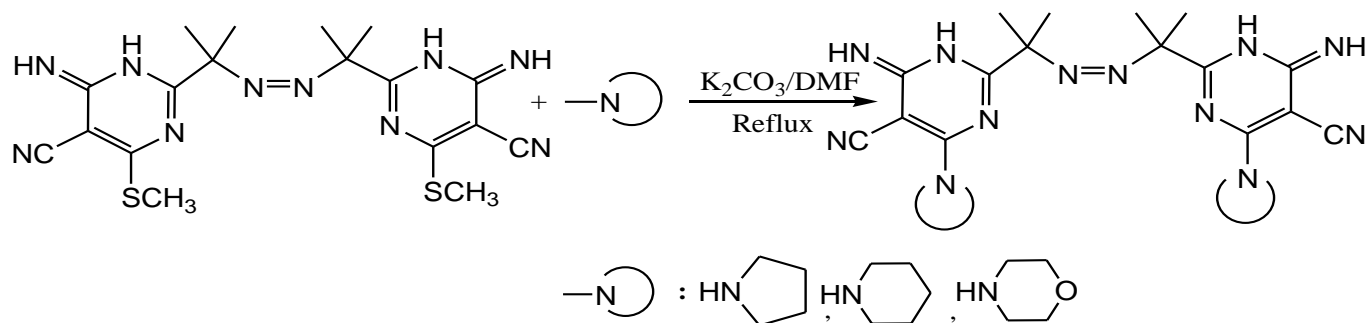
Scheme: Synthesis of heteryl amino derivatives of bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(methylthio) pyrimidine] diazene

III. RESULTS AND DISCUSSION

In the study of optimization of reaction condition and solvent for the synthesis of heteryl amino derivatives of bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(methylthio) pyrimidine] diazene we have obtained low yield at room temperature than the reaction carried out at the reflux condition.

IV. EXPERIMENTAL SECTION

All chemicals procured from spectrochem, Alfa Aeser, SDfine, Sigma Aldrich were used without further purification. The IR spectra were recorded with Shimadzu FTIR. The melting points were recorded using Veego digital melting point apparatus. The NMR spectra were recorded with Bruker 400MHz using DMSOd6 solvent.

V. GENERAL PROCEDURE

Compound (0.442 g, 1 mmol) and different heteryl amines, (1 mmol) in 1:2 proportion using 15 ml of DMF as solvent and catalyst anhydrous K_2CO_3as catalyst (10 mg) reflux for 5-7 hours, the progress of reaction was monitored by TLC. The reaction mixture was cooled to room temperature and poured into ice cold water. The separated solid product was filtered off, washed many times with water and recrystallized from ethanol.

VI. SPECTRAL DATA

1) bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(piperidinyl) pyrimidine] diazene
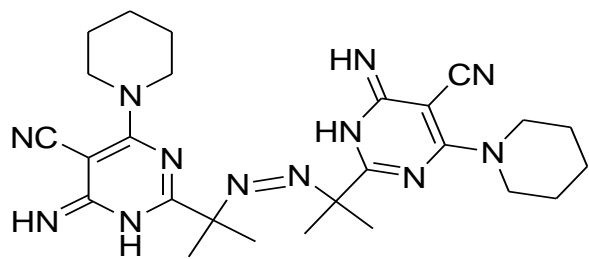
- **Molecular Formula**   : $C_{26}H_{36}N_{12}$
- **Mol. Weight (g/mol)**   :516.6
- **IR(KBr) (cm^{-1})**   : 3300(=NH), 2198 (CN), 1616 (C=N)
- **^{1}H NMR (δ, ppm)**   : 1.24 (q, 8H), 1.36 (s, 12H), 2.82 (t, 8H), 3.86 (s, 2H),
  (DMSOd$_6$)   9.21(s, 2H)
- **Mass (m/z)**   : 372.2, 516.4 (M$^{+.}$)

2) bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(p-piperazinyl) pyrimidine] diazene
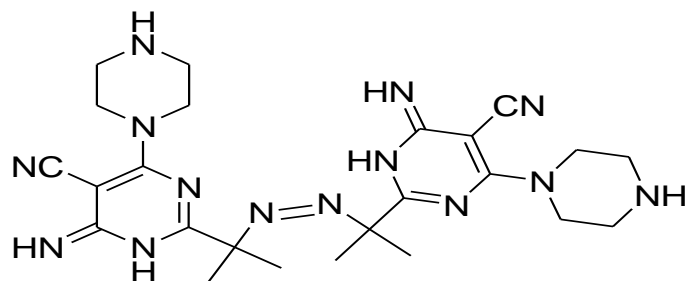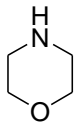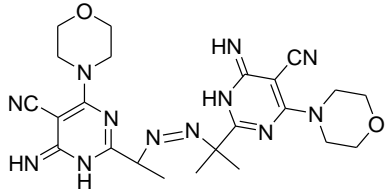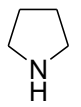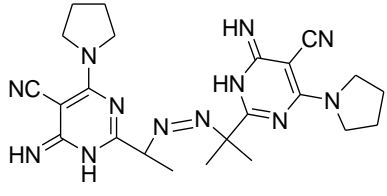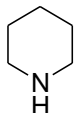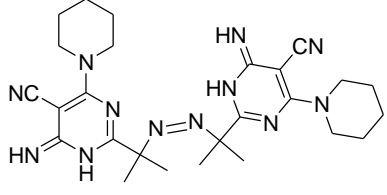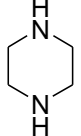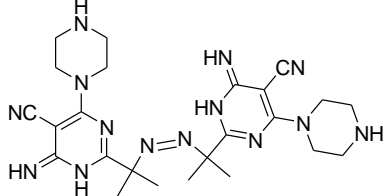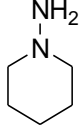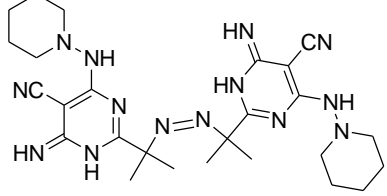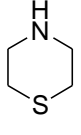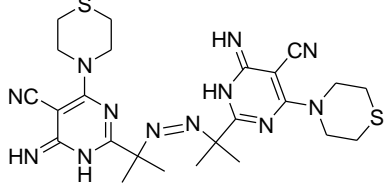
- **Molecular Formula**   : $C_{24}H_{34}N_{14}$
- **Mol. Weight (g/mol)**   :518.6
- **IR(KBr) (cm^{-1})**   : 3309 (=NH), 2204 (CN), 1610 (C=N)
- **^{1}H NMR   (δ, ppm)** : 1.35 (s, 12H), 3.08 (t, 8H), 3.10 (t, 8H), 3.82 (s, 2H),
- **(DMSOd$_6$)**   8.00 (s, 2H)
- **Mass (m/z)**   : 332.6, 518.9(M$^{+.}$)

3) bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(4-thiomorpholino) pyrimidine] diazene
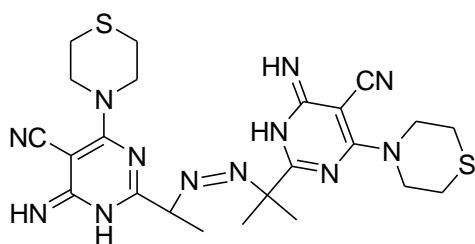
- **Molecular Formula**   : $C_{24}H_{32}N_{12}S_2$
- **Mol. Weight (g/mol)**: 552.7
- **IR(KBr) (cm^{-1})**   : 3301 (=NH), 2198 (CN), 1606 (C=N)
- **Mass (m/z)**   : 477.1, 552.6 (M$^{+.}$)

Table: Synthesis of heteryl amino derivatives of bis[5-cyano-1,6-dihydro-6-imino-2-isopropyl-4-(methylthio) pyrimidine] diazene

Entry	Substrate	Product	Reaction Time (h)	Yield (%)	M.P. (°C)
a			5.0	74	194
b			5.5	70	186
c			6.5	67	180
d			4.5	78	203
e			5.0	79	178
f			6.5	83	182

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Green Thiocyanation of Aryl Aldehydes Using Ethyl Methyl Imidazolium Chloride

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ABSTRACT

A green method for thiocyanation of aldehydes using 1-ethyl-3-methyl imidazolium chloride ionic liquid as a catalyst, provide environmental friendly and simple protocol for thiocyanated aldehydes as major outcome in short reaction time. Different substituted thiocyanated aldehydes are the sole outcomes of this method. These thiocyanato aldehydes are useful intermediates in the synthesis of heterocycles bearing sulfur, in which the thiocyanate group will be readily altered into other sulfur-containing compounds.

Keywords: Emim[Cl],Aldehydes, Ammonium thiocyanate, RT (Room Temperature)

I.   INTRODUCTION

An electrophilic thiocyanation of aromatic compunds is significant carbon-heteroatom bond formation reaction, thiocyanates are the versatile synthons in organic synthesis. [10-13] It is innovative and fast methods for synthesis of thiocyanate group containing aromatic systems. In view of the adaptability of thiocyanate group, it will be important to explore this. A number of strategies have been created for the thiocyanation of arenes using different reagents under optimum conditions. [14-16] But only a limited ceric ammonium nitrate [17], Iodine/methanol [18],IL-OPPh$_2$ [19], potassium peroxydisulfate and HCl/H$_2$O$_2$ [20], Iodine/ammonium thiocyanate [21], ferric chloride/ammonium thiocyanate [22],and oxone/ammonium thiocyanate. [23] Very recently, 2,3-dichloro-5,6-dicyano benzoquinone (DDQ/NH$_4$SCN [24], HIO$_3$/NH$_4$SCN [25] and p-toluene sulfonic Acid/NH$_4$SCN [26] have been applied to the thiocyanation of aromatic systems. All these methodologies having some lacunae such as the little availability or tough preparation of substrate, the need of large amount of strong oxidizing reagents, least yields for some compounds, and performed in certain harsh conditions. [27-31] Hence, requirement for build up alternative synthesis path accessible to the thiocyanation is in high insist. [32-36] Increasing attention in the make use of environmentally friendly procedures and reagents, aqueous mediated reactions have gained considerable notice in this, because of environmentally safety reasons. Due to the high dielectric constant and high cohesive energy density water is universal solvent for chemical reactions as compared to other organic solvents. It has also special effect due to which it shows novel solvation and assembly processes and it is ecofriendly, nontoxic, easily available, and inexpensive

compared to costly hazardous solvents. [37] The growth of an proficient and appropriate thiocyanation imitation methodology in water is an significant research area. [38-39] Thiocyanated aromatic aldehydes can shows antimicrobial [40], anti-inflammatory [41], antipyretic and analgesic [42] activity. Herein we designed simple and efficient route for the thiocyanation of aromatic aldehydes using ionic liquid.

II. PRESENT WORK

Here in we have reported simple, efficient and green method for thiocyanation of substituted benzaldehyde using ammonium thiocyanate as reagent under infiuence of ethyl methyl imidazolium chloride and zinc chloride as catalyst. This RTIL is acts as good catalyst to yield more product in short reaction time and easy work up.

R=CH$_3$,OCH$_3$,Br, I,Cl
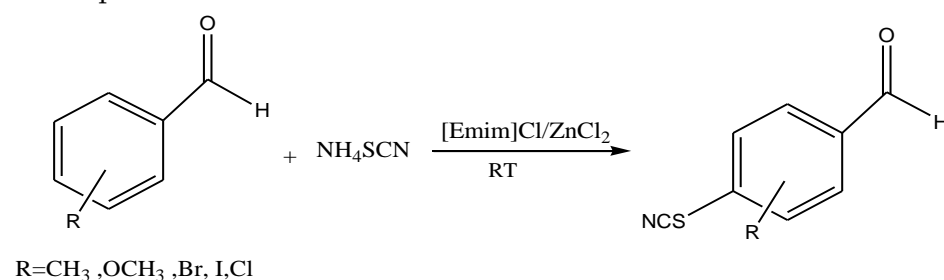
Scheme: green thiocyanation of aryl aldehydes using RTIL

III. EXPERIMENTAL SECTION
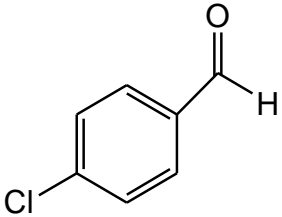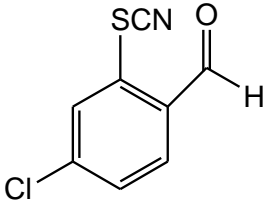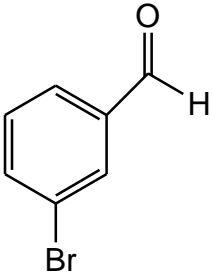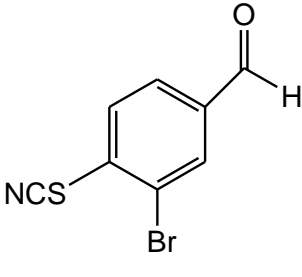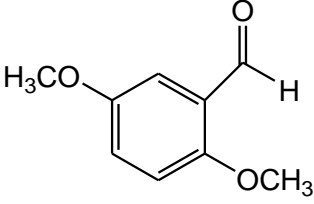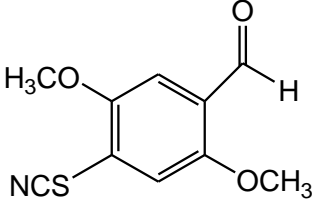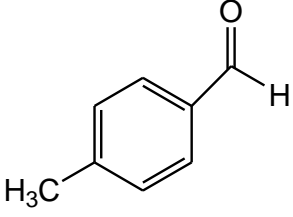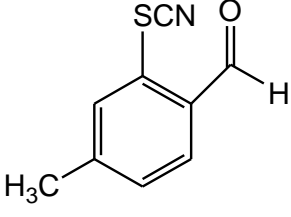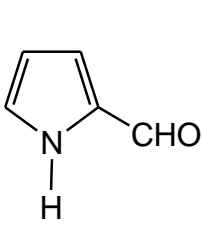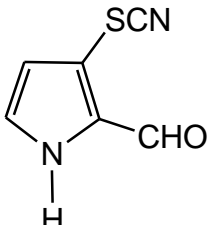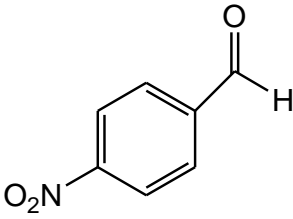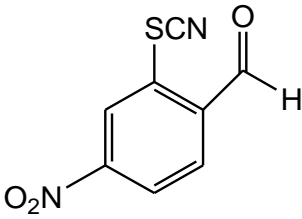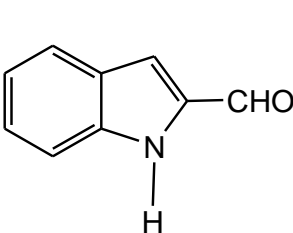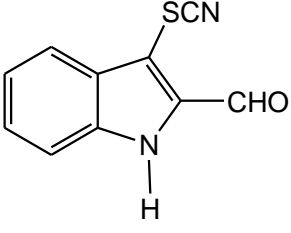
IR spectra were measured on a shimadzu FTIR,^{1}H NMR spectra were recorded using CDCl$_3$ at 400 MHz, TMS as an internal standard. Mass spectra were recorded on Shimadzu LC-MS using ionization technique. The elemental analysis was conceded out on Thermo Finnigan, CHNS analyzer. The growth of the reaction was monitored by TLC. All the chemicals were purchased from Avra, spectrochem, Alfa aeser chemicals. All melting points were recorded on shimadzu digital melting point apparatus.
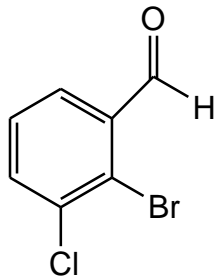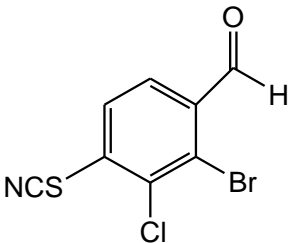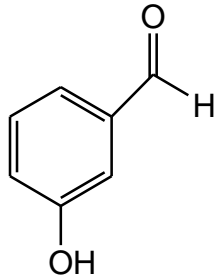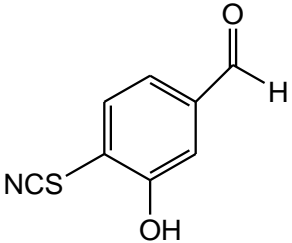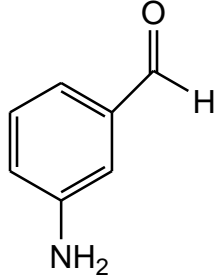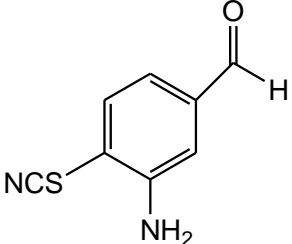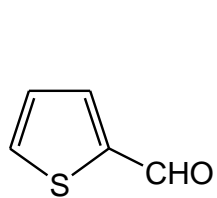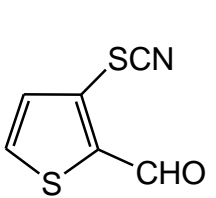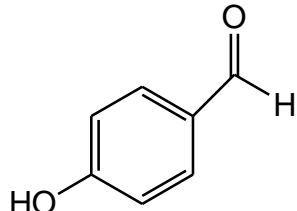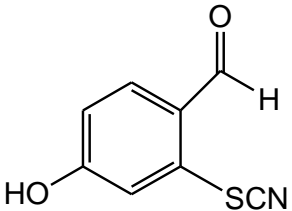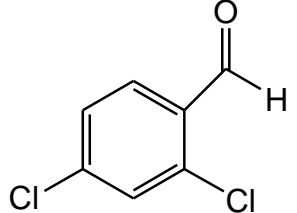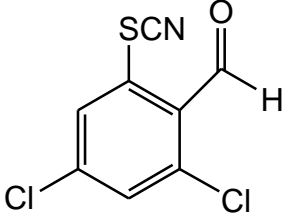
IV. GENERAL PROCEDURE

To a mixture of aryl aldehyde (5mmol) and ammonium thiocyanate (10mmol) and 1-ethyl-3-methyl imidazolium chloride/zinc chloride was added as catalyst. The mixture was stirred at room temperature for appropriate time in presence of acetonirtile as a solvent. Development of reaction was monitored by TLC. After completion of reaction solid product formed which is further recrysallised using ethanol to get pure product. Yield of this procedures are high in very short reaction time and RTIL catalyst was recovered by distillation and recycled upto three times for further use.

Thiocyanation of aromatic aldehydes using ionic liquid

Entry	Substrate	Product	Reaction Time (min.)	Yield (%)	M.P. (^{0}C)

a	4-chlorobenzaldehyde (Cl–C6H4–CHO)	4-chloro-2-thiocyanatobenzaldehyde (SCN derivative)	52	80	241-243
b	3-bromobenzaldehyde	3-bromo-4-isothiocyanatobenzaldehyde (NCS derivative)	54	85	179-181
c	2,5-dimethoxybenzaldehyde (H3CO, OCH3)	NCS-substituted 2,5-dimethoxybenzaldehyde	34	75	168-170
d	4-methylbenzaldehyde (H3C)	SCN-substituted 4-methylbenzaldehyde	38	89	187-189
e	pyrrole-2-carbaldehyde (CHO)	3-thiocyanato-pyrrole-2-carbaldehyde (SCN)	30	92	146-148
f	4-nitrobenzaldehyde (O2N)	SCN-substituted 4-nitrobenzaldehyde	55	79	188-190
g	indole-2-carbaldehyde (CHO)	3-thiocyanato-indole-2-carbaldehyde (SCN)	32	96	192-194

h			40	80	189-191
i			42	84	163-165
j			45	83	177-179
k			30	90	169-171
l			35	94	156-158
m			27	81	164-166

Spectral data of thiocyanated compounds
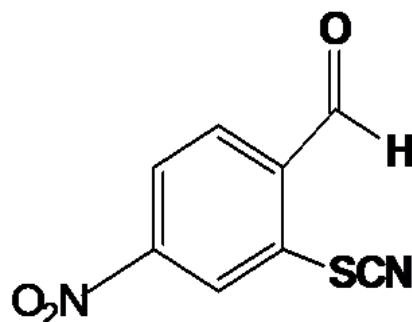
(f) IR-(cm^{-1}): 3107(Ar. C-H), 2065(SCN), 1716(C=O), 1541(-NO$_2$), 1346(C=C)

^{1}HNMR- (CDCl$_3$)δ: 10.1(s,1H), 8.40(d,1H), 8.12(s,1H), 8.10(d,1H)

^{13}CNMR -(CDCl$_3$)δ: 190.4, 151.0,140.0,130.5, 111.1,124.3

Mass -(m/z): 209.3(m$^{+\cdot}$), 219.1,224.2
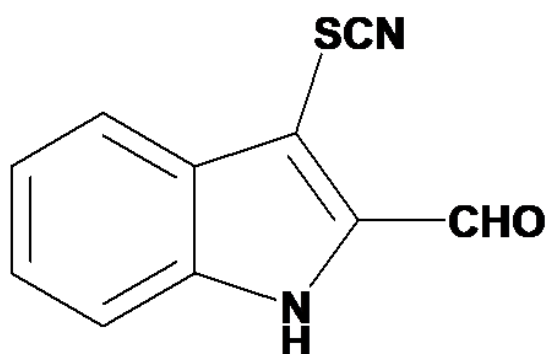
(g) IR-(cm^{-1}): 3164(N-H),2817(Ar. C-H),2065(SCN),1635(C=O),1519(C=C),

^{13}HNMR -(CDCl$_3$)δ: 7.63(d 1H);7.64(d 1H);7.79(d 1H);7.80(d 1H);9.61(d 1H);10.46(s 1H)

Mass -(m/z): 201.3(m$^{+\cdot}$),218.2,274.5,301.4
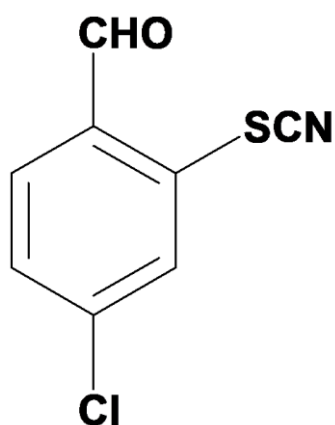
(a) ^{1}HNMR- (CDCl$_3$)δ: 7.14(d 1H);7.37(s 1H);7.38(d 1H);10.42(s 1H)

^{13}CNMR -(CDCl$_3$)δ: 113.28,127.98,130.08,131.80,132.38,133.87,146.48,191.38

Mass -(m/z): 211.7(m$^{+\cdot}$),239.9,287.9,337.9,369.9

V. CONCLUSION

We have developed very easy and convenient procedure for thiocyanation of aromatic substituted aldehydes. The catalyst used ethyl methyl imidazolium chloride is non toxic for environment. The reagent used ammonium thiocyanate is very easily available. We observed that, further purification was not necessary of products, just by recrystallising with ethanol product becomes pure. Yield of this procedures are high in very short reaction time to complete this reaction. The advantages of this methodology environmentally benign, simple workup, recyclable and reusable catalyst.

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Agro Medico Study of Melghat Region

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ABSTRACT

Melghat is known as paradise of Vidharbh .Melghat means the 'meeting of Ghats 'which is just what the area is, a large tract of unending hills .The forest of Melghat is mostly of the Dry Mixed Deciduous type and one of the important forests of Vidharbh region .The Melghat forest has great diversity of medicinal plants. Present study includes the study of agro medico study of this region.

Key words: Medicinal plants, Melghat Forest.

I.   INTRODUCTION

The forest of Melghat is mostly of the Dry Mixed deciduous type and one of the important forests of Vidarbha region of Maharashtra in India. The vegetation varies considerably with the change in altitude , soil, temperature, humidity and rainfall.

The average rain fall varies from 1300 mm to 1450 mm, the temperature range varies from 13 to 41^0 c and humidity varies from 48% to 100 %. The soil is also different types .The general floristic study of Melghat Forest includes the plants like 94 tree species, 708 shrubs, 368 small herbs, 66 climbers, 2 species of Bamboo, 127 species of grasses.

The study of medicinal plants done by Botanical experts, Agriculture University students and the students of Ayurveda etc. time to time and explored by them. Now it is necessary to study the Agro Medico View by the Expert. The farmer can do the farming of these medicinal plants .

II.   OBSERVATION

Sr. No.	Name of Plants	Common Name	Family	Medicinal Uses
1	*Adhatodavasica*	Adulsa	Acanthaceae	Asthama, skin diseases, fever.
2	*Cassia fistula*	Amaltas	Caesalpinoidae	Digestive problem,piles.
3	*Withaniasomnifera*	Ashavgandha	Solanaceae	Joint pain, energetic, usable in male sexual problems.

4	*Azadirachataindica*	Kadunimb	Meliaceae	Skin diseases, fever, snake bite, Hair problems,cosmatics,moisquitoreplient.
5	*Terminaliabelerica*	Behada	Combretaceae	Cough, cold, asthama, digestive problems, one of the important ingredient of Triphala churn.
6	*Terminaliachebula*	Hirda	Combretaceae	Increases resistance power, skin diseases, piles, digestive problems.
7	*Aeglemarmelos*	Bel	Rutaceae	Usable in dysentery.Ulcer .
8	*Phyllanthusamarus*	Bhuiawla	Euphorbiaceae	Fever.
9	*Semicarpusanacardium*	Biba	Anacardiaceae	Arthritis , oil uses in joint pain.
10	*Cymbopogon martini*	Tikhadi	Poaceae	Cosmatics, perfums, oil uses in paralysis and for massage.
11	*Phyllanthusemblica*	Awla	Euphorbiaceae	Increases resistance power, source of Vitamin C, one of the important ingradient of Triphala.
12	*Madhucaindica*	Moha	Sapindaceae	Arthritis, piles, skin diseases, usable in diabetis.
13	*Menthaviridis*	Pudina	Lamiaceae	Oil used in pharmaceutical industries.
14	*Catharanthusroseus*	Sadaphuli	Apocynaceae	Roots usable in diabetis and cancer treatment.
15	*Asparagus racmosus*	Shatavari	Liliaceae	Energetic, Usable in ladies problem.
16	*Ocimum sanctum*	Tulas	Lamiaceae	Holi plant for Hindus,UsesinCough, cold, fever, skin diseases, headache.
17	*Rutagraveolens*	Sitap	Rutaceae	Uses on worms for the childrens.
18	*Dendrocalamusstrictus*	Bambu	Poaceae	Use as a vegetable ,Adivasi people make the Bamboo prickle. Its usable in Agricultural furniture, home furniture .
19	*Dioscoriatuberosa*	Babra	Dioscoreaceae	Energetuc, used as a vegetable by tribes,

III. DISCUSSION

Melghatregion has Agricultural ecosystem in Melghat rural area composed of annual cultivated crops with reference to sustabitlity of soil. The average rain fall of Melghat area is 1200 -1300mm. Soil is red, murmi. The crops are in annual pattern.The tribes of MelghatKorku, Bhill,gavlon used the forest minor produce with relation to ethnobotany and ethnovetarnary aspects. In agricultural ecosystem, some of the herbaceous and busy weeds are considered as the medicinal plants and they are used in the remedy of various diseases of domestic cattle and human being.

Some of the plants are antipyurtic, laxative, used in gastric problems. From the ancient era it is observed that the culture and tradition of tribes shows that agricultural ecosystem and forest ecosystem shows close resemblance with each other and they shows the socio eco potential.Forest produce used by the tribs like bamboo, Sagvan for agriculture instruments, for their huts etc.tribes totally dependen on the forest for their life.

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Yield and Proximate Composition of Pleurotus Sajor - Caju

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ABSTRACT

Pleurotus sajor-caju wascultivated on different agro wastes viz. soybean straw, paddy straw, wheat straw, jowar straw, sunflower stalk and bajra strawto study the productivity and proximate composition of fruiting bodies. Soybean straw showed significantly highest yield (with 81.00% B.E.), maximum protein (25.90%), fat (2.80 %), and ash (7.40%) content. Significantly maximum moisture content was found (88.30 %) on wheat straw, carbohydrate content on Jowar (58.20%) straw, crude fiber content (7.90 %) on paddy straw.

Keywords: *P.sajor-caju*, B. E., yield, agro waste, fruiting body.

I. INTRODUCTION

Mushrooms are the reproductive structure of fleshy macro fungi and rich with protein, vitamin and minerals. More than 2000 species of edible mushrooms are known, out of which only few species have been cultivated commercially by preparing beds (Nair, 1994). Among the various edible mushroom types, Pleurotus species have become more popular and widely cultivated throughout the world particularly in Asia and Europe as they have simple and low cost production technology shows higher bio efficiency. Pleurotus species are rich source of vitamin C, Bcomplex (thiamin, riboflavin, folic acid and niacin), minerals (Ca, P, Fe,K and Na) and protein (Sturion and Otterer,1995; Justo et al.,1998; Manzi, et al., 1999; Caglarirmak, 2007). Pleurotus species content high potassium: sodium ratio,(Mandhare, 2000) which makes mushrooms an ideal food for patients suffering from hyper tention and heart diseases .(Rai et al.,1998). The cultivation of edible mushroom offers one of the most feasible and economic method for the bioconversion of agrolignocellulosic wastes Bano et al. 1993; Cohen et al, 2002). The technology can also limit air pollution associated with burning agriculture wastes as well as to decrease environmental pollution due to unutilized agricultural wastes. Aim of this work was to evaluate the substrate for cultivation and nutritional quality of Pleuotus sajor-caju.

II. MATERIAL AND METHODS

2.1. Culture: The pure culture of Pleurotus sajor-caju was obtained from National Collection of Industrial Microorganisms (NCIM) National chemical laboratory (NCL), Pune, India. The cultures were maintained on 2% malt extract agar slants at 4 ºC. Sub culturing was done after every 15 days.

2.2. Spawn Preparation: Spawn was prepared in polythene packets. Sorghum whole grains were boiled in water bath for 10 to 15 min. at the ratio of 1:1 (sorghum grain: water) and mixed with 4% (w/w) $CaCo_3$ and 2 % (w/w) $CaSo_4$. Sorghum grains then packed (250g) in polythene bags (200 x 300mm. size and sterilized in an autoclave at 121 ºC for 30 min. After sterilization, the bags were inoculated with actively growing mycelium of the Pleurotus from the malt extract slants and incubated (at 27 ± 2 ºC) for mycelial growth without any light for 10-15 days until the mycelium fully covered the grains.

2.3. Cultivation: The agro waste , soybean straw, paddy straw, wheat straw, jowar straw, bajra straw and sunflower stalk were collected from local farms and were used as cultivation substrate, following the method prepared by Bano and Shrivastava (1962) with slight modifications. The substrates were chopped to 2-3 cm. pieces and soaked in water over night to moisten it and excess water was drained off.

After soaking, the substrate was steam sterilized at 121 ºC for 20 min. in an autoclave. The polythene bags of the size 35x45 cm were filled with sterilized substrates and multi layered technique was adopted for spawning. Each bag was filled with 1 kg dry substrate and the spawn was added at the rate of 2% of the wet weight basis of substrate. After inoculation, the bags were kept in house where the temperature and humidity were maintained around 25 ºC and 80 to 90 % respectively with sufficient light and ventilation for 20 days. The spawn run was completed within 18 days. The polythene bags were tear-off following the spawn run. Formation of fruit bodies was evident within 3-4 days after removal of poly bags. The beds were maintained up to the harvest of the third flush, which was completed in 35 days after spawning. A small layer of substrate was scrapped off from all the side of the beds after each harvest. Each of the six treatments was replicated three times.

2.4. Yield and Biological efficiency: Total weight of all the fruiting bodies harvested from all the three pickings were measured as total yield of mushroom. The biological efficiency (yield of mushroom per kg substrate on dry wt. basis) was calculated by the following formula Chang et al. (1981)

2.5. Proximate analysis: Analysis of moisture, protein, fat, crude fibre, total carbohydrates, ash of samples were done by standard methods (AOAC, 1995). The recorded data in the present work was subjected to statistical analysis as per the procedure given by Panse and Sukhatme (1978).

III. RESULT AND DISCUSSICON

3.1 Yield Performance and Biological Efficiency of *P. sajor-caju*:

Effect of different substrates on the yield performance of mushroom varied significantly (Table 1)

Soybean straw showed significantly maximum yield (810.00 gm/kg straw, with 81.00 % B.E) followed by paddy straw (779.33 gm/kg straw with 77.93 % B.E.) and least yield was recorded (640 gm/kg straw, with 64 % B.E. on sunflower stalk. Patil *et al* (2010) also reported the maximum yield on soybean straw followed by paddy straw and wheat straw with *Pleurotus ostreatus*.

Table 1: Effect of different substrate on yield of *P. sajor-caju*

Substrate	Yield (gm) / Kg dry straw			Total	B.E.(%)
	I[st] Picking	IInd Picking	IIIrd Picking		
Soybean straw	340.00	290.00	180.00	810.00	81.00
Paddy straw	360.00	308.33	111.00	779.33	77.93
Wheat straw	320.33	255.33	153.00	728.66	72.86

Jowar straw	315.00	222.33	135.00	672.33	67.23
Sunflower stalk	308.00	232.00	100.00	640.00	64.00
Bajra straw	285.00	238.00	158.33	681.33	68.13
S.E.+-	14.80	7.18	3.48		
C.D. at 5%	53.30	23.35	14.25		

Table 2: Effect of different substrates on Nutritional content of *P.sajor-caju*.

Substrate	Moisture (%)	Total carbohydrate (%)	Protein (%)	Fat (%	Crude fibre (%	Ash (%)
Soybean straw	87.30	53.80	25.90	2.80	6.60	7.40
Paddy straw	87.80	55.30	23.50	2.40	7.95	6.80
Wheat straw	88.30	56.20	23.20	2.58	7.00	6.60
Jowar straw	85.70	58.20	23.10	2.60	7.50	7.20
Sunflower stalk	86.50	50.70	21.00	2.70	7.60	6.80
Bajra straw	85.10	50.20	24.10	2.42	7.70	6.90
S.E.+-	0.44	0.66	0.59	0.11	0.11	0.15
C.D. at 5%	0.85	2.34	1.66	0.18	0.26	0.46

3.2 Proximate Composition of P. sajor-caju:

Different substrates affected the nutritional composition of mushroom (Table 2).

Different substrates affected the nutritional composition of mushroom (Table 2). Soybean straw showed maximum protein (25.90 %), fat (2.82%) and ash (7.30 %) content of P. sajor-caju. The protein content of mushroom on dry weight basis varied from 21.00 % to 25.90 %. Similar results were reported with P. sajor-caju by Dias et. al, (2003). Kortei and WiafeKwagyan (2015) reported that the protein content of P. eous was 24.10% .The fat content on dry wt basis ranged between 2.40 % to 2.80 %. The ash content of mushroom ranged from 6.60 to 7.40 %. Superiority of soybean straw over paddy, wheat, jowar straw in terms of yield, protein, ash was reported earlier by Patil and Jadhav, (1999).Comparing the six lignocellulosic residues as substrates for the cultivation of P. sajor-caju shows that, soybean straw supported best growth of P. sajor-caju as evidenced by completed and heavy colonization of substrates forming a compact white mass of mycelium within 2 weeks of inoculation.

Maximum moisture content was 88.30 % when *P. sajor-caju* was grown on wheat straw. Carbohydrate content of *P. sajor-caju* was 58.20 % grown on Jowar straw being the highest followed by on (55.30 %) paddy straw. These results are confirmed with the findings of Patil et. al (2008). The crude fibre content of mushroom varied from 6.60 to 7.95 % on different substrates. Observed values of crude fiber and ash content in present study are similar with the previous studies Khydagiet. al (1997) and Bonatti et. al (2004).The % content of moisture, carbohydrates, protein, fat, crude fibre and ash were found in accordance with earlier studies (Syed Abrar et.al, 2009, Patil and Baig, 2020). The variation in these nutrients content might be due to the quality and quantity of nutrients available in substrates Patil, (2012).

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E-Learning, M-Learning & Information Literacy : Role of Academic Library

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ABSTRACT

The rapid growth of ICT & rising computer knowledge / skills of the students have laid very strong foundation for the appearance of new & more sophisticated educational from such as E-Learning, M-Learning. Today information is an important resource for organizations, business & every walk of our life. To identify, retrieve, analyse& effective use of information is required skill set for employees or users, which is know as Information literacy skills. This paper digs in evaluate the concepts of E-Learning , M-Learning& Information Literacy.

Keywords : E-Learning, M-Learning, Information Literacy

I. INTRODUCTION

Information technology can play importance role in the effective learning process of students engaged in higher studies today a lot of information generated through print & mass media. E-Learning has arisen from the information and communication technological revaluation & like others forms of technology. It is undoubtedly facilitating change across the educational sector. Libraries have always been an integral part of learning, helping learner find, evaluate & exploit resources. There for it is unsurprising that change in education is being felt in the library profession.

All types of information available on internet in public domain as well as through different subscription based databases provided by various hosts & aggregators is bound to play a very importance role in teaching, learning & research. Information is available from many sources & many formats such as printed text, television, videos, library databases, websites & more. It is also increasingly importance in the contemporary environment of rapid technological change &proliferating information resources that the users are equipped with basic / advanced skills of information gathering.

Many countries Colleges & Universities have developed information literacy policies & programs based on information literacy competency standards for education that focus on teaching students critical skills to become lifelong learners, including the abilities to-

- Determine the extent of information needed
- Evaluate information & its sources critically.
- Access the needed information effectively & efficiently.
- Use information effectively to accomplish a specific purpose.

II. E-LEARNING

E-Learning is the learning enabled by the electronic media. It is a sophisticated approach to facilitate & enhance learning through computers, tablets, smart phones, digital TVs & PDAs with the help of telecommunication, networks & secondary storage devices etc. E-learning is defined as instruction delivered on a computer via internet or CD-ROM. It can be self-paced or instructor-led & includes media in the form of text, streaming video, & audio and builds user knowledge to improve organizational functioning. E-learning commonly refers to training delivered electronically in an organizational setting while online learning is used to differentiate courses delivered via the internet in educational setting.

According to CISCO's quoted by Jeevan, E-learning is the overreaching umbrella that encompasses education, information, communication & training. It is the web-enabled system that makes information & knowledge accessible to those who need it, when they need it – anytime , anywhere. In the present context it is a web-based learning. In e-learning computer acts as a teacher & the students can gain knowledge & skills from this electronic teacher at convenient timings.

Advantages of E-Learning:

With the e-learning in higher education &the popularization& application of enterprise training, the e-learning is considered to be a computer, multimedia & network-based, teacher-led and student-centered teaching mode of the new & also in practical applications, e-learning also refers to the information technology environment in the teaching & learning behavior. The advantages of E-learning are as under

- **Remote Learner-Teacher:**In the e-learningenvironment, the learner & the teacher need not to travel to a common physical location for the purpose of education. They can be away from each other, yet achieving the goal of education through technological means.
- **Learner Centered:** E-learning can be personalized to the learner, or as it is called customized to the need of the learner. Unlike the classroom-based learning the e-learner can choose his/ her learning module.
- **Anywhere Learning:** E-learning provides remote access to learning facilities through the ICT. As such the e-learner can learn from the place of his convenience, even from home, office, while travelling or literally from anywhere. In the globalized world the work style is changing. People are expected to work from anywhere & anytime. The e-learning suits to this philosophy.
- **Anytime Learning:** The time is not a constraint to the e-learner, one can learn anytime that suits his schedule. It is truly 24x7 learning system.
- **Just-in-Time:** The c-learning (classroom learning) adopts the philosophy of just-in-case. So what is taught & studied in c-learning is on the thinking that such & such knowledge, skill may be needed in future. On the contrary the e-learning is arranged to develop skills, which are needed at the particular time.
- **Multiple Collaborations:** In e-learning there emerge multiple collaboration, i.e. teacher-student, student-student, as well as teacher-teacher. Multiple collaborations also include collaboration between the content development experts & the technology people.
- **Facilitates Lifelong Learning:** Being self-paced, e-learning candeveloped skills in the e-learner which can be useful to him for lifelong learning.
- Reducing the administrative load by making routine information available online. This will release more time for other activities.

- Making communication easier with individual students & groups of students.
- Making it possible to use a wider range of resources that may otherwise be too difficult or expensive to use.
- Motivating & supporting students to take responsibility of their own learning.
- Supporting & increasingly large and diverse student population with little increase in teaching time.
- Making it easier to amend & update materials.
- Contributing to quality assurance agency institutional audits.
- Instructors of the highest caliber can share there knowledge across borders, allowing students to attend courses across physical, political & economic boundaries. Recognized experts have the opportunity of making information available internationally, to any one interested at minimum costs.

Disadvantages of E-Learning:

In spite above advantages, E-learning has the following disadvantages.

- No direct interaction leading to confusion in the minds of the students.
- No immediate feedback.
- Requirements of latest gadgets & infrastructure. It is big challenge especially in the under development or developing countries.
- More maturity & discipline is a mandatory condition for students.
- Due to lack of interaction, all the aspects of a subject may not be covered.
- Personal development of students is not possible.
- Regular updation remains an indispensable requirement.
- Technical support should be made available round the clock for monitoring & maintenance to the servers, busy signals or to handle the break downs.

III. M-LEARNING : THE FUTURE OF E-LEARNING

The rapid growth of information technologies & rising computer skills of the students have made it possible to develop & implement more and more sophisticated educational forms such as E-learning. Nowadays, the concept of e-learning has ushered in a new phase of development i.e.M-Learning. M-Learning (Mobile Learning) is another form of Distance Learning like E-learning.

M-Learning provides an added advantages over E-learning in the way that M-learning offers the users opportunity to learn anywhere at any time without permanent physical connection to cable networks. This can be achieved by the use of portable devices such as portable computers & Tablet PCs, smart phones, cell phones or PDAs. They must have the ability to connect to other computer devices, to present educational information & to realize bilateral information exchange between the student & the teacher. Today there are several communication technologies which are used in mobile devices, such as GSM, WAP, GPRS, Blue-tooth, Wi-Fi & Inferred Data Association (IrDA) etc.

Advantages of M-Learning:

The M-Learning advantages comparing to e-learning are as under.

- It can be used everywhere at every time.
- Most of mobile devices have lower prices than desktop PCs.
- Smaller size and light weight than desktop PCs.

- Ensures bigger students engage as m-learning is based on modern technologies, which students use in everyday life.
- Using GPS technology the m-learning can provide location dependent education.

Limitations on M-Learning:

- Most of the applications do not support the mobile devices.
- Small display limits the use of the mobile devices.
- Frequent need to recharge the battery.
- Higher maintenance costs.
- Lower memory / storage capacities of the mobile devices.
- Most of the times it not possible to do job on graphics.
- The bandwidth degrades rapidly with the increased number of users.

IV. INFORMATION LITERACY

Information literacy is a set of qualities required to recognize when information is needed & have the capacity to find, assess & use effectively the information needed to take better decisions.

Definition of Information literacy:

The American Librarian Association's (1989) Presidential Committee on information Literacy, final report defines Information Literacy as "A set of abilities requiring individuals to recognize when information is needed & have the ability to locate & use effectively the needed information." In other words, information literacy is a set of skills, which enables the individuals to recognize his / her information need. In addition, is also enables to locate, evaluate & use the needed informationeffectively.

Barefoots defined that "One should be information literate to solve problems related to information & to become information literate one should learn technology skills set which includes how to find & use the information for their problems and efficient & effective decision making."

According to Bruce & Candy "Information literacy is the ability to locate, evaluate, manage & use information from a range of sources for problem-solving, decision-making & research" According to Association of College & research libraries "Information literacy is the basis for lifelong learning. For all disciplines common, toall learning environments, & to all level of education. It makes user or learners to master content, & extent their investigations become more self-directed, and assume greater control over their own learning."

One will neither become information literate or information communication technology, literate overnight. Just as with writing & speaking skills, your skills will improve over time as you gain proficiency in the topics you choose to study. This method will give you practice in searching for , choosing & accessing the information you come across & will allow you to create new thoughts, which you communicate to other using a range of technological tools. As defined by Chartered Institute of Library & Information Professionals "Information Literacy is knowingwhen & why you need information, where to find it, & how to evaluate, use & communicate it in an ethical manner."

V. LIBRARY & INFORMATION LITERACY

21ˢᵗ Century is known as information age because of information uncontrolled explosion of information sources & outputs. Which make it very difficult to students, to learner everything they need to know. Here Information Literacy plays a big role in teaching critical skills to become experts or lifelong learners.

In 1989 American Library Association Presidential Committee on Information Literacy says: Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information& how to use information in such way that others can learn from them. They people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand".

Information literacy gives platform for lifelong learning which is common in all disciplines, all level of education & all learning environments which improve searching skills of users and make them lifelong learners. Since long back librarians are involved in Library orientation. Effectively training users on library use, resources & services. Different terminologies like library instruction, library orientation, bibliographic instructions & user education have been used at different time to define the process of helping students or users how to use the library & resources effectively. Today information literacy is replaced all these terms.

Librarians what started as library orientation will grownup to be library instruction, Bibliographical instruction & now become Information Literacy.

In this information age students are facing it very difficult to know everything what is available in the library in print or digital format. Academic libraries are having their own experts for training or teaching both students & faculty colleagues on how to find evaluate & use information effectively. Now day's librarians specially trained / qualified to teach & handle information literacy programs. Information Literacy made users lifelong learners. It is fundamental principal of higher education.

Need of Information Literacy:

Today librarians are providing information in traditional as well as electronic & digital forms. Information literacy is required because of proliferating information access resources. In this digital age users need to more information literate them over before while internet, E-mail, www can contain valid & and accurate information. It is very nature encourages quick & easy self-publication.

Today the information universe has become more complex than over before due to the rapid technological advancement & information explosion in network-based resources. The students are drowning in Information Ocean. This emphasized the need for IL skill to exploit the new technology to use information effectively. The internet with a wealth to open access resources viz, subject, gateways, portals, e-books, e-journals, institutional repositories with play crucial role in learning, teaching research activities of higher education in the country.

Role of Library and Librarians in effective Information Literacy Program:

- Understanding the need of users, customers, learners.
- Understand user learning ability & how information & information resources contribute the process of learning.
- Libraries should not be served as store house of information & quite place but should not be dynamic gateway for disseminating information.
- As ALA defined "In this information age information literacy is survival skill of life line." Libraries & library professional should take a lead role in developing & delivering effective information literacy

programs so that students or faculties to effectively retrieve, explore & investigation the information whenever & wherever it found in digital or print.

- Librarians should collaborate with faculties & other specialist for delivering effective information literacy program.
- Effectively design syllabus for information literacy program keeping in mind user needs.
- Teaching users how to access, evaluated & use the information.
- Developing & executing information policy.
- Archival of required information in all formats.
- Become a leader in introducing information technologies & ensuring their effective use.
- One should be expert in technology, subject knowledge & available resources.
- Smart enough to evaluate the information organize & store for future use.
- Should have the ability to add value to information.
- Fair knowledge of effective delivery mechanism & dissemination of information. Should understand legal & economical aspects of information.
- Required good marketing & communicational skills.
- Should be practical and creative thinker.

VI. CONCLUSION

In e-learning & m-learning process the future libraries will emerge as active bridge between the information. The librarians can help in creating & developing repositories and content management. However e-learning & m-learning is only the tool & its effectiveness will depend on the quality of the content including the learning resources & the use made of the communication tools.

To conclude, in this information age Library & Library professionals play very importance role in executing information literacy in their organization. Need for the library professionals to acquire required skills & ICT knowledge to train their users on how to make use of available resources effectively for their information need. Now it is high time for library professional to handle information literacy program effectively otherwise IT professional or faculties will take over our profession.

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A Survey : Impact of Covid-19 Pandemic on Educational Sector in India

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ABSTRACT

The impact of pandemic COVID-19 is observed in every sector around the world. The educationsectors of India, as well as the world, are badly affected by this.The end of March 2020 recorded the spread of covid 19 pandemics to over 185 countries and resulted in the closure of over 95 percent of all schools, colleges, and universities impacting close to approximately 350 million students.Around 32 crore learners stopped moving schools/colleges and all educational activities halted in India. COVID-19 pandemic lockdown has worked as a catalyst for educational institutions to grow and opt for online platforms with advanced technologies, which have not been used before. Entrance tests of several universities and many competitive examinations are held in such a crucial period that is affecting the education system badly. In the present study,data collected by using a semi-structured questionnaire via the Google survey form was shared with the study participants through an online platform by schools and collegestudents, servants, farmers, businessmen, and others (Total=247) from which 131 males and 116 females.This paper highlights somemeasures taken by the Government of India to provideseamless education in the country. Both the positive and negative impacts of COVID-19 on educationare discussed and some fruitful suggestions are also pointed to carry out educational activities during the pandemic situation.

Keywords: Education, COVID-19, Impact, University, Government of India.

I. INTRODUCTION

The world is facing a crisis today due to the Coronavirus Covid 19 pandemiccompelled human society to maintain social distancing.On February 11, 2020, the World Health Organisation (WHO) proposed an official name of the virus as COVID-19, an acronym for Coronavirus disease 2019. It was first identified in Wuhan, China on December 31, 2019. The first death by COVID-19 was the 61-year-old man in Wuhan, China on January 11, 2020. WHO declared COVID-19 as a pandemic on March 11, 2020[1].The first death due to COVID-19 was reported in India on March 12, 2020.from most of the countries including India have taken strict precautionary measures to reduce the coronavirus spreading such as social distancing, hand hygiene,

wearing face masks, and closure of schools, colleges, airports, restaurants, shopping malls, and other places where the people might gather[2].

COVID-19 pandemic significantly disrupted the education sector which is a critical determinant of a country's economic future.The pandemic has had an impact on the education sector, as the primary rolling stock of this sector - the student being forced to remain in their homes to spare the risk of possible infection and death due to the virus, if the schools and colleges were to run during the pandemic.This has caused almost all schools and colleges to reach out to the online route for running the day's scheduled classesvia smartphones.The creation of a new online route for the delivery of course content will become more prominent in the post-Covid world as the survivors of the pandemic.Thus, COVID-19 has created many challenges and opportunities for educational institutes to strengthen their infrastructure [3]. Thiscreates a new paradigm for teachers and professors as they will have to adapt to this changed situation to be more congruent while delivering their lectures and course content through the online route. The teachers assigned work to students via the internet, delivered lectures through live video conferencing using different Apps like Zoom, Google meets Facebook, YouTube, Telegram, Skype, etc.There are WhatsApp groups of guardians, teachers, students, and parents foreffective communication through which they are always in touch to share their difficulties through this e-medium [4]. But not every student is well equipped with the high-speed internet and digital gadgets and are unable to use computerized learning arrangement. Numerous advanced educational institutions in India are equipped with digital facilities right now to cope up with sudden changes from traditional education set up to the online education system.

II. METHODOLOGY

This cross-sectional survey was conducted in the state of Maharashtra, India, during the lockdown period4 April 2021 to 28 April 2021. Data and information presented in the current study are collected via online survey mode from all schools and collegestudents,servants, farmers, businessmen, and others(Total=247) from which 131 are males and 116 are females in Maharashtra state, India.Data was collected using a structured questionnaire viathe Google survey form that was shared with the study participants through an online platform. The data collected were analyzed using the software Statistical Package for the Social Sciences version 20. The results are presented as percentages and proportions.

III. RESULTS AND DISCUSSION

This study was conducted among 247respondents in which School and college students (76.9%), servants (2.4%), farmers (8.1%), and businessmen (2%) in the state of Maharashtra, India.This survey helps to assess the impact of COVID-19 on the educationalsector in India. Of the total study participants(247), there were females 116 (47%) and 131 (53%) males of which 226 (91.5%)respondents are a bachelor and 21 (8.5%) are married. The survey was collected from respondents having different educational qualifications, 10th (2.4%), 12th (8.9%), UG/PG (66.3%), Ph.D. (4.5%), and other qualifications (17.4%). The distribution of the study population according to their age group is1-20 years (38.5%), 21-40 years (56.7%), and 41-60 years (4.5%). Nuclear families consisted of (53.8%) of the total study population and joint families consisted of (46.2%).

3.1 COVID-19 Impact:

Every coin has two faces. With bad comes the good, and positive educational changes have been brought about as a result of the COVID-19 lockdown.

3.1.1. Negative Impact:

The present survey also picked up respondent's family members, 1 (0.8%), 2 (3.2%), 3 (9.7%), 4 (40.5%), and >4 (45.7%) and family income, < 1 lack (59.5%), 2 L (16.6%), 3 L (4%), 4 L (4.9%) and > 4 L (15%) per year.From studied population, 146(59.1%) students already had android mobile for online lectures, 38 (15.4%) students especially purchased android mobiles during this pandemic period, 42 (17.4%) students used family members mobile and 21 (8.1%) students are disable to purchase, because of economic crises.

Present survey data also revealed that teaching in colleges should be open (25.1%) and offline (64.8%) during such pandemic situations because the offline education system is effective in many aspects like proper communication between teachers and students (23.1%), control on entry and exit of students (3.6%), proper students' response (5.3%), no any technical issue (5.3%) and all reasons (62.8%) (Fig. A). On the other view, the online education system (advanced teaching skills) is not effective because of lack of proper communication between teachers and students (17%), no control on entry and exit of students (4%), poor students' response (7.7%), technical issues (10.5%) and all reasons (60.7%) during the lecture time as shown in Fig. B.

Fig. A) Offline Education System is Beneficial

	Proper commu. bet. teach. and stu.	Control on entry/ exit of students	Proper students' response	No any tech. issue	All
■ Series1	23.10%	3.60%	5.30%	5.30%	62.80%

Fig. B) Online Education is not effective

	Lack of commu. bet. teach. and stu.	No control on entry or exit of stu.	Poor students' response	Technical issues	All
■ Series1	17%	4%	7.70%	10.50%	60.70%
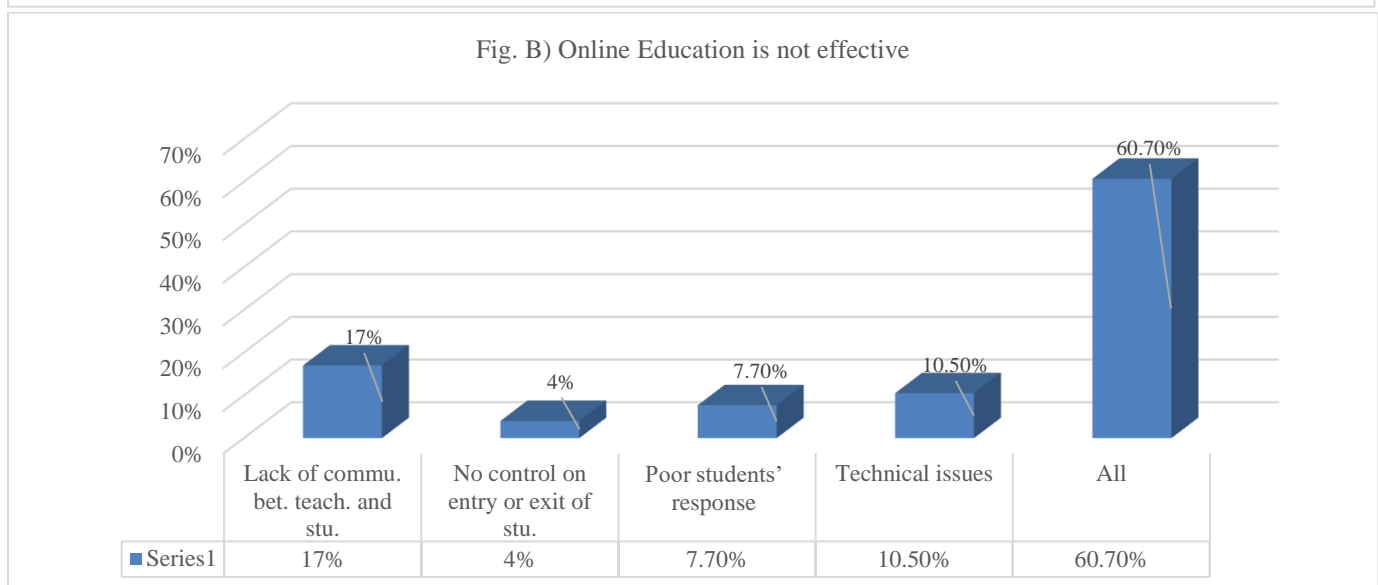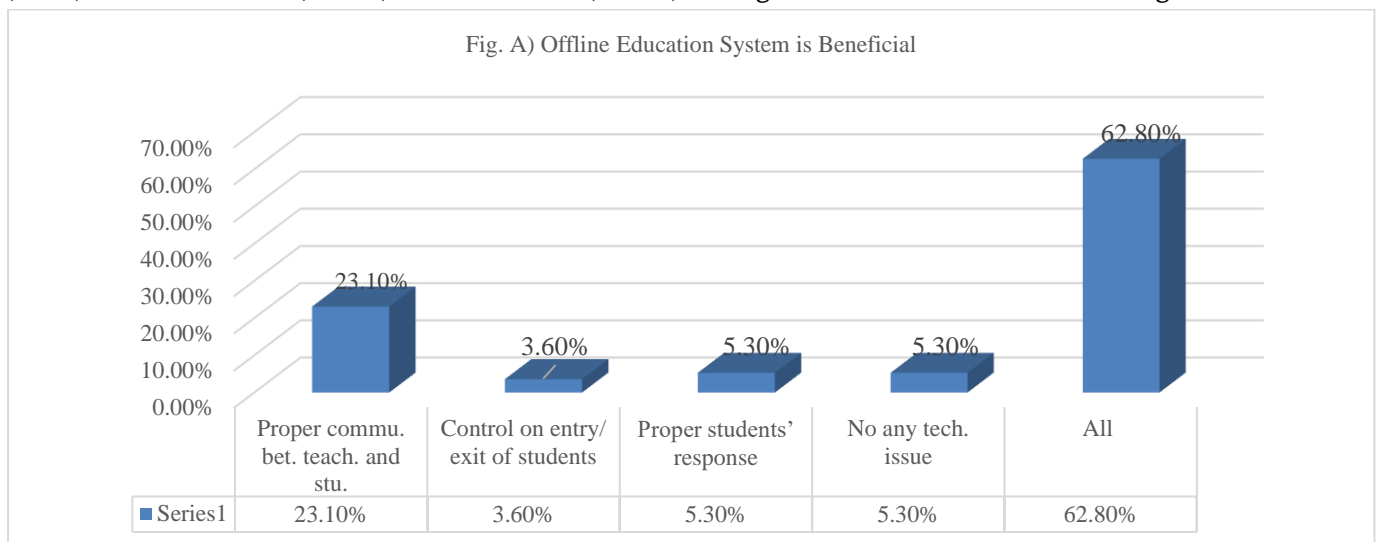
The survey data shows that studied population feeling bored (72.9%) with the lockdown period because of missing school/college days (33.2%) by students, no outdoor freedom (20.2%), household working (3.2%), family clashes (2.4%) and all reasons (41%). People also suffered from economic crises during the lockdown period and to overcome it, they choose alternative income sources like preparation and selling of masks (9.3%), a working job in medical lines (7.3%), tiffin (food) home delivery (4.5%), agricultural work (22.7%) and others (56.3%).

3.1.2. Positive Impact:

Although the lockdown has kept people sealed indoors due to the spiraling fear and mass confusion, it seems to have certain positive social effects as well (Joyal Alias Saji, Bichu P. Babu, Shaliet Rose Sebastian., 2021). We all have been so busy in our routine life that many of us may have lost those real, genuine moments we have with our loved ones. The COVID-19 situation has given us a chance to happy (27.1%) in many aspects like spending maximum time with family (25.1%), getting joyful moments (3.6%), relaxed time (11.3%), stronger emotional attachments with family members (8.9%) and all reasons (51.8%).In the COVID-19 lockdown period, people spend their free time to achieve new achievements (72.9%) like Learning Management System (Zoom/Google meet) (30%), English speaking course (5.3%), video making (7.3%), completion of online courses (17%) and others (40.5%).

Data collected from the respondents showed that teaching in colleges or institutes should be close (74.9%) and online (35.2%) during the lockdown period because the online education system is beneficial for its time saving (18.2%), fulfilled with advanced technology (12.6%), not restricted for a place (19.3%), easy to better understanding (2.4%) and all reasons (4.7%) (Fig. C). On vice-versa offline education system (Primitive teaching skill) is not effective because its time consuming (15.8%), lack of advanced technology use (18.6%), difficult to better understanding (12.1%), place restricted (25.1%), and all reasons (28%) as shown in Fig. D.

Fig.C) Online Education is Beneficial

	Time-saving	Fulfill with adv. Tech.	Not restricted to place	Easy to better understand	All
■ Series1	18.20%	12.60%	19.30%	2.40%	47%

Fig. D) Offline Education system is not effective

	Time-consuming	Lack of adv. tech. use	Difficult to better understanding	Place restricted	All
■ Series1	15.80%	18.60%	12.10%	25.10%	28%
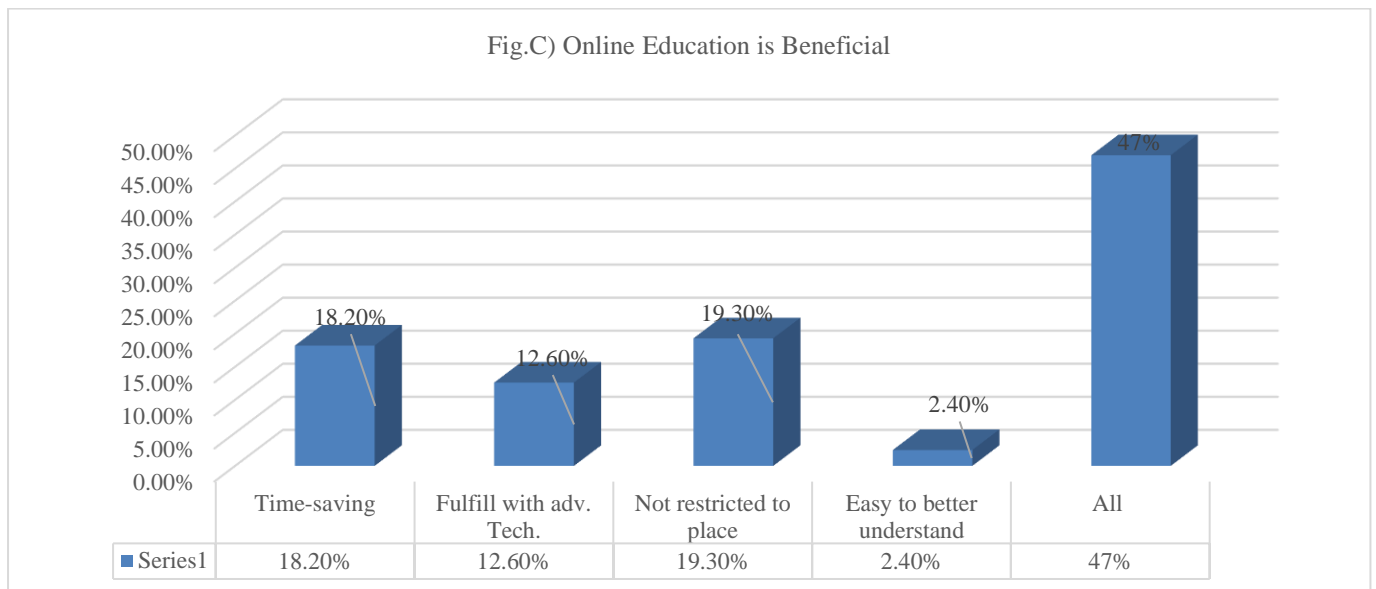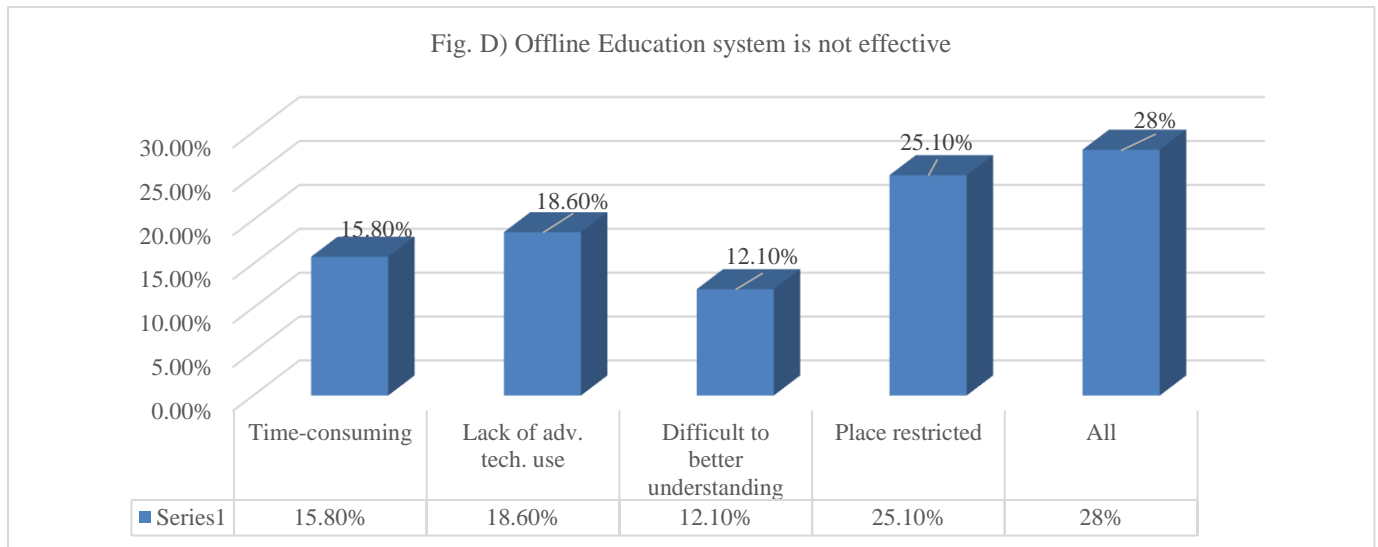
In the present pandemic COVID-19 lockdown period, people became aware of how important it is to maintain personal hygiene with precautions like washing hands every 20 min. (1.6%), regular mask-wearing (3.2%), use of sanitizer (4.5%), social distancing (3.6%), and all reasons (87%) being reported by many of the study participants. The current survey shows that46 (18.6%) respondents vaccinated and 201 (81.4%) respondents are not vaccinated yet against the COVID-19 virus. The survey collected from the studies population suggests that the effective strategies to break the COVID-19 chain are the COVID-19 test (6.9%), lockdown period (19.4%), COVID-19 vaccination (26.3%), and self-immune enhancement (47.4%). The present collected data shows that COVID-19 vaccination and self-immune enhancement are two effective remedies to break the COVID-19 chain.

IV. CONCLUSION

The Covid 19 pandemic had badly impacted the education sector, which due to the nature of the sector (commercialized), relies on the physical presence of the teacher and the students in the schools, colleges, and universities.In the COVID-19 pandemic, students are being taught, via the online route by the teachers who are adjusting themselves to this new paradigm.The Government of India has explored the possibility of Online EducationLearning (OEL) by adopting different digital technologies to cope up with the present crisis of COVID-19.Issues relating to the changed situation likelack of proper communication between teachers and students, no control on entry or exit of students, poor students response, and other technical issues are a few of the various challenges being experienced in this current lockdown period.It is the need of the hour for the Government of India and educational institutions to strengthen their knowledge and Information Technology infrastructure to be ready for facing situations like the COVID-19 pandemic.Even if the COVID-19 crisis stretches longer, there is an urgent need to take efforts on maximum utilization of online platforms so that students not only complete their degree in this academic year but also get ready for the future digital-oriented environment.Further detailed study needful to explore the impact of COVID-19 on the education system of India.

V. ACKNOWLEDGEMENT

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Alum Catalyzed Synthesis of Dimethyl 1-(2-Chloroquinolin-3-Yl)-2, 2-Dicyanoethylphosphonate from 2-Chloroquinoline-3-Carbaldehyde

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ABSTRACT

An efficient solvent free method was developed for the synthesis ofderivatives of dimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate from 2-((2-chloroquinolin-3-yl)methylene)malononitrile, obtained from 2-chloroquinolin-3-carbaldehydes by using dimethylphosphite in the presence of alum as catalyst at room temperature. All the synthesized compounds were characterized by IR, 1HNMR, Mass spectroscopy.

Keywords: - 2-chloroquinoline-3-carbaldehyde, Knoevenagel condensation, Michael addition, dimethylphosphite, Alum.

I. INTRODUCTION

Quinoline ring system represents a very important and major class of heterocyclic compounds and is used as a key intermediate for many pharmacologically important compounds.[1-3] The derivatives of quinoline exhibits physiological and biological activities as antimalarial,[4-5]anti-inflammatory,[6-7] antitumor,[8-9] DNA binding capacity,[10]antibacterial,[11]antimicrobial,[12-13] anticancer[14]and antiparasiticproperties.[15]Also quinoline is used in the study of bioorganic and bioorganometallic processes.[16]

Organophosphorous compounds are important substrates in the study of biochemical processes[17] and are widely used as biologically active compounds. In the last few years, phosphonates have been the focus of intensive studies due to their interest as stable transition state analogue enzyme inhibitors. In fact, the phosphonates and phosphonic acid moieties may be accepted by enzymes as false substrates and interfere with biological processes.[18-19] Owing to their synthetic and biological values, the chemistry of phosphonates has stimulated increasing interest and the development of new organophosphorous compounds and new methodologies for their preparation still remains of great interest.[20-21] Simoni et al[22] reported the tetramethylguanidine catalyzed addition of dialkylphosphates to a variety of α,β- unsaturated compounds including carboxylic acid esters, ketones, and nitriles as well as, saturated aldehydes, ketones and imines. Wasielewski and coworkers[23] described the addition of sodium diethylphosphite to ethyl acrylate to give 3-phosphonopropionates. Chambers et al[27] reported the addition of dimethyl phosphonate to methyl N-acetyl-2- aminoacrylate, which was prepared by trimethylphosphite mediated esterification of the corresponding acid. Synthesis of the GABA-B

antagonist, Phaclofen, which features a Michael addition of a phosphonates to β-nitrostyrene was reported by Hal.l[25] Addition of H-P bond to olefins promoted by AIBN or base described by Zhao.[26] Tan and co-workers[27] showed TBD catalyzed P-C bond formation via the conjugateaddition.

Knoevenagel condensation reactions have been extensively studied as an important carbon-carbon bond forming reaction. Generally, this reaction is catalyzed by a Lewis acid or base.[28-30]

Alum $(KAl(SO_4)_2.12H_2O)$ were found to be effective in the synthesis of cis-isoquinolic acids,[31]dihydropyrimidines via Biginelli reaction,[32] dibenzoxanthenes,[33] 1,5-benzodiazepines,[34] trisubstituted imidazoles.[35] However, there are no any reports of the use of alum as a catalyst for the synthesis of dimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate. Hence in the Search of better reaction condition we were interested in the synthesis of dimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate using Alum as versatile catalyst.

II. RESULTS AND DISCUSSION

2-((2-chloroquinolin-3-yl)methylene)malononitrile**(2a-f) (Scheme 1, Table I)** were synthesized by the Knoevenagel condensation of substituted 2-chloroquinoline-3-carbaldehyde and malonanitrile using catalytic amount of DBU under solvent free condition in excellent yields. The products were characterized by physical and spectroscopic data.

dimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate**(3a-f)(Scheme 1, Table II)** were then prepared in excellent yields by reacting 2-((2-chloroquinolin-3-yl)methylene)malononitrile**(2a-f)** with dimethylphosphite in the presence of alum as catalyst without solvent at room temperature. Michael addition product has been confirmed by spectral analysis (IR, NMR and Mass).

III. MATERIALS AND METHODS

In laboratory 2-chloroquinoline-carbaldehyde[1] was prepared using reported method. Required solvents and reagents are purchased from spectrochem, Avra chemicals and S.D. fine chem. otherwise stated. Physical constants (melting point) were carried out in open capillaries at atmospheric pressure. Proton NMR were recorded on AVANCE in $CDCl_3$+DMSO and $CDCl_3$ at 300 MHz, 400 MHz using standard as TMS. Perkin-Elmer and Shimadzu FTIR were used for recording of IR spectra. Thermo exactive orbitrap methods (FTMS) used for mass spectra analysis, showing a molecular ion peak.
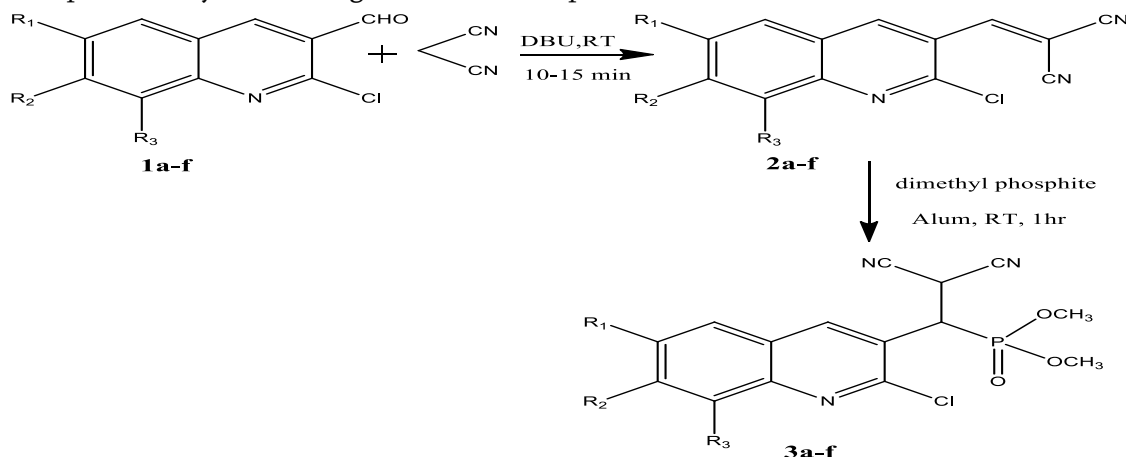
Scheme-1: Alum catalyzed Synthesis of dimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate

IV. EXPERIMENTAL PROCEDURE

Synthesis of 2-((2-chloroquinolin-3-yl)methylene)malononitrile(2a) To the stirred solution of 2-chloroquinoline-3-carbaldehyde (0.96 gm, 5 mmol) and malonanitrile(0.45 gm, 7.5 mmol) was added DBU (2 to 3 drops) at room temperature. The progress of reaction was monitored by the TLC (solvent system- hexane: ethyl acetate). After the completion of the reaction (10 min), reaction mixture was dissolved in 10 mL of ethanol and was added 30 mL of cold water. The obtained solid was filtered and washed with water, dried under vacuum (1.15 gm, 95%).

Synthesisofdimethyl 1-(2-chloroquinolin-3-yl)-2,2-dicyanoethylphosphonate(3a) Toa mixture of 2-((2-chloroquinolin-3-yl)methylene)malononitrile(1.0 gm, 4.1 mmol) and dimethylphosphite (1.65 gm, 15 mmol) was added alumin catalytic amount and was stirred at room temperature for 40-60 min. The progress of the reaction was monitored by the TLC using hexane: ethyl acetate (8:2) as the solvent system. After the completion of the reaction, the reaction mixture was dissolved in methanol and was concentrated. The concentrated mass was dissolved in methylene chloride (10 ml)and precipitated by slowly addition of 30 mL hexane to afford the pure compound (1.20 gm, 80%).

V. SPECTRAL DATA

2-((2-chloroquinolin-3-yl)methylene)malononitrile(2a)
IR (KBr, cm^{-1}): 2221 (-C≡N); **FT-MS:** m/z 240.2 (m+1) and 242.2 (m+3).

dimethyl (1-(2-chloroquinolin-3-yl)-2,2-dicyanoethyl)phosphonate(3a)
IR (KBr, cm^{-1}): 2252 (-C≡N); 1235 (-P=O); 1032 (-P-O-C).**^{1}H NMR (CDCl$_3$, δ ppm):**2.6 (d, 1H,(-CH-CH); 2.85(d, 1H, -CH-CH); 3.5 (s, 3H, -OCH$_3$); 3.6 (s, 3H, -OCH$_3$), 7.62 (t, 1H, Ar-H); 7.8 (t, 1H, Ar-H); 7.92 (d,1H, Ar-H); 8.04 (d, 1H, Ar-H); 8.35 (s, 1H, Ar-H)**FT-MS:** m/z 350.1 (m+1) and 352.1 (m+3).

dimethyl (1-(2-chloro-6-methylquinolin-3-yl)-2,2-dicyanoethyl)phosphonate(3b)
IR (KBr, cm^{-1}): 2254 (-C≡N); 1238 (-P=O); 1030 (-P-O-C).**^{1}H NMR (CDCl$_3$, δ ppm):**2.32 (s, 3H, Ar-CH$_3$); 2.54 (d, 1H, -CH-CH); 2.90 (d, 1H, -CH-CH); 3.54 (s, 3H, -OCH$_3$); 3.62 (s, 3H, -OCH$_3$), 7.60 (d, 1H, Ar-H); 7.70(d, 1H, Ar-H); 7.95 (d,1H, Ar-H); 8.30 (s, 1H, Ar-H)**FT-MS:** m/z 364.2 (m+1) and 364.2 (m+3).

Table I data of2-((2-chloroquinolin-3-yl)methylene)malononitrile

Entry	R$_1$	R$_2$	R$_3$	Time (min)	Yield (%)	Melting Point (°C)
2a	H	H	H	10	95	150-152
2b	CH$_3$	H	H	15	93	164-166
2c	H	CH$_3$	H	10	91	140-142
2d	H	H	CH$_3$	10	94	172-174
2e	OCH$_3$	H	H	15	92	148-150
2f	H	OCH$_3$	H	15	91	165-167

Table II data ofdimethyl (1-(2-chloroquinolin-3-yl)-2,2-dicyanoethyl)phosphonate

Entry	R_1	R_2	R_3	Time (min)	Yield (%)	MP/BP (°C)
3a	H	H	H	50	80	136-138
3b	CH_3	H	H	55	82	128-130
3c	H	CH_3	H	55	83	140-142
3d	H	H	CH_3	60	82	110-112
3e	OCH_3	H	H	60	82	152-154
3f	H	OCH_3	H	60	82	180-182

VI. CONCLUSION

In conclusion, a new methodology was developed for the synthesis of novel dimethyl (1-(2-chloroquinolin-3-yl)-2,2-dicyanoethyl)phosphonatederivatives **(3a-f)** from2-((2-chloroquinolin-3-yl)methylene)malononitrile**(2a-f)**, obtained from 2-chloroquinolin-3-carbaldehydes **(1a-f)** by using dimethylphosphite in the presence of alum as catalyst at room temperature in high yields. All the reactions were performed under mild reaction conditions, shorter reaction time and in high yields (Table II).

VII.ACKNOWLEDGEMENT

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Determination of Organochlorine Pesticides Residues From Water Samples Collected From Lower Pus Dam, Veni (M.S.)

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ABSTRACT

The contamination of organochlorine pesticides (OCPs) from the selected surface water of Lower Pus dam at Veni in Mahagaon Tahesil of Yavatmal District was investigated to estimate the current status of Organochlorine Pesticide residues in water. In this study water samples were collected from various locations of lower pus dam veni in two seasons during the year 2019. The Endosulfan, DDT & DDE were the most frequent detected compounds in the water. The concentration of the Endosulfan pesticides residue was found in the range of 0.03-0.04 μg/L, DDT in the range of 0.04-0.05 μg/L and DDE in the range of 0.01-0.02 μg/L. The Chlorodane and Heptachlore pesticide residues were found in very low concentration.

Key Words: Organochlorine , Pesticides, Lower pus dam.

I.   INTRODUCTION

Pesticide is a general classification that includes insecticides, rodenticides, fungicides, herbicides and fumigants. Although pesticides may be selectively toxic to these forms of life, they may still be toxic to man if food contaminated by them is ingested[1]. Pesticides are known to be toxic to man[1]. People have contradictory ideas about the meaning of pesticides. The dictionary defines pesticide as a sub- stance for destroying harmful insects. The scientists are of the opinion that pesticides are chemical or biological substances that are designed to kill or retard the growth of pests interfering with the growth of crops, shrubs, trees, timber and other vegetation desired by humans. The term pesticide includes substances intended for use as plant growth regulators, defoliants, desiccants or agents for thinning fruit or preventing the premature fall of fruit[1]. The substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport also come under the category of pesticides [2]. Pesticides (herbicides, fungicides, insecticides) are widely used in the agriculture and industry around the world due to their high insecticidal activity. The presence of pesticide residues and metabolites in food, water and soil currently represents one of the major issues for environmental chemistry. Pesticides are, in fact, among the most important environmental pollutants because of their increasing use in agriculture[3].The toxicity of pesticides to target and non-target organisms generally depends on the amount present in the environment, the proportion available to the biota and

ultimately in the amount actually encountered and absorbed by the organism[4]. Environmental distribution may lead to exposure of living organisms including man that are far removed from intended targets. Researchers have detected pesticides residues in heptachlor, endosulfane, Aldane, DDT and PCBs. Many of these pesticides have also been detected in sediment, aquatic plants and fish [5].

II. MATERIAL AND METHODS

Water samples were taken from 0.3 m below the surface with a pre-cleaned glass bottle. For sampling turbulent midstream position of water bodies were chosen to approximate mean concentration of river water. All foreign bodies were removed and the samples were stored in ice during transport and were kept at 4^0 C in the laboratory until the solid phase extraction.

III. SAMPLE EXTRACTION

The procedure applied for the extraction of pesticides was similar to those reported by Laabs *et al* [6] and Steinwandter [7]. Water samples were extracted using ultrasonic extraction. Sox let extraction was done with 20 ml of hexane: dichloromethane (3:1) for 30 min. The extract was concentrated with the aid of rotator evaporator. Pre-elution was carried out with the HPLC methanol. The concentration solvent extract was then analyzed for Pesticides. The solvent of the mobile phase of the HPLC is methanol and water (1:1). This was prepared by measuring 250ml of HPLC grade methanol into a 500ml flask and made up with 250ml of distilled water. The HPLC model CECIL 1010 was switched on. The wavelength of the system was determined by using UV visible equipment. Little quantity of stock solution was diluted with methanol and its wavelength determined nu scanning. A peak of 202nm was reached. The system wavelength was then set at 202nm and the sensitivity of the 0.05 nm of the UV detector component set. The flow rate was set at 1ml/min, afterwards, the purging of the system commenced by allowing the system to run for some time. The purging was carried out through a washing solution of 30% methanol, 70% water. Bubbling helium gas into the solution carried out degassing of the mobile phase was then set up and connected with HPLC system and allowed to run through the system of 20min. Each sample residues was dissolved in 1ml methanol. The extracted residues were the loaded and injected into the valve of the chromatography system. The resulting chromatograph for each sample was printed out. The various retentions time noted, concentration determined and recorded.

IV. RESULT AND DISCUSSION

Lower Pus dam is located at Veni in Mahagaon Tehasil, of Yavatmal district in Maharashtra state of India. This dam is totally surrounded by farm land. Farmer's of this region uses different fertilizers as well as pesticides to control the growth and population of pest for the well growth of crops which is very useful source of their economy and food. These pesticides can enter the reservoir through running waters and subterranean canals. These factors may lead to the contamination of this dam.

During the analysis of water we checked the some organochlorine pesticides.Table 1. shows result of organochlorine pesticides in water sapmples collected from three different sites of the dam. The Endosulfan, DDT & DDE were the most frequent detected compounds in the water. The concentration of DDT in the range of 0.04-0.05 μg/L and DDE in the range of 0.01-0.02 μg/L. The Chlorodane pesticide residues were found in

very low concentration. The pesticides heptachlor was not detected in the water samples in all site. It is showing that the farmers around the dam do not use them in large in their farming activities. Endosulfan, a broad spectrum contact insecticide and acaricide, is another pesticide used by many farmers. The associated figure for mean concentration of Endosulfan pesticides residue was found in the range of 0.03-0.04 µg/L.

Table 1: Levels of Organochlorine pesticides in water samples collected from Lower Pus dam.

	DDT			DDE			Endosulphone			Chlorodane			Heptachlore	
Pesticide station	1	2	3	1	2	3	1	2	3	1	2	3	1	2
Summer season (2019)	0.01	0.03	0.04	0.01	0.02	0.01	0.03	0.02	0.01	0.01	ND	ND	ND	ND
Winter season (2019)	0.03	0.04	0.03	0.02	0.03	0.02	0.04	0.03	0.05	ND	0.01	ND	ND	ND
Average mean	0.02	0.035	0.035	0.015	0.025	0.015	0.03	0.02	0.01	ND	ND	ND	ND	ND
Standard deviation	0.014	0.0070	0.0070	0.0070	0.0070	0.0070	0.007	0.007	0.02	-	ND	-	-	-
Range	0.01-0.03	0.03-0.04	0.01-0.04	0.01-0.06	0.01-0.04	0.01-0.02	0.01-0.04	0.01-0.03	0.01-0.05	0.0-0.01	0.0-0.01	-	-	-

V. CONCLUSION

The analysis of water quality parameters of Lower pus dam reservoir showed that the values are well within the permissible limits. The result of study reveals that the quality of dam water is though fit for domestic, irrigation purpose and also for drinking purpose after some treatment and need continuous monitoring of physico -chemical parameters to improve the quality of water.

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Application of Yogic and Nutritional Aspects: Enhancing Sports Performance

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ABSTRACT

Yoga, the old Indian discipline is principally a profound science. Today, yoga tracks down its utility in numerous circles of human existence. Sports are no special case for it. Yoga is productive in conveying the physical, mental and moral wellness expected of sports faculty, in this way building up that yoga is a flexible framework applicable to a reformist society. Furthermore, yoga additionally delivers to build up the guideline of widespread unity among sports people. Nourishing science, then again gives significant data on the right sort of food decisions, dietary propensities and the need of healthful supplementation for individuals in the field of sports. This paper endeavors to draw out certain parts of yoga and nourishment that play a part in augmenting sports execution.

I. INTRODUCTION

Actual Postures (Asana) Yogic actual activities (Asana) incorporate Asanas (static stances), Vinyasas (dynamic activities), Sat kriyas (decontamination cycles) and Mudras (energy-control rehearses). Yogic actual stances can build the Range of joint movement (ROM), increment muscle length and pressure (stretch) nadis (nerves and different channels) while keeping up with joint dependability. Nerve reflexes can be used to foster solid strength all through ROM and to prepare muscles to be willfully dynamic or loose at any length. Synergistic muscle actuations can be utilized to expand the distance among proximal and distal connections of muscle and to build adaptability. Muscle co-enactments around the significant joints (Bandhas) can assist with settling these joints, aid age of energy, and advance dissemination.

Breath control (Pranayama) Breath-control (Pranayama) is viewed as the connection between the body and the psyche, as it tends to be worked on during both the actual activities and the thoughtful practices. Pranayama, which in a real sense implies extension and guideline (Ayama) of the existence power in the breath (Prana), developsinternal energy and extremely productive breathing which can lessen the measure of oxygen needed to do a particular measure of work. Breath-control can be utilized to build strength, adaptability and cardiovascular wellness; to lessen circulatory strain and to direct blood science, chemical levels and the sensory system.

Some significant ramifications of Yoga in upgrading sports execution

1. Ideal Training Load There are an ideal number of times to rehash every asana or vinyasa to accomplish a most extreme preparing impact. Astute utilization of hatha yoga vinyasas (dynamic yoga works out) exploits grounded research that shows the ideal preparing load for dynamic exercise is between 3 rounds and 9 rounds. for e.g.:- a vinyasa style surya namaskara (Salute to the Sun), when it is intended to be hard sufficient that it very well may be performed between at least 3 and a limit of multiple times before you can presently don't rehash it (without resting), then, at that point, the ideal preparing load has been found and the best enhancements in powerful strength can be accomplished.

2. Preparing for expanded enlistment of engine units An individual with generally little muscles might be actually more grounded than somebody with bigger muscles in case they can select (actuate or turn on) various engine units. (An engine unit is a singular engine nerve and all the muscle strands it innervates).

3. Cardiopulmonary Training To further develop high-impact limit you need to practice at 60% of your most extreme pulse for a time of 15-an hour, 3-5 days for week. High-impact limit is a proportion of individual's maximal oxygen take-up for example the maximal measure of oxygen equipped for being shipped to and being used by the functioning muscles, per unit time and per unit body weight. Dynamic yoga vinyasa practice can contend with vigorous activities in further developing maximal oxygen take-up and usage.

4. Explicitness of Training The explicitness guideline essentially expresses that to turn out to be better at a specific exercise or ability, you should play out that activity or expertise. This preparation reaction has been demonstrated to be profoundly explicit. Conventional strength preparing strategies frequently just exercise a muscle, through a restricted scope of movement (ROM). This can cause a diminishing in muscle length and its flexible nature. Yoga stances which enact muscles through full ROM upgrade flexible nature of muscles and muscle strength through ROM. In this manner, in sports requiring the commitment and preparing of different muscles, progressed yoga stances prove to be useful.

5. Response Time Many reports have shown further developed Reaction Time (RT) and respiratory tensions following twelve weeks yoga preparing that included asanas just as pranayamas. (2) Tejaswini et al (2016) in her investigations closed Pranayama and reflection improve (a) tangible data preparing capacity; (b)central reconciliation of learning and memory, and (c) engine capacity and coordination, visual examining, mental adaptability, supported consideration, psychomotor speed, and speed of data handling.

6. Connections and Communication Yamas and Niyamas establish a decent framework to fabricate connections among colleagues. The regarded characteristics of honesty, non possessiveness, physical and mental cleanliness and happiness are nuance moved into as a matter of fact yogic lessons. Companionship, empathy and lack of concern, which are fundamental mentalities for sports work force, are extremely indispensable to yoga. 7. One sharpness Athletes and different games people who need to perform at high rates can benefit hugely from rehearses like Jyothi Trataka. The act of focusing one's vision and brain on an article assists them with supporting one's consideration for longer timeframes. This is very valuable in any game. The review led by Pushp Latha Rajpooth and Pushpa, on Trataka over tension, it was finished up Trataka opens the intrinsic energy of the psyche and guides it in the torpid spaces of cognizance. Further consequences of one-sharpness of psyche are high resolution, further developed memory and focus.

II. SIGNIFICANT SUPPLEMENTS

Amino corrosive supplementation

Protein and amino corrosive supplementation as powders or pills isn't required and ought to be debilitate. Taking a lot of protein or amino corrosive enhancements can prompt parchedness, hypercalciuria, weight gain and weight on the kidney and liver.

Fat

Fat, is the major, if not generally significant, fuel for light to direct force work out. Albeit fat is a significant metabolic fuel for muscle movement during longer high-impact practice and performs numerous significant capacities in the body, no endeavor ought to be made to burn-through more fat over the typical sum except if the competitor is eating under 15% of calories from fat. (7) Very restricted proof backings the idea of devouring a high fat eating routine for competitors. However a few examinations have proposed a constructive outcome of moderately high fat eating regimens on athletic.

Micronutrients

The requirement for nutrients and minerals in practice has been investigated by Haymes and Clarkson (1998) with the agreement that except if an individual is lacking in a given supplement, supplementation with that supplement doesn't majorly affect execution. A few supplements are of worry in competitors, including folate, the B nutrients, calcium, and zinc. Since numerous ladies competitors are likewise veggie lovers, iron and explicitly nutrient B12 might be of extra worry in this subgroup. (8) A condition called sports weakness, described by decline in serum ferritin and hemoglobin might be capable.

Nutrients with cell reinforcement movement, especially nutrient C, nutrient E, and betacarotene, kill free extremists. The inquiry is whether they upgrade recuperation from work out. (9) Results from examines in people show that when 10 mg (33,333 IU) of beta-carotene, 800 IU of nutrient E, and 1000 mg of nutrient C were added to the weight control plans of reasonably prepared sprinters for 3 to about a month, levels of creatine phosphokinase and lactic dehydrogenase (both files of muscle harm) were fundamentally lower, plasma glutathione didn't increment, and recuperation after practice was quicker. (10) In examinations where competitors' were insufficient in Vitamin C, supplementation worked on actual execution, yet an intensive investigation of these examinations support the overall end that Vitamin C supplementation doesn't increment actual execution limit in subjects with typical body levels of Vitamin C.

Ergogenic helps

Numerous competitors utilize wholesome ergogenic helps since they are assaulted with promotions and tributes from different competitors and mentors about their impacts on execution. Many accept that ergogenic helps will work on their presentation and aid recuperation. As before, and likely later on, a significant number of these ergogenic helps are not upheld by logical investigations. Truth be told, many demonstration just as fake treatments.

III. CONCLUSION

To summarize it, sports is a requesting movement which expects one to be truly, intellectually, genuinely and healthfully fit. Yoga and sustenance are unified sciences which assume a fundamental part in improving presentation of athletes and ladies. Yoga has complex physiological, mental advantages, some of which are examined previously. Yoga, a long way from being a simple physical or breathing aerobatic exhibition or a

show of sorcery or otherworldly powers, is a study of future, with a comprehensive vision. Sustenance contributes by laying a decent dietary establishment, through arranging an even eating routine adequate to oblige the requirements of athletes and ladies. By the insightful use of the above examined and a lot more parts of yoga and nourishment, one can augment their presentation.

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Insects Pests Management : Prevention and Control

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ABSTRACT

An effective and reasonable irritation the board relies upon the information on the procedure, bug science and bug biology in agroecosystem. This section features the essential ideas and standards of feasible bug the executives that depend on distinct objectives, appraisals of populace size, assessment and correlation of accessible administration choices and checking just as assessment of rehearsed the board exercises/techniques concerning and costs. Characterized objectives decide better and fitting accessible administration alternatives in a predominant circumstance; populace gauges help in deciding activity edge and choosing time span for commencement important activities. Viability of accessible control alternatives in specified time span, natural and social outcomes and money saving advantage proportion can help in positioning out the proficient, practical and ecofriendly the executives techniques. This section centers around the key ideas and standards, reasonable systems and different methods of bug the board.

I. INTRODUCTION

Each organic entity cooperates with biotic and abiotic parts of biological system and battle for its better endurance and presence in nature. Various kinds of collaborations exist among bothers and different parts of biological system, particularly human, plants and creatures. These collaborations can make issues of contest for food and space; endemic or scourge episode of illnesses/aggravation, harm to properties and injury to the two plants and creatures. Bug occurrence just as its populace elements and control are managed in such intelligent agroecosystem by many powers and factors. The major of these are powers of obliteration like natural obstruction, powers of manifestations like biotic potential and attributes or parts of an agro ecosystem. A thorough information on ruinous powers including abiotic stresses (unfriendly ecological conditions/thickness autonomous variables), biotic burdens (thickness subordinate components like hunters, parasites, microorganisms, contenders and so on) and biotic potential (regenerative potential, endurance potential, nutritive potential and defensive potential) (Fig. 2.1) assist us with choosing whether the time is to take on "Do-Nothing Strategy", "Diminish Number Strategy", "Lessen Crop-Susceptibility Strategy" or "Coordinated Strategy" to deal with the indeginous and outlandish arising nuisance issues (Pedigo and Rice 2009; Schowalter 2011).

Nuisance the board is a two-strand approach which essentially relys on the information on the procedure, bug science and vermin nature in agroecosystem (Fig. 2.1). The determination of proper nuisance control

innovation just as its successful and productive application mostly relies on a far reaching information about it. Incorporated use of various and profoundly viable strategies; decrease in number or impacts of bug underneath characterized monetary choice levels (EIL and ETL); and protection of ecological quality are the key attributes/components of reasonable irritation the board (Pedigo and Rice 2009). In any case, Geier (1966) recommends some strengthening attributes/components of feasible nuisance the executives framework and ponders that a bug the board innovation/framework ought to be: 1) exceptionally target explicit i.e., extremely particular for vermin and safe for nontarget organic entities ; 2) Comprehensive and favorable for crop efficiency (not be phytotoxic and improve plant-development and yield); 3) profoundly viable with the critical standards of environment and 4) lenient to expected bugs yet inside monetarily passable cutoff. A thorough and down to earth information on previously mentioned components ensures the improvement of an ecofriendly, prudent and proficient, crop creation and assurance program (Buurma 2008; Alam 2010; Schowalter 2011). Powerful and practical creepy crawly bug the executives likewise relies upon monetary choice levels which are mendatory for deciding the strategy, guaranteeing reasonable pesticide application, decreasing unsuitable financial harms, shielding the benefits of maker and moderating the natural quality in any nuisance circumstance (Alam 2010; Jha 2010).

II. GENERAL PRINCIPLES OF PEST MANAGEMENT

The time of regular harvest creation and insurance has gone to ecofriendly and natural yield creation and security framework where normal items based strategies are utilized in the horticultural business and harmful synthetic compounds based procedures are being drained from the farming framework. A supportable agroecosystem framework making out of better and more useful yields with least use of harmful pesticides relies on a comprehensive nuisance the executives approach (Joshi 2006; Dhaliwal and Koul 2007; Singh 2008) which depends on after fundamental Principles.

Nuisance aversion/prohibition

It is somewhat prudent advance which restrains the section of any bug bother into any agroecosystem and guarantees bug free zone. This guideline depends on the usage of suc methods or practices which reject and forestall the irritation and it is constantly considered as an establishment step of any IPM program. Irritation evasion or rejection procedures incorporate hand-picking, screening, stowing, actual beating, banding, catching, acausting (commotion creation), actual boundaries, consuming, sieving and winnowing and rope hauling, and so forth, (Dhaliwal et al. 2006).

Hand-picking

Hand picking is somewhat barring strategy which isn't practicable for enormous scope bug the board program; be that as it may, it tends to be rehearsed for limited scope bother the executives program like in yards, kitchen planting, limited scope burrow cultivating, inside nurseries. This procedure is the most functional way in specific conditions like, when modest work is free, bugs and their eggs/egg-masses are enormous and obvious, creepy crawlies are excessively lazy, have congregating conduct and are effectively open to the pickers. Handpicking of sluggish and apparent hatchlings of Pieris brassicae (L.) (Cabbage butterfly) (Lepidoptera: Pieridae), lemon butterfly [Papilio demoleus Linn. (Lepidoptera: Papilionidae)], semiloopers and loopers (Lepidoptera: Noctuidae), cutworms (Lepidoptera: Noctuidae) and red pumkin insect [Aulacophora foveicollis

Lucas (Coleoptera: Chrysomelidae)] and noticeable eggs/egg-masses of cabbage butterfly, armyworm [Spodoptera (Guenee) and Mythemna (Ochsenheimer,) spp. (Lepidoptera: Noctuidae)], and drills [Pyralid drills, Noctuid drills, Crambid drills and so on (Lepidoptera)] is a simplest, immediate and amazing strategy for controlling them particularly when their invasion is limited to a couple of plants.

III. STRATEGIES TO IDENTIFY PEST SPECIES

A few methodologies can be utilized for an exact recognizable proof of valuable and unsafe bugs. The gets can measure up to pics/pictures accessible on the web sites or in abstract/books. The assortments can be shipped off master creepy crawly taxonomists oentomologists who can distinguish bugs and disclose different inquiries identified with the recognized irritation. Different methodologies incorporate employing entomologists from neighborhood schools, colleges, or nuisance the board organizations (pesticide association) or getting preparing from these associations for accurate distinguishing proof of irritations. After an exact recognizable proof of the gets, reference assortment ought to be kept up with for future ID and preparing of different partners.

Distinguishing creepy crawly trash and harm
A few creepy crawlies are truly challenging to notice, find and distinguish in light of the fact that they for the most part remain stowing away during daytime and are dynamic for exceptionally brief timeframe or during night. The presence of such creepy crawlies not set in stone dependent on their garbage, harms, remainders, items and so forth A serious watchfulness is required. For instance, life phases of silverfish [Lepisma saccharina L. (Thysanure: Lepismatidae)], booklice (Psocoptera: Insecta) and different bugs are hard to situate because of their little size, covering tone and withdrawn propensities. The accompanying signs can be utilized to perceive the products enduring an onslaught of creepy crawlies:

Bug remains
Sheded wings of termite, packaging of hatchlings, exuvia of shed creepy crawlies, dim egg cases of cockroaches, webbing of garments moths [Tinea pellionella L. (Lepidoptera: Tineidae] are some noticeable models the signs which can be utilized for recognizable proof of creepy crawly bugs.

Getting science and nature of nuisance:

Speculations and Practical
A productive, viable and effective administration of creepy crawly bugs is constantly established on a far reaching information on the science, morphology, interior life systems, conduct, development (transformation), life history and environment of the bug. The morphological information on a bug assists with fostering a proper innovation and choose the determination of fitting insect spray. Chemotropism based strategies including attractant or anti-agents have been created for different creepy crawly bugs. The improvement of such procedures relies on information about chemoreceptors like, gustatory, olfactory, tactile receptors and so forth Improvement and determination of shade of light of light-traps rely upon the information on underlying parts and physiology of compound eyes of creepy crawlies (Dhaliwal and Arora 2003; Pedigo and Rice 2009). The information on primary parts and physiology of compound eyes of creepy crawly give data about the sort of shading which is exceptionally appealing for any bug. For instance, yellow tacky snares are utilized for the

control of aphids as aphids are drawn to yellow tone (Saha and Dhaliwal 2012). The information about the kinds of mouthparts of creepy crawly bugs assists with choosing what sort of insect sprays ought to be chosen for fruitful control of the bug. For instance, in the event that the plaguing bug bothers have sucking sort of mouthparts, insect poisons with fundamental and contact activity are the most suitable.

IV. CONCLUSION

Vermin the board is a fundamental and essential part of controlling, overseeing and directing normal assets and farming frameworks. A region wide open mindfulness crusade about the arising vermin issue should be coordinated and thorough information on bugs should be exceeded to change the inclination, upgrade the limit and inspire the eagerness of people to oversee bothers. A compelling vermin the board involves a long haul and suffering obligation to bug the executives or bug destruction program by the business gatherings, government elements, society and local area.

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Studies on Ethonomedicinal Properties and Ecological Aspects of Leucas Aspera Linn Plant

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ABSTRACT

This study indicates that *Leucas aspera* extracts have good antidiabetic activity. Ethanol and Petroleum ether extracts of *Leucas aspera* exhibited significant anti-hyperglycemic activities. The current piece of work is a focus on micro level study and is purely based on contents in leaf of *L. aspera* in Nagpur region which is use in medicine as well as cosmetics. Basically Aromatic plants of family Lamiaceae that is *L. aspera* have aromatic smell and its aroma which is a characteristic features of family Lamiaceae. *L. aspera,* **is** commonly known as **Dronapushpi**. In this work I got six compounds in leaves of *L.aspera* which is use as medicine as well as cosmetics industry. These are **9,9 trimethyloctahydrbenzo(d) cycloprop(c) oxepin-2,4-dione,3-Buten-2-one,3-methyl-4-(1,3,3-trimethyl-7-Oxabicyclo[4.1.0]heptan-1y,** **Tetratriacontane ,Hexacosane, Heptacosane, Tetratetracontane** Also I got 1.33 % gm of aroma oil found in 100 gm leaves of *L. aspera. L. aspera* is a wild herb or shrub which is having medicinal value to a great extent and is available abundantly in field of India **Conclusion-** Natural herbs help in preserving and enhancing the beauty and personality of human beings. Natural Cosmetics and personal-care products may contain ingredients whose safety is unknown or which are known to create health risks. The present review focuses on the ethnobotnical potential of herbal extracts for cosmetic purposes. Natural cosmetics general term applied to all preparation and external conditioning and beautifying the body.

Key Words: *Leucas aspera* ,Ethnobotany, Cosmetics, antidibetic activity

I. INTRODUCTION

According to world health organization (WHO) variety of drugs are obtained from ethonomedicinal plants. In developed countries almost 80% of individuals depends on compounds derived from ethnomedicinal plant. In this regard properties, saftey & efficiency of them should be investingated[1]. Ethnobotany is systematic study of the relationship between plants and people. It is not simply the study of human use of plants rather ethonobotany locates plants within their cultural contex in particular socities. The impacts of modern human societies on traditional cultures and natural habitats have caused huge losses of individual species and profoundly disupted communites of species. The singnificance of ethnobotany and ethnomedicinal plant is mainfold. The study of indigenous food production and local medicinal knowledge may have practical

implication for developing sastainble agriculture and discovery of new medicines. Ethnobotany also encourage an awarness of the link between biodiversity and culture diversity as well as a sophisticated understainding of the mutual influence of plants mutual influence of plants and human. The Global strategy for Plant conservation, a plant to save the world's Plant species-grew out of the Convention on Biological diversity and is being fed into government policy around the world. The GSPC hightlights the importance of plants and the ecosyetem services they provide for all life on earth, and aims to ensure their consevation. The Global strategy for Plant consevation is a catalyst for working together at all levels-local national, regional and global-to understrand, conserve and use sustainbly the worlds's immense wealth of plant diversity whilst promoting awareness and building the necessary capcities for its implention. Ethnomedicinal plant consevation strategies need to be understood and planned for based on an understaiding of indigenous knowledge and practices[2]. Gas chromatogrphy and Mass spectrum is one of the best method to identify the plants chemical components. *Leucas aspera* contain essential oil which is volatile organic strong smell substance and have great importance in pharmaceuticals industries, food, cosmetics etc.

Fig. *Leucas aspera*

History And Description of *Leucas aspera* (L) Poit.

Lamiaceae family species are important for its medicinal properties among plants. This family represented by 45 genera and 574 species [3].Number of aromatic plants come under this family. *Leucas aspera* (wild) belonging to the family of Lamiaceae is a aromatic herb commonly called "**Tamba",** found as weed in Africa, Asia-temperate and Asia – tropical countries. *Leucas aspera* was first described by Linnaeus based on an illustration and description of plants growing in the Leiden botanic garden. *Leucas aspera* (wild) plant contains essential oil which is alkaloids.

Ecological Aspects of *Leucas aspera*

Leucas aspera is commonly found throughout India and the Philippines as well as the plains of Mauritius and Java. In India and the Philippines, it is a very common weed *Leucas aspera* is typically found in dry, open, sandy soil and is abundant in areas with waste.[3].Soil type colour of various studied area found that   balck soil is common and brown are rare, while pH shows different scale.

II. METHODOLOGY

The present work is based on various site surveys made in Nagpur region(Maharashtra). The plant was collected and its identification was authenticated at research laboratory of Institute of Science, Nagpur. For Ecological parameter used qudrat method for density,frequency, abundance in Studied area of various sites the.It is one the best method for ecological study oof plant The information of traditional uses of the plant was gathered from respective site. GC-MS Analysis - The test plant extracts were subjected to GC-MS analysis at laboratory's (IIT Bombay) Sophisticated Analytical Instrument Facility (formerly RSIC), Indian Institute of Technology, Powai, Mumbai – 400076, India.

III. RESULT AND DISCUSSION

The present investigation was carried out on plant *Leucas aspera* of Lamiaceae family to study the presence of medicinally active phytochemicals in the leaves. The chemical composition of the essential compounds from the leaves of *Leucas aspera* (L.) Poit collected from campus and PDKV forest which experienced different climatic and geographic circumstances, were determined by GC-MS. It has been already reported by various workers. As seen in the table- 1, different compounds were determined from the leaves of *Leucas aspera* (L.) Poit. The present investigations concluded that the leaf of *Leucas aspera* contains chemical compounds. These chemicals are widely used in Ayurvedic traditional medicines as well as cosmetics industry..

The pH of soil sample indicates that the ranges are 7.05, 7.62 and 7.49 .PDKV forest soil was slightly alkaline and it indicates neutral nature of the soil. The pH of soil Savner is found to be in the range of 7.62 indicating more than normal nature of the soil. *Leucas aspera* Plant density, frequency, abundance in Studied area showed that .The ecological density, frequency, and abundance of the lucas aspera plant have been reduced to a minimum.

Leucas aspera contain chemical compounds and herbal ingredients,and it has been said that 70-80% of the world's population relies on some from of non-conventional medicine[4] and around 25-40% of all prescription drugs contain active ingredients derived from plants in theUnited States[5].

Table No. 1 : Soil Quality Status and pH of the studied sites

S.N.	Parameter	General Percentage	Soil Sampling Location / Concentration		
			PDKV Forest Soil	Savner Field Soil	Gorewada lake Soil
1.	Soil Color		Black	Black	Brown
2	pH	7.1-7.5	7.6	7.49	7.05

Soil Quality status & pH Of Studied Sites
- PDKV forrest
- Savner
- Gorewada Lake
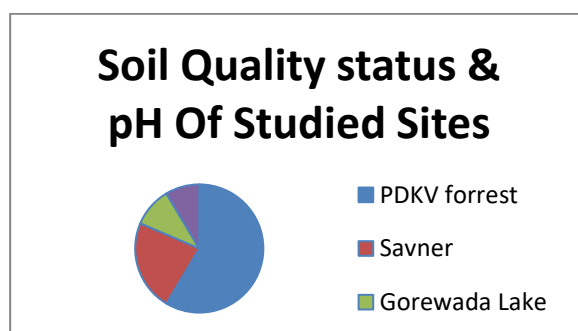
Table No. : 2 Showing *Leucas aspera* Plant Density, Frequency, Abundance in Studied area of various sites the.

S.N.	Name of sites	No. of individuals in diff. Quadrat each of 1 square meter size	Total No. of Indivi-dual	Density	Frequency	Abundance
1	Gorewada Lake	× 5 8 × 2 9 × 10 × 3	37	37/10=3.7pt/m²	----	------
		- × × - × × - × - ×	--------	------	60%pt/m²	
		37 Species occurred	6	-----	------	6.16/m²
2	PDKV Field	- 4 - - 7 - 5 - 3 -	19	1.9pt/m²	------	------
		- × - - × - × - × -		------	40%pt/m²	------
		19 Species occurred	4	------	------	4.75/m²
3	Savner Field	1 3 - 5 1 - 6 - 3 -	19	1.9pt/m²	------	------
		× × - × × - × - × -		------	60%pt/m²	------
		19 Species occurred	6	------	------	3.1/m²

Ethnomedicinal importance :

Leucas aspera used to treat inflammatory and allergic conditions.

*The entire plant is also used as an insectide and indicated in traditional medicine for cough,colds,painful swelling and chronic skin eruption [5]

*Apart from this, the plant possesses wound healing property and is used in cobra venom poisoning[6] .

*A mixture of leaves and charcoal applied on the wounds of cattle to kill worms.

*This leafy vegetable is rich in Calcium, magnesium potassium, iron and vitamins such as vitamin C, vitamin D and vitamin E.[(10)]

* *Leucas aspera* is used commonly as an insecticide.[11]

*Aromatic oil is found in 1.33% in 3gm of dry weight of powder of leaves of ***Leucas aspera.***

Table1: The chemical Components *Leucas aspera* (L)

S. N.	R.T.	Name of compound	Molecular formula	Mol. Weight	Peak Area
1	13.6	9,9 trimethyloctahydrbenzo (d) cycloprop(c) oxepin-2,4-dione	$C_{14}H_{20}O_3$	236	137364
2	13.6	3-Buten-2-one,3-methyl-4-(1,3,3-trimethyl-7-Oxabicyclo[4.1.0]heptan-1-	$C_{14}H_{22}O_2$	222	137364

		yl)-			
3	14.2	Tetratriacontane	$C_{34}H_{70}$	478	113304
4	14.2	Hexacosane	$C_{26}H_{54}$	366	113304
5	21.7	Heptacosane	$C_{27}H_{56}$	380	582218
6	21.7	Tetratetracontane	$C_{44}H_{90}$	618	582218

Hit 2 : Hexacosane
$C_{26}H_{54}$; MF: 501; RMF: 658; Prob 25.9%; CAS: 630-01-3; Lib: replib; ID: 5765.
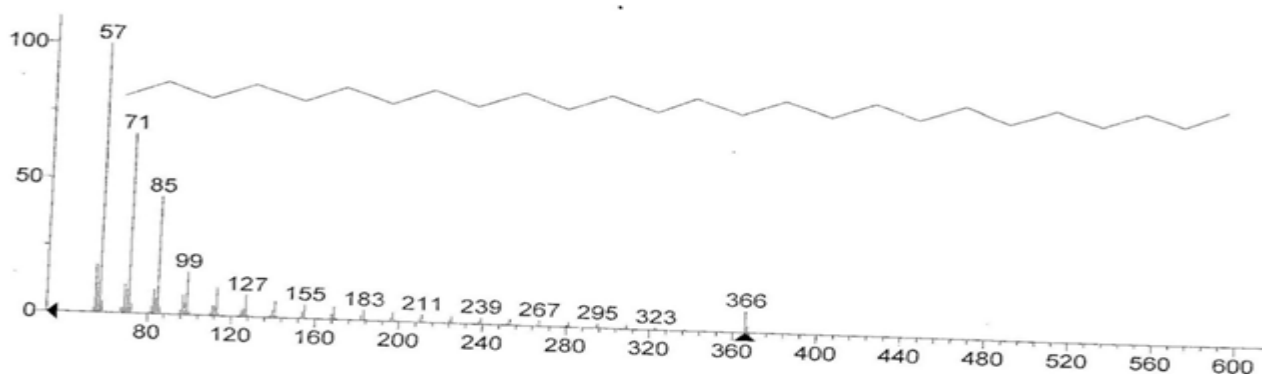
Hit 1 : Tetratetracontane
$C_{44}H_{90}$; MF: 743; RMF: 804; Prob 7.39%; CAS: 7098-22-8; Lib: replib; ID: 5520.
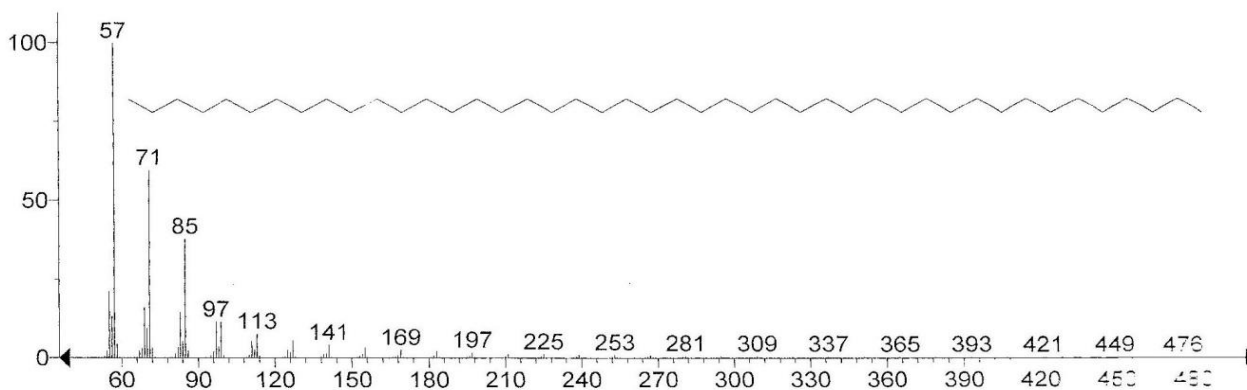
Hit 2 : Heptacosane
$C_{27}H_{56}$; MF: 736; RMF: 850; Prob 5.66%; CAS: 593-49-7; Lib: replib; ID: 5509.
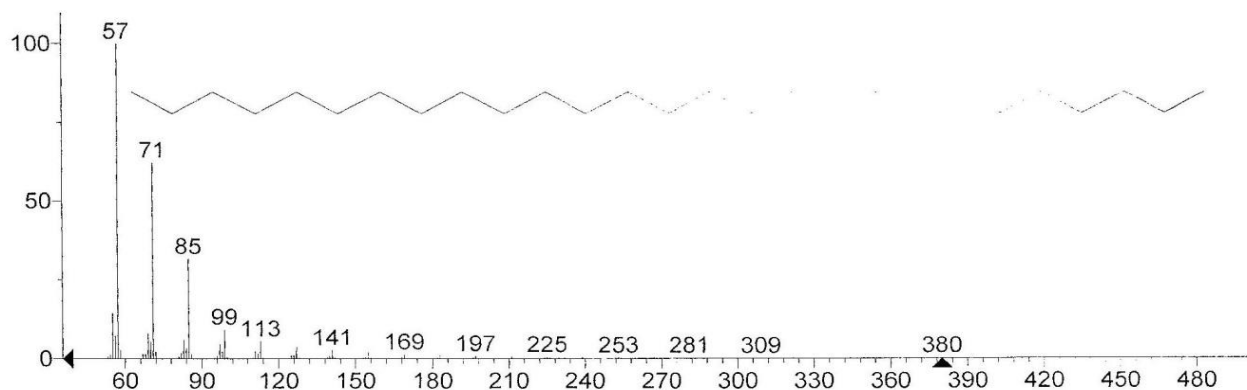
IV. CONCLUSION

Most of the medicinal claims are centered on flowerand inflorescence of the plant. The whole plant and leaves, are also administered in a few specific clinical conditions.The analysis of all the claims clearly indicates thepotential of the plant to be an excellent analgesic, antipyretic and anti inflammatory drug which needs to be validated through preclinical and safety and efficacy trials. Their ecological study suggests that these plants are tropical wild herbs, having aromatic smell and are perennial, but. The present investigation concluded that the density, frequency and abundance of *L. aspera* vary at the various sites, viz. Gorewada, PDKV, and Savner due to the edaphic factors and climatic conditions as well as the water sources available at the particular sites therefore the present observations may conclude that, it is exotic and well adapted for the extreme atmospheric conditions. The present GC-MS screenings are an essential tools for confirmation of the results and it may serve as pavements for the researcher to select a group of plants having similar chemical constituents and their detailed investigation regarding their chemistry and functions is required, so that they can be used in allopathic or in Ayurvedic medicine as well as cosmatics industry.

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Eco-Friendly Synthesis of Quinoxaline Derivatives Catalysed By Zinc Triflate

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ABSTRACT

Quinoxaline nucleus based nitrogen containing compounds have wide applications in pharmaceutical and paint industries. Some antibiotic structures constitute the quinoxaline moiety. For the synthesis of such important class of derivatives, a simple and efficient method is developed. The reaction between substituted phenacyl bromide and benzene 1,2 diamine catalysed by Zinc triflate in water solvent. The method is eco-friendly; require mild reaction condition, easy work up procedure and good yield are the main features of the method.
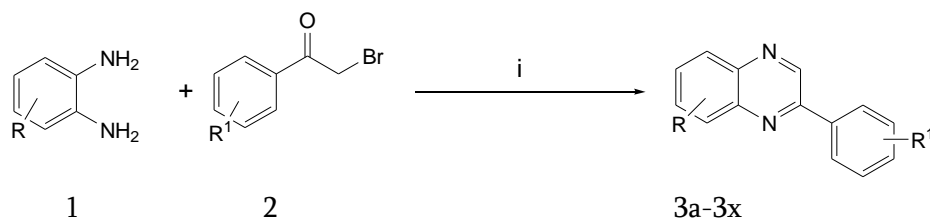
Scheme 1: *Reagent and conditions*: (i) 10 mol% $Zn(OTf)_2$, 5 mL water, 70-80^{0}C.

Keywords: quinoxaline, phenacyl bromide, benzene 1, 2 diamine, zinc triflate.

I. INTRODUCTION

Quinoxaline based heterocyclic compounds constitute a versatile class of nitrogen containing compounds. Quinoxaline moiety is useful intermediate in organic synthesis & medicinal chemistry. They are well known for their wide range of biological activities including anti-bacterial[1a], anti-viral[1b], anti-inflammatory[1c], anti-cancer[1d], anti HIV[1e]etc. Quinoxaline derivatives also have a variety of applications in dyes, fluorescent materials, semiconductors[2a], insecticides, fungicides and herbicides[2b]. Some examples are shown in **Figure 1**. For example, Quinacillin is highly effective in penicillin sensitive or strains of staphyllococcusaureus which produces penicillinase. Brimonidine is used for the treatment of open-angle glaucoma, as eye drops or applied to the skin. Varenicline is used to treat nicotine addiction. This scaffold was also well- known in bioacids,[3] organic synthons,[4] electroluminescent materials,[5] organic semiconductors,[6] cavitands,[7] dehydroannulenes[8] and ligands in coordination chemistry[9].The quinoxaline nucleus is the main constituent of some antibiotics such as Levomycin, Actinoleutin and Echinomycin[10]. Therefore attention is made for the synthesis of quinoxaline derivatives.
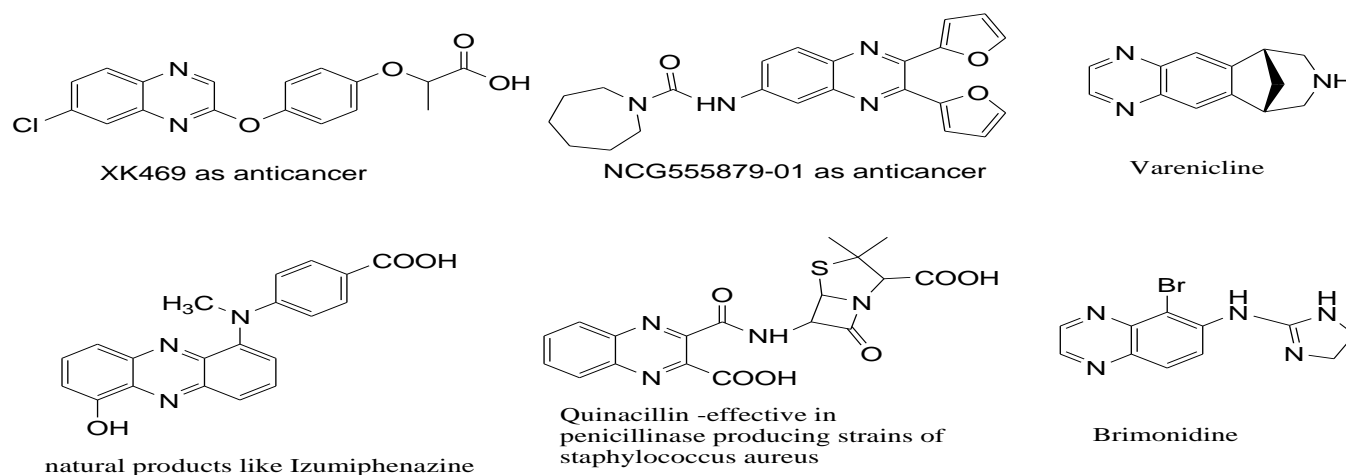
Figure 1. Examples of bioactive compounds having quinoxaline scaffold.

In recent years there is a considerable interest in developing environmentally benignreactions.[11, 12].For this purpose, the use of solid heterogeneous acid catalysts in organic synthesis is extensively carried out. Heterogeneous solid acid catalysts are superior to the conventional homogeneous acid catalysts due to their low cost, operational simplicity, low toxicity and environmental compatibility. Moreover, they can easily be recovered from reaction mixtures by filtration and reused for making the process economically viable.

The reactions catalysed by zinc are found to be sustainable alternative to use of more precious or toxic transition metals.[13] Zinc triflate [Zn(OTf)$_2$] is an inexpensive catalyst having thermal stability, ease of availability, low cost and addresses problem associated with the toxicity of metals up to a great extent. It is known as an efficient catalyst used in various chemical transformations[14-16].

Numerous common synthetic methods involve double condensation reactions between o-phenylene diamine and α-diketones[17-21] with or without the presence of catalyst in various solvents. Synthesis of quinoxaline derivatives is carried out from diketone and 1,2 diamine using zinc triflate in acetonitrile.[22] Alternative methods are also proposed which includes oxidative trapping of α-hydroxy ketones with o- phenylene diamine[19], oxidative trapping of α-hydroxy ketones with o- phenylenediamine in presence of transition metal complexes such as Mn, Pd, Cu, Pb[23-25]. Reaction of 2-bromo acetophenone with o-phenylenediamine or α-hydroxy ketones or from arynes[26-35], Cu (II) [36], microwave irradiation [37, 41], RuCl$_2$(PPh$_3$) [38], HClO$_4$.SiO$_2$[39], Ga(OTf)$_3$[40], SSA[42], K 10 clay[43], Amberlite IR-120H[44] and VOSO$_4$[45,46].

The above reported methodologies for synthesis of quinoxaline derivatives have shown good results in many instances. However, some of the synthetic strategies also have limitations in terms of expensive reagents, long reaction time, environmentally hazardous, harsh reaction conditions, tedious work-up procedure and unsatisfactory yield. Therefore, in order to overcome these disadvantages of previous methods I have developed a simple, highly efficient and environmentally benign method for the synthesis of quinoxalines catalysed by zinc triflate [Zn(OTf)$_2$] in solvent water. The product can be separated by filteration of the reaction mixture after completion of the reaction Hence, this method provides a green and much improved protocol over the existing methods. Thus, herein I report a green and simple approach for the synthesis of quinoxaline derivatives from various 2-bromo acetophenones and 1,2-diamines catalyzed by zinc triflate [Zn(OTf)$_2$] **(Scheme 1)**.

1(a-c)   2(a-i)   3a-3x
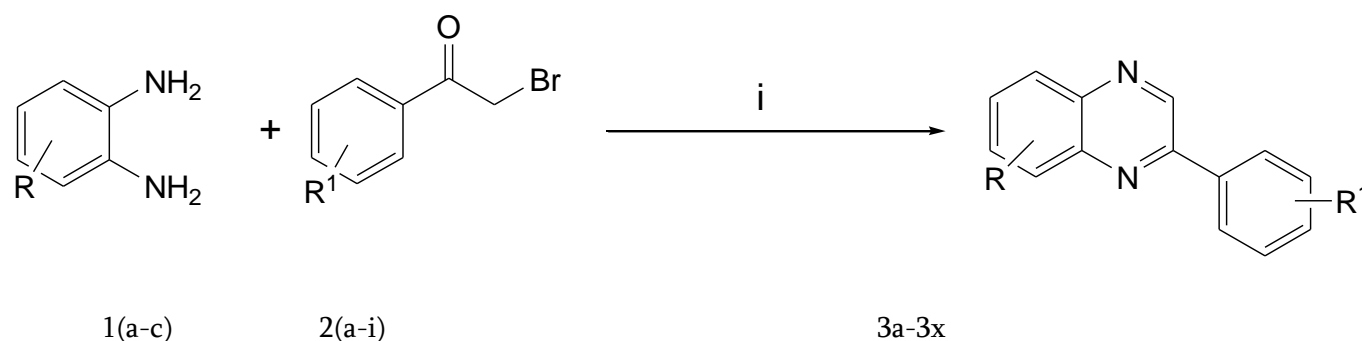
Scheme 1: *Reagent and conditions*: (i) 10 mol% Zn(OTf)$_2$, 5 mL water, 70-80^{0}C.

II. EXPERIMENTAL

2.1. General details

All chemicals were purchased from Sigma Aldrich and Spectrochem companies and used without further purification. The reactions were monitored by TLC using aluminum sheets 20 x 20 cm, Silica gel 60 F$_{254}$,Merck grade. Products were characterized by ^{1}H and ^{13}C NMR spectra recorded on a Bruker spectrometer using CDCl$_3$& DMSO-d$_6$ as a solvent and tetramethylsilane as an internal standard. Mass spectrometric data was recorded by an electron spray ionisation (EST) technique on a Q-tof-micro quadruple mass spectrometer (Micro mass). Melting points were determined on DBK-programmable melting point apparatus.

2.2. General procedure for the synthesis of quinoxalines

In a 25 mL round bottom flask 1,2-diamine (1 mmol), 2-bromo acetophenone (1 mmol), 5mL water and Zinc triflate (10 mol%) were heated at 70-80^{0}C for 35 to 60 minutes. The progress of reaction was monitored by TLC. After completion of reaction; confirmed by thin-layer chromatography (TLC) using eluent petroleum ether–ethyl acetate (7:3), the reaction mixture was cooled and filtered. The product as residue was washed with water thrice. The crude product obtained was recrystallised using ethanol to afford the products in good yields. The structure of the product was confirmed by Mass and ^{1}H NMR specta.

III. RESULT AND DISCUSSION

Herein, I reported synthesis of quinoxaline derivatives in good to excellent yields via one pot reaction between o-phenylenediamines and various substituted bromo acetophenones. All reactions were performed by the use of zinc triflate Zn(OTf)$_2$ as catalyst in water under reflux. The products were obtained in good to excellent yields.

To determine the suitable reaction conditions, a solvent-free reaction of 2, 4-dibromo acetophenone (1 mmol) and o-phenylenediamine (1 mmol) was performed at room temperature (entry 1, **Table 1**). Low yield was observed in this case. Then, the reaction mixture was heated for 4 h and 50% yield was found. So, we studied the effect of solvent and various amounts of zinc triflate catalyst on the model reaction **(Scheme1).** The reaction was performed by using different solvents such as CH$_2$Cl$_2$, EtOH and CH$_3$CN under heat for about 40-90^{0}C with more time and low yield **(entry 1-4, Table 1).** The same reaction was performed in presence of 10 mol% at 70-80^{0}C water **(entry 5, Table 1).** More result was obtained using 10 mol% of the catalyst **(entry 5-7, Table 1).**

Table 1: Optimization of reaction condition for the synthesis of quinoxaline derivatives.

Entry	Solvent	Catalyst (mol%)	Temperature (^0C)	Time (min.)	Yield (%)
1	None	-	70-80	240	50
2	CH_2Cl_2	10	RT	85	68
3	EtOH	10	70-80	40	78
4	CH_3CN	10	80-90	70	72
5	**H_2O**	**10**	**70-80**	**35**	**88**
6	H_2O	5	70-80	42	78
7	H_2O	20	70-80	35	87

Thereafter, a series of reactions was carried out using diversely substituted 2-bromo acetophenone under identical reaction conditions. All these reactions afforded good to excellent yields of 2-Phenyl quinoxaline derivatives (3a-3p), **(entries 1-16, Table 2).** Methyl and chloro substituted o-phenylene diamines were used which produced selectively one product with various substituted 2-bromo acetophenones bearing both electron donating and withdrawing groups. All these reactions resulted in good to excellent yields (**Table 2**).

Table 2 : One pot synthesis of quinoxaline derivatives in 1:1 water - ethanol mixture Using zinc triflate $Zn(OTf)_2$ [a].

Entry	1,2diamine 1(a-c)	2-bromo acetophenone 2(a-i)	Product 3 (a-x)	Time (min.)	Yield[b] (%)
1	O-phenylene diamine	4-Br	3a	28	88
2	O-phenylene diamine	4-OCH_3	3b	46	85
3	O-phenylene diamine	4-CH_3	3c	42	88
4	O-phenylene diamine	4-Cl	3d	40	88
5	O-phenylene diamine	4-NO_2	3e	34	90
6	O-phenylene diamine	3,4-dichloro	3f	43	85
7	O-phenylene diamine	4-F	3g	35	87
8	O-phenylene diamine	4-CN	3h	38	89
9	O-phenylene diamine	4-H	3i	40	86
10	4-methyl o-phenylene diamine	4-Br	3j	41	88
11	4-methyl o-phenylene diamine	4-OCH_3	3k	53	90
12	4-methyl o-phenylene diamine	4-CH_3	3l	50	91
13	4-methyl o-phenylene diamine	4-Cl	3m	48	84
14	4-methyl o-phenylene diamine	4-NO_2	3n	46	91
15	4-methyl o-phenylene diamine	4-F	3o	52	86
16	4-methyl o-phenylene diamine	4-CN	3p	55	88

17	4-methyl o-phenylene diamine	4-H	3q	58	87
18	4-chloro o-phenylene diamine	4-OCH$_3$	3r	64	84
19	4-chloro o-phenylene diamine	4-CH$_3$	3s	60	85
20	4-chloro o-phenylene diamine	4-Cl	3t	58	82
21	4-chloro o-phenylene diamine	4-NO$_2$	3u	53	84
22	4-chloro o-phenylene diamine	4-F	3v	58	83
23	4-chloro o-phenylene diamine	4-CN	3w	60	82
24	4-chloro o-phenylene diamine	4-H	3x	63	86

[a]Substitutedo-phenylenediamine (1 mmol), substituted 2-bromo acetopenone (1.0 mmol), H$_2$O (5 mL), under reflux.

[b]isolated yield

IV. CHARACTERISATION DATA
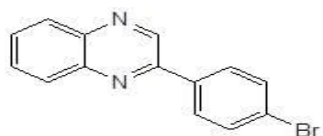
2-(4-bromophenyl)quinoxaline (entry 1, 3a, Table 2): MP- 138-140^{0}C[12] :

^{1}H NMR (400MHz, CDCl$_3$): δ (ppm) 7.7-7.782 (m, 2H, Ar), 7.788-7.830 (m, 2H, Ar), 8.126-8.130 (s, 2H, Ar), 8.152-8.158 (s, 2H, Ar), 9.344 (s, 1H, Ar);

ESI-MS: m/z = found-285 (M+1), exact-284 for C$_{14}$H$_9$BrN$_2$.
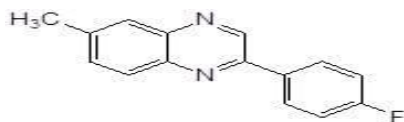
2-(4-fluorophenyl) 6-methyl quinoxaline (entry 15, 3o, Table 2) MP-141-143^{0}C :

IR (Cm^{-1})779, 881, 927, 960, 1047, 1134, 1161, 1222, 1267, 1377, 1436, 1467, 1496, 1541, 1599, 1620, 1656, 1870, 1907, 2337, 2360, 2856, 2918, 3059.

^{1}H NMR (400MHz, CDCl$_3$): δ (ppm) 2.6 (s, 3H, CH$_3$), 7.109 (s, 1H, Ar), 7.15 (s, 1H, Ar), 7.3 (m, 1H, Ar), 7.85 (m,1H, Ar), 8.0 (m, 1H, Ar), 8.1 (s, 2H, Ar), 9.1 (s, 1H, Ar)

^{13}C NMR (500 MHz, DMSO d$_6$):δ (ppm) 21.23, 78.61, 116.02, 127.52, 128.31, 129.49, 131.92, 132.67, 139.69, 140.98, 149.81, 162.52, 164.50.

ESI-MS: m/z = found-239 (M+1), exact-238 for C$_{15}$H$_{11}$FN$_2$.

V. CONCLUSION

In summary, I report an efficient synthesis of 2-phenyl quinoxaline derivatives by the reaction of various benzene 1,2 diamine and substituted phenacyl bromides using zinc triflate Zn(OTf)$_2$ catalyst. Non-hazardous reaction condition and the use of water as the reaction solvent makes the present protocol an environmentally benign and green approach for the synthesis of 2-phenyl quinoxaline derivatives.

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Rheostat Effects of Leaves Extracts of Some Indigenous Plants on Household Insect Pests, Red Imported Fire Ant, Solonepsisgeminata Fabricius

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ABSTRACT

Red imported fire ants are dominant in altered areas and live in a wide variety of habitats. They can be found in rain forests, disturbed areas, deserts, grasslands, alongside roads and buildings, and in electrical equipment. Colonies form large mounds constructed from soil with no visible entrances because foraging tunnels are built and workers emerge far away from the nest. The highest mortality rate and repellent activity was noted at 10% ethanolic plant extract of Ipomea cornea (Beshram) among the plants used for experiments. The evaluation of experimental data revealed that Azadirachta indica (Neem), Ipomoea carnea (Beshram) and Vitex negundo(Nirgudi)the plants species synthesized numerous volatiles known to exhibit toxic, insecticidal and repellent properties to the household pests. Testing of the ethanolic extract of plants leaves for the control of household pest help in the development of new synthetic insecticides which do not appears post hazard effect on human. The laboratory experimental evaluation of the leaves of commonly occurring of such indigenous plants shows highest toxicity and repellent activities against the red imported fire ant, Solonepsisgeminata. Theexperimental resultsindicate the potential of ethanolic plant extracts to control the commonly occurred household pest red antsas compared with the commercial highly toxic, synthetic pesticides such as Boric powder and Lindane.

Key words: Solonepsisgeminata, Ethanolic plant extract, toxicity, bioformulation.

I. INTRODUCTION

Pesticides are the key component of Integrated Pest Management (IPM), help out an important role to control the agricultural pest and the household pests but led to the environmental problems including health hazards to humans. The heavy usage of pesticides created a great concern especially in case of household control of pests left higher level of insecticide residues. These chemical insecticides find in above maximum residue limits in the samples of milk, cattle drinking water, fodder, feed collected from cattle colony [17]. The rapidly rising human population and sustainable development cause global warming on the earth which affects on insects pest population. Some of the insect in addition not only damages the crops but spreads the dangerous diseases and harmful to human health. Awareness regarding the food safety has increased the demand for organically produced food, which necessitates evaluating the performance of plant-basedpesticides as safer alternatives to

conventional insecticides [1]. *Azadirachtaindica* (Neem), *Ipomoea carnea(*Beshram/sadafuli)an*Vitex negundo* (Nirgudi)are plants having diverse pest control properties. Many plants, like Neem, Sadafuli, Nirgudi, Kambarmodi andKaranj have the alkaloids, phenolics, glycosides and tannins types of chemical defensive compounds when mixed with ethanolic groupsaffects on the insect feeding and unpalatable to the insects[3]. However, these compounds act as the toxins and repellent to kill the insect pests. These ethanolic formulations being as a safer alternative to the synthetic insecticides as an environment friendly product. Whereas the application of these herbal pesticides is limited due to the instability which needs its application at short time intervals[10,12]

II. MATERIAL METHOD

The fresh leaves of the respective plants were chopped in to small pieces with a knife and dried in shade (Fig. 1). These dried pieces were then grounded in grinder to make coarse powder. The 10 mg of each plant powder packed and processed in Soxhlet Appratus (Fig. 2) using 150 ml ethanol asstock solvent.The dried ethanolicplant extracts of*Azadirachtaindica* (Neem), *Ipomoea carnea(*Beshram/sadafuli) and*Vitex negundo* (Nirgudi)in ethanolprepared in 5%, 10%, 15%and 20%formulations as working formulation.The set of 30 adult life stages of the household pest,red fire ant,*Solonepsisgeminata*collected in the separate glass containers to check the % mortality after 24hour. Each set was tested and compared with control set (treated with water) and a conventional synthetic insecticideLindane as check in 0.2% formulation (Aqueous).

III. RESULTS

The present study based on application of ethanolic leaf extracts of five different plants treated as the potent insecticide against the household pest, imported red fire ant,*Solonepsisgeminata*. The treatment of these leaf extracts applied in viz., 5%, 10%, 15 %, and 20% formulations at the interval of 24, 48 and 72 hours. The exposed groups of carpenter ant divided into two chambers such as Experimental and Control set. The treatment of the 20% ethanolic leaf extracts indicated maximum lethal effects and percent mortality only after the interval of 72 hours against the adult stage of the carpenter ant as compared to synthetic insecticides. Also to determine the sublethal effects of 20% ethanol leaf extracts among all the plants estimations of biochemical constituents in the midgut of carpenter ants studied after each interval of 24, 48 and 72 hours of treatment (Table- 1 and 2). The biochemical composition of total protein, carbohydrate and lipid in the midgut of experimental set of carpenter ants shows significant decreasing concentrations as compared to control group. The greenhouse trials revealed that the 20% methanol leaf extracts may acts as the stomach poisons with higher repellent activity showing non-target toxicity at highest mortality rate of adult red fire ants (Table-1).

Figure no.- 1 : Ethanolic Leaves Extracts of plants

Figure no.- 2 : Experimental setup of Glass Container

Table – 1: Effect of 20 % Methanolic Leaves Extract on the Biochemical composition of Midgut of the red fire ant,*Solonepsisgeminata* after 72 hours (Exp.-Experimental group of ants)

S. No.	Leaves Extract of Plants	Percentage Mortality/ hour			
		5%	10%	15%	20%
1	*Azadirachta indica*	11.55± 1.62	15.61± 2.41	21.55± 5.73	82.3± 6.45
2	*Vitex negundo*	31.4± 3.93	23.5± 3.32	39.3± 6.26	82.2± 8.71
3	*Ipomoea carnea*	32.± 4.35	32.5± 5.22	48.8± 8.28	91.1± 10.85
4	Check-I / Boric powder	11.1± 2.21	12.4± 2.12	24.1± 3.12	82.± 5.21
5	Control	0	0	0	0

(P< 0.001)

In the present study the ethanolic leaves extracts of were tested and applied in comparison with synthetic insecticides viz. (0.2% Stock solution)Lindane with emphasis on their residual determination. The present study revealed that these formulations are acts as stomach and contact toxins with higher repellent activity with disturbed metabolism and suppressive oviposition rate. The highest % ofethanolic plant extracts like 20 % after time period of 72 hoursgave at the best in toxicity and repellent trials showing non-target toxicity at maximum % mortality rate of adults of red fire ant (Table-2 and Graph-2).

Table – 2: Effect of 20 % Methanolic Leaves Extract on the Biochemical composition of Midgut of the red fire ant,*Solonepsisgeminata* after 72 hours (Exp.-Experimental group of ants)

S. No ..	Leaves Extract of Plants	Biochemical Composition in µg/mg, after 24 hr					
		Protein		Carbohydrate		Lipid	
		Exp.	Control	Exp.	Control	Exp.	Control
3	*Azadirachta indica*	2.83± 0.13	7.01± 0.23	4.25± 0.03	10.5± 0.33	0.41± 0.018	1.15± 0.06
4	*Vitex negundo*	2.25± 0.01	6.21± 0.32	4.15± 0.21	9.25± 0.74	0.31± 0.02	1.1± 0.04
5	*Ipomoea carnea*	1.33± 0.95	7.51± 0.88	2.35± 0.85	11.15± 0.94	0.22± 0.75	1.22± 0.11

Figure 4: Effect of 20 % Methanolic Leaves Extract on the biochemical composition of Midgut after 72 hours.
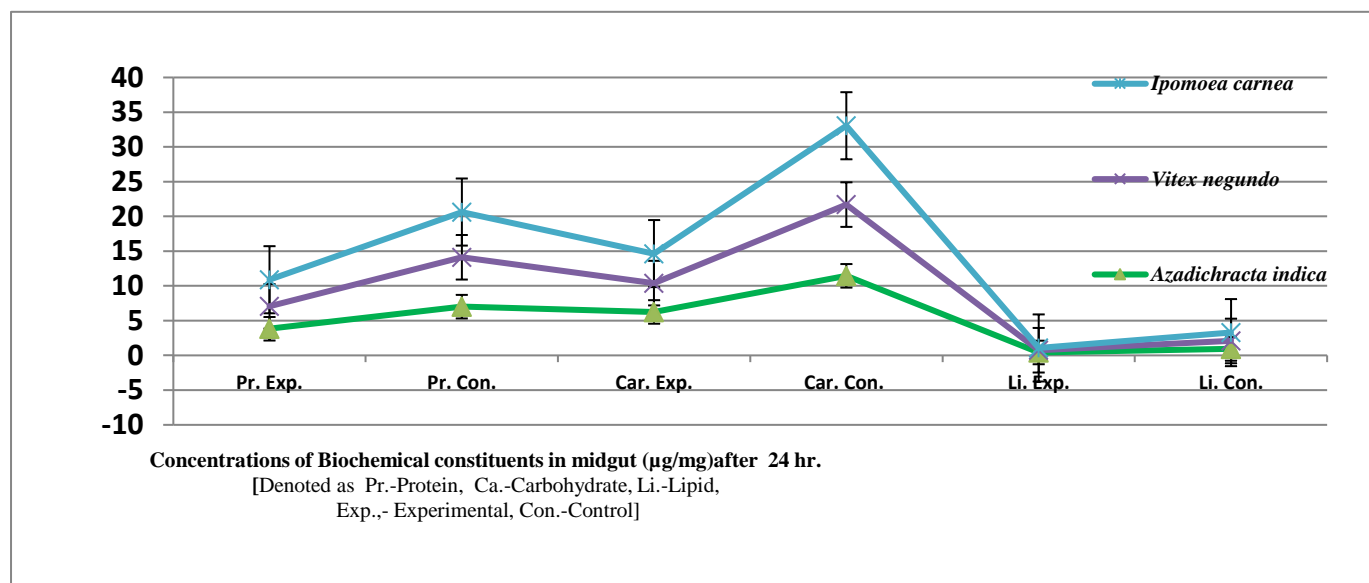
IV. DISCUSSION AND CONCLUSION

Ant behavior depends upon a number of environmental conditions one of which is the availability of different food resources[5,8]. The imported red fire ant,*Solonepsisgeminata* along with some other ants, form a group of household insect pests causing consistent nuisance and damaging store grains, food materials, bakery products, sweets and ornamental as well as vegetable plants [10,11,12]. In general by applying an ant bait consisting boric acid at variable concentrations used to control the developmental stages of household ants and colony

population. These substances are, moreover found to be inducing high mortality of chicks and poisoning food and bakery products [1,10]. The Annona seed extracts effects on the reduction of total protein content influencing adversely the protein metabolism and the vital process in insect life [6]. Derivatives of local plants such as kernel powder and seed oils of *Azadirachta indica* [21] were also reported to be effective against coleopteran pests due to their antifeedant, ovicidal, insecticidal and other growth regulatory actions. The treatment of these oral toxins distributed among the nest mates and larvae through regurgitation during trophyllaxis [7,8,14]. Such synthetic insecticides give maximum mortality by exerting nervous, digestive and respiratory toxin [13,19]. In the red fire ant,*Solonepsisgeminata* the midgut is lined with enteric epithelium with thin peritrophic membrane as the innermost layer. It is the main site for the synthesis of different enzymes and biochemical components that carry out the digestion and metabolism similar to hymenopteran bees [24].The histopathological studies on midgut of red fire ant,resulted in degradation of the basal membrane and degeneration in the epithelial lining after the treatment of 20% methanol leaf extracts of the plant, *Ipomoea carnea*. These observations were almost similar to that reported in *Hieroglyphusnigrorepletus* [20], *Heliothisherrata*[18] and *in Periplaneta Americana* [22] after the treatment some synthetic insecticides.

The present study determined the action and sublethal concentration ofleaf extracts of *Ipomoea carnea* extracts as the potent insecticide directly affected on biochemical constituents such as total proteins, carbohydrates and lipids[15]. This is the first study suggesting sublethal effects of the 20 % formulations of leaf extracts of locally available indigenous plants on digestion, absorption and metabolism ultimately leading to death of the ants. It becomes apparent that these insecticidal effects of the plant extracts are exerted due to the action of toxic substances like alkaloids and enzymes as discussed above[23]. Therefore this study revealed the effective use and broad spectrum mode of action of botanical insecticides as the stomach and contact insecticides against red fire ant,*Solonepsisgeminatawhich* exercises knock down effects in future and reduces the use of synthetic insecticides.

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Comparative Study of Mobile Devices Based on Query Processing in Mobile Environment

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ABSTRACT

The main objective is to investigate the performance improvement of mobile query processing, focusing on the server and client sides. In server side query processing, we consider single-cell and multi-cell queries, whereby a cell is a service area for a single stationary host to communicate with a static network. A quick response in answer to a mobile query is important, because mobile users invariably move to another location while awaiting the query result. The application of query processing will change the way of user interaction and it also increase working performance for better user workability. This paper is a brief description on comparative study of different devices and Implementation of query processing in their environment. This paper explains and considers various attributes of the devices. The paper also covers suggestions with respect to query processing mechanism for performance improvements within minimum time in mobile computing environment.

Keywords- Query processing, mobile computing, mobile devices, mobile environment, mobile database

I. INTRODUCTION

This paper presents a comparative study based on query processing of two different mobile devices in a same mobile computing environment. The paper also presents architecture for similar concept. The comparative study of a Smartphone and Laptop is studied in this paper as both the devices have different hardware specification and software specification. The query processing time taken by the Smartphone and Laptop is tested using same search engine and the time gap is also noted. The paper goes through with various methods for query processing and the implementation on these two devices. The Mobile environments are composed of wireless technologies in which user asked for query to be processed,on demand query processing. The mobile environment is collection of mobile heterogeneous hosts, which are enabled to communicate using "wireless links". These wireless links may change according to the natures of mobile networks, moreover, nodes in the ad-hoc network have to communicate without any centralized or help. Each mobile node offers limited functionality only. However, as a whole, these devices can handle more complex tasks.
The complex tasks can be resolved by implementing advancements in query processing on these mobile devices. This will save the energy and power consumption by the devices can be saved. The usability for the user will

also change using query processing mechanism Thus, this mechanisms that allows the sharing of functionality among differentdevices in same environment will change the way of user's interaction for searching fast query time in mobile computing environment.

II. CHALLENGES IN QUERY PROCESSING

The role of query processing in a mobile environment is to form a high level query on a distributed database, which is seen as a single query by to different devices by two different users; into an efficient execution strategy and finding the execution time take by the devices. An important point of query processing is query optimization. Because many execution strategies are query optimization solution can help in reducing the time required for a query to be processed.Location management is an important issue in query processing in mobile environment. Since the number of user population carrying mobile devices increases linearly with the service demand, the communication traffic for locating users also increases accordingly. This situation requires an efficient strategy for location tracking and management. Location management is a very essential factor for optimization of query processing mobile based environment.

The more number of data send by the devices, that moves as requests will be served from the centralized server and this will increases the chance of mobile clients to send the request to the server. However, at a certain point the advantage of the broadcast data will be diminished if there is too many data in the broadcast cycle. Consequently, it will severely affect the query response time since mobile users have to wait for considerably long delay before they receive the desired data.Therefore, it is essential to decide what data to be broadcast that serves most of the requests since the query access pattern is changed dynamically.

A query may be optimized at different times relative to the actual time of query execution. Optimization can be done statically before executing the query or dynamically as the query is executed. The main advantage of the later method is that the actual sizes of the intermediate relations are available to the query processor, thereby minimizing the probability of a bad choice. The main drawback of the dynamic method is that the query optimization, which is an expensive one, must be repeated for each and every query. So, Hybrid optimization may be better in some situation. Thus architecture is shown for basic query processing in mobile environment.

III. QUERY PROCESSING ARCHITECTURE
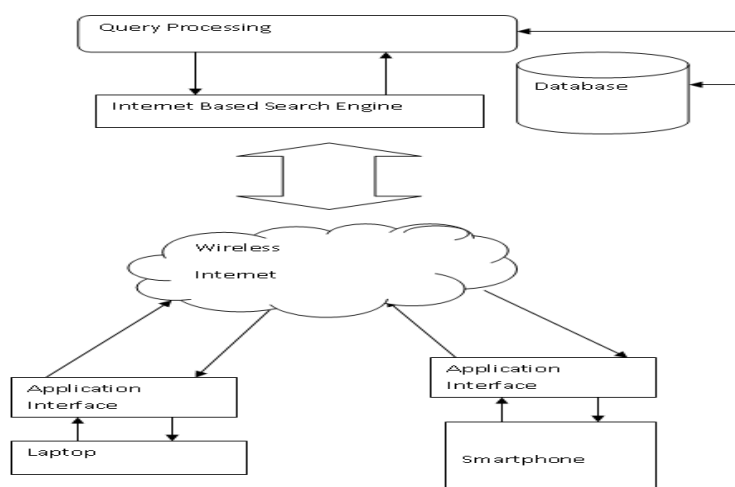
Query Processing Architecture

The above architecture is based on query processing and about two different devices interacting with the search engine for query processing. This architecture is designed on the basis of taking two devices, one of which is a laptop which is a computing device with a significant hardware and software for running the query through a web browser. The second is devices used for comparative study is a Smartphone which is also have hardware with good specification to run the query through the web browser. The mobile environment considered in the study is an internet connection source through a local WiFi i.e. wireless fidelity in the college campus. The reason behind considering this environment is that both the devices will work on the same environment with the only difference of the attributes of them. The service provider for both the will be common. The explanation of the individual components is as follows:

Database: The database symbol showed in the diagram is about distributed database of the web based search engine. This database is huge collection of information which is served by the websites to the local users.

Query Processing: In query processing section different algorithm and query processing strategies are implemented for maximizing the user performance.

Internet Based Search engine: The internet based search engine is the website used for the experimental work. This web site will act as a front end for the query processing. The website considered will be Google as it is most powerful and high configured search engine.

Wireless Internet connectivity: This section is about wireless internet connectivity which will act as source for consideration and will change the way a normal query processing. The source provides an interface for the two devices to connect to the server and act as mediator between the devices and local internet.

Application Interface: The application interface is a web browser and the platform used by the devices to interact with the wireless internet connectivity sources. The devices will communicate with the mobile environment using the application interface depending on the application interface they asked for the similar query and the processing time taken by them is studied in the related work.

Laptop: The laptop is an end user device which acts as an interface between the users. User fired the query through the laptop and the time taken for the query to be executed is considered.

Smartphone: The smart phone is also an end user device which acts as an interface by the user to process the query. The user fired query from smart phone and it proceed by the server.

IV. QUERY PROCESSING FRAMEWORK

There are various types of queries available for different communication systems. The existence of queries is more than in wireless environment than wired environment. This paper is focus to query taxonomy. Some queries exist only in a wireless environment and some in the traditional environment, but some types of queries in the both environment. The queries classified in mobile environment: Traditional queries and Context awareness queries. Context awareness queries are classified into three types namely location dependent queries, context dependent queries and hybrid queries.

4.1 Traditional Queries:

Traditional queries are general queries in traditional database management system. Now-a-days, these queries are typical queries that people are dealing with day-to-day basis in a stationary network environment system. This type of query specially mentions the required information in the query statement and the result of the

query is based only on the actual query itself. Examples of such type of queries are: (i) A depositor wants to retrieve his account statement of provident fund. (ii) Any person wants to know up gradation of LIC policy after 5 years.

4.2 Context Awareness queries:

The word context defines a variety of aspects. Context categorized likely computing context, user context, and physical context. The computing context concerned with computing resources like as network, connectivity, bandwidth, workstation, server, clients. User context relates to user's needs, preferences, roles, profile and alike. Physical context associates with environment, issue which include lightning, noise, traffic, temperature and humidity. In addition to context, there is another category of context called as "Time context" which implies to time of day, week, month, and year. It defines context as either aspect of physical world or condition and activities in the fictitious world. Context awareness queries always define that context relates to who, when, where, what context awareness generate a new class of application in mobile computing.With the help of context awareness queries, mobile device is expected to perform constantly in wide range of dynamically and continually changing situation. It is prominent for the device to be able to aware of situation, environment and tasks that the mobile client is performing as well as will be performing in the near future. Example: To find motel information in current region. The query will give effect of retrieving information about restaurant as well as fuel based on user preferences and prefacing maps, traffic and weather condition which is likely to be queried next.

4.3 Location Dependent Queries:

Location dependent query is category of queries that are motivated by mobile clients. The location of mobile client is a parameter of the query for location dependent query. The processing of queries fully depends on the user's location. The current route, direction of motion and the speed are necessary to be taken in account for services of queries. Generally, each location updates create two direct cost : (i) Transmission cost, which directs to the cost to inform the server of the fresh location and (ii) Server processing cost, which refers to the cost of updating the system containing the location of the mobile unit. The parameter for location can be in any object like as taxis,trucks and helicopters. This category of querytypes can be further divided into followingthree classes: (i)moving user seeking static object (ii) moving user seeking moving object and (iii) static user seeking moving object.

- **Moving User seeking Static Object:**

Moving User seeking Static Object query generates from amoving userand the searched object is static. An example of thisquery is :Request of information by tourist on road to knowaboutmotel with in distance of 5 kms.

- **Static User seeking Moving Object:**

This type of query generates from a stationary user and thesearched object is moving. An example of this query is:Request of information for a particular trains arriving on badnera junction withinone hour.

- **Moving User seeking Moving Object:**

This type of query generates from moving user and the seeking searched object is also moving. An example of this query is:

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Request to retrieve information about Cruise1 members byCruise2 members of cruise when both are in different cruise.

Location dependent queries can also be classified depend on the based on query type. (i) Continuous query and (ii) Non- Continuous query.

4.4 Continuous query:

Is such type of query involves real time monitoring of mobile objects. This type of query compared with conventional queries that are based on an instant of the database at some moment in time.The continuous query includes real-time monitoring of mobileobjects. Real-time monitoring queries are continuous formonitoring purposes. In a continuous query setting even afterthe initial query is answered and the query is still kept by theserver. Hence, in the case where the user moves into a different location or when new information becomes available, it will then need to be dispatched to the user. Example: (i) To request information about nearby tourist attractions, hotels, or shopping center while traveling. With this class of query, clients need to send a query only once and notification of the updated information about nearby tourist attractions, hotels, or shopping center will be sent automatically as clients move to different regions. (ii) To notify mobile clients whenever they are close to a certain situation such as dangerous zone or traffic jam by providing some form of alerts to them.In this case, the system must be able to provide the accuratequery results and update them in real time whenever mobileclients enter or exit the region defined by the query. This classof query can be referred as range-monitoring queries [9]. Therange-monitoring queries are removed from the system onlywhen the user explicitly ends the query.

4.5 Non-continuous query:

The non-continuous location-dependent query is different fromthe continuous query as the system does not manage the query.The mobile client generate query to obtain data from repositoryat the remote stationary server. Data management strategies inthe on-demand mechanism refer to the optimization methodused at the server side to serve an on-demand request or arequest that is sent to the server for processing. Databroadcasting strategy relates to determining a method todisseminate the database item to mobile client so that theresponse time, tuning time and power utilization of retrievingdatabase items are minimized.

V. QUERY PROCESSING FOR MOBILE DEVICE

When locatinga mobile station that may hold the required data and when selecting information particularly for location dependent information services, the location of mobile units are an important parameter. Query processing for mobile devices classified generally into on demand, push based, hybrid data dissemination.

5.1 On-Demand Query:

User makes exclusively requests for data in on demand broadcast. If number of clients requests the same data at approximately the same time, the server may match these requests and only broadcast the data once. In on demand query data dissemination is only user oriented. The location dependent on demand query is different from continuous query. On demand query specified its database management does not manage the query but only the location of each mobile unit in specified areas.

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In on-demand broadcast, clients make explicit requests for data. If multiple clients request the same data at approximately the same time, the server may match these requests and only broadcast the data once. On-demand data dissemination is only user-oriented. It provides interactive capability to users for accessing the information through query. Users do not have to search in the wireless information space by tuning several channels. However, this approach has many disadvantages. First of all, it is resource intensive. Users require a separate channel to send requests to the server. The server, after receiving there quest, composes the result and sends it to the user on a backchannel (downstream) known to the user. Thus, every pull needs two channels for completing the process. Moreover, since incoming requests are usually not identical, the server cannot always efficiently group requests in order to exploit the advantages of broadcast. Obviously, this depends on the volume and the context of the incoming workload. To make things worse, client-server architectures are notoriously not scalable. When the number of incoming requests becomes too high, the server fails to keep up.

5.2 Push-Based:

In push-based systems, the server appoints point-to-multipointcommunication and sends dataitems in the absence ofexplicitclient requests. In order to achieve that, the server maintains abroadcast schedule, which determines the order and the frequency in which data items are broadcast.

Let the schedulerhandles three data items (A, B and C), out of which B and C arebroadcast with the same frequency and A twice more frequently,resulting in the transmission schedule: (A, B, A, C, A, B, A, C...). The major feature of such systems is capability. Clientpopulation does not influence the dissemination process because clients do not issue requests. The additions of new clients do notinfluence the server's incoming load or the client perceivedaccess time.In addition to that, clients need few resources such as airindexing enabling clients to efficiently locate data in thebroadcast channel. Moreover, data can be kept properly, sincethe server can simply broadcast any updates. The major problemof push-based systems is their lack of self-organizationandaddictiveness. Since the server does not receive explicit clientrequests, it remains unaware of possible changes in client. This incurs severalproblems. Bandwidth for instance, can be unnecessarily utilizedfor a relatively low number of end clients. Apart from that,thepush service requires more powerful hardware.

5.3 Hybrid data dissemination:

The hybrid data dissemination is a combination of on-demand and push based approaches. Dataitems are classified into hot Data item and cold data item. Hot data items are delivered through push-based channels,where as cold data items are disseminated through on-demand channels.The hybrid data dissemination requires proper documentclassification and bandwidth division for data dissemination.

These are interrelated issues, simply because a given bandwidth division determines the performance of a documentclassification choice and, conversely, a given documentclassification determines a bandwidth split that optimizesperformance. In turn, both document classification andbandwidth division depend on the popularity of data itemsbecause download latency is smaller when hot items areassigned to multicast push, cold items to uncast pull, and thebandwidth is divided appropriately between the two channels.

VI. CONCLUSION

Emerging technology of wireless trends enables people to conductactivities,business,and transactions anytime and anywhere without any attachment to stationary computer. Naïve users are now able to access email, news, weather, and query to the central database server using wireless devices. Mobile database focuses on the query issue that is the dominant operation in mobile computing. Since mobile database is a new dimension of database application, the type of query, query processing strategy, and communication technology that involves in the application are different than what applies in traditional databases. In this paper, Ianalyzed the issues of query selection, taxonomy and query processing strategies. We have defined query taxonomy as well as query processing strategy in mobile databases. Query in mobile databases are categorized into context-awareness query and ad-hoc query. Context-awareness query is further classified into location dependent, context dependent, and hybrid query. Query processing in mobile databases includes mobile client, on air, and server strategy. Mobile client and on air strategy corresponds to caching strategy and broadcast strategy respectively. This work is presented query broadcast management schemes to optimize and minimize the query access time of mobile clients when retrieving broadcast database items.

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Association of MyCoFlora with Soybean Seed Their Significance and Management

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ABSTRACT

Seed mycoflora of Soyabean *(Glycine max* L.) seeds were examined in agar plate, blotter method and found the association of fungi *i.e., Aspergillus niger, Aspergillus flavus, Fusarium oxysporum, Fusarium moniliforme, Macrophomina phaseolina,Sclerotium rolfsii* and *Alternaria alternata.* Seed mycoflora and their culture filtrate caused considered reduction in seed germination and seedling growth. Effect of fungicides, bio-agents and Phyto-extracts on seed mycoflora, germination and vigour index of Soyabean was also evaluated. Seed treatments improved seed germination, vigour index and reduced seed borne mycoflora.

Keywords: Soybean, seed mycoflora, seed germination, vigor index.

I. INTRODUCTION

Soybean (Glycine max L) is native of eastern asia. Soybean belongs to the family Fabaceae. It contains 40-44% protein, 20% oil, 8.77% fats and 5.6% fibers. It is also rich in both major and minor minerals.

Major fungal diseases of Soybean (Glycine max L) include Leaf spot, Blight, seedling rot, collar rot, charcoal rot, downy mildew (Mukharjee et.al. 1986). Studies on the mycoflora associated with soya bean seeds and their significance have been made by different researchers and they revealed that more than hundred pathogens were known to affect the Soyabean crop(Sinclair, 1982). The fungal pathogens associated with seeds are responsible for several undesirable changes, making them unfit for human consumption as well as sowing (Patil et.al. 2012).The continuous use of chemicals to control diseases results in accumulation of harmful residues of chemicals in the soil, water and seed.

Thus, in recent years, considerable success has been achieved byintroducing antagonists to control seed borne fungalpathogens. A notable work has been done formanagement of seedling diseases of many cropscaused by Rhizoctonia solani and Sclerotium rolfsiiboth in vitro and in pot culture experiments by usingTrichoderma (Akhter 1999, Pradeep et al. 2000,Raihan et al. 2003, Haider 2005).Plant extracts also show antifungalactivity against wide range of fungi (Abd-Allaet.al 2001).Present investigation wasundertaken to find out the fungi associated withthe seeds of Soybean, and effect offungicides, bio-agents and plant-extracts onseed mycoflora, seed germination, seedlinglength and vigor index.

II. MATERIALS AND METHODS

Collection of seed samples: (Source of cultivars)

Seeds of Soybean (Glycine max L)-Cv. PK-472, Cv. MAUS-30, Cv. MAUS-38.were obtained from the pulses Researchstation, Marathwada Agricultural University,Badnapur, Jalna, Maharashtra, local farmers,local dealer, etc. The seeds were stored at22°C in cloth bags and used whenever

Plating of the seed component

Standard blotter paper method and Agar plate method as described by the International Seed Testing Association (ISTA 1996), was used for the isolation of the seed-borne fungi associated with the Soybean seed samples.

Standard blotter test:

Seeds were equidistantly spaced on moist sterile blotters in Petri plate moist chambers.10 Petri plates of 9" diameter each containing 10 seeds were incubated at 27+2°C for eight days. Observations were made for fungi appearing on seeds every 24 hours and growth was carefully transferred to PDA slants for further studies.

Agar plating:

Seeds were equidistantly plated on GNA plates aseptically. Colonies which developed during three days were picked up and maintained on PDA/GNA slants. Untreated seeds disinfected externally by treating with10% sodium hypochlorite solution for 10 minutes were used for internally seed mycoflora.

Seed treatments Treatment with fungicides

Seven chemical fungicides used for seed treatment in different concentration viz; mancozeb 75% WP, carbendazim 50% WP, metalaxyl 8% + mancozeb 64%, pyraclostrobin 5% + metiram 55%, carbendazim 12% + mancozeb 63%, carboxin 75% WP & chlorothalonil 75% WP were evaluated to check their efficacy on germination and vigour index of seeds inoculated with isolated fungi. These treated seeds were evaluated by paper towel method(Khare, M.N.1996)and incubated at 27 ± 2 0 C for 7 days. After end of incubation period observations were recorded as number of germinated seeds, shoot length and root length to calculating vigour index and germination percentage.

Treatment with Antagonists and Phyto-extracts as bio-priming

Bio-priming was done to study the effect of different bio-agents viz; Trichoderma viride @ 0.4%, Trichoderma harzianum @ 0.4%, Pseudomonas fluorescens @ 5.0 ml, and phyto-extracts viz; Cumin seed extract @ 0.2%, Neem seed extract @ 1.0% & Garlic clove extract @ 1.0% used in different concentration on germination and seedling vigour. Seeds of pigeon pea were soaked in spore suspension of each of the bio-agents and phytoextracts for 24 hours. 2% sugar solution was added into the suspension as sticky material and to provide nutrition to bio-agents which were used for inoculation. Concentration of each bio-agent was adjusted at 107 - 108 cfu/ml with the help hemocytometer and serial dilution technique. Then, effect of respective bio-agents and phyto-extracts were evaluated by Paper towel method (Khare, M.N.1996). Seeds soaked in sterilized distilled water served as control treatment.

Identification of Fungi:

The various fungi were identified to their generic and specific taxon on the basis of gross colonial and microscopic morphology as per the Key given in "Pictorial atlas of soil and seed fungi: morphologies of cultured fungi and Key to species" (Tsuneo Watanabe, 2002). The fungi were identified on the basis of the shape, measurement and size of the conidiophores, sporangiophores, vesicles, sterigmata, conidia, hyphae, conidial head morphology by using binocular microscope (LABO Bioplan XL). Morphological studies were usually made from the material mounted on slides in lacto phenol and cotton blue. Certain fungi, however particularly those imperfect species which from chains of spores that were easily displaced. Such imperfect fungi were studied without disrupting their growth pattern.

III. RESULTS AND DISCUSSION

Eight fungi belonging to six genera were isolatedby standard blotter paper and agar plate method. Those were Alternaria alternata,Fusarium oxysporum, Fusarium moniliforme, Sclerotium rolfsii, Curvularia lunata, Macrophomina phaseolina, Aspergillus niger and Aspergillus flavus.

Effect of seed infecting fungi on seed health status

Assessment by artificially Inoculation of pigeon pea seeds with fungi significantly reduced seed germination,shoot and root length, and thereby seedling vigour index (Table 1). Seeds inoculated withFusarium oxysporumshowed lowest seed germination (56%) which was at par with Fusarium moniliforme(58%) as earlier reported. All treatments resulted in reduced shoot length, root length and seedling vigor index. Fusarium oxysporumrecorded minimum shoot length (4.00 cm), root length (5.25 cm) and seedling vigor index (518.20). Treatment with Aspergillus flavus, Fusarium oxysporum, Fusarium moniliforme, Alternaria alternata, Sclerotium rolfsii, Curvularia lunata and Macrophomina phaseolina. recorded similarly.

Effect of culture filtrate of isolated seed infecting fungi on seed health

Seeds treated with culture filtrates of Aspergillus niger, A. flavus, Fusarium oxysporum, F. moniliforme, Alternaria alternata, Sclerotium rolfsii., Curvularia lunata and Macrophomina phaseolina recorded 43, 45, 54, 58,62, 66, 69, 73and 78 % germination,respectively (Table, 2). Aspergillus niger recorded minimum shoot length (3.30 cm), root length (4.70 cm) and seedling vigour index (344.20) which wasat par with Aspergillus flavus 3.45 cm, 4.83 cm and 372.72, respectively. Similarly, Fusarium oxysporum, Fusarium moniliforme, Alternaria alternata, Sclerotium rolfsii,Curvularia lunata and Macrophomina phaseolina, also recorded less shoot length, root length and seedling vigor index. Incomparison, significantly highest seed germination (96.00%), shoot length (8.15 cm), root length (12.80 cm) and seedling vigor index(2011.00) were obtained in healthy seeds(Lokesh, M.S. et.al 1992).

Management Effect of seed treatment with fungicides on soybean seed

Data presented in the (Table 3) revealed significant effect of all fungicides on seed germination, shoot length, root length and seedling vigour index. Seed treated with metalaxyl 8% + mancozeb 64% recorded highest seed germination (93.33%) which was at par with carbendazim 12% + mancozeb 63% (92.00%) and pyraclostrobin 5% + mitiram 55% (90.67%). Whereas, mancozeb 75% WP, carbendazim 50% WP, carboxin 75% WP and chlorothalonil 75% WP recorded 84.00, 74.67, 80.00 and 77.33 per cent seed germination, respectively.

Significantly maximum shoot length (11.23 cm) was observed in seed treated with metalaxyl 8% + mancozeb 64% which was at par with carbendazim 12% + mancozeb 63% (11.07 cm). Seeds treated with mancozeb 75% WP (9.20 cm), carbendazim 50% WP (8.30 cm), pyraclostrobin 5% + metiram 55% (9.93 cm), carboxin 75% WP (8.13 cm) and chlorothalonil 75% WP (7.73 cm) also increased shoot length over control. Significantly maximum root length (13.67 cm) was observed in metalaxyl 8% + mancozeb 64% which was at par with pyraclostrobin 5% + mitiram 55% (13.50 cm). Seeds treated with mancozeb 75% WP (11.87 cm), carbendazim 50% WP (10.57 cm), carbendazim 12% + mancozeb 63% (12.87 cm), carboxin 75% WP (9.45 cm) and chlorothalonil 75% WP (9.17 cm) alsoincreased root length over control.

Different bio-agents and phyto-extracts were tested to check their effect on seed germination and seedling health of pigeon pea seeds inoculated with mixture of all isolated fungi. Data presented in the (Table 4) revealed significant effect of all bio-agents and phyto-extracts on seed germination shoot length, root length and seedling vigour index. Seed treated with Trichoderma viride recorded highest seed germination (88.00%) which was at par with Trichoderma harzianum (85.33%). Whereas, in Pseudomonas fluorescens, Neem seed extract, Garlic clove extract and Cumin seed extract recorded 77.33, 73.33, 78.67, 74.67 and 72.00 per cent seed germination, respectively. The results in terms of shoot and root length with seedling vigour index, all the treatments showed larger shoot length, root length and seedling vigour index as compared to control.

IV. CONCLUSION

Results of this work show that the three varieties of soybean seeds studied are infected are Alternaria alternata,Fusarium oxysporum, Fusarium moniliforme, Sclerotium rolfsiiCurvularia lunata, Macrophomina phaseolina. and saprophytic fungi are Aspergillus flavus, Aspergillus niger. The higher seed germination, seedling dry weight, vigour index and lower seed infection are found in fungicides than in bioagent and phyto extracts. From the above discussion it is clearthat the studies on seed mycoflora of food cropslike Soybean is an important aspect of the plantprotection because without seed health tests wecannot touch the target of food security as thehealthy seeds are the pre-required of the healthyagriculture.

Table 1. Effect of seed inoculation with different fungi on seed germination, shoot length, root length and seedling vigour index in pigeonpea.

Fungi	Seed Germination	Decrease in seed germination over healthy seed	Shoot length (cm)	Decrease in shoot length over healthy seed	Root length (cm)	Decrease in Root length over healthy seed	SVI
Alternaria alternata	76.00	21.65	7.68	18.98	9.78	26.63	1326.30
Fusarium oxysporum	54.00	43.75	4.73	41.96	5.83	54.45	569.70
Fusarium moniliforme	58.00	39.58	5.60	31.28	7.10	44.53	736.90

Sclerotium rolfsii,	69.00	28.12	6.68	18.03	9.65	24.60	1127.10
Curvularia lunata	73.00	73.00	23.96	6.20	23.92	9.15	1121.10
Macrophomina phaseolina	78.00	18.75	7.03	13.74	10.33	19.29	1352.90
Aspergillus niger	43.00	55.20	3.30	59.50	4.70	63.28	344.2
Aspergillus flavus	45.00	53.12	3.45	57.67	4.83	62.27	372.72
Control (Healthy seed)	96.00	-	8.15	-	12.80	-	2011.00

Table 2. Effect of culture filtrate of isolated seed infecting fungi on seed germination, shoot length, and root length.

Fungi	Seed Germination	Decrease in seed germination over healthy seed	Shoot length (cm)	Decrease in shoot length over healthy seed	Root length (cm)	Decrease in Root length over healthy seed	SVI
Alternaria alternata	66.00	31.25	5.80	28.83	8.73	31.79	958.50
Fusarium oxysporum	54.00	43.75	4.73	41.96	5.83	54.45	569.70
Fusarium moniliforme	58.00	39.58	5.60	31.28	7.10	44.53	736.90
Sclerotium rolfsii	62.00	35.42	5.30	34.96	6.48	49.37	729.90
Curvularia lunata	69.00	28.12	6.68	18.03	9.65	24.60	1127.10
Macrophomina phaseolina	73.00	23.96	6.20	23.92	9.15	28.51	1121.10
Aspergillus niger	43.00	55.20	3.30	59.50	4.70	63.28	344.20
Aspergillus flavus	43.00	55.20	3.30	59.50	4.70	63.28	344.20
Control (Healthy seed)	96.00	-	8.15	-	12.80	-	2011.00

Table 3. Effect of seed treatment with fungicides on soybean seed germination, shoot length, root length and seedling vigour index in vitro.

Treatment	Conc.	Seed Germination	Decrease in seed germination over healthy seed	Shoot length (cm)	Decrease in shoot length over healthy seed	Root length (cm)	Decrease in Root length over healthy seed	SVI
Mancozeb 75% WP,	0.3%	84.00	57.51	9.20	48.39	11.87	61.93	1769.20
Carbendazim 50% WP	0.1%	74.67	40.01	8.30	33.87	10.57	44.20	1409.20
Metalaxyl 8% + Mancozeb 64%,	0.2%	93.33	75.00	11.23	81.12	13.67	86.49	2323.73
Pyraclostrobin 5% + Metiram 55%,	0.2%	90.67	70.02	9.93	60.16	13.50	84.17	2124.53
Carbendazim 12% + Mancozeb 63%,	0.2%	92.00	72.51	11.07	78.55	12.87	75.57	2201.07
Carboxin 75% WP	0.3%	80.00	50.00	8.13	31.13	9.45	28.92	1406.36
Chlorothalonil 75% WP	0.3%	77.33	45.00	7.73	24.68	9.17	25.10	1306.80
Control	-	53.33	-	6.20	-	7.33	-	721.07
CD 0.05%		3.71		0.19		0.20		65.24

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Extraction of Phytochemicals and Study of Their Antimicrobial and Antioxidant Activities of Leaves of Spilanthes Acmella L

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ABSTRACT

The pharmacological activities of any plant is because of the presence of primary metabolites, secondary metabolites. Spilanthes acmella could also be an important medicinal plant commonly mentioned as akarkara plant with rich source of therapeutic constituents. By chewing the leaves or flowers, it produces a numbing effect to the tongue and gums so it's called as toothache plant. In soxhlet extraction technique Extraction solvents was heated in the bottom flask, vaporizes into the sample thimble, condenses in the condenser and drip back. When the liquid content reaches the siphon arm, the liquid contents emptied into the bottom flask again and the process is continued. Gram positive bacteria Staphylococcus aureus NCIM 2079, Gram negative bacteria Escherichia coli NCIM 2109, Fungi (Yeast) Candida albicans NCIM 3471, Fungi (Mould) Aspergillus niger NCIM 545 are used as reference Strain for antimicrobial activity. Antioxidant activity was tested by DPPH method.

Extracts of leaves of Spilanthes acmella L. using Chloroform, ethyl acetate and methanol solvents exhibited potent antimicrobial activity against Escherichia coli, Staphylococcus aureus, Candida albicans and Aspergillus niger. The Chloroform extract showed highest antimicrobial activity against Escherichia coli with zone of inhibition of 25.24mm and 10.54 against Staphylococcus aureus. Potent activity against Aspergillus niger with zone of inhibition of 19.12 mm. Antioxidant activity was tested by DPPH method. The use of herbal crude drugs, in tracts and their remedies have significantly increased throughout the world. Phytochemical extraction by Soxhlet apparatus is very effective time saving and solvent saving Technique. The scientific and authentic researches can be done in order to exploit traditional knowledge of medicinal plants.

Keywords: Phytochemicals, Spilanthes acmella L., hot extraction, Soxhlet, Chloroform extract, antimicrobial, antioxidant activity, etc.

I. INTRODUCTION

Herbs have provided some of the important life savings drugs used in armamentarium of modern medicine. Among the estimated 4,00,000 plants species, only 6% have been studied for biological activity and about 15%

have been investigated phytochemically[1]. Although there is great advancement in medical science, plants are considered as important contributors in health care [2]. According to World Health Organization about 80% of population relies on traditional medicines for their primary health needs [3]. Plants have ability to synthesize secondary metabolites. These synthesized metabolites are aromatic substances, used by plants as defensive molecules against predation by microorganism, insects and other herbivores [4]. However, these defensive molecules give plants their medicinal value which is appreciated by human being.

According to WHO 11% of the basic and essential drugs are obtained from plant and number of synthetic drugs are also obtained from natural precursors. Phytochemicals possess antioxidants [5], antifungal [6], and antibacterial [7]. A huge number of plants are used as remedy against several ailments by tribal communities. Besides, the origin of most of the drugs available now a days, are from medicinal plants. Research on medicinal plants is increasing day by day due to high cost and possible side effects associated with the use of modern drugs. Treatment of ailments using medicinal plants is often cheaper and in almost all cases it lacks side effects[8]. It is very important to search for effective but of low cost and reliable traditional therapeutic agents, hence also the abuse of drugs for ailment is in high increase which motivated drug resistant organisms. This work is aimed at studying *Spilanthes acmella* L.

Introduction of *Spilanthes acmella* L.:

Spilanthes acmella L., an ayurvedic herb, is distributed widely in forest throughout India. *Spilanthes acmella* could also be an important medicinal plant commonly mentioned as akarkara plant with richsource of therapeutic constituents. By chewing the leaves or flowers, it produces a numbing effect to the toung and gums so it's called as toothache plant. Flower heads and roots are utilized in treatment of scabies, psoriasis, scurvy, and toothache, infection of gums and throats and paralysis of tongue [8, 9]. The plant has been used as anti-inflammatory and analgesic, anesthetic and antipyretic, bio-insecticides and as remedy for rheumatism, and infection of gums and as immunostimulant [10]. The flower heads are chewed to alleviate the toothache and other mouth related troubles. Leaves are

used externally in treatment of skin diseases. Root decoction is used as purgative.

Leaf decoction is used as diuretic and lithotriptic. Whole plant is used in treatment of dysentery [11].

Previous work on *Spilanthes acmella* L.:

Preliminanary studies have reported as diuretic17, antiinflammatory and analgesic18, vasorelaxant and antioxidant19. There shortly more data was found on its leaf and root phytochemical analysis [12]. In phytochemical investigations of the genus Spilanthes, Acmella ciliata, one of the closely related species to Spilanthes, was found to contain 20 amides [13].

II. METHODS AND MATERIAL

Sample Species Collection:

The sample Species were collected from Satpura ranges in Dhule Disrict. The collected sample species were observed and identified by taxonomist, as *Spilanthes acmella* L. Healthy plants were washed to remove clay, leaves were separated, and then separated dried leaves were crushed and ground to powder [22]. This powdered sample was used for next extraction.

Extraction:

Extraction is the basic step to separate the desired natural phytoconstituents from the plant material. The precise mode of extraction depends on texture and water content of plant material being extracted and type of substance which is to be isolated. Crude extract was taken from Soxhlet apparatus using Chloroform, ethyl acetate and water as a solvent [20]. These solvents show good solubility for maximum organic compounds, and due to low boiling point it can be easily recovered.

Soxhlet extraction or hot continuous extraction:

In this method, powdered sample was placed in thimble chamber of the Soxhlet apparatus. The extraction solvent Chloroform was heated in the bottom flask, vaporizes into the sample thimble, condenses in the condenser and drip back. When the liquid content reached the siphon arm, the liquid contents emptied into the bottom flask again and the process was continued [22].

About 200g of dried sample powder was weighed and extraction process is carried out by using 250 ml of Chloroform in Soxhlet apparatus for 48 hours. The extract was concentrated by evaporation at 80^0C for 8 hours and then dried. The concentrated extract was made in Gel form and stored at room temperature prior to phytochemical screening [19, 20].

Phytochemical screening

Preliminary Screening of secondary metabolites:

1. Saponin: 0.5g Extract was mixed with 5ml of distilled water and shaken vigorously for a stable persistent froth.

2. Steroids: 2ml of acetic acid added to 0.5g extract with the addition chloroform, heated, with the addition of 2ml H_2SO_4. The colour changes to orange indicates presence of steroids [16].

3. Flavanoids: 0.5g Extract was shaken with 1 ml of dilute ammonia solution. A yellow color indicates the presence of Flavanoids [19].

4. Tannins: 0.5g Exctract was boiled in 20ml of water in a test tube and then filtered. Few drops of 0.1% ferric chloride solution was added and brownish green or blue black colour indicated its presence [18].

5. Cardiac glycosides: 0.5g Extracts was treated with 2ml of glacial acetic acid containing a drop of ferric chloride solution. Then 1ml of concentrated H_2SO_4 was added. A brown ring of the interface indicates a deoxy-sugar characteristic of cardenolides. A violet ring may appear below the brown ring, while in the acetic acid layer, a greenish ring may form just gradually throughout thin layer, indicates the presence of cardiac glycosides [17].

6. Free Alkaloids: 0.5g extract was dissolved in 1.5 ml of 2% HCL and treated with two drops of Mayer's reagent. Turbidity and formation of creamy white precipitate was regarded as evidence for the presence of free alkaloids in the extract [19]

7. Alkaloids salts: The 0.5g aqueous extract of each organs of the plant (25ml) was stirred with 15ml of 10% HCl on a steam bath for 30 minutes. The mixture was extracted three times with dimethyl ether. 1 ml of the aqueous layer was treated with two drops of Wagner's reagent. Formation of brownish precipitate was regarded as evidence for the presence of salts alkaloids in the extract [18].

8.Terpenoides: The presence of Terpenoides was determined as described for steroids except that red, pink or violet colour indicates the presence of Terpenoides.

9. Salkowskitest: 0.5g of extract was mixed in 2 ml of chloroform,   and concentrated H_2SO_4 (3ml) was carefully added to form a layer. A reddish brown coloration of the interface was formed to show positive results for the presence of Terpenoides.

10. Anthracenosides: To 0.5g extract was added 15 ml of 10% HCl. The mixture was refluxed for 30 minutes. After cooling, the mixture is extracted three with 15 ml of diethyl extract. After evaporation of 8 ml of etheric layer, the residue was treated with 2 ml of hot water and some drops of 10% NH_4OH. Appearance of red orange colour revealed the presence of anthracenosides [17]

Material and method for antimicrobial study

Gram positive bacteria *Staphylococcus aureus* NCIM 2079, Gram negative bacteria *Escherichia coli* NCIM 2109, Fungi (Yeast) *Candida albicans* NCIM *3471*, Fungi (Mould) *Aspergillus niger* NCIM *545* are used as reference Strain.

Concentration used for anti microbial tests:

Stock solution [1000 microgram per ml] of each compound was prepared in Dimethylsulfoxide (100 % DMSO). Assay carried out by taking concentration 100 microgram per disk. Hi-media antibiotics disk: Chloramphenicol (10 microgram/disk, Amphotericin-B (100 units/disk) moistened with DMSO are used as standard [24,25].

Media used

Microbiological media used for bacteria (*Staphylococcus aureus, and Escherichia coli)* is **Nutrient agar** (Himedia)

Composition (gL-1): Sodium chloride, 5.0; Beef extract 10.0; Peptone 10.0 (pH 7.2)

Microbiological media for fungi (*Aspergillusniger*) is **Potato dextrose agar** (Hi-media)

Composition (gL-1): Potatoes infusion, 200.0; Dextrose 20.0 (pH 5.2)

Microbiological media for yeast (*Candida albicans*) is **MGYP** (all ingredients of Hi media)

Composition (gL-1): Malt extract, 3.0; Glucose, 10.0; Yeast extract, 3.0; Peptone, 5.0 (pH6.4) [24, 25]

Antioxidant activity:

DPPH radical scavenging assay

DPPH radical scavenging activity was done using the reaction mixture containing 1 ml of DPPH solution (2.0 mm /L, in 95% methanol v/v) with 3 ml extract was shaken and incubated for 30 min at room temperature in dark. After the incubation absorbance was read at 517 nm against a blank. The radical scavenging activity was measured as a decrease in the absorbance of DPPH in triplicates and calculated using the following equation [25, 27]:

$$Effect\ of scavanging(\%) = \left[\frac{1 - A\ sample}{Acontrol}\right] \times 100$$

Effect of scavenging(%) =[(1-A sample)/Acontrol] ×100

III. RESULTS AND DISCUSSION

The results Phytochemical Screening are mentioned in table no. 1

Table1: Phytochemical Screening of extracts of Leaves of *Spilanthes acmella* L. [4].

Test	Chloroform extract	Ethyl acatate extract	Methanol extract
Alkaloid	+	+	+

Steroid	-	-	+
Terpenoid	-	+	+
Flavanoids	+	+	+
Polyphenols	-	-	-
Tannins	-	-	-
Cardiac glycosides	-	+	-
Saponins	-	+	+

+ = Presence, - = absence

The results obtained for antimicrobial activity are presented in table no. 2 and figure no. 1 as below.

Table 2: An antimicrobial activity (diameter in mm) of Chloroform extract of parts of *Spilanthes acmella* L. [19].

Extract in different solvents	Bacteria		Fungi	
	E. coli	S. aureus	C. albicans	A. niger
Chloroform	25.24	10.54	-	-
Ethyl acatate	11.24	-	11.24	-
Methanol	13.00	-	-	19.12
C	30.32	29.82	-	-
A	-	-	18.55	18.13

E. coli = Escherichia coli, S. aureus = Staphylococcus aureus, C. albicans = Candida albicans, A. niger = Aspergillus niger, C = Chloramphenicol (Standard antibacterial), A = Amphotericin B (Standard antifungal)
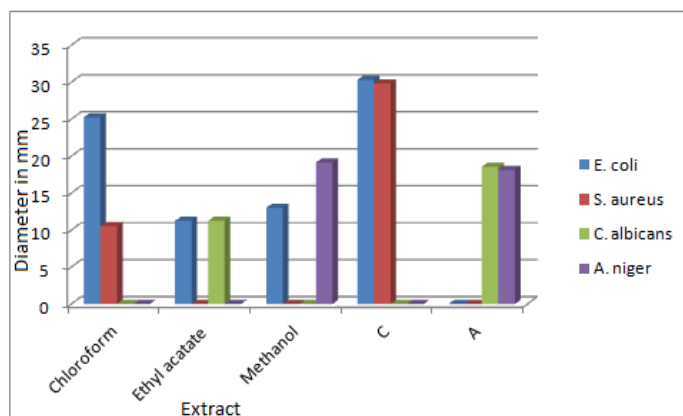
Fig. no. 1 An antimicrobial activity (diameter in mm) of Leaves extracts of *Spilanthes acmella* L. [24].

The results of antioxidant study were obtained in terms of percent scavenging activity. The percent scavenging activity for each extract is shown in table no. 3 and figure no. 2 as below.

Table 3: %Antioxidant activity of leaves extracts by DPPH method [26, 27].

Extract	Concentration		
	200µg/ml	400µg/ml	600µg/ml
Chloroform	30.09%	43.96%	67.82%
Ethyl acetate	80.02%	91.81%	97.08%
Methanol	100.13%	100.55%	101.24%
Ascorbic acid	81.27%	83.49%	96.67%
Control	00	00	00
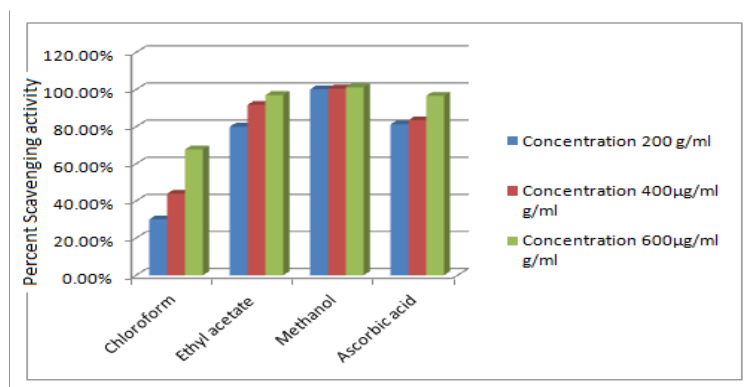
Fig no. 2 %Antioxidant activity of leaves extracts by DPPH method [28].

Discussion:

In our study phytochemical screening of leaves of *Spilanthes acmella* L. using chloroform, ethyl acetate and methanol as a solvent was carried out. Results obtained as shown in Table no. 1. Secondary metabolites of plant are mainly responsible for different pharmaco-logical properties and their therapeutic benefits [29]. Extracts of leaves in different solvents were tested against the pathogenic bacteria and fungi. Antioxidants have inhibitory capacity to oxidative stress induce cellu-lar damage and their main mechanism underlying this property is to scavenge free radicals due to their redox capacity [30,31]. In present work, we observed that the investigated leaves extracts of *Spilanthes acmella* L. possess good DPPH free radical scavenging potential. Chloroform extracts shows presence of alkaloids and flavanoids. Observed results of microbial activity as inhibitory zone formation are shown in table no. 2 and also clarified by Figure no. 1. The results obtained in antioxidant activity as % scavenging activity as shown in table no. 3 and clarified in figure no. 2. Alkaloids and flavanoids present in choloform extract shows activity against bacteria *Escherichia coli* with forming diameter of 25.24 mm and *Staphylococcus aureus* with forming diameter of 10.54mm. Alkaloids and flavanoids present in Choloform extract shows 30.09%, 43.96%, and 67.82% scavenging activity at 200 μg/ml, 400 μg/ml and 600 μg/ml. Ethyl acetate extract shows presence of alkaloids, terpenoides, flavanoid, cardiac glycosides and saponins shows activity against bacteria *Escherichia coli* with forming diameter of 11.24 mm and fungi *Candida albicans* with forming diameter of 11.24 mm. These secondary metabolites shown 80.02%, 91.81%, and 97.08% scavenging activity at200 μg/ml, 400 μg/ml and 600 μg/ml respectively. Methanol extract shows presence of alkaloids, steroids, terpenoides, flavanoid, and saponins. Alkaloids and other secondary metabolites present in leaves extract shows activity against bacteria *Escherichia coli* with forming diameter of 13.00mm and *Aspergillus niger* with forming diameter of 19.12mm. This is more potent antifungal activitis than standard (Amphotericin B). These secondary metabolites show 100.13%, 100.55%, and 101.24% scavenging activity. These free radical scavanging activities are more potent than standard used. The leaves extracts of different solvents can be considered as good source of anti bacterial, antifungal and anti oxidant agent due to presence of alkaloids, terpenoides, steroids, cardiac glycoside and saponins. However further studies are suggested to isolate the individual components using chromatographic techniques and to study different antifungal and anti cancer activities[32].

IV. CONCLUSION

Phytochemical extraction by Soxhlet apparatus is very effective time saving and solvent saving Technique. Specific phytochemical can be extracted using solvents with varying polarities. With this work I want to

conclude that plants have lots of useful phytoconstituents that can be used as medicine[32]. Leaves extracts shows activity against bacteria and fungi *Escherichia coli*, *Staphylococcus aureus* and fungi *Candida albicans* and *Aspergillus niger*, it also shows scavenging activity at three concentrations 200 μg/ml, 400 μg/ml and 600 μg/ml. Further purification and characterization will definitely give the more efficient antimicrobial and antioxidant drug for mankind [32].

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Computer Science in Compulsory Education Curriculum

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ABSTRACT

Computers have become a part and parcel of life and with it we have seen various new applications of computers and developed a new field of science i.e. "Computer Science". Computer Science is not only a study of programming languages but it is also a study of design and use of computer for application of the theory from different fields. Artificial Intelligence, Virtual Reality, Big Data Analytics, Networking, etc. are a few prominent uses of Computer Science that are seen to be having immense potential for developments in future. Since there has been a major focus shift on technology, including Computer Science as a compulsory subject in the education curriculum is very important. Many education curriculum have been designed based on the present use of technology but are being offered as an optional subject, whereas Computer Science can no more be viewed as a secondary subject and should be a necessary qualification irrespective of the field of study a student chooses to pursue. This paper highlights the main reasons for the subject to be included as a compulsory education curriculum. Not only does the paper highlight the reasons but it also states the significance of Computer Science in the future.

I.   INTRODUCTION

Computers have evolved faster than any other innovation by humans and have managed to be an essential part of day to day lives of mankind [1]. The reason behind computers being the most favoured tool by humans is its time saving quality that enables organizations to interpret results from extensively large data [2]. Availability of large data due to the consistently increasing population has led to the development of a new field in science i.e., "Computer Science" [1]. Computer Science is one of the fastest growing and highest paying career paths in the world. However, it is being observed that there is a decreasing supply of teachers and students in Computer Science [2]. The reason behind the decrease in interest is directly related on how exposed the students are to information and technology, also whether the resources are made available to the students at early stages to develop an interest in the subject. Computer Science is a study of computers and computational systems [2]. Computer Scientists mostly deal with software and software systems; this also includes the theory, designing and application. Areas of study for computer sciences comprises of artificial intelligence, computer systems and networks ,database systems, numerical analysis, programming languages, bioinformatics, visual and graphical analysis, etc. Although knowing how to program is important to study computer science, it is only the basic step in studying the field and computer science is much more than only programming aspects [2].

This paper is not concerned with the influential development of computer science in human life, but it's primary concern is importance of computer science in the education curriculum and the need of the hour to make computer science compulsory in the education curriculum [1]. In this paper I would like to highlight the facts about computer sciences and make a rational argument about why computer science deserves a place in the compulsory education curriculum, and shall conclude with the impacts and benefits on the future research and development in this field [2].

Reasons for Computer Science to be an integral part of the Education Curriculum:

When it comes to computer science, it is not just a field with programming languages and algorithms based on computer skills. But it is a blend of 4 main fields: Science, Technology, Engineering and Mathematics which can combined be referred as STEM. The term "STEM" is used to address the education policy and curriculum choices in schools to improve knowledge and grasp of the new age science and technology [1]. One of the main reasons behind making computer science a compulsory subject along with STEM is that it will curb the problem of students skipping out on computer science as an elective subject and gain knowledge about the field from a younger age and get accustomed to the new programming languages, computer science will be treated as any other regular subject [2]. This will burst the bubble created around computer science; about it being a subject of only computer skills and nothing beyond it, students will be introduced to this subject at a very early stage which will result in more students choosing computer science as a career opportunity [1].

Regardless which career path a student chooses, students who have studied computer science have an extra edge over the other students who happen to be unaware of the subject or had skipped the elective subject in schools [2]. There are various job opportunities awaiting just for the students with a graduation degree and also have a deep understanding of computer science [1].

Computer science not only provides job opportunities but it also enhances student's logical thinking and reasoning abilities. Computer Science deals with a high intensity problem solving and so the subject will also develop new approaches of thinking and solving the problems [2]. Not only is it a claim , but it has been proved that students who have been exposed to programming languages at young ages have shown excellent development of critical thinking in the student[2]. Not only is computer science closely related to mathematics but it also deals with a high amount of statistics. The combined curriculum of computer science and statistics is being implemented in a few colleges in India, the subject is commonly known as "Informatics" [1].

There are various open sources of programming communities that have made significant progress in computer sciences, but one can only gain knowledge from these free sources if the person has the basic knowledge of programming [2]. By keeping computer science as an elective subject, the students who have skipped on the subject will unfortunately be locked in their own inability to learn new developments in the technology [1]. But if computer science was a compulsory subject in the education curriculum, at least any student who wishes to learn the advancements of science field through these open sources can do so on his/her own [2].

With the consistently increasing population, it is being difficult to handle the data without any help from computers; it has become an essential need for the world to have more programmers to handle such huge amounts of data [1]. The need for new programs is constantly increasing, though there are arguments being presented that Artificial Intelligence and Automation might decrease the need of programmers [2]. But I believe it won't affect the increasing need of programmers because of the systems of Artificial Intelligence and Automations will require continuous updates as we progress further, as the models built now do not cater the needs of future [1].

"Digital India" one of the many programs that have been launched in India is a move of our nation towards computer sciences and acceptance of the new technology over the old mainstream tedious work [1]. It is the need of an hour that people realize importance of computers and its advancements in the field of science to be significant. Businesses, Healthcare, Government Offices, etc are highly dependent on the computers and constantly updated software and programs [2].

Providing the students with the knowledge of computer sciences along with basic programming skills will give the student a chance to learn the subject at an early stage and they shall have more time on advancing and developing their skills sets when they wish to pursue a higher level degree in the subject. Implementing this will result in obtaining more skilled and efficient programmers [1].

Various subjects such as Mathematics, Statistics, etc have found their applications to be made only with the help of computer sciences and so it becomes much more important for a person with any specialized subject to have additional computer knowledge to maintain a balance with the technology [2].

Impacts and Benefits on future research and development:

Computer Science is a versatile field and it has surely become a need for many industries, also for the industries not directly linked with technology, Computer Science plays an important role[1]. A Computer Scientist can even make his own path as a career in business, medicine, agriculture, social-welfare, etc.

Looking at the present, the role technology plays in our lives we can definitely conclude that it will be an essential part of human growth in the future; this also means that the need for more talented computer scientists will never end. Not only is it a need of future but in present as well we do need some highly talented Computer Scientists. In addition, the increasing use of technology means more job opportunities for the students.

The imprints of computer science being essentially useful in development of a country are seen in the government policies as well, one such implementation of government policy is the introduction of "FASTag" in order to reduce the waiting time at toll plazas on national highways [3].

Finally, inevitably the upcoming era will be a digital era and to compete in this environment computer science plays a very important role. So it becomes highly important that the coming generations are introduced to this subject at early stages in order to make them ready for the digital era and to develop and advance as a nation as well.

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Drinking Water Quality Analysis of Water Samples Collected From Manora Region, Dist. Washim

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ABSTRACT

For the drinking water quality analysis, the samples were collected from the different regions of Manora which includes Tap water, Tub well, and Well water for observation of Physico-chemical analysis. The in-vitro test of the collected water samples was performed for analysis of different parameters such as water temperature, pH, dissolved oxygen, total dissolved solids, Conductance, Chlorides, and Phosphates. The obtained data were compared with the standard unit given by BIS. The results of this study tell that physico-chemical parameters are within maximum permissible limit of WHO and BIS. Therefore, water is safe and suitable for domestic and drinking purposes after some treatment.

Keywords: Physico-chemical analysis, Manora region & Drinking water standards.

I. INTRODUCTION

The quality of Drinking water plays a very important role because it is directly related to human health [1, 2]. Today, the quality of water which we drinking is getting affected by the different activates of a human being. The availability of drinking water through surface and groundwater resources has become a very critical day-to-day life. Only 1% part is available on the land for drinking, domestic, agriculture, power generation, for industries and waste disposal [3].

Water sources are polluted by domestic wastage in rural areas whereas industrial wastage discharges into natural water sources in urban areas. Industrialization without provision of proper treatment of wastage and effluents as well as excessive applications of fertilizers and pesticides for agriculture purposes [4]. Due to the use of contaminated drinking water, the human population suffers from varied of water borne diseases. The increased use of metal based fertilizer in the agricultural revolution of the government could rise in the concentration of metal pollutants in the freshwater reservoirs due to water runoff [5].

The WHO suggests that 75% of all diseases in developing countries occur from polluted drinking water [6]. As a result, concerns about water quality are frequently the most critical factor in determining access to better water sources. Acceptable quality shows the safety of drinking water in terms of its physical, chemical, and bacteriological parameters [7]. International National and local agencies have established parameters to determine the biological and physicochemical quality of drinking water [8, 9].

The present work was carried out in the Manora region to study the Drinking water quality. Manora is located in the Washim district of Maharashtra in the Amravati division. It is located between 20.2161°N & 77.5591oE coordinates.

II. METHODS AND MATERIAL

Water samples were collected in pre-cleaned polypropylene bottles with necessary precaution from different Loctions. Various physico-chemical parameters were analyses as given in standard manual of water and waste water analysis [10]. Selections of seven different stations were identified and water samples were collected at sites and assign as S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10.

The main aim of the study was to investigate the physico-chemical characteristics of drinking water samples in Manora Region. Samples were collected from the sites in between 09:00 a.m. to 10:00 a.m. The sample for dissolved oxygen analysis was collected gently just below the water surface in a BOD bottle (250 ml) to avoid any air bubbles entering the bottle. The parameters like temperature, pH, dissolved oxygen, total solids, Conductance are analysed by using water analysis kit [11,12], Hardness is analysed as Calcium EDTA titration, Chloride by titration and Phosphate is analyzed by Calorimeter.

The reagents employed in this study were of the A.R./G.R. grade, and distilled water was utilised to make the various solutions. All reagents and calorimetric solution were produced and purified using a standard procedure for water analysis.

III. RESULTS AND DISCUSSION

The values of physico-chemicals parameters of Manora region are given in Table 1.

Temperature

Water temperature is one of the most important ecological factor which controls the physiological behavior of aquatic systems and hence the quality of water. In the present investigation, the water temperature ranged between 230C to 280C. The highest temperature of 280C was obtained at Site S6.

pH

It is nothing but the measure of the concentration of hydrogen ions, which provides the range of the acidity or alkalinity of a solution. In this study the pH ranges 7.2 to 8.2.

Table 1: Values of physico-chemicals parameters of Manora region.

Location	Temp.	PH.	DO	EC	TDS	TH	Chloride	Phosphate
S1	25.3	7.5	6.6	0.4	450	321.5	52.4	0.673
S2	26.3	7.64	6.3	0.4	479	423.8	47.8	0.993
S3	25.4	7.32	5.6	0.5	570	256.2	60.3	0.865
S4	25.5	7.23	5.7	0.3	367	254.3	29.5	0.785
S5	23.6	8.25	7.9	0.3	283	364.5	43.6	0.918
S6	28.7	7.63	6.2	0.2	423	470.4	62.4	0.341
S7	25.5	7.21	7.3	0.4	630	260.6	56.9	0.092
S8	25.6	7.57	8.2	0.5	439	180.6	32.6	0.862
S9	24.5	8.15	7.8	0.3	520	210.3	29.8	0.093
S10	24.7	7.35	6.9	0.3	630	287.2	39.5	0.742

Dissolved Oxygen (DO)

It is the amount of gaseous oxygen (O_2) dissolved in the water. DO is very important parameter in concern with the water quality. It reflects the physical and biological present in the water. Oxygen enters the water by direct absorption from the atmosphere, by rapid movement, or as a waste product of plant photosynthesis. Water temperature and the volume of moving water can affect dissolved oxygen levels. Dissolved oxygen content indicates the health and ability of water body to purity itself through biochemical processes. During this study DO varies in the range of 5.6 to 8.2

Electrical Conductivity (EC)

EC is a measure of water's capability to pass electrical current. This ability is directly related to the concentration of ions in the water. The EC in present study for various samples is in the range of 0.3 to 0.5 M mhos.

Total dissolved soldis (TDS)

TDS refer to matter suspended and dissolved in water. Waters with high total solids generally are of poorer palatability and may induce an unfavorable physiological reaction in the transient consumer. In this study the TDS was found in the range of 367mg/L to 630 mg/L. The highest TDS was observed at site S7 & S10 which is 630 mg/L.

Total Hardness (TH)

The total Hardness of water is mainly due to the presence of Calcium and Magnesium ions which apart from Sulphate, Chloride and Nitrates are found in combination with carbonates and bicarbonates. In this study the total hardness were found to be 180.6 to 470.4 mg/L.

Chloride

The Chloride are found in partially in all natural waters. Chlorides are the most common inorganic ions present in the water. In this study the values for Chlorides are found in the range of 29.5 to 62.4 mg/L.

Phosphate

Phosphate leads to eutrophication which could also leads to unpleasant taste and odour of the water. The Phosphate content in the selected water sample were found in the range of 0.092 to 0.993 mg/L.

IV. CONCLUSION

By comparing the different values obtained in the present study with the permissible limits given by BIS and WHO, it can be conclude that most of the values are well within the permissible limits. The result of study reveals that the quality of drinking water is though fit for domestic as well as for drinking purpose after some treatment.

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Combustion Synthesis of Ce³⁺ Activated Blue-Emitting KBaPO₄ Phosphors

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ABSTRACT

Blue emitting KBaPO₄: Ce³⁺phosphors sample is prepared using combustion synthesis method. Spectroscopic properties of Ce³⁺ and integrate the Ce³⁺ ion with host inorganic material show interest for most of the applications in photoluminescence studies. Prepared sample of KBaPO₄: Ce³⁺carried out for emission and excitation spectra for photoluminescence measurement. XRD, morphology, absorption band and concentration of Ce³⁺ ion with emission intensity are reported in present work. Structural and morphological studies confirm phase and purity of prepared sample with crystalline in nature. PL spectra of Ce³⁺ due to the 4f–5d transition of Ce³⁺ ions peaking at 330 nm. Chromatic properties index with the help of the emission spectra with color coordinate of sample observed in blue region. The photoluminescence emission spectra of KBaPO₄: Ce³⁺phosphor exhibit blue emission band centered at 440 nm.

Keywords: - XRD, Photoluminescence, morphology, chromatic, stability temperature, emission and excitation spectra.

I. INTRODUCTION

Every day lighting requirements attract interest for Solid state lighting in ultraviolet light emitting diodes and their potential applications. Light-emitting diode based white light sources are low power consumption, high efficiency, longer lifetime, and mercury-free excitation [12, 13]. Numerous domains have various applications in novel and vacuum-ultraviolet phosphors [3]. Physical properties of Stoichiometric rare earth with aluminates based phosphors have great attraction in recent [4, 14].

White light emitting diodes are high efficiency, long lifetime, energy saving, and positive environmental effect for lighting sources and illumination [6-7]. White light emitting diodes have two important factor Quantum efficiency and color rendering index of phosphor [8]. Most of the inorganic luminescence materials have working applications in many devices which shows high stability, brightness, and flexible in industrial process for lighting and display devices [8]. Phosphors like BaAl₂O₄:Eu²⁺:Dy³⁺[9] and BaAl₂O₄:Tb³⁺[10] are prepared and studies for photoluminescence and high chemical stability. Blue luminescence [11] and green luminescence materials [8-6] based activated calcium aluminates are prepared by solid state method. The emission peak of sample NaLa(WO4)2:Ce3+ and LiLa(WO4)2:Ce3+ 378 and 425 nm (λexc = 350 nm) with Excitation wavelengths of Ce3+ and Dy3+ activated alkali lanthanide tungstates are in UV region which are report

applicable for solid state lighting [1]. KBaPO$_4$ powder doped with Sm^{3+},Eu^{3+},Dy^{3+} and synthesized for solid-state lighting show excitation and emission effectively[2] . A green phosphor light sample of KBaPO4:Tb3+ reported and synthesized by the higher temperature solid state technique which report emission peaks at 437, 490, 545, 586 and 622 nm which correspond to the 5D3→7F4 and 5D4→7FJ=6.5,4,3 transition of Tb3+ [15]. The present work report Ce^{3+} trivalent cerium ion used as different material in many appliances with luminescence and stability temperature in high energy research and medical imaging application. Blue emitting KBaPO$_4$: Ce^{3+} phosphors wet chemical method at 100^{0}c. KBaPO$_4$: Ce^{3+} sample are studies for photoluminescence measurement with analysis of emission and excitation spectra. Prepared sample show crystalline in nature. Absorption band are taken in range of 280 to 380 nm due to 4f – 5d transition. Luminescence property of prepared blue emitting phosphor sample concentration increases by adding trivalent cerium ion as a activator. Excitation and emission band spectra are observed at 330nm and 440 nm. Chromatic properties induced with the help of the emission spectra. Single host phosphor is blue emitting promising and mixed with other color emission to obtain white light emission diodes.

II. EXPERIMENTAL

KBaPO$_4$:Ce^{3+}phosphors sample were preparedby wet chemical method at temperature of 100^0 C by using oven. For sample preparation KNO3(99.99% purity Merck),Ba(NO$_3$)$_2$ (99.99% purity Merck), KPO$_4$ (99.99% purity Merck) and and Cerium Nitrate (Ce(NO$_3$)$_3$, REI 99.9 %) mixed with double distillation water. The prepared sample is studies for different concentration of Ce^{3+} (1-10 mol %). All compound and element are mixed in stoichiometric ratio in a beaker with double distillation water and stirrer in magnetic stirrer for 3-4 hours. Once the homogeneous mixture found its kept in oven at 100 ^{0}C for 24 hours to obtain pasty solution. Formed solution is then shifted to silica crucible and kept in a muffle furnace to formed fine powder. The temperature of muffle furnace is maintained at 100^{0}C. The prepared sample powder is then carried out for the analysis of emission and excitation spectra for photoluminescence measurement and XRD. Photoluminescence (PL) emission for excitation was measured in Shimadzu RF5301PC spectroflurophotometer.

III. RESULTS AND DISCUSSION

Fig.1 shows the XRD patterns of as prepared sample of KBaPO$_4$:Ce^{3+} lampphosphors. The XRD pattern of sample is crystalline in nature. XRD-pattern of KBaPO$_4$:Ce^{3+} lamp phosphors is found good agreement with JCPDS no. 84-1462. The XRD-patter shows phosphor have good crystalline nature. The combustion synthesized powders have a good crystalline nature.

Morphology study of the sample KBaPO$_4$:Ce^{3+} phosphorsis in figure 2. Combustion synthesized KBaPO$_4$:Ce^{3+}phosphor under few microns to sub few micron. It indicate that prepared sample are sharp shape surface morphology and have grains of crystalline nature. The grain size of crystallite is in the range of sub micrometer as shown in SEM images.
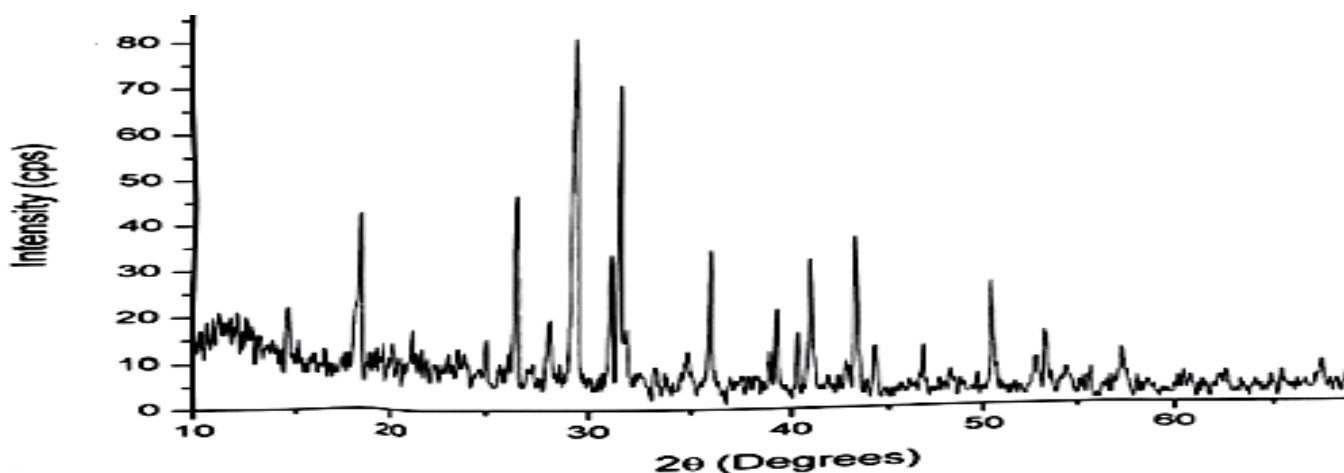
Fig.1 XRD-pattern of KBaPO₄:Ce³⁺ lamp phosphors.
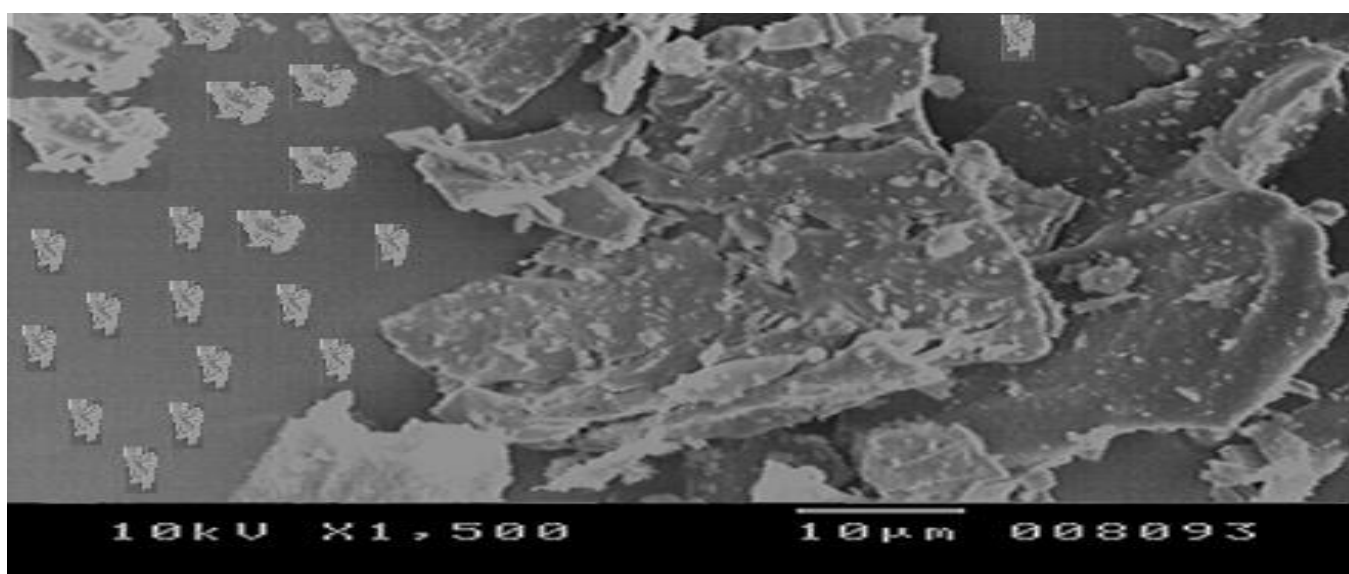
Fig.2 Morphology of the KBaPO₄:Ce³⁺ phosphors.

Figure 3 and 4 shows photoluminescence excitation and emission spectra of prepared sample KBaPO4:Ce3⁺ with wide absorption band in the range of 280 to 380 nm due 4f–5d transition of Ce³⁺ ions peak at 330 nm and exhibit blue emission band centered at 440 nm. The configuration of Ce³⁺ ion in ground state is divide into two levels $^2F_{5/2}$ and $^2F_{7/2}$ whereas the $5d^1$ excited configuration is divide by the crystal playing field ranging from 2 to 5 components. Emission spectra of the prepared samples shows broad blue emission band in the range of 400-650 nm peak at 441 nm. The excitation takes place at maximum ground level splitting to the 5d levels and emission developed from the excited level i.e. lowest level toward the two splitting ground levels state.
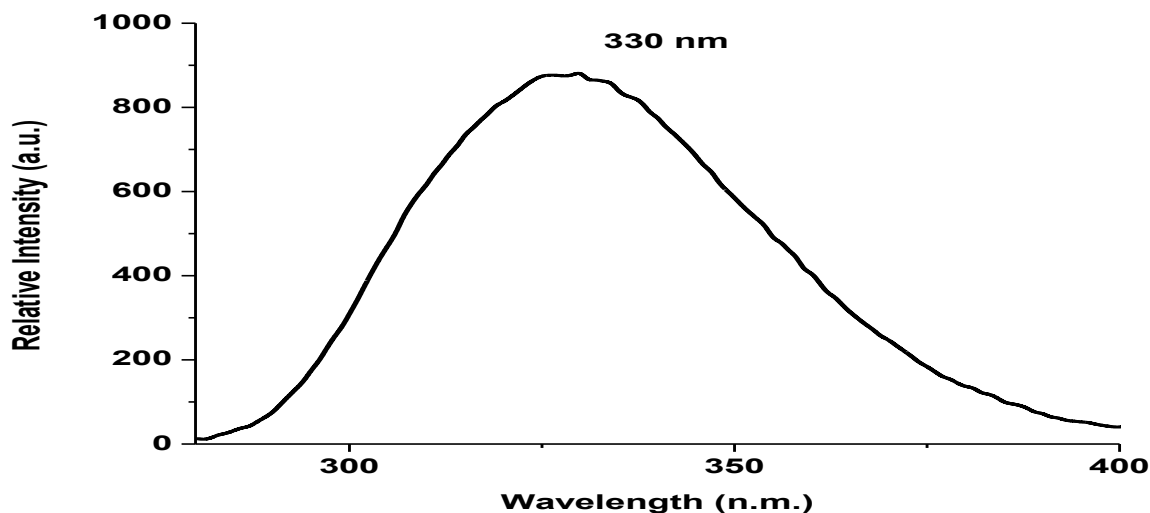
Fig.3 Excitation Spectra for KBaPO₄:Ce³⁺phosphors, λ_{em}= 440 nm.
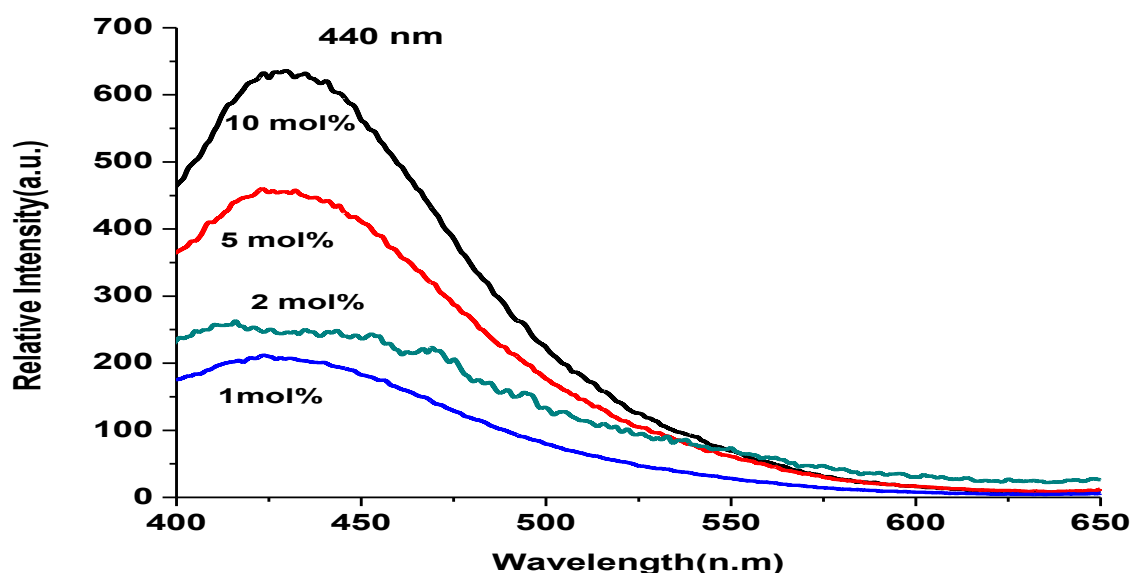
Fig. 4 Emission spectra for KBaPO₄:Ce³⁺ phosphor λ_{ex}=330 nm

The emission spectra is clearly shows no another emission band was observed in emission spectrum indicating that trivalent cerium ion occupies one category of sites in the host material. So KBaPO₄:Ce³⁺among blue emission is able to find potential applications as a blue emitting lamp phosphor. The sample compounds KBaPO₄:Ce³⁺was synthesized by modified combustion synthesis method with activated by alkaline earth Ce³⁺ ion in concentration from 1 to 10 mol %. Prepared sample KBaPO₄:Ce³⁺blue emittingphosphor gives in the emission spectra at 440 nm exhibit a blue shift moderately with commercial available phosphor.

Figure 5 shows relationship between Emission Intensity and Concentration of Ce³⁺ ion in KBaPO₄:Ce³⁺ phosphor. A series of KBaPO₄:Ce³⁺blue emitting phosphor with varying Ce³⁺ concentrations of 1 mol %. to 10 mol % was prepared. The effect of doped Ce³⁺ concentration on the emission intensity of KBaPO₄:Ce³⁺ phosphor is anaysis. For study of relationships between concentration of Ce³⁺ ion and emission intensity in KBaPO₄:Ce³⁺phosphor exactness is important. For every concentration as in sample graphical representation is shown. The concentration of Ce³⁺ does not transform and disturbed the emission spectrum only changes in the

intensity occur. At 2 mol. % concentrations of Ce³⁺ ion the peak for the luminescence spectra for the strong blue emission is obtained but the emission intensity is found weak. As concentration increases further the emission intensity increase with the concentration of Ce³⁺ ion. The maximum value of emission intensity is observer at concentration of 10 mol.% Ce³⁺ ion. The KBaPO₄:Ce³⁺blue emitting phosphor prepared is effectively excited by 330 nm suitable for lighting lamp phosphor. The strong emission in the blue region at 440 nm with observing maximum emission intensity is shown in figure. From the graphical representation emission lines spectrum intensities are improved. for 10 m% of trivalent cerium concentrations the emission intensity is observed to be 635.4033 nm and the smallest amount of intensity for emission spectra is found to 208.9125 nm for 1 m% of Ce³⁺ concentration. All the observed values are tabulated in table 1. Addition of trivalent cerium ion in to KBaPO₄:Ce³⁺host which improves the crystalline of prepared sample. As increases in the concentration of trivalent cerium ions which increases the size of particles shows increases in intensity of photoluminescence.

S.N.	Conc. of Ce³⁺in KBaPO₄:Ce³⁺ phosphor	Emission intensity (a.u.)
1	1 mol%	208.9125
2	2 mol%	251.2584
3	5 mol%	414.01
4	10 mol%	635.4033

Table1. Emission intensities w.r.to conc. of Ce³⁺ in KBaPO₄:Ce³⁺ Blue emitting Phosphor
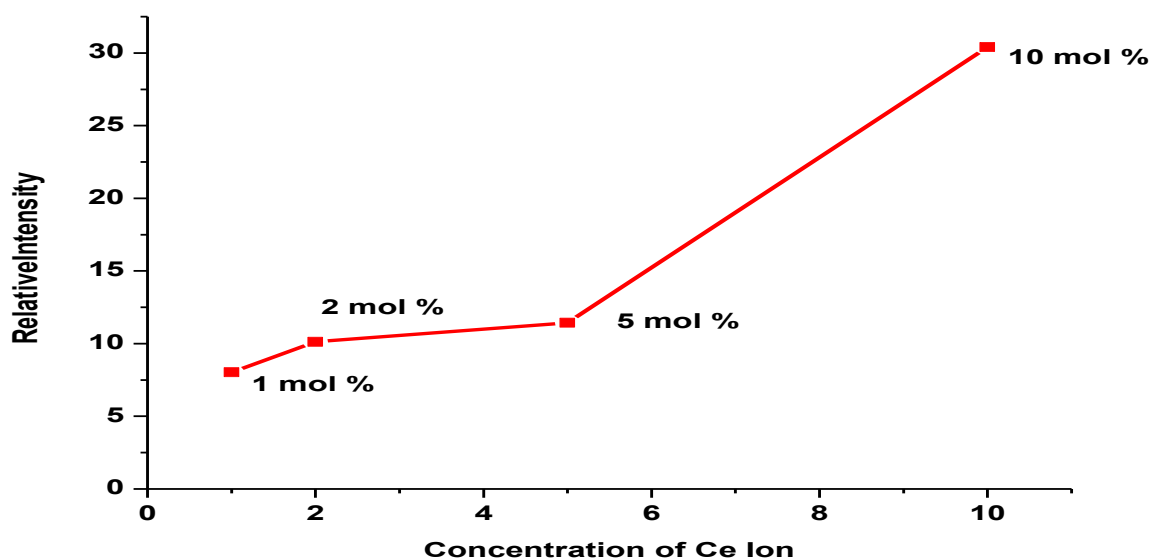
Fig. 5 Effect of conc. of dopant Ce³⁺ on emission intensity of KBaPO₄:Ce³⁺ Phosphor

Figure 6 shows CIE chromatic diagram for KBaPO₄:Ce³⁺ phosphor. The emission spectrum of Ce³⁺ was consider in blue regionfor further study and characterization the luminescent properties of KBaPO₄:Ce³⁺blue emitting phosphors for achieve the complete emission of color. The coordinate prepared sample are been determine for chromaticity indexed with the help of the emission spectra of Ce³⁺.
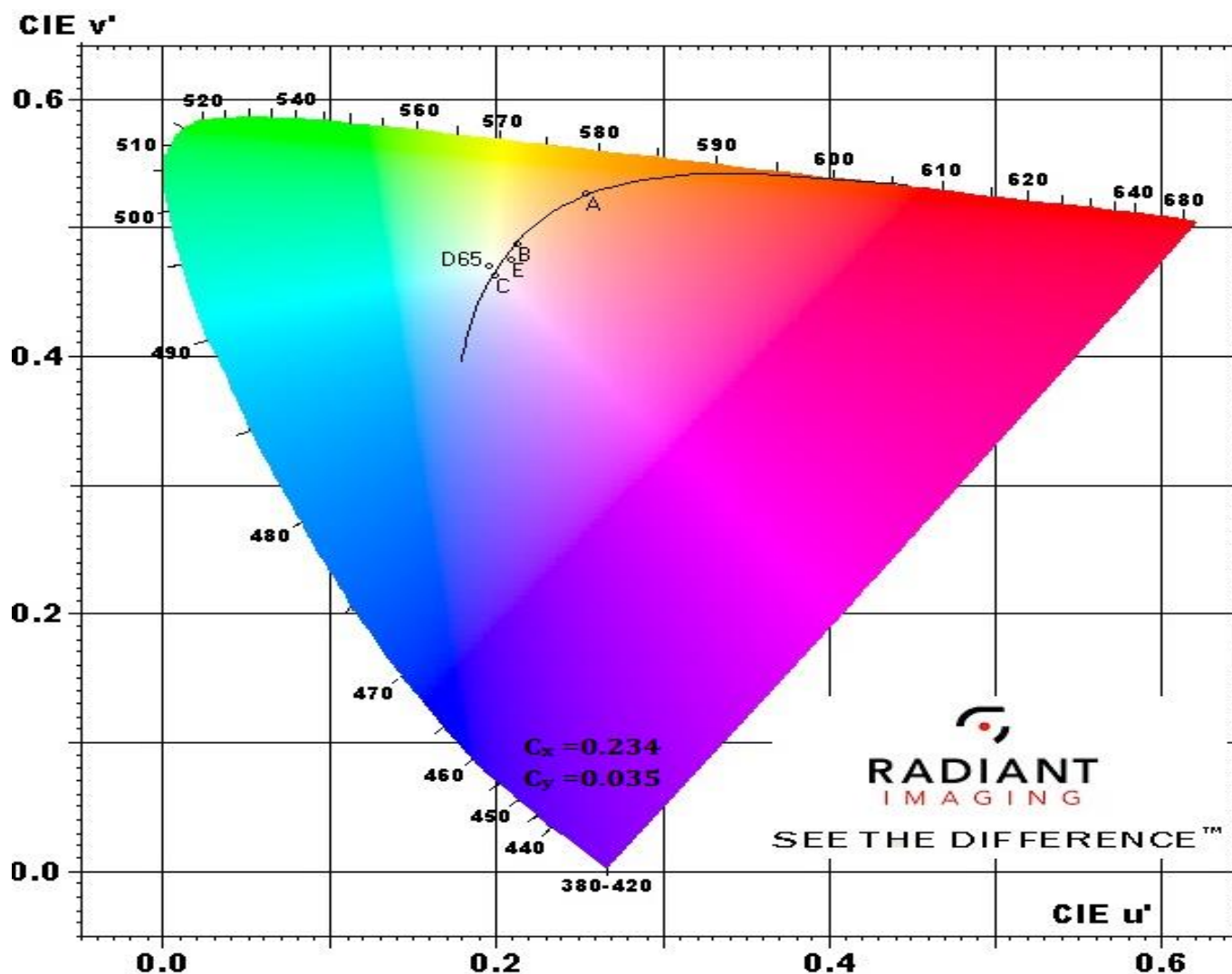
Figure 6 CIE chromatic diagram for KBaPO₄:Ce³⁺ phosphor.

The color coordinates of the KBaPO$_4$:Ce^{3+}phosphor sample observed in blue region with coordinate at C$_x$ =0.234, C$_y$ =0.035. CIE diagram explains that the KBaPO$_4$:Ce^{3+}phosphors are very near to the CIE graph frame, which easy to shows the color clarity of prepared phosphor material. The system of chromaticity coordinates (x, y) calculated with the help of the color calculator program radiant imaging.

IV. CONCLUSION

The photoluminescence characteristics of Ce^{3+} activated blue-emitting KBaPO$_4$:Ce^{3+}phosphors report in the near UV–vis range shows the excitation bands at 330 nm and emission band at 441nm due to spectral overlap of two energy level. Doping concentration of KBaPO$_4$:Ce^{3+}phosphor has been report a minor change in relative intensity of the 5d-^{2}F$_{5/2}$ to 5d-^{2}F$_{7/2}$ with self absorption improved splitting of crystallite. XRD pattern of prepared KBaPO$_4$:Ce^{3+}phosphor reveals the good crystalline in nature. Scanning electron microscopic images shows morphology of the phosphor at microns to sub few microns. The complete characteristics of Ce$^+$ doped KBaPO$_4$:Ce^{3+}reveals that, it is a promising blue emitting single-host phosphor for lamp industries and mixed with other color emission phosphors to obtain white light.

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Exploration and Assessment of Wild Vegetables of Jalgaon Jamod, Dist. Buldhana (Maharashtra)

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ABSTRACT

Wild vegetables those occur naturally not only provide source of carbohydrates and proteins but also help to fill up deficiencies of many micronutrients, vitamins and minerals, which are not present in our regular vegetables. Present investigation concerns with exploration of such wild edibles from Jalgaon jamod region. About 40 different wild vegetables contributed to 29 families scored during the investigation. These annual or seasonal vegetables make part of regular diets of local inhabitants and tribal peoples. Maximum vegetables were belonged to amaranthaceae (10%) family followed by caesalpiniaceae (8%), euphorbiaceae (8%), portulacaceae (5%), malvaceae (5%), rutaceae (5%) and fabaceae (5%). While about 21 remaining families contribute only 3%. Present research will provide visibility to these wild nutritional crops and encourage their further evaluation for possible nutritional and pharmaceutical benefits.

Keywords: Wild vegetables, Jalgaon jamod, Annual, Seasonal, Tribal peoples, Amaranthaceae etc.

I. INTRODUCTION

Nature has been so kind to human since the inception of time, providing food, shelter and several other things necessary to make out living. There is so much to explore and utilize from nature and man's accomplishments are just a drop comparing to ocean. Several plants occur naturally and are unknown, have nutritional as well as nutraceutical values. Vegetables are the key source of carbohydrates, proteins, micronutrients, vitamins and fibers in human nutrition generally based chiefly on carbohydrates. Specifically seasonal vegetables can help to fill up deficiencies of many micronutrients, vitamins and minerals caused by redundancy of vegetables in daily diet. In recent years, these wild vegetables gained considerable importance in urban nutrition system as they serves as source of many rare nutrients, which are not present in our regular leafy, fruit and tuber vegetables. There beneficial effects on human health made them famous and increase their demand in local food market.

Mostly tribal communities collect these wild edibles from their natural habitat. As these communities have undisturbed relationship with nature, they have knowledge about various preparations of these wild edibles and they are usually sold in tribal market (Jain and Sinha, 1988). Usually these wild vegetables provide additional source of food supplements and generates source of income to the tribal and local people. Many workers earlier evaluated nutritional superiority of these wild vegetables over cultivated field crops. These

vegetables also execute the food needs of the rural communities especially during the periods of food crises. These wild food resources include fruits, leaves, bulbs, roots, seeds, shoot stalk etc. which are usually made into delicious recipes and consumed. These wild plants have made important parts of human food system among indigenous cultures. Even though more than 7000 plant species are cultivated or harvested for food as well as pharmaceutical purpose from wild vegetation throughout the world, many among them or others are still neglected and underutilized due to negligence about their utility and necessity in human diet (Ghane et al., 2010; Price, 2003). It is estimated that about 60-70% of population that resides in agricultural and forest areas in developing countries relies on roots, leaves, fruits and nuts of forest species, which forms an integral part of their daily diets. They serve as an alternative to their daily staple food as well as a valuable food supplement during periods of food deficit to achieve nutritionally balanced diet (Aryal et al., 2009; Narzary et al., 2013). Nowadays documentation of such wild edibles is gaining importance to avail them as possible food resource. Present work is an attempt to document diversity of these wild vegetables from rural and forest area of taluka Jalgaon jamod, Dist Buldhana of Vidarbha region of Maharashtra. It will help to spread knowledge about these plants among the local peoples, which will help to increase their consumption thereby providing them market value.

II. MATERIALS AND METHODS

Present study conducted in Jalgaon jamod which is a small town in Buldhana district (Maharashtra) situated at elevation of about 291m. It is situated at the base of the Satpura range, about 10 km from Satpura. Its geographical location as represented by coordinates is 21.0486oN 76.5344oE. A survey conducted through different localities of the above said region. Personal interviews of local inhabitants and tribal peoples along with market surveys are the methods employed to gather information. Several Adivasi communities, local peoples were contacted and survey carried out. The naturalized population of these wild edibles was noted. Knowledge of their edible parts and edibility was noted from interview. Plants were identified using standard floras like Dhore (2002) and Naik (1998). Whole data was organized and tabulated. A comprehensive literature survey carried out to explore their medicinal properties. The vegetables that consume after roasting or boiling was categorized as cooked whereas those consumed directly (in salad, pickles) was designated as raw.

III. RESULTS AND DISCUSSIONS

The present study deals with the study of diversity and seasonal availability of wild edible vegetables. The vegetables that are found to be common in rural and forest areas of taluka Jalgaon jamod were recorded. In total 40 species belongs to 29 families were documented (Plate I). Details about botanical name, common name, family, habit, season, edibility and medicinal use of these plants are tabulated in Table 1. Medicinal uses of these wild edibles were reviewed from available literature including Kumar et al. (2012), Shivhare et al. (2012), Seth (2005), Baliga et al. (2011), Kshirsagar et al. (2012), Alegbejo (2013), Reyad-ul-Ferdous et al. (2015), Prabhu et al. (2021), Jana and Shekhawat (2010), Balekari and Veeresham (2015), Raza et al. (2013), Waako et al. (2005), Arif et al. (2016), Tamilselvan et al. (2011), Agyare et al. (2016), Orni et al. (2018), Jamkhande et al. (2013), Dutta (2015), Sailakshmi et al. (2018), Kumar et al. (2010), Mohamed et al. (2012), Parikh and Patel (2017), Lampariello et al. (2012), Mathew and Negi (2017), Patel et al. (2011), Kambhar (2014), Poovathur and Joseph (2016) and Gupta et al. (2015).

Among the wild edibles, maximum species are herbs (45%) followed by trees (25%), climbers (20%) and shrubs (10%). Maximum species were contributed by family Amaranthaceae (10%) followed by cucurbitaceae and caesalpiniaceae contributing 8%. Families like portulacaceae, malvaceae, rutaceae and fabaceae contributes 5%. All remaining families have only 1 species of wild edibles (Figure1). Several workers earlier documented diversity of wild edibles from various regions. Sanchez- Mata et al. (2011) documented 15 species (from 10 families) from Mediterranean area. Atram (2015) explore medicinal potential of wild leafy vegetables growing in rainy season from Maharashtra state. Chaithanya et al. (2015), Patil and Patil (2000), Ahmad et al. (2019), Dhole (2021) documented wild edibles from different regions including Nanda Devi Biosphere Reserve, Vazhachal forest (Kerala), Nasik (Maharashtra), Pakistan, Gaya (Bihar) etc.

Table 1: Details of Wild edibles documented from area of Jalgaon jamod, Buldhana district, Maharashtra.

Botanical Name	Local Name	Family	Habit	Season	Edibility	Medicinal uses
Abelmoschus ficulneus L.	Ran bhendi, Jungli bhindi	Malvaceae	Shrub	Winter	Leaves (cooked)	Used as a febrifuge, stomachic and antipyretic, also to treat diarrhea.
Aegle marmelos L.	Bel	Rutaceae	Tree	Summer	Fruits (raw or cooked)	Used for treatment of constipation, diarrhea, diabetes, respiratory affections, chronic diarrhea, dysentery and peptic ulcers; also possess cooling, laxative, astringent, digestive, stomachic, hypoglycemic and spasmogenic properties.
Amaranthus cruentus L.	Rajgura, Lal math	Amaranthaceae	Herb	Rainy/ Summer	Whole plant (cooked)	Boiled leaves and roots used as laxative, diuretic, anti-diabetic, antipyretic, anti-snake venom, antileprotic, anti-gonorrheal, expectorant, anti-inflammatory and has immunomodulatory activity, anti-androgenic activity and anthelmintic properties. Use to treat disturbed breathing in acute bronchitis, constipation, piles and anaemia.
Amaranthus viridis L.	Chopada math	Amaranthaceae	Herb	Rainy/ Summer	Whole plant (cooked)	Useful in diarrhea, inflammation, constipation, piles, anemia, jaundice, leucorrhoea and pain; has anti-inflammatory, antihepatotoxic, antiulcer antiallergic, antiviral actions. Used to reduce labour pain and antipyretic.

Anethum graveolens L.	Shepu	Apiaceae	Herb	Rainy	Whole plant (cooked)	Effective on inflammation, flatulence, intestinal worms, ulcers and spermatorrhea; ingredient in gripe water, relieve colic pain in babies and flatulence in young children; also improves appetite, relieves gas, urinary complaints, piles, aids digestion cures, and mental disorders
Bauhinia racemosa Lam.	Aapta	Caesalpiniaceae	Tree	Summer	Flowers or buds (cooked)	Used as laxative astringent to treat cough, dysentery, hemorrhage, piles, headache, fever, skin diseases, blood diseases and diarrhea.
Capparis zeylanica L.	Waghoti	Capparaceae	Climber	Rainy	Fruit (cooked)	Effective on snake bites; has anti-diabetic, insulin secretagogue activities
Cardiospermum halicacabum L.	Kapalfodi	Sapindaceae	Climber	Rainy	Leaves & shoots (cooked)	Has antimicrobial, antimalarial, antifungal, antiparasitic, antidiarrheal, anxiolytic, rubifacient, antipyretic properties; employed for management of painful, arthritic inflammatory conditions.
Carissa carandas auct. non L.	Karwand	Apocynaceae	Shrub	Rainy	Fruits (raw)	Useful in anorexia, sore throat, mouth ulcer and skin disorders; possess cardiotonic activity, antihypertensive activity, cooling and acidic properties.
Cassia tora L.	Tarota	Caesalpiniaceae	Herb	Rainy	Young leaves and Seeds (cooked)	Have laxative, antiperiodic, anthelmentic, germicide and antiseptic properties. Useful in helminthiasis, fever, constipation and cardiac disorders.
Celosia argentea L.	Kardu	Amaranthaceae	Herb	Rainy/ Winter	Leaves (cooked)	Possess diuretic properties; beneficial as antidote, stomach disorder, calculi, diabetes and spermatorrhoea.
Coccinia grandis L.	Tondali	Cucurbitaceae	Climber	Winter	Fruits (cooked)	Use for burning sensation, fever, agalactia, jaundice, stomach ache, skin disease, diabetes, wound healing, ulcers, asthma and cough.
Colocasia esculenta L.	Alu, Chamkura	Araceae	Herb	All	Leaves (cooked)	Have antimicrobial and anti-inflammatory properties; Use to treat haemorrhage, otorrhea, adenitis,

					alopecia, cough, anorexia.
Commelina benghalensis L.	Kena	Comme linaceae	Herb	Rainy	Leaves (cooked)	Use to treat burns, leprosy, piles, constipation, fever calculi, indigestion, sore throat, pain and inflammations; used as emollient, demulcent and laxative.
Cordia dichotoma G. Forst.	Bhokar	Boragin aceae	Tree	Winter	Fruits (raw or cooked)	Have several medicinal properties like sweet, cooling, antidiabetic, antiulcer, anti-inflammatory, laxative, anthelmintic, aphrodisiac, astringent, diuretic, emollient immune-modulator and analgesic.
Dendrocalamus strictus Roxb.	Bambu	Poaceae	Tree	Rainy/ Winter	Young shoots (cooked)	Beneficial in tuberculosis, cough; Usually used as a tonic and delicacy.
Digera muricata L.	Kunjar, Kundra, Latmahur ia	Amaran thaceae	Herb	Rainy	Leaves & young shoots (cooked)	Useful in diabetes, constipation, digestive system disorders, urinary disorders, boils and piles.
Dioscorea alata L.	Ratalu, Kand, Goradu	Dioscor eaceae	Climbe r	Winter	Stem tubers (cooked)	Useful in piles, gonorrhea, helminthiasis; tuber paste usually applied on cancerous wounds, leprosy, gonorrhoea, blood pressure and in skin diseases.
Diospyros melanoxylon Roxb.	Tembhur ni	Ebenace ae	Tree	Winter	Ripe Fruits (raw)	Have antioxidant, cooling and astringent effect.
Euphorbia hirta L.	Dudhi	Euphor biaceae	Herb	Rainy	Tender young leaves & shoots (cooked)	Beneficial in gastrointestinal disorders including diarrhea, dysentery, intestinal parasitosis, bronchial and respiratory diseases like asthma, bronchitis, hay fever and in conjunctivitis; also possess hypotensive and tonic properties.
Hibiscus sabdariffa L.	Ambadi, Roselle	Malvace ae	Shrub	Winter	Young leaves and tender stem (raw or cooked)	To treat hypertension, pyrexia and liver damage
Hypochaeris	Pathar	Asterac	Herb	All	Whole	For treatment of fever, headache,

radicata L.		eae			plant mostly roots and leaves (cooked)	colic
Limonia acidissima L.	Kaithbael, Kait, Kawath	Rutaceae	Tree	Winter	Ripe Fruits (raw)	Used as tonic, appetizing, astringent, stimulant, stomachic and digestive.
Manilkara hexandra Roxb.	Khirani	Sapotaceae	Tree	Winter to summer	Ripe Fruits (raw)	Have hypoglycemic, antioxidant, demulcent and emollient effects.
Momordica dioica Roxb.	Kartoli, Karusale	Cucurbitaceae	Climber	Rainy/ Winter	Fruits (cooked)	Beneficial in leprosy, fever, diabetes, hypertension, malignant ulcer, worms, jaundice; common stomachic and laxative.
Moringa oleifera Lam.	Shevga	Moringaceae	Tree	All	Leaves, pods & Flowers (cooked)	Useful in scurvy, inflammation, helminthiasis and rheumatism; Have diuretic, cholagogue, stimulant and aphrodisiac properties.
Mucuna pruriens Hook.	Kuyari	Fabaceae	Climber	Winter	Pods (cooked)	Use in management of male infertility, nervous disorders, as an antioxidant, aphrodisiac, anti-Parkinson's and neuroprotective effects,
Musa acuminata Colla.	Kacchi keli	Musaceae	Shrub	All	Unripe fruits (raw)	Have antioxidant, antidiabetic, immunomodulatory, hypolipidemic, anticancer, antimicrobial and especially anti-HIV activities; .employed for treatment of fever, cough, bronchitis, dysentery, allergic infections, sexually transmitted infections and non-communicable diseases.
Oxalis corniculata L.	Ambushi, Tinpatti	Oxalidaceae	Herb	Rainy	Leaves (cooked)	Useful in dyspepsia, dysentery, scurvy ulcer hemorrhoids, anemia, fever, diarrhea.
Phyllanthus amarus Schum. & Thonn.	Bhuiawala	Phyllanthaceae	Herb	Rainy	Fruits (raw)	Common astringent, stomachic, diuretic, febrifuge and antiseptic. The whole plant is beneficial in gastropathy, diarrhea, dysentery, intermittent fevers, ophthalmopathy,

					scabies, ulcers, gonorrhea, menorrhagia, wounds and other genital affections.
Physalis minima L.	Balloon plant	Solanaceae	Herb	Rainy	Fruits (raw)	Use to treat gastropathy, colic, ulcer, cough, bronchitis, anorexia, constipation, jaundice, scurvy.
Portulaca oleracea L.	Ghol bhaji	Portulacaceae	Herb	All	Whole plant (cooked)	Has diuretic, sedative, analgesic and cardiotonic properties; use to treat rheumatism, gynaecological diseases, the urinary tract worm diseases, fever, dysentery; applied externally to ulcers, eczema and dermatitis; serves as a tonic and choleretic.
Portulaca quadrifida L.	Ranghol, Chiu chi bhaji	Portulacaceae	Herb	All	Whole plant (cooked)	Similar medicinal properties as *Portulaca oleracea.*
Rumex vescarius L.	Ambatchuka	Polygonaceae	Herb	Rainy	Whole plant (cooked)	Has antioxidant, antibacterial, stimulant properties; commonly employed as tonic and aphrodisiac agent.
Sesbania grandiflora L.	Heta, Hetga	Fabaceae	Tree	Winter	Flowers (cooked)	Useful in digestion, nasal catarrh, headache and weakness.
Tamarindus indica L.	Chinch	Caesalpiniaceae	Tree	Winter	Whole plant, mostly fruits and flower (raw and cooked)	Useful in gastropathy, helminthiasis, ulcer, jaundice, anorexia, scurvy and impotency; Has anthelmintic, emetic, anodyne, antifungal, astringent, aperient and ophthalmic properties.
Telosma pallida Roxb.	Jhutel, jivati	Asclepiadaceae	climber	Rainy	Flowers (cooked)	Used to treat leukoderma; has anti-fungal, antitumor, anti-epilepsy, anti-asthmatics properties.
Trianthema portulacastrum L.	Lal vasul	Aizoaceae	Herb	Rainy	Leaves (cooked)	Have antioxidant, diuretic, analgesic, hepatoprotective and anticarcinogenic effects.
Tribulus terrestris L.	Gokharu	Zygophyllaceae	Herb	Summer	Leaves (cooked)	Medicinal properties include astringent, diuretic, aphrodisiac, depurative, anthelmintic, anti-inflammatory and tonic properties.
Tricosanthes	Sharanya,	Cucurbi	Climbe	Winter	Fruits	Common tonic, febrifuge; beneficial

| *dioica* Roxb. | Parwal | taceae | r | | (cooked) | in edema, alopecia, alcoholism, jaundice and in subacute cases of enlargement of liver. |

Medakkar and Sharma (2016) conducted ethno-botanical exploration of exotic plants used for human consumption in Ahmednagar district. They have found about 52 species belongs to 32 families. They also observed that amaranthaceae family followed by caesalpiniaceae, fabaceae and euphorbiaceae contributes maximum species. Sinha and Lakra (2005) investigated plant consumption patterns in three tribal dominated districts in Orissa including Kheonjhar, Mayurbhanj and Dhenknal. They have collected data of about 46 fruit types, 50 leaves types, 11 flower types, 14 tuber types and 5 gum type wild edibles consumed by tribal population. Many workers like Misra et al. (2008), Dalzell and Gibson (1861) documented several indigenous plant species including naturalized and introduced. Upadhye et al. (1986) evaluated details of about 34 species of wild medicinal plants used by rural population of southwestern parts of Kolhapur district. Khan and Kakde (2014) surveyed Konkan region and reported 58 wild vegetables in total belonging 55 genera and 27 families.

Figure 1: Familywise distribution of wild edibles from Jalgaon jamod region.
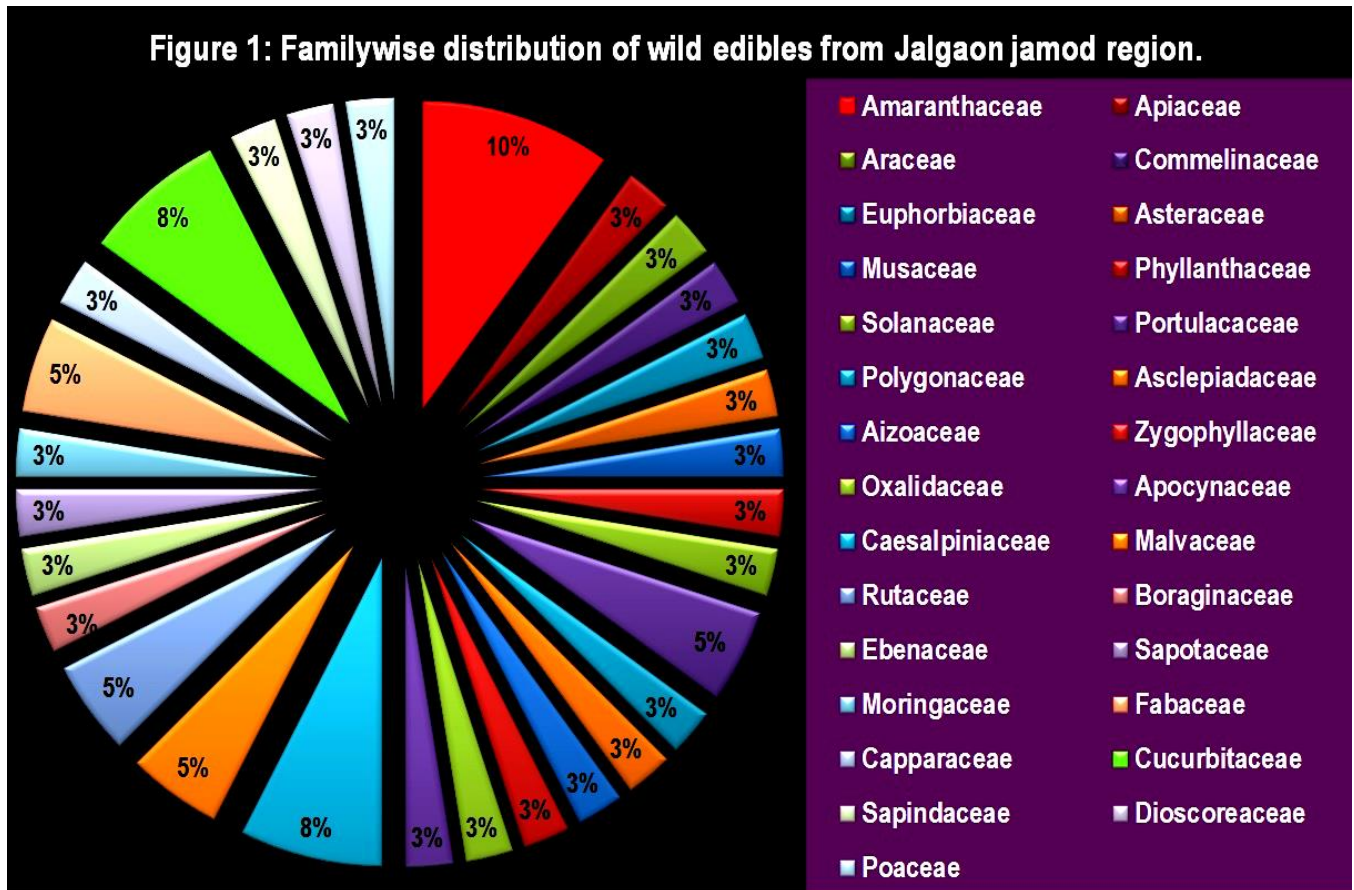
IV. CONCLUSIONS

Present study aimed at exploring diversity of wild edibles from Jalgaon jamod region from district Buldhana. There were 40 species from 29 families were recorded. Among them most of the species are herbs followed by trees, climbers and shrubs. Familywise distribution of various wild edibles is represent in figure 1. Most of the species of wild edibles are found to be belongs to Amaranthaceae (4 species) while families like cucurbitaceae and caesalpiniaceae occupies 2nd position (with 3 species each). These are followed by portulacaceae,

malvaceae, rutaceae and fabaceae (with 2 species each); while all the remaining families contribute only 1 species. Present work is helpful to assess diversity of wild vegetables and their indigenous knowledge in tribal areas. Research will serves as a base for further evaluation of these wild edibles for nutritional and pharmaceutical properties.

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Physicochemical Analysis of Water from Various Sources in Umarkhed Region

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ABSTRACT

Water is perhaps the most precious natural resource after air. Though the surface of the earth is mostly consisting of water, only a small part of it is usable, which makes this resource very limited. This precious and limited resource, therefore, must be used with prudence. As water is required for different purposes, the suitability of it must be checked before use. Also, sources of water must be monitored regularly to determine whether they are in sound health or not. Poor condition of water bodies is not only the indictor of environmental degradation, it is also a threat to the ecosystem. In industries, improper quality of water may cause hazards and severe economic loss. Thus, the quality of water is very important in both environmental and economic aspects. Thus, water quality analysis is essential for using it in any purpose. After years of research, water quality analysis is now consisting of some standard protocols. There are guidelines for sampling, preservation and analysis of the samples. Here the standard chain of action is discussed briefly so that it may be useful to the analysts and researchers. Key Words: Water Quality Monitoring, Water Quality Assessment, Water Quality Analysis, Chain of Custody

Keywords: Drinking water, water quality parameters, underground water.

I. INTRODUCTION

Water is one of the most important natural resources on the earth. Water is important to all living organisms, ecological systems, human health, food production and economic development. Drinking water is important for the health. The safety of drinking water is affected by various contaminants which included chemical and microbiological. Such contaminants cause serious health problems. Due to these contaminants quality of drinking water becomes poor. Sometimes this quality of water causes different type of diseases in the human being , so that quality of water must be tested for both the chemical as well as microbial contaminants. The most important 5 major Application of water are: 1.] Hydropower, 2.] Domestics uses 3.] Irrigation 4.]

Industrial uses 5.] Commercial uses. The most important water quality parameters considered for the examination in this study are pH, Odour, Colour, Taste, Temperature, Turbidity, Total Dissolved Solids (TDS), Dissolved oxygen (DO), Dissolved carbon dioxide, Metals and Metalloids, Total Hardness, Alkalinity etc.

Drinking water is an important constituent for all types of living beings. Groundwater is one of the most valuable natural resources, which supports human health, economic development and ecological diversity. Groundwater is a valuable dynamic and replenishes able natural resource in present day and limited in extent. Groundwater resource assessment of a region involves a detailed study of the sub-surface water, including geology and hydrogeology, monitoring and production of well data. The water quality guidelines provide a Limit Value for each parameter

for drinking water. It is necessary that the quality of drinking water.

2.2Drinking: As per WHO/CPCB Standards Irrigation: pH Conductivity Sodium & Potassium Nutrients Specific compounds

II. MATERIALS AND METHODS

The Water Samples are collected from Umarkhed region in ten Different places in the Morning Hours between 9 to 11am, Water Sample are collected in Polythene Bottles. The Water samples are immediately brought in to Laboratory of G.S Gawande college Umarkhed for the Estimation of various Physico-chemical Parameters like Water Temperature, pH was recorded by using Thermometer and Digital pH Meter. (Systronics). Specific conductivities is measured by using digital conductivity meter. The TDS values were measured by using TDS meter. While other Parameters Such as Hardness, Sodium, and potassium by Flame photometry. The Manganesium, Calcium & Magnesium Chloride, Sulphate and Nitrate were Estimated in the Laboratory By using Standard laboratory methods. In Present Study involves the Analysis of Water Quality in Terms of Physicochemical methods.

2.1. Study Area

The study area has been shown with location latitudes and longitudes with all details as shown in Photograph. The climate of the area is generally mentioned. Surrounding local and geological condition should be mention. I have followed Study area in Umarkhed region at different places.

2.2. Sample Collection

I have collected sample For Drinking water analysis to collect the sample either in plastic bottle or glass bottle. Various water quality parameters required the certain temperature. All parameters should determine using as per standard methods.

Borewell II - Main Campus
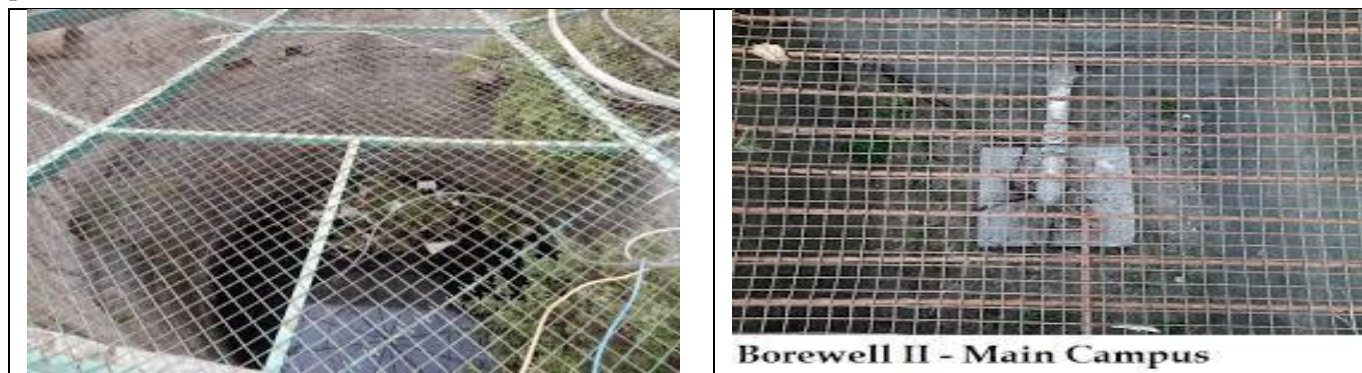
Table: 1- Details of Sample Sources.

Sample No.	Sample Station	Type of Source	ccc	Latitude N	Longitude E
1.	Chauibhara	Bore Well	66	17⁰ 716¹	83⁰ 285¹
2.	Khadakpura	Open Well	28	17⁰712¹	83⁰ 295¹
3.	Nath Nagar	Bore Well	68	17⁰ 716¹	83⁰ 289¹
4.	AnandNagri	Open Well	31	17⁰ 721¹	83⁰ 286¹
5.	Teacher Colny	Bore Well	61	17⁰ 722¹	83⁰ 287¹
6.	Bourbon	Bore Well	70	17⁰ 725¹	83⁰ 289¹
7.	Azad Ward	Bore Well	65	17⁰ 724¹	83⁰ 285¹
8.	Nagapur	Open Well	32	17⁰ 719¹	83⁰ 289¹
9.	Rupala	Open Well	35	17⁰ 718¹	83⁰ 283¹
10.	Gawande College	Bore Well	68	17⁰ 718¹	83⁰ 287¹

III. ANALYTICAL METHODS

Table: 2- Methods of Analysis:

S.NO.	Parameter	Method	Instrument/Equipment
1.	Temperature	Laboratory method	0.1 0 c scale thermometer
2.	P^H	Electrometric	pH meter
3.	Conductivity	Electrometric	Conductivity meter
4.	DO, BOD	Iodometric (Titrimetric)	
5.	COD.	Chemical oxidation-reduction , open reflux, Closed reflux, COD Disaster	
6.	Hardness, Ca	Titration with EDTA	Titrimetric Method (Complexometric).
7.	Alkalinity	Titration with Sulphuric acid	Titrimetric Method
8.	Chloride	Titration with Silver nitrate	Titrimetric Method
9.	Na, K	Flame Photometric	Flame photometer
10.	Nitrate,	Photometric Method	UV-Vis. Spectrophotometer
11.	Phosphate	Photometric Method	UV-Vis. Spectrophotometer
12.	Boron	Photometric Method	Photometer WTW, model Photoflex Turb Set
13.	Floride	Photometric Method	Photometer WTW, model Photoflex Turb Set

3.1. Analysis of Samples:

Analysis of the collected ground water samples was done in accordance with the procedures suggested in the Standard Analytical Procedure Manual for water samples which is based on 'Standard Methods for the Examination of Water and Wastewater' 19th edition, APHA, AWWA, wef 1995 (alkalinity-titrimetrically, pH-potentiometrically, HCO3 — + CO3 2- -calculation from pH and alkalinity, DO Iodometrically, BOD- bottle

incubation for 5days at 20oC, COD-open reflux, Ca and total hardness-EDTA titrimetric, Mg- calculation from total hardness and Ca, NO3 -&PO4 3—spectrophotometric, Cl—-argentometric titrimetric, total dissolved solids- calculation from conductivity).

Sr. No.	Test	S1	S 2	S 4	S 5	S 6	S 7	S 8	S9	S10
1.	Temperature (ºC)	27	30	28	29	30	27	30	27	29
2.	Colour (Unit)	<1	<1	<1	<1	<1	<1	<1	<1	<1
3.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	pH	6.5	7.1	7.3	6.9	7.1	6.8	7.1	6.7	6.8
6.	Turbidity (NTU)	0.6	0.4	0.2	0.3	0.7	0.5	0.5	0.7	0.6
7.	TDS (ppm)	156	150	154	152	153	164	153	152	162
8.	Dissolved oxygen (ppm)	6.1	6.3	6.2	6.2	6.1	6.3	6.1	6.2	6.3
9.	Dissolved carbon dioxide(ppm)	36	40	39	36	38	37	38	36	36
10.	Alkalinity (ppm)	8	9	8	9	10	8	8	10	9
11.	Chloride (ppm)	58	30	41	35	36	40	39	40	37
12.	Calcium (ppm)	7	6.2	8	7.1	6.5	8	6.2	8	6.3
13.	Barium (ppm)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
14.	Magnesium (ppm)	2.2	3.4	2.5	3.1	2.5	2.1	2.1	2.2	2.5
15.	Total Hardness (ppm)	4	4.5	5.0	4.2	3.9	4.1	3.9	4.1	4.0
16.	Copper (ppm)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
17.	Sulphate (ppm)	8	10	14	16	11	9	10	11	9

3.2. Parameters included in water quality assessment Results and Discussion

3.3. Odor, colour and Test

Sample colour is transparent. Organic or suspending partical is not present. Sample is odourless. After color and odor test of sample should be acceptable.

3.4. pH

pH is most important in determining the corrosive nature of water. Lower the pH value higher is the corrosive nature of water. pH was positively correlated with electrical conductance and total alkalinity(Gupta et al., 2009). The reduced rate of photosynthetic activity the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH. During the summer month oxygen value is low coincided with high temperature.Various factors bring about changes the pH of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical

condition (Karanth 1987). The pH Value of water indicate hydrogen ion contration . The pH scale is extends from 0(Very acidic) to 14 (very alkaline) with 7 corresponding to exact neutrality at 25°C (P.R.S.Pillai).

3.5. EC (Electrical Conductivity)

Conductivity shows significant correlation with ten parameters such as temperature , pH value , alkalinity , total hardness , calcium , total solids, total dissolved solids , chemical oxygen demand , chloride and iron concentration of water. Navneet Kumar et al (2010) suggested that the underground drinking water quality of study area can be checked effectively by controlling conductivity of water and this may also be applied to water quality management of other study areas. It is measured with the help of EC meter which measures the resistance offered by the water between two platinized electrodes. The instrument is standardized with known values of conductance observed with standard KCl solution.

3.6. Turbidity

The Intensity of light scattered by the sample in specific conditions with intensity of light scattered by standard reference suspension under the same condition. The higher the intensity of scattered light, higher the turbidity (P.R.S.Pillai).

3.7. Total Alkalinity

The alkalinity of water is a measure of its capacity to neutralize acids. It is primarily due to salts of weak acids, although weak or strong base may also contribute. Alkalinity is usually impacted by bicarbonate, carbonate and hydroxide (P.R.S.Pillai).

3.8. Acidity and Alkalinity

The pH of water is less than 7 that water is acitic water. Much acetic water is harmful for human. It is Composed primarily of carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-), alkalinity acts as a stabilizer for pH. Alkalinity, pH and hardness affect the toxicity of many substances in the water. It is determined by simple dil HCl titration in presence of phenolphthalein (Indicator)and methyl orange indicators. Alkalinity in boiler water essentially results from the presence of hydroxyl and carbonate ions. Hydroxyl alkalinity (causticity) in boiler water is necessary to protect the boiler against corrosion. Too high a causticity causes other operating problems, such as foaming. Excessively high causticity levels can result in a type of caustic attack of the boiler called "embrittlement".

3.9. Biochemical Oxygen Demand (BOD)

The BOD is measure of the extent of pollutant in the water body. The untreated discharge of municipal and domestic wastes in water bodies increases the amount of organic content. Therefore the microbes present in water require more amount of oxygen for its degradation (Sumant Kumar et al.). BOD is a measure of organic material contamination in water, specified in mg/L. BOD is the amount of dissolved oxygen required for the biochemical decomposition of organic compounds and the oxidation of certain inorganic materials (e.g., iron, sulfites). Typically the test for BOD is conducted over a five-day period (Milacron Marketing Co.).

3.10. Chemical Oxygen Demand (COD)

Chemical Oxygen Demond (COD) test measures the oxygen demand of biodegradable pollutants and the oxygen demand of non-biodegradable oxidisable pollutants water. COD is a water quality measure used not only to measure the amount of biologically active substances such as bacteria but also biologically inactive organic matter in water (Khuhawari et al.) COD is another measure of organic material contamination in water specified in mg/L. COD is the amount of dissolved oxygen required to cause chemical oxidation of the organic material in water. Both BOD and COD are key indicators of the environmental health of a surface

water supply. They are commonly used in waste water treatment but rarely in general water treatment. (Milacron Marketing Co.).

3.11. Total Hardness

Hardness is defined as the concentration of multivalent metallic cations in solution. The Public health Service Standards recommend a max of 500 mg/l of hardness in drinking water (Peavy, Rowe).

3.12. Calcium

Calcium is measured by complexometric titration with standard solution of ETDA using Patton's and Reeder's indicator under the pH conditions of more than 12.0. These conditions are achieved by adding a fixed volume of 4N Sodium Hydroxide. The volume of titrant (EDTA solution) against the known volume of sample gives the concentration of calcium in the sample water.

3.13. Magnesium

Magnesium is measured by complexometric titration with standard solution of EDTA using Eriochrome black T as indicator under the buffer conditions of pH 10.0. The buffer solution is made from Ammonium Chloride and Ammonium Hydroxide. The solution indicatethe pH variations during titration.

3.14. Sodium

Sodium measured with the help of flame photometer. The instrument is standardized with the known concentration of sodium ion (1 to 100 mg/liter). The samples having higher concentration are suitably diluted with distilled water and the dilution factor is applied to the observed values.

3.15. Potassium

Potassium also measured with the help of flame photometer. The instrument is standardized with known concentration of potassium solution, in the range of 1 mg to 5 mg/litre. The sample having higher concentration is suitably diluted with distilled water and the dilution factor is applied to the observed values.

3.16. Chloride

High chloride content in water may be due to the pollution from chloride rich effluent of sewage and municipal waste. However chloride in excess imparts salty taste to water and people who are not accustomed to high chloride are subjected to laxative effect (Raviprakash ,Rao et al.).

3.17. Sulphate:

Natural water contains sulphate ions and most of these ions are also soluble in water. Many sulphate ions are produce by oxidation process of their ores, they also present in industrial wastes. The method to measure quantity of sulphate is by UV Spectrophotometer. As per IS: 10500-2012 Desirable limit for Sulphate is 200 and 400 mg/l in Permissible limit.

3.18. Nitrate:

Nitrate is present in raw water and mainly it is a form of N2 compound (of its oxidizing state). Nitrate is produced from chemical and fertilizer factories, matters of animals, decline vegetables, domestic and industrial discharge. The method to measure quantity of nitrate is by UV Spectrophotometer. As per IS: 10500-2012 Desirable limit for nitrate is max.45 and no relaxation in permissible limit.

3.19. Chloride16:

All type of natural and raw water contains chlorides. It comes from activities carried out in agricultural area, Industrial activities and from chloride stones. Its concentration is high because of human activities. As per IS: 10500-2012 Desirable limit for chloride is 250 and 1000 mg/l in Permissible limit.

3.20. Fluoride:

Fluoride occurs as fluorspar (fluorite), rock phosphate, triphite, phosphorite crystals etc, in nature. Among factors which control the concentration of fluoride are the climate of the area and the presence of accessory minerals in the rock minerals assemblage through which the ground water is circulating. As per IS: 10500-2012 Desirable limit for fluoride is 1 and 1.5 mg/l in Permissible limit.

3.21. Boron:

Boron naturally occurs as boric acid and boric acid salts. It is released from rocks and soils through weathering, and subsequently ends up in water. It also gets added to soil and ground water through domestic landfills, when these are inadequately sealed .It serves as a typical indicator compound that indicates the presence of other hazardous substances. As per IS: 10500-2012 Desirable limit for Boron is .5 and 1 mg/l in Permissible limit.

3.22. Phosphate:

Phosphorus is an essential plant nutrient and most often controls aquatic plant growth in fresh water. Normally ground water contains only a minimum phosphorus level because of the low solubility of native phosphate minerals and the ability of soils to retain phosphate.

IV. CONCLUSIONS

It is very essential and important to test the water before it is used for drinking,water must be tested with different physic-chemical parameters. Selection of parameters for testing of water is solely depends upon for what purpose we going to use that water and what extent we need its quality and purity. Water does content different types of floating, dissolved, suspended and microbiological as well as bacteriological impurities. Groundwater is the most important source of water supply for drinking, irrigation and industrial purposes. Increasing population and its necessities have lead to the deterioration of surface and sub surface water. The modern civilization and urbanization frequently discharging industrial effluent, domestic sewage and solid waste dump. The cause of ground water gets pollute and create health problems. Once the groundwater is contaminated, its quality cannot be restored by stopping the pollutants from the source it therefore becomes imperative to regularly monitor the quality of groundwater and to device ways and means to protect it. So before using of water we should investigate qualitative analysis of some physicochemical parameters of groundwater. This may be considered as reference for the society to get cautious about the impending deterioration of their environment and health.

Discussion:

Physical parameters like Temperature, Odour, Taste &Colour was agreeable in Process and Municipal water. The general ISI standard for Drinking water's Turbidity is <0.1 NTU. Turbidity >5 NTU is considered unhealthy. In different area of Municipal water the turbidity ranging from 0.1 NTU to 0.5 NTU. In Naroda Municipal water, observed higher Turbidity than other area. The pH range of drinking water should far between 6.5 to 7.5 and municipal water pH observed 7 to 7.5.So it complied with the acceptance criteria of pH range & it was found to be healthy for human use. For Potable water, Dissolved carbon dioxide & Dissolved oxygen were found to be 6.4 and 33 (Average value of five different areas) respectively. TDS of water sample showed range below 1500 ppm & it complied with the given criteria of Indian standard. Minerals like Calcium, Magnesium, Chloride, Sulphate, Barium, and Copper are essential for body. Tests of theseminerals were performed on potable water sample. The results complied with the given range of Test for Minerals. Alkalinity & Total Hardness of potable water should less than or equal to 10 and 300 ppm respectively. Results

were complied with the given limits of both tests. Watertemperature may be depending on the season, geographic location and sampling time. As water Temperature increases, it makes it more difficult for aquatic life to get sufficient oxygen to meet it's need. Thermal pollution can cause shifts in the community structure of aquatic organisms.

Turbidity of lake ranges from 4 NTU to 11 NTU. Some are naturally highly turbid but human activities have increased the levels of suspended solids in many habitats.The lake amount of Total dissolved solid recorded ranges from 668 ppm to 942 ppm. High value of suspended solid can lower the primary Productivity of system by covering the algae and Macrophytes, at times leading to almost their complete removal.The low oxygen level was recorded during summer mainly due to removal of free oxygen through respiration by bacteria and other animals as well as the oxygen demand for decomposition of organic matter. DO is the single most important gas for most aquatic organism.If the amount of free oxygen go below then 2.0 mg/l for few day in the lake containing aquatic organism it would lead the killing of most of the biota in the aquatic system. Higher value of free carbon dioxide generally coincided with minimum dissolved oxygen. Habited water is generally used by animals & birds & aquatic life. The disturbance in this biological system & ecological system may affect health of animals & birds & aquatic life.

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Chemical Analysis of Drinking Water in Dhanki Region Ta- Umarkhed, Dist- Yavatmal

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ABSTRACT

The objectives of this study are to analyze the underground water quality of Greater Dhanki Region by water quality index. The most important 11 physico-chemical and biological parameters such as Calcium, Magnesium, Chloride, Sulphate, Total Hardness, Berium, Total Dissolved Solids, Alkalinity collected from 10 different locations since a period of 2021. In this study 80% water samples were found good quality and only 20% water samples falls under moderately poor category. The water quality index ranges from 15.47 to 62.65. Therefore there is a need of some treatment before usage and also required to protect that area from contamination.

Keywords: Water quality parameter, Underground water, Drinking water,

I. INTRODUCTION

Groundwater is a important source of water supply through the world. The ground water quality is still important to the communiy. Therefore it is important to ensure its high quality at all time so that the consumer health is not compromised. The three major activities of groundwater resource are affected 1]. The wxcessive use of fertilizer and pesticides. 2]. Untreated or Partioally treated waterwaste to the environment. 3]. Exessive pumping and improper management of aquiferes result. One of the most causes of ground water is the activity of solid waste disposal in open un-engineered landfill du to the lack of pollution control interventions such as water proof layer , leachte treatment pond , monitoring wells, etc.(Girija et al.,2007).

Ground water is a good source of fresh water resource which is the biggest issues in front of the policy makers for its sustainable utilization. Natural filtration through soil and sediments makes the ground water free from organic impurities (Karanth, 1989). Various major controlling ground water chemistry factors are regional geology, geochemically process and landuse patterns (Kumar, Ramanathan, Rao, & Kumar, 2006Kumar, M. , Ramanathan, A. L. , Rao, M. S. , & Kumar, B. (2006). Identification and evaluation

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Literature Review

II. STUDY AREA

Dhanki is a large village located in Umarkhed Taluka of Yavatmal district, Maharashtra with total 3743 families residing. The Dhanki village has population of **17267** of which 8906 are males while 8361 are females as per Population Census 2011. The water supply in the area is done through overhead tanks, tube wells, trunks and other supply lines.

Country	India
State	Maharastra
District	Yavatmal
Taluka	Umarkhed
Location	Dhanki
Population(2020/2021) est.	16,749 - 18,994
Population(2011)	17267
Houses	3743
Lat.	19⁰ 34' 0"
Lag.	77° 51' 0"
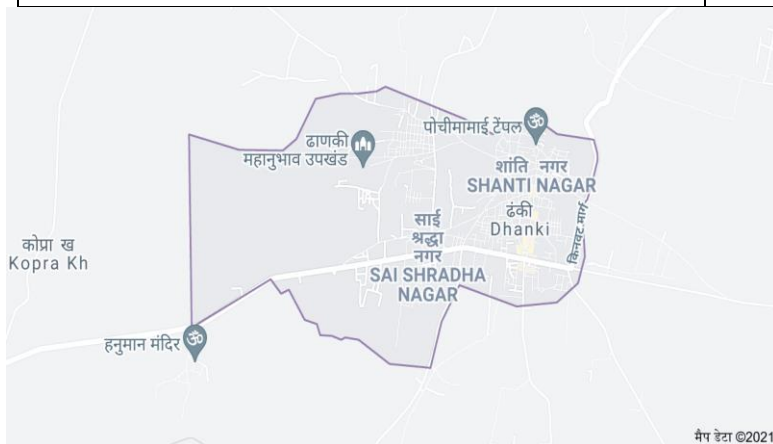
Fig.1 Location of water sample in Dhanki region

III. SAMPLE COLLECTED

I have collected water sample in dhinki villege at 10 different places Shanti nagar, Sai Shradha Nagar, Mahanubhav upkhand, Hanuman mandir temple, Pochama temple, Chatrapati chauik, SBI Colony, Swami Pendse college,fule budh vihar, Datt mandir Temple, shown in the above map. The water sample is collected in plastic bottles in morning time between 7:00 am to 10:00 am from july to september 2021. The collected water sample is taken in to the laboratory for the pourpoes of analysis of physicochemical and biological parameter of the sample.

Table: 1- Details of Sample Sources.

Sr. No	Sample Station	Type of Source	Depth in Feet
1.	Shanti nagar,	Bore well	200
2.	Sai Shradha Nagar	Bore well	240
3.	Mahanubhav upkhand,	Open well	60
4.	Hanuman mandir temple	Bore well	170
5.	Pochama temple	Bore well	280
6.	Chatrapati chauik	Bore well	300
7.	SBI Colony	Bore well	150
8.	Swami Pendse college	Bore well	220
9.	fule budh vihar	Open well	70
10.	Datt mandir Temple	Bore well	180

IV. MATERIAL AND METHOD

The several physicochemical and biological parameter of water sample of drinking water collected for the study, thee parameter like pH, turbidity, Alkalinity, BOD, DO, COD, TDS, Cloride, fluride, Sulfate, Berium, magnesium, hardness, calcium,

4.1 Test of water sampls:

Water quality test	Discription	instrument
pH	The major acidity (Hydronium ion +H) in the water.	pH meter
Temp.	Laboratory method	0.1^0c thermometer
Test	The test of water ranging from agriable to disagriable.	By testing
Odour	Odour is recognizing as a quality factor affecting acceptability of drianking water.	Wide mouth glass stoped bottle
Hardness	Measurment of calcium and magnecium in water.	Titrimetric methor (Complex metric)
Magnesium	Measurment of magnesium in amount of water.	Titrimetric method
Calcium	Mesurment of calcium in amount of water.	Titrimetric method
TDS	The measure amount of perticular solid that are in water.	Gravimetric method
DO	The amount of Oxygen availabe in the water.	Titrimetric

			method(Iodometric)
BOD	It is the amount of dissolved oxygen needed by aerobic biological organism.		Titrimetric method

4.2 Physiochemical and Analysis of water sample :

Sr. No	Test	Sample1	Sample2	Sample3	Samples4	Sample5
1.	Temp	28	30	27	29	33
2	pH	6.5	7.1	7	7.3	6.4
3	Turbidity(NTU)	0.5	0.7	0.4	0.6	0.5
4	Alkalinity	7	9	8	9	7
5	COD (mg/L).	39	36	38	30	37
6	DO(mg/L.)	6.3	6.1	6.0	6.2	6.1
7	TDS (mg/L.)	154	160	152	163	153
8	Chloride	36	40	38	34	31
9	Sulfate	10	9	11	14	16
10	Berium	Nil	Nil	Nil	Nil	Nil
11	Magnesim	3.4	2.2	2.7	3.6	3.4
12	Calcium	6.2	8	7.1	6.6	8.2
13	hardness	5.1	4.1	5.0	3.9	3.6

4.3 Physiochemical and Analysis of water sample :

Sr. No	Test	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
1.	Temp	29	30	33	27	28
2.	pH	6.8	7.0	6.4	6.9	6.5
3.	Turbidity	0.4	0.7	0.5	0.7	0.5
4.	Alkalinity	6	9	7	10	7
5.	BOD					
6.	COD	37	38	37	41	39
7.	DO	6.5	6.1	6.1	5.0	6.3
8.	TDS	156	166	153	162	154
9.	Chloride	39	41	31	33	36
10.	Sulfate	12	9	16	13	10
11.	Berium	Nil	Nil	Nil	Nil	Nil
12.	Magnesim	3.1	3.2	3.4	3.7	3.4
13.	Calcium	6.1	7.2	8.2	7.3	6.2
14.	hardness	6.1	3.1	3.6	5.4	5.1

4.4 Color, Odor, and Temperature:

The collected all samples colourless and odourless that's why the all sample indicates colloidal substances and decomposed vegetative matter is absent in the samples. The temperature of all sample is range between

27.9°C and 33.4°C due to increases in the sessional temperature in the Dhanki village during the July to September because it is directly related to the climatic condition during the session.

V. RESULT AND DISCUSSION

The temperature of underground water samples collected from the different open wall and bore well in Dhanki region at water temperature range 27.9°C to 33.4°C. The maximum temperature was observed at Swami Pendse college and Pochama temple and the minimum temperature was recorded at Mahanubhav upkhand and fule budh vihar during the july to suptember 2021 session. The pH values varies from 6.4 to 7.4 including alkline nature of underground water study area. The maximum pH was recorded in the area of Hanuman mandir temple ie. (7.3) The value of chloride were found in range 31 to 41 ml/lit.The maximum value was recored in SBI colony Dhanki ie.(41) .while the minimum value was found in Pochama temple and Swami Pendse college 31. The maximum hardness was observed at Chatrapati chauik Dhanki ie.(6.1) . Berium are absent in all water sample in Dhanki area.The maximum magnesium ion are found in fule budh vihar Dhanki 3.7.The maximum turbidity of water sample ia 0.7 (NTU) Sai Shradha Nagar,

VI. CONCLUSION

From the above paper in the present study 75% water found good quality and remaining 25% water sample under moderate and poor category because of due to increasing in water pollution, industrialization, water quality of drinking water get decreases and hence there is a need of proper analysis of water and prior treatment.

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Some Traditional Genotypes of Jowar from Osmanabad District of Maharashtra State

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ABSTRACT

Jowar is the major crop after sugarcane and maize of Osmanabad district. Present paper deals with some traditional genotypes of Jowar found in Osmanabad district. Most of them are rare. They are used as medicinal plants and economically very important. It is the need of time to conserve them for the use of next generation. In present paper the traditional genotypes of Jowar like Jot, Lakdi, Maldagdi, Maldandi and Shendri are discussed.

Key word: Traditional, Genotype, Jowar.

I. INTRODUCTION

Sorghum (*Sorghum bicolor* (L.) Moench) is the fifth most economically important crop among cereals in the world. It is grown on approximately 44 million hectares of land (Prakash *et al.*, 2010), in 99 countries (ICRISAT, 2009) with an annual production of 60 million tons (Iqbal *et al.,* 2010). *Sorghum* is third in importance after *rice* and *wheat*, and is currently grown on 8.7 million hectares with an annual production of 7.2 million tons in India (FAO) 2006). It has a number of advantages which have made it the traditional staple cereal crop in subsistence or low-resource agriculture in the hot semi-arid regions (Nagaraja *et al.*, 2008). *Sorghum* is the principal staple food of Maharashtra, and is also an important food of Karnataka, Madhya Pradesh, Tamil Nadu and Andhra Pradesh (Anonymous, 2006). In tropical and sub-tropical areas of Africa and Asia, *sorghum* is grown predominantly for human consumption. Normally *sorghum* is consumed in the form of *Roti*, porridges and boiled grains. Some of the sweet *sorghum* types have importance as a source of syrup for human consumption. Demand for other confectionaries, jaggery and malted beverages are increasing in India (Ratnavathi, 2017). In the developing countries of Asia and Africa, *sorghum* is a multipurpose crop and has diverse uses including human consumption and animal feed. *Sorghum* (*Sorghum bicolor* (L.) Moench) is a drought-resistant crop and an important food resource in terms of nutritional as well as socio-economic values, especially in semi-arid environments (Ilaria *et al.*, 2015). It is being grown in India in both *kharif*

(rainy) and *rabbi* (post rainy) seasons. The *rabbi sorghum* crop accounts for 45% of the total area under cultivation and 32% of the total production.

In present day, *Jowar* is major crop that undergoes large scale cultivation having commercial importance. Unfortunately, traditional landraces of *jowar* have been marginalized and their distribution is threatened. The traditional genotypes of *jowar* are very important however they are not popular.

II. STUDY AREA

Osmanabad is the district of Maharashtra state, comprising eight talukas viz. Bhoom, Kalamb, Lohara, Omeraga, Osmanabad, Paranda, Tuljapur and Washi. Osmanabad is a drought prone area. The total geographical area of Osmanabad district is 7569. Km^2. Out of which 241.45 kms, area is urban and 7271.0 sq. kms area is rural indicating the dominance of the rural sector (97%). Osmanabad lies at the southern part of Marathwada, between 17.35^0 to 18.40^0 North latitude and 75.16^0 to 76.40^0 East longitudes. It is located about 600 meters above the sea level. It is bounded by Solapur district to the South-West, by Ahmednagar district to North-West, by Beed district to the North and by Latur district to East. It comprises of 737 villages.

Nearly 32 % of its area comes under the rain shadow region. Annual average rainfall is 760 mm and drought is a permanent features. About 65% of agriculture is dry land farming and *Jowar* is the major crop after *sugarcane* and *maize*. Agriculture plays an important role in the Indian economy. Agriculture is the backbone of our country. It includes farming of crops, Over 58 % rural households primarily depend upon agriculture. In Osmanabad *jowar* is the main staple food of the people, which is grown over an area of 2553 kg/ha with an annual production of 1967 million tones. (Govt. of MH, 2015).
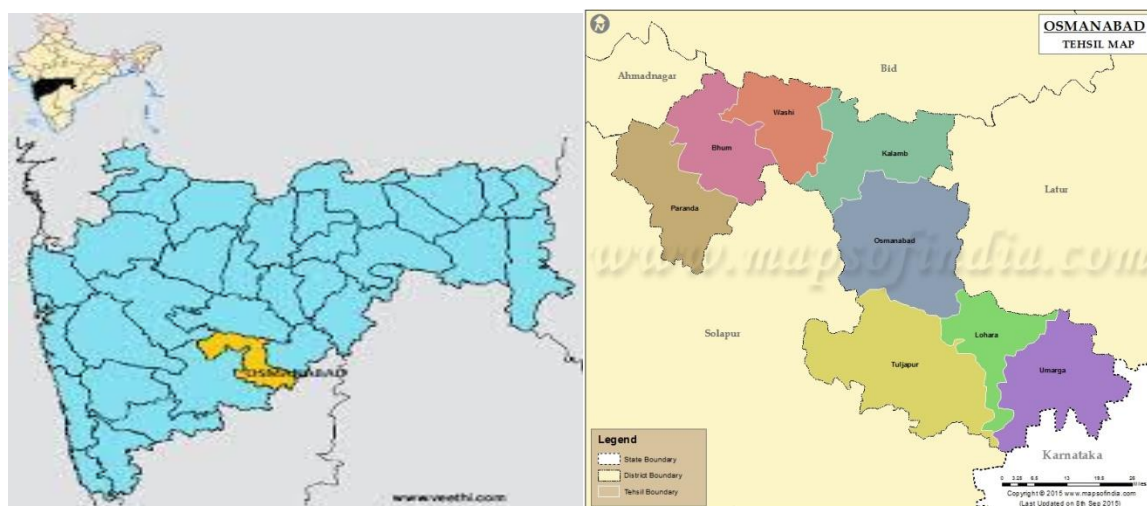
Fig. 1 Maps of study area.

III. MATERIALS AND METHODS

An intensive survey was conducted to collect the traditional genotypes of *Jowar* from Osmanabad district. Frequent visits were made to the study area during both seasons i.e. *rabbi* as well as *kharif* season. The results of the survey gave five genotypes of *jowar* from Osmanabad district. Herbarium specimens of each genotype were prepared and deposited at BAMU Herbarium. Specific information was collected using the following methods: (1) Knowledge holders were requested to accompany us to the field and identified the genotypes; (2)

Specimens were brought to the village and shown to knowledge holders for sharing information; and (3) Photographs taken from the field crops for further study. The collection study of the areas was initiated from various localities of the districts.

The verification generally made on the basis of repeated information. Vernacular names of the traditional genotypes of *sorghum* appeared interesting and therefore have been also noted. The seed samples were collected from the farmers growing these genotypes.

Morphology of Traditional Genotypes:

1) Jot

Morphological characters:

- Height of plant is 195- 225 cm.
- It is cultivated in rabbi season.
- Panicle is bend is the characteristics feature of this genotype.
- It produce more fodder which having good quality for cattle's.
- Crop grown in scanty rainfall.
- It requires less water, Duration for maturity is 110-120 days.
- The variety is drought resistant, suitable for less fertile soil.
- Production 6-7 q/ acre.
- Quality of roti is very good.
- Variety having good fodder value, cherished by animals.
- The straw bundles are sold in rural markets.
- Good fodder value being sweet.
- The grains are nutritious the yield is used domestically not sold in market.
- Grains are used as staple food.
- Special for young roasted grains i.e. Hurda purpose.
- Seed color: Bold white.

2) Lakdi

- Height of plant is 195-253 cm.
- It is cultivated in rabbi season.
- It requires black, well-drained soil.
- The variety is not cultivated in large scale.
- Less food value, rarely used to prepare bread.
- Suitable for any type of soil.
- It is also planted on field as borders for protection of the crops.
- Production 5-6q/acre.
- Seed color: Bold white.

3) Maldagdi

- Height of plant is 185-205 cm.
- It is cultivated in rabbi season.

➤ The grains are nutritious used for preparing bread and papad.

➤ Cultivated in black soil, heavy rainfall / irrigation are needed.

➤ Grown in drought condition. Proper irrigation gives good yield.

➤ The grains are not sold in market.

➤ The variety is largely cultivated on hill area therefore so called Maldagdi.

➤ Seed color: Bold white.

4) Maldandi

➤ Height 188-210 cm.

➤ It is cultivated in rabbi season.

➤ Panicle is straight and semi compact.

➤ Good grain and fodder quality.

➤ Cultivated in all types of soil.

➤ Good quality of roti.

➤ Its flour having highest water holding capacity.

➤ It also having good organoleptic taste however the yield is low.

➤ It is cultivated in both seasons.

➤ Fodder yield is also better, cherished by animals.

➤ Crop is cultivated throughout the rural areas of Marathwada reason.

➤ Production 5-7q/acre.

➤ Seed color: Pearly white.

5) Shendri

➤ The height of plant is 165-187 cm.

➤ It is cultivated in rabbi season.

➤ It is adapted to all types of soil.

➤ It is cultivated in poor fertile soil, requires less irrigation, it is drought resistant variety.

➤ Less food value rarely used to prepare bread.

➤ Crop grown in scanty rainfall.

➤ The genotype is cultivated for fodder by some farmers, no marketing of the yield.

➤ Genotype does not require chemical fertilizers.

➤ The grains are crushed and offered to cattle's.

➤ Seed color: Reddish grey.

Table No. 1. Grain purity percentage and weight.

Sr. No.	Name of Traditional Genotype	Total wt. of 100 healthy grains (gm).	Purity Percentage
i	Jot	2.22 gm	100 %
ii	Lakdi	2.09 gm	98 %
iii	Maldagdi	2.26 gm	99 %
iv	Maldandi	2.84 gm	99 %
v	Shendri	1.91 gm	99 %

IV. RESULTS AND CONCLUSION

The field survey of Osmanabad district revealed 5 genotypes of Jowar belonging to 5 different Tahsils. Maldandi genotype is found to be heavier in weight and Shendri to be lighter in weight. All 5 genotypes are found to be medicinally important. 02 genotypes namely Maldandi and Maldagadi are used as antirhumatic; Shendri and Jot are antidiabetic and Lakdi genotype is used in Typhoid. It is interesting to note that, the farmers collect and conserve seeds for next season with hanging the panicle at homes or packed in knots. Lakdi genotype is endemic to Bhoom Tahsil of Osmanabad district. Other genotypes are common to Marathwada region. It is learnt from farmers that the Malgota, Pandharpuri and Kalbondi genotypes of Jowar are considered to be extinct.

The grains belonging to different genotypes vary in colors. The height of plant, panicle, colour of grains, taste, yields and uses are variable from genotypes to genotypes. The rural people have knowledge to conserve the traditional genotypes.

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Fig. 1. Jot.

Fig. 2. Lakdi.

Fig. 3. Maldagdi.

Fig. 4. Maldandi.

Fig. 5. Shendri.

Using Machine Learning Techniques to Detect Distributed Denial of Service Attacks

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ABSTRACT

Machine learning (ML) is used for network intrusion detection because it is predictable after training with relevant data. ML provides a great way to detect new and unknown attacks. There are many types of network intrusion attacks; however, this document focuses on distributed denial of service (DDoS). DDoS attacks are the most destructive attacks, which will disrupt the safe operation of basic services provided by different organizations in the Internet community. These attacks are becoming more and more complex, and the number is expected to increase, which makes detecting and combating these threats challenging. Therefore, an advanced intrusion detection system (IDS) is needed to identify and recognize abnormal behavior of Internet traffic. This research combines well-known clustering methods such as Naive Bayes, Multilayer Perceptron (MLP), and SVM, uses decision trees and various classification algorithms, to detect DDOS attacks.

Keywords: Classification, Distributed Denial of Service, Machine Learning,

I. INTRODUCTION

With the expansion of computer networks (especially the Internet), a variety of cyber-attacks have appeared. An international ransomware virus called Wannacry recently stopped internet services in approximately 156 countries. Based on Kaspersky Lab's full Q4 results, botnet-assisted attacks target assets in nearly 69 countries / regions. The last quarter also saw the largest DDoS-based botnet attack lasting approximately 15.5 days and 371 hours. Hackers or shady hackers continue to create new forms of multi- layered DDoS attacks, mainly on the OSI network and the application layer [1]. This type of attack uses spoofed IP addresses to hide source detection and carry out large- scale attacks. These attacks are quite large, because the attack traffic absolutely consumes the network spectrum at peak times, thereby reducing legitimate data packets.

Ironically, the victims were government entities, financial companies, national defense forces, and military institutions. Famous websites such as Facebook, Twitter, and WikiLeaks have become victims of DDoS. They have also observed that the interruption of routine maintenance leads to financial failures, exhaustion of

services, and inaccessibility [2]. This paper focus on different machine learning identification methods, such as SVM, Naive Bayes, and decision trees, to detect and analyze different forms of these attacks, including Smurf, UDP flood, and HTTP flood.

In Network Intrusion Detection System (NIDS) research, there are three detection methods: misuse or signature- based, anomaly-based, and hybrid-based detection methods. Signature-based or misuse methods primarily detect known intrusion attacks, while anomaly-based methods detect new or unknown intrusion attacks. The hybrid base can detect known and unknown intrusion attacks [3].

Machine learning (ML) technology learns patterns from past data and makes predictions on current data. Because ML recognizes patterns, rather than specific signatures, it can be used in hybrid-based methods that can detect small changes in known attacks. New attacks are constantly occurring, so it is very important that NIDS can adapt to changes to detect known and unknown attacks. There are many types of attacks on NIDS. However, this article focuses on distributed denial of service (DDoS) attacks [4]. DDoS is very similar to a denial-of-service attack. The difference is that the latter has a single source of attack, while the former has multiple sources of attack. Due to the total consumption of network resources by these attacks, both types of attacks will result in the inability to access network resources. The challenge of an effective NIDS is to have a high accuracy rate, a low false alarm rate. These are some of the main indicators emphasized by the current NIDS research [5].

II. TYPES OF ATTACKS

DDOS Attack – If multiple applications (usually one or more application servers) flood the capacity or infrastructure of the target network, a distributed denial of service (DDoS) attack can occur. Figure 1 below shows an attack that is usually the result of multiple infected systems (such as botnets) flooding the target network with traffic [7, 8].
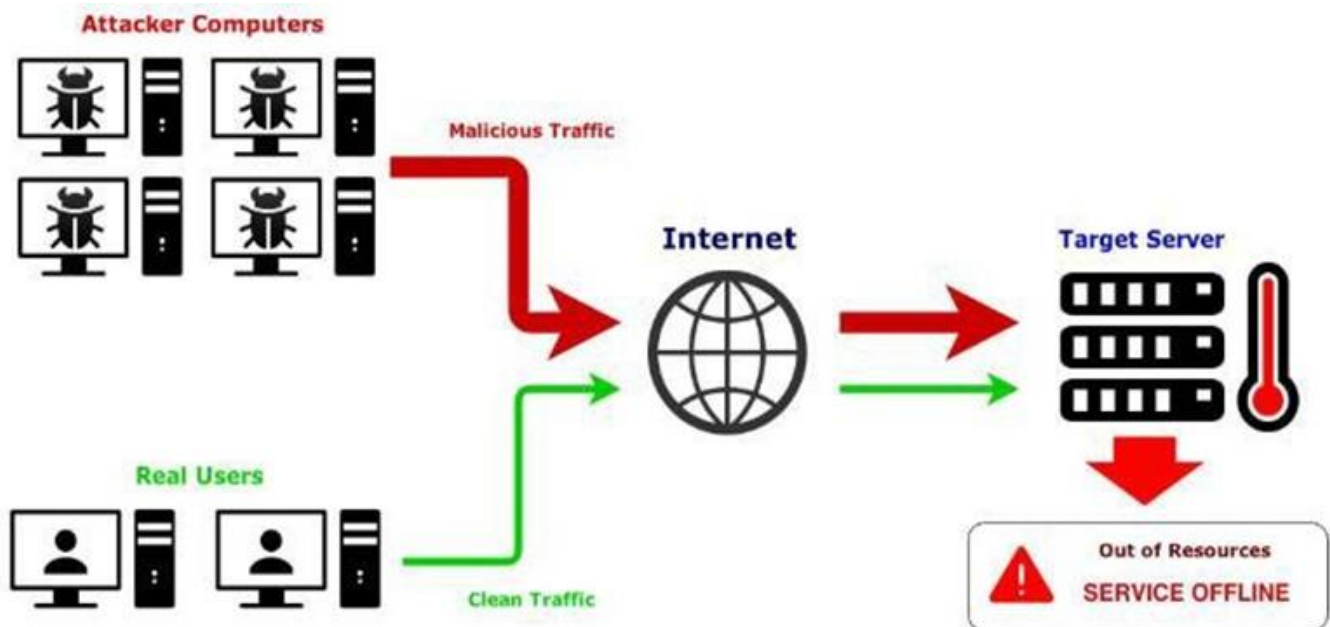
Figure 1: DDOS Attack

UDP Flood - UDP flooding is a Denial of Service (DoS) attack in which the attacker uses an IP packet composed of User Datagram Protocol (UDP) packets to attack and bypass the host's random port. Figure 2

below shows that the host is looking for applications related to certain datagrams in the entire attack pattern. If it is not detected, the host will send a "target unreachable" packet to the sender. The result of this flood bombing is that the network is flooded and therefore does not respond to legal traffic [8].
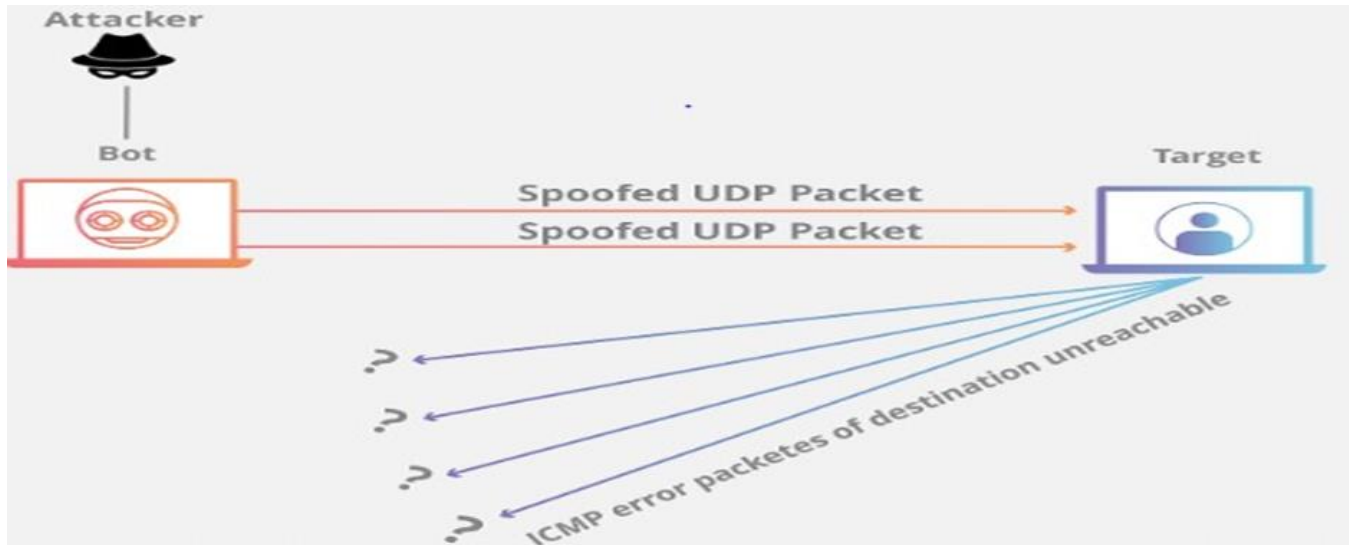
Figure 2: UDP Flood

ICMP (PING) Flood - Ping flood, is recognized as ICMP flood, is a well-known Denial of Service (DoS) assault where attacker powers a casualty's gadget down with flooding it with demands for ICMP reverberation, likewise called as pings. The figure3 will clarifies ICMP flood assault, this attack incorporates overpowering the casualty's organization according to popular demand parcels, understanding the framework will respond with similarly however many answer bundles as could reasonably be expected. Record types to get an objective down for ICMP demands additionally utilize custom programming or code, such as hping and scapy [9].
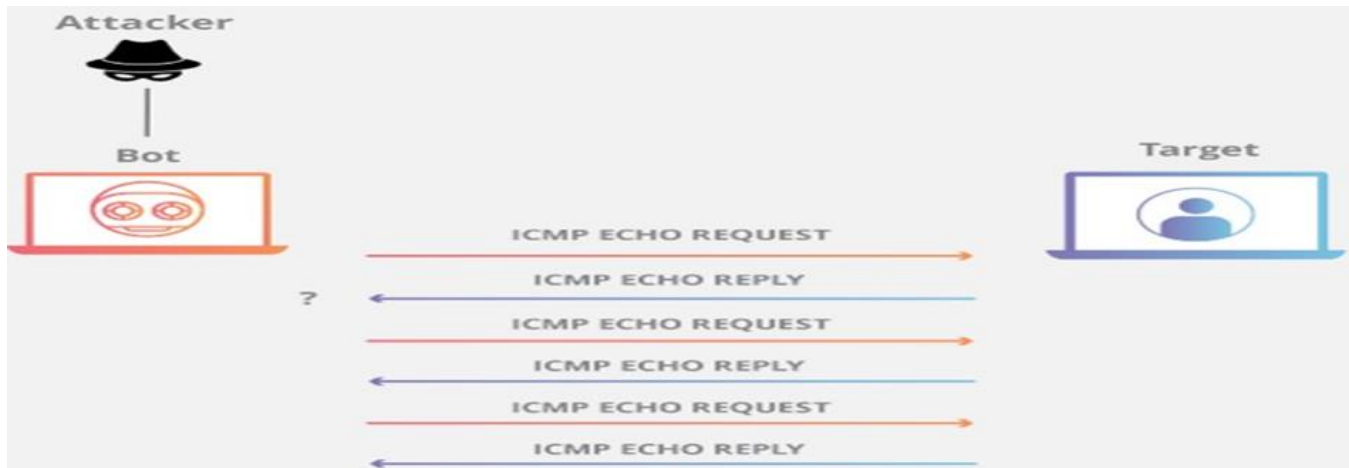
Figure 3: Icmp (ping) Flood

SMURF Attack This is additionally a one of the ddos attack wherein enormous gatherings of Internet Control Message Protocol (ICMP) bundles for the most part utilizing satirize source IP of the casualty are communicated over an IP broadcast address to a PC organization. The beneath figure4 shows naturally, numerous gadgets on an organization will answer it by giving a reaction to the source IP address. On the off

chance that the number of frameworks over the organization getting, reacting to such bundle is very high, so traffic can overpower the assailant's PC [9.10].
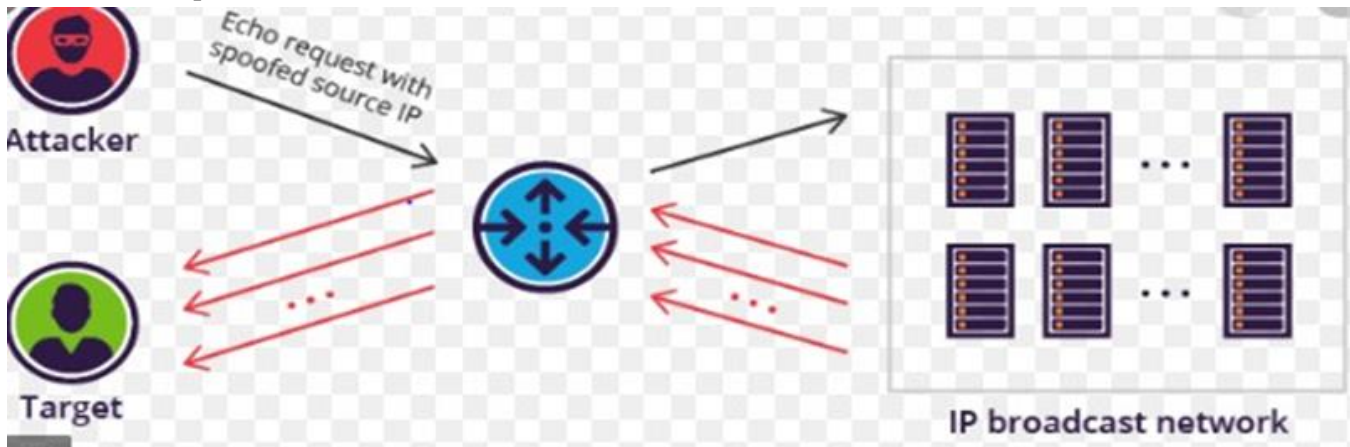
Figure 4: Smurf Attack

Http Flood Attack -A HTTP flood is a refusal of- administration dispersed volumetric (DDoS) assault, it is displayed in the figure5, and it is worked to overburden a chose worker with HTTP demands. At the point when the objective has likewise been loaded up with questions and can't respond to customary traffic, there will be forswearing of-administration for explicit solicitations from real clients [9, 10].
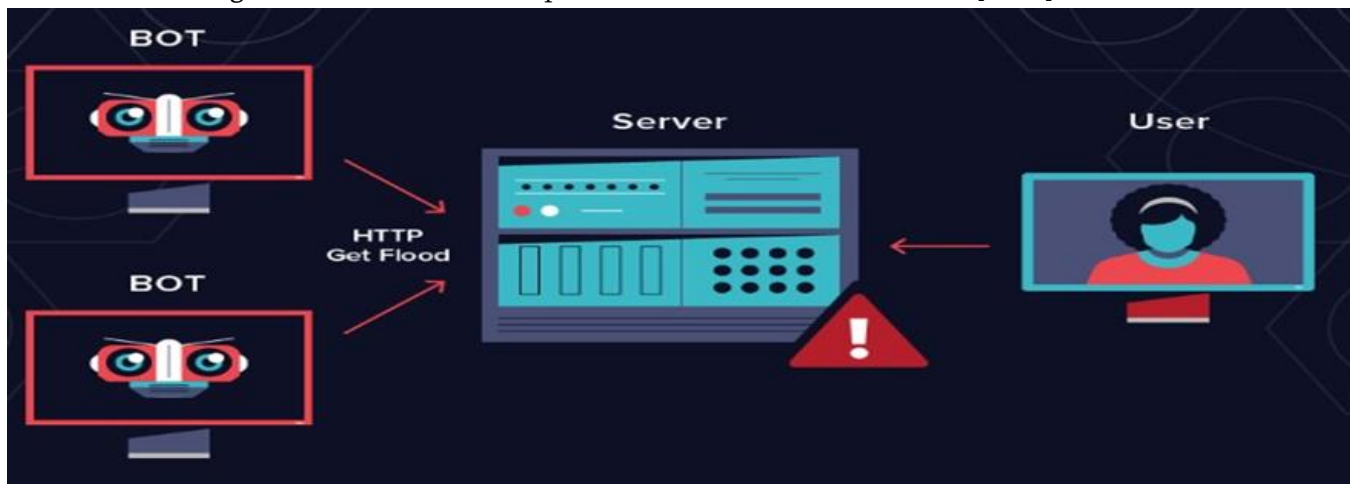
Figure 5: Http flood Attack

III. MACHINE LEARNING METHODS RELATED TO DDOS ATTACK DETECTION

Machine learning (ML) strategies study the sample from beyond information and make predictions for modern-day information. Since ML recognizes patterns, as opposed to specific signatures, it could be used for hybrid-primarily based totally technique that could hit upon small versions from regarded assaults. New assaults are constantly being created, consequently it's far crucial that NIDS be capable of adapt to adjustments to hit upon each regarded and unknown assaults [11].

ML can be partitioned into three fundamental sorts: supervised, unsupervised and semi-supervised. Supervised calculations expect information to be marked, then, at that point dependent on the name, they can characterize the information as indicated by an unmistakable example for each class or name. Solo calculations can utilize information with no naming. This sort of calculation bunches the information into

group(s) with comparative qualities. Semi- supervised calculations use information that are somewhat marked. The ML types and calculation are displayed in Fig. 6. It has been tracked down that administered calculations function admirably in IDS with recently known assaults, while solo calculation are more hearty with both known and obscure assaults [11,12].
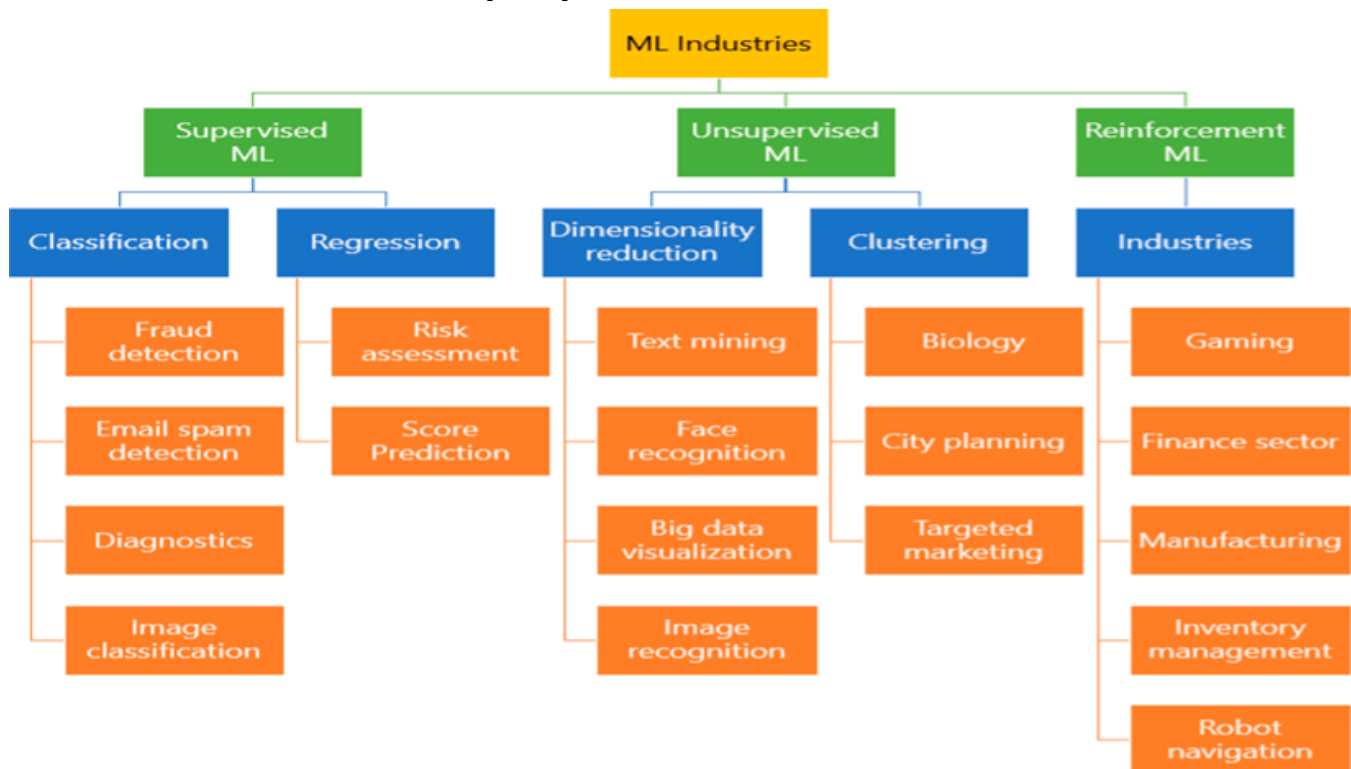
Figure 6: Classification of ML Algorithms

Signature based IDS is a human based activity, including numerous long periods of testing, creating and conveying the mark and making new mark for obscure assaults as well. So giving a less human based framework becomes essential. Machine Learning dialects inferred abnormality based IDS offers an answer for this issue, assisting with fusing a system which can gain from information and anticipate obscure details data on educated information [13, 14].

A. **Naïve bayes.** -Naive Bayes is cantered around the Bayesian arrangement model. Building up classifiers is a simple and easiest strategy: models which gives class names to give cases, characterized as the vectors of highlighting esteems, where the classes marks will be determined among certain limited set [14].

B. **Support Vector Machine-** SVM makes order and relapse utilizing the directed strategy for learning .Based on a gathering of trained models, every one of which is set apart as strategies are partitioned into two arrangements, a SVM calculation makes a plan which predicts that the new model will in general fall into one among the two [14].

C. **Decision Trees -** One of the essential methods utilized in AI and information mining is the decision tree. It is additionally used as a prescient model where discoveries with respect to an article are planned to suspicions about the ideal worth of the item. A decision tree might be utilized in the choice information examination to outwardly and expressly demonstrate dynamic. The informational index is contemplated and developed in this strategy. Therefore, if the new information component is given for characterization, the earlier dataset will group it properly [15, 16].

D. **Artificial Neural Network** -The expression "Artificial Neural Network" is gotten from Biological neural organizations that foster the construction of a human mind. Like the human cerebrum that has neurons interconnected to each other, artificial neural organizations additionally have neurons that are interconnected to each other in different layers of the organizations. These neurons are known as nodes [16].

E. **K-means clustering** - It is a bunching procedure broadly used to parcel an assortment of information in bunches k naturally. The K-implies grouping calculation works by picking k beginning bunch places in an informational collection and afterward refining them recursively as portrays. .Each model will be dispensed to its closest bunch center. It refreshes the mean of its part cases to every one of the bunch places. The calculation merges when the allotment of occasions to groups doesn't adjust further [15,16].

F. **Logistic Regression** - This calculation utilizes a regression model to track down the best-fitting model that portrays a reliant variable dependent on a bunch of autonomous factors. The results of the reliant variable comprise of just two potential qualities: valid or bogus. Along these lines it is appropriate for parallel characterizations [14, 15].

G. **Boosted Trees (BT)** - This calculation depends on choice tree with the expansion of a boosting technique. All things considered, of building one enormous tree, various little trees are constructed. Then, at that point the consequence of every little tree is added, with a weighted worth, to get a last prescient result [15, 16].

H. **Random Forest** - This calculation is like BT, where various little trees are constructed. Be that as it may, it contrasts in the manner in which it works out the last prescient result. Rather than utilizing a boosting strategy, it utilizes a packing technique. This strategy utilizes the mean of the singular little trees to get the last prescient result. This classifier is observed to be quick and proficient with enormous datasets [15, 16].

IV. CONCLUSION

It is concluded after a detailed analysis that web attacks are risky and that IDS / IPS may not tackle the new attacks that affect the networks. Machine learning approaches play a critical role in gaining exposure to the intensity of the assault and thereby making enterprises take suitable measures to limit certain attacks.

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Comparison & Correlation of Some Pulses Mycoflora in Different Storage Bags

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ABSTRACT

Among Various leguminous crops geern gram [*Vigna radiate*,(L)] and black gram[*Vigna mungo*,(L.)] are the important pulses crops cultivated in Marathwada region of Maharashtra. The crops have been reported to suffer from various types of disease and majority of them are known to be caused by fungi which are seed borne in nature. The term pulse mycoflora or seed borne fungi is used for both qualitative as well as quantitative analysis of fungi occurring on or in the seed.

In present investigation attempts have been made to study pulses mycoflora responsible for various pulses abnormalities and toxify its content in different storage containers like Paper bag, Polythen bag, Gunny bag, and Polythene Coated Gunny bag.

Key words:-Storage, Mycoflora, Pulses, bags.

I. INTRODUCTION

Proteins are the main important constituents of pulses. The degradation of proteins due to association of mycoflora is an important aspect about the value quality of the pulses proteins were highly degraded by seed mycoflora in various crops, which had resulted increase in the amount of amino acids. Significant decrease in protein content due to infestation of moulds has been observed in Pulses of black gram and green gram.

The legume like pea, chickpea, bean, gram, horse gram arhar, Greengram, and blackgram are cultivated as pulse crops in the region of Marathwada, in the state of Maharashtra. Among these, greengram or mung Bean [Vigna radiate (L.)Wilczek.], blackgram or urid bean [Vigna mungo (L.) Hepper.], Chickpea or gram or bengalgram (Cicer arietinum L.) and pea or Matar (Pisum sativum L.) are important dietary ingredients of the food for our Vegetarian population due to rich in essential amion acids. These are the major Pulse crops, which are cultivated mainly during Kharif, and Rabi seasons under rain fed conditions and also in a small portion under irrigated condition with assured water supply. These crops are cultivated either as sole crops or inter crops with jowar and bajra. Dev et al (1999).

The term pulses mycoflora or seed-borne fungi is used for both qualitative as well as quantitative analysis of fungi occurring on or in the seeds Among different leguminous crops, the seed mycoflora of gaur (Cymopsis tetragonoloba) was studied by Jain and Patel (2004) and reported significant association of species of Aspergillus,

Rhizopus, Cephalosporium , Fusarium   Cochliobolus, Drechslera, Fusarium, Penicillium, Rhizoctonia and Rhizopus were the main components of seed mycoflora of cowpea while, Deo and Gupta (2003) reported about thirty four species of fungi belonging to the eighteen genera, as Alternaria, Penicillium, Aspergillus, Periconia, Aeremonium, Chaetomium, Cladosporium, Curvularia, Gliocladium, Monilia, Paceiliomycetes to be associated with the seeds of gram. & identified important seed-borne genera on pigeonpea as Aspergillus, Alternaria, Curvularia, Fusarium and Rhizopus, Trichoderma and Verticillium

II. MATERIALS AND METHODS

Stored Samples of Pulses of green gram and black gram were collected from field, farm, storehouse, Dal mills, Godowns and market places composite samples were prepared by mixing the individual samples together, preserved in cloth bags at room temperature during the studies. The stored pulses were plated on Czepeks Dox agar (CDA) with 5% Nacl wt/v.(Neergaard 1973).

The fungal growth on the plate was preliminarily identified on the basis of sporulation characters like sexual or asexual spores or the fruiting bodies further the identification was done using standard procedures the pure cultures were maintained on PDA slants.

Table 1. Isolation of Storage fungi from Green Gram and Black Gram (Salt Agar plate method)

Mycoflora	Green Gram	Black Gram
Absidia sp.	05	00
Alternaria alternata	15	30
Alternaria tenius	15	00
Aspergillus flavus	40	15
Aspergillus fumigates	10	00
Aspergillus niger	30	20
Botrytis sp.	15	00
Chaetomiumum globosum	10	00
Cladosporium herbarum	25	00
Curvularia lunata	35	70
Curvularia sp.	45	20
Cunninghamella sp.	15	10
Drechslera	30	00
Fusarium equiseti	25	65
Fusarium oxysporum	05	30
Fusarium moniliforme	35	30
Fusarium roseum	-	35
Fusarium semitectum	15	15
Macrophomina phaseolina	10	30
Mucor sp.	-	45
Penicillium sp	10	-
Phoma exigua	10	25

Phytophora sp.	15	20
Pythium sp.	05	-
Rhizoctina solani	65	80
Rhizopus stolonifer	70	75
Syncephalastrum sp.	60	-

Table 2. Effect of different Storege containers on incidence of mycoflora of green gram and black gram.

| Pulses | Paper bag | Polythene bag | Gunny bag | Polythene Coated Gunny bag |
	No. of fungi isolated	No. of fungi isolated	No. of fungi isolated	No. of fungi isolated
Green Gram	14	18	20	12
Black Gram	12	14	15	13

III. RESULT AND DISCUSSIONS

During storage pulses show biodeterioration due to qualitative and quantitative increase in storage mycoflora. Proteins are the main important constituent of pulses. The degradation of proteins due to association of mycoflora is an important aspect about the value qulity of pulses. Sinha and Prasad (1977) found that proteins were highly degraded by seed mycoflora in various crops, which had resulted decrease in the amount of amino acids. Significant decrease in protein content due to infestation of moulds has been observed in black gram and green gram. Bilgrami et.al.,(1978) In order to study this isolation were made from pulses of green gram and black gram which were stored under ordinary conditions in the market yard or godowns for 16-18 months by using salt agar method.

It is clear from the result summarised in Table 1. That there was qualitative and quantitative variation in storage mycoflora of green gram and black gram. Green gram and black gram gave highest amount of mycoflora .The species of Absidia ,Aspergillus, Botrytis, Cunninghamella,Mortierella, Penicillium, Syncephalastrum and Tricoderma appreared newly from that of filed fungi. Similarly Girisham and Reddy (1986) studied mycoflora of pearl millet in relation to storage period and found that the fungi colonizing the seeds, increased with progress of storage period.

At the same time pathogenic fungi like Fusarium oxysporium, Macrophomina phaseolina, Rhizoctonia solani and Alternaria alternate showed less. Incidence of Aspergillus fumigates, Cladosporium herbarum, Botrytis sp., and Penicillium sp., were reported only on green gram but not on black gram pulses.

It is clear from the results given in Table 2. Pulses of green gram and black gram gave maximum mycoflora when stored in gunny bags followed by pulses stored in polythene bags. Where as, pulses in paper bags showed less number of fungi.

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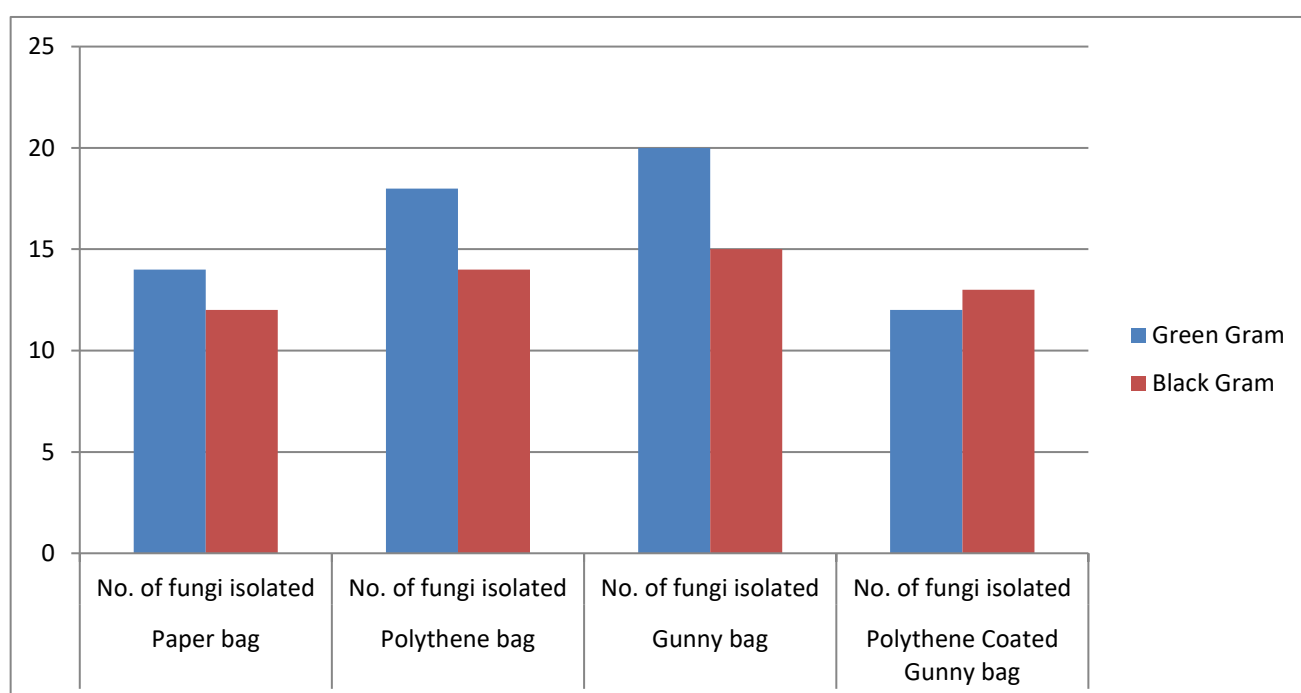
Yogic and Nutritional Benefits of Sports Performance

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ABSTRACT

Derived form the sankrit word yuji meaning yoke or union, yoga is an ancient practice that brings together mind and body practicing yoga is said to come with many benefits for both mental and physical health though not all of these benefits have been backed by science. nutrition is a topic of constant change and has grown as a dynamic field of clinical study. Nutrition plays a very vital role in our life. Yoga and Ayurveda had laid down the foundations of dietetics. The valuable guidelines regarding various food articles and diet for Yoga Sadhaka, to achieve maximum benefits, are given in traditional yoga texts like Hatha Pradipika and Gheranda Samhitha. Now is the time to evaluate the place of nutrition in Yoga and to study how the dietetic principles in yoga will help to eradicate the national problem of Mal-nutrition and poverty which is the pressing need of the moment

Keyword:-yoga, nutrition, performance

I. INTRODUCTION

Yoga emphasizes an intimate connection of diet with mind, because mind is formed from the subtlest portion of the essence of food. According to the yogic concept of good nutrition, diet is of three kinds: Sattvic (pure),Rajasic (over-stimulating) and Tamasic (dull) with respect to its effect on the body and mind. Sattvic diet is supposed to increase the energy of the mind and produce cheerfulness, serenity and to improve mental health .Rajasic food creates jealousy, anger, delusion, fantasies and egotism. Tamasic food increases pessimism, laziness and doubt. Sattvic food is fresh, juicy, light, unctuous, nourishing and tasty. Rajasic food is bitter, sour, salty, pungent, hot and dry. Tamasic foods are stale, heavy, half-cooked or over-Cooked sports nutrition is the foundation for success of athlete . It is a well designed nutrition plan that allows active adults and athletes to performs as their best. It supplies the right food type energy nutrients, and fluids to keep the body well hydrated and functioning as peak levels .sports nutrition is unique to each preson and is planned according to individual goals. To examine yoga practically, the Astanga yoga system of Patanjali and the techniques of Hatha yoga can be used to divide it into two parts - Physical yoga and Non-physical yoga. The two main activities of Physical yoga

i. Physical Postures.
ii. Breathe control (Pranayama).

The two main activities of Non-Physical yoga are

i.   Ethical disciplines (Yama and Niyama)

ii. Meditative practices (Pratayahara, Dharana, Dhyana and Samadhi

Nutritional Aspects Now more than ever, the need for accurate sports nutrition information is increasing. Whether the athlete's performance is recreational or elite, it will be influenced by what he or she eats and drinks. Unfortunately, there is much misinformation regarding a proper diet for physically active persons. In the quest for success, many health- and fitness-conscious persons will try any dietary regimen or nutritional supplement in the hope of reaching a new level of wellness or physical performance. The 40-30-30 Diet Athletes must supposedly eat the

Sports nutrition basics: - macronutrients

The energy required for living and physical activity comes from the food we eat and fluid intake. Macronutrients in the following food group supply the energy essential to optimal body function.

Carbohydrates: - are either simple or compels and the most important energy source for the human body. simple cards include sugars naturally occurring in food like fruits, vegetables, and milk .whole grain bread ,potatoes ,most vegetables, and oats are examples of healthy compels cards. Your digestive system breaks down carbohydrates into glucose or blood sugar which feeds energy to your cells, tissues and organs.

Proteins: - proteins are made up of amino acids and are essential to every cell of the human body. protein contains all the amino acids needed by the body, and include animal sources like meat, fish poultry and milk .Essential amino acids cants be made by the body and must be supplied by food .protein plays an important role in muscle recovery and growth.

Fats:- can be saturated or unsaturated and they play a vital role in the human body. unsaturated fats are considered healthy and come form plant sources like olive oil and nuts saturated fats are found in animal products like red meats and high fat dairy, which are indicated to increase the risk of disease. Healthy fats provide energy, help with body development protect our organs, and maintain cell membranes.

Active adults and competitive athletes lean mass, improving body composition, or enhancing athletic performance. these sport-specific scenario require differing nutritional programs. research findings indicate the right food type, caloric intake, nutrient timing, fluids ,and supplementation are essential and specific to each individual. the training programs require a well designed diet for active adults and competitive athletes. research shows a balanced nutrition plan should include sufficient calories and healthy macronutrients to optimize athletic performance. the body will use carbohydrates or fats as the main energy source, depending on exercise intensity and duration .Active adults exercising three to four times weekly can impede athletic training and performance.

Increase Strength In addition to improve flexibility, yoga is the best way to an exercise routine for its strength-building benefits.In fact, there are specific poses in yoga that are designed to increase strength and build muscle.

Promotes Healthy Eating Habits:

Mindful eating, also known as intuitive eating, is a concept that encourages being present in the moment while eating.

It's about paying attention to the taste, smell and texture of your food and noticing any thoughts, feelings or sensations you experience while eating.

This practice has been shown to promote healthy eating habits that help control blood sugar, increase weight loss and treat disordered eating behaviors .

Because yoga places a similar emphasis on mindfulness, some studies show that it could be used to encourage healthy eating behaviors.

One study incorporated yoga into an outpatient eating disorder treatment program with 54 patients, finding that yoga helped reduce both eating disorder symptoms and preoccupation with food .

Another small study looked at how yoga affected symptoms of binge eating disorder, a disorder characterized by compulsive overeating and a feeling of loss of control.

Improve Breathing: Pranayama, or yogic breathing, is a practice in yoga that focuses on controlling the breath through breathing exercises and techniques.several studies have found that practicing yoga could help improve breathing.

Vital capacity is a measure of the maximum amount of air that can be expelled from the lungs. It is especially important for those with lung disease, heart problems and asthma. Improving breathing can help build endurance, optimize performance

Improves Flexibility and Balance: Many people add yoga to their fitness routine to improve flexibility and balance. There is considerable research that backs this benefit, demonstrating that it can optimize performance through the use of specific poses that target flexibility and balance.

Improve Heart Health: From pumping blood throughout the body to supplying tissues with important nutrients, the health of your heart is an essential component of overall health. Yoga may help improve heart health and reduce several risk factors for heart disease.

II. CONCLUSION

To sum it up, sports is a demanding activity which requires one to be physically, mentally, emotionally and nutritionally fit. Yoga and nutrition are allied sciences which play an essential role in enhancing performance of sportsmen and women. Yoga has manifold physiological, psychological benefits, Nutrition contributes by laying a good dietary foundation, by means of planning a well-balanced diet sufficient to cater to the needs of sportsmen and women. By the intelligent application of the above discussed and many more aspects of yoga and nutrition, one can maximize their performance.

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Effect of Synthesis Techniques on VUV Properties of Eu^{3+} Doped YVO$_4$ Phosphors: A Comparative Study

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ABSTRACT

The europium doped yttrium vanadate (YVO4:Eu3+) doped phosphor have been synthesized by two different techniques viz., solution combustion (CM) and solid-state diffusion (SSD) techniques. X-ray diffraction patterns confirm the formation of a pure phase in the samples synthesized by both the methods; however, the luminescence intensities of the samples are different under vacuum ultraviolet (VUV) excitation i.e., 147 and 172nm. The effect of synthetic technique is also seen on morphology of materials studied with the help of scanning electron microscopy, which shows an agglomeration and increase in particle size with increasing calcination temperature in case of SSD. The luminescent properties of the synthesized material have been studied by using synchrotron radiation. The photoluminescence (PL) results clearly show the strongest red emission peak at the wavelength around 618 nm. The highest luminescent intensity is obtained for the sample prepared by the CM method compared to SSD method. It is also noted that wavelength of 172 nm is more efficient than the 147 nm for excitation of YVO4:Eu3+.

Keywords: Yttrium Vanadate, Combustion Synthesis, Solid State Diffusion, VUV Luminescence

I. INTRODUCTION

A plasma display panel (PDP) has been regarded as a promising candidate for a display with a large area mainly because its emissive features include a wide viewing angle and high brightness. PDP phosphors are expected to meet the critical requirements to yield a high luminous efficiency on excitation with vacuum ultraviolet (VUV) radiation of wavelengths 147 and 172 nm generated from a plasma of a mixture of He and Xe noble gases[1]. Oxide phosphors with aluminate, silicate, vanadate, phosphate, and borate groups generally exhibit strong absorption in the VUV spectral region[2-3].

The main weakness of red-emitting PDP phosphors currently used are the lack of colour purity, long decay lifetime and colour degradation due to material instability. For these reasons, the optical and luminescence properties such as luminous efficiency, purity of chromaticity and saturation, and decay lifetime of PDP phosphors have been widely investigated[5-7]. A search for red-emitting PDP phosphors with improved efficiency, brightness, and colour saturation has become an important task for which research is being actively pursued. Several synthesis routes have been described for the preparation of Eu^{3+}-doped YVO_4 such as co-precipitation, hydrothermal, solid-state reaction, combustion method[8-12]. However, there is no report on the comparison of structural and VUV properties of Eu^{3+}-doped YVO_4 sample synthesized via combustion and solid-state reaction routes. To develop satisfactory red-emitting PDP phosphor, we have thoroughly investigated the effect of preparation method on photoluminescence (PL) properties $YVO_4:Eu^{3+}$ phosphor under VUV excitation. Here, we report the synthesis and VUV PL spectral investigations of red-emitting $Y_{1-x}VO_4: Eu_x$ phosphors in several series and also the dependence of luminescence performance on method of synthesis. The $YVO_4:Eu^{3+}$ phosphor has been prepared by low temperature, low cost and less time-consuming solution combustion method and high temperature conventional solid-state diffusion method. We have also studied the optimized composition of the dopant to obtain red-emitting phosphor with great potential for PDP application.

Pure and Eu^{3+}-doped YVO_4 phosphors were prepared following two techniques, namely the solution combustion synthesis and high-temperature solid-state diffusion method. Analytical graded yttrium oxide (Y_2O_3), europium oxide (Eu_2O_3), ammonium meta-vanadate (NH_4VO_3) and urea [$CO(NH_2)_2$] were taken as starting materials.

II. METHODS AND MATERIAL

2.1. Solution Combustion Method:

In the first step for solution combustion synthesis method, 0.5 mol of Y_2O_3 and xEu_2O_3 (x = 0.02, 0.04, 0.06, 0.08, 0.10) were dissolved in the concentrated HNO_3 (nitric acid) to form respective nitrates. Stoichiometric amount of NH_4VO_3 was dissolved in doubled distilled water and slowly added to the previously formed nitrates, which resulted in a dark brown solution. In this solution, appropriate amount of urea was added as a fuel and ammonium nitrate as a oxidizer was added. The required amount of fuel (urea) and oxidizer (ammonium nitrate) was calculated by the ratio of oxidizing and reducing valencies[11]. Then, the mixture was stirred until the clear solution is formed. The as-prepared solution of reaction mixture was placed in pre-heated muffle furnace at 550 ^0C temperature for 5 min and such process resulted in a black powder. Finally, the black powder was annealed at 800 C for 3 h resulting in the final product.

2.2. Solid State Diffusion Method:

$Y_{1-x}Eu_xVO_4$ (x = 0.02, 0.04, 0.06, 0.08, 0.10) phosphors were also prepared by conventional high-temperature solid-state reaction method. All the reagents (Y_2O_3, NH_4VO_3 and Eu_2O_3) were taken in stoichiometric ratio and mixed together in mortar–pestle for half an hour and heated at 700 ^0C for 6h. The last product was again ground properly and maintained in a muffle furnace at 1200 ^0C for 3h. Finally, the sample was removed out from the furnace and after normal cooling ground appropriately. The X-ray diffraction (XRD) pattern of the sample was recorded on Rigaku miniflex X-ray diffractometer with a scan speed 2.000 deg/min and with Cu Ka radiation. The morphology of the phosphor particles was studied by using Hitachi model S-4800 type-2 field-emission scanning electron microscope (SEM) and elemental analysis by Bruker EDS. The VUV spectra were

recorded at Department of Physics, S.G.B., Amravati University, Amravati, by using remote access mode of Beamline 4B8 in Beijing synchrotron radiation facilities (BSRF)[13] under dedicated synchrotron mode (2.5 GeV, 150 – 60 mA). The vacuum in the sample chamber was about 1×10^{-5} mbar. The effects of the experimental setup response on the relative VUV excitation intensities of the samples were corrected by dividing the measured excitation intensities of the samples with the excitation intensities of sodium salicylate measured simultaneously in the same excitation conditions. The region of excitation spectra was from 100 to 300 nm and the emission spectra recorded at 147 and 172 nm excitation.

III. RESULT AND DISCUSSION

3.1 X-ray Diffraction

The crystallinity and surface morphology have a great impact on optical behaviour such as photoluminescence of the material[14]. Fig.1 illustrate the XRD patterns of Eu^{3+}-doped YVO_4 prepared by combustion and solid-state reaction route, respectively. The formation of the crystalline phase of as-prepared products of SSD and CM method was confirmed by X-ray diffraction patterns of YVO_4 (as shown in Figure 1) to verify the phase purity and crystal structure. The X-ray pattern of both method samples indicated a pure phase of the standard YVO_4 and all the peaks are in good agreement with the (ICDD, 01-082-1968). There were no additional peaks found as the concentration of Eu ion was increased to 10%. Thus, it seen that pure phase of YVO_4 could be achieved using CM method at low temperature compared to solid state diffusion (SSD) synthesis, which require higher temperature and time for synthesizing YVO_4. This agreement indicates that the phosphor has been successfully prepared by using the CM and SSD method. It is also noticed that the crystal diffraction intensity of YVO_4 obtained by SSD is lower than that obtained from the CM method.
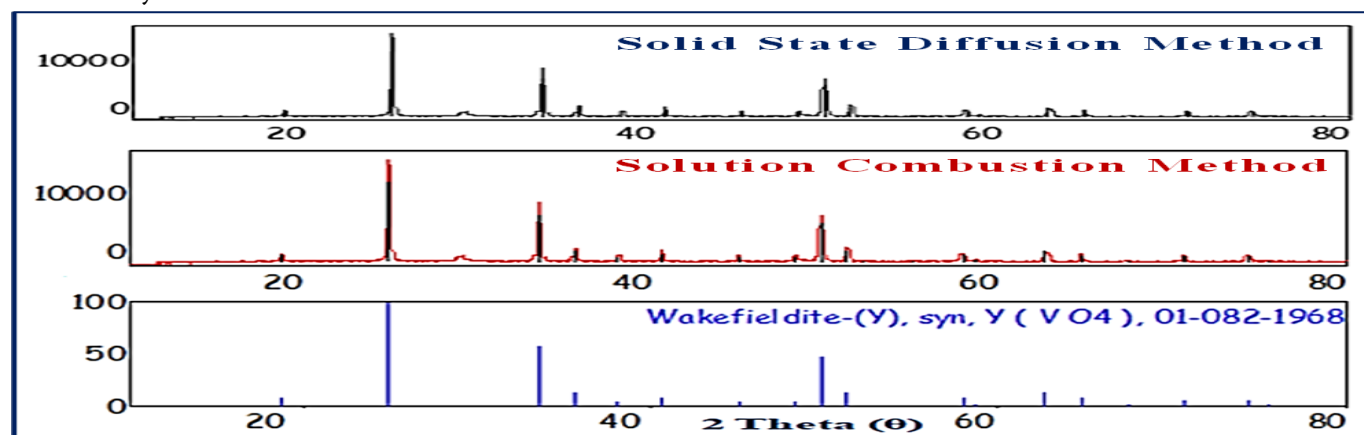
Figure 1: XRD patterns for undoped and Eu^{3+}-doped YVO_4 phosphors prepared by combustion method. Standard JCPDS pattern is also given for reference.

3.2 Scanning Electron Microscopy

The morphologies of $YVO_4:Eu^{3+}$ prepared by conventional CM technique and SSD route are shown in Fig. 2(a) and (b), respectively. The $YVO_4:Eu^{3+}$ particles prepared by conventional solid-state route have an irregular shape, coarse surface, wide size distribution, and are highly aggregated, whereas the $YVO_4:Eu^{3+}$ particles prepared by CM technique have rod shape, smooth surface, narrow size distribution in 1um range, and are lowly aggregated. The morphology difference above mentioned should have originated from different preparation conditions and post-treatment techniques. In conventional solid-state reaction route, a high-

temperature calcination is required for obtaining the phosphor materials with high crystallinity, however, high-temperature calcinations make the phosphor particles large and easily agglomerated, thus, milling and grinding appear necessary to obtain suitable particle size for application, but these post-treatment techniques significantly damage the surface quality of phosphor particles[15], as shown in Fig. 2(a). Compared with solid-state reaction route, the CM route needs a lower calcination temperature for the host crystallization and no milling and grinding processes. It is known that the morphology of phosphor particles plays an important role in improving the performance of flat panel displays. The phosphor particles with smooth surfaces are able to increase the screen brightness and improve the resolution[16] because of lower scattering of evolved light and higher packing densities than irregularly shaped particles obtained by conventional solid-state route.
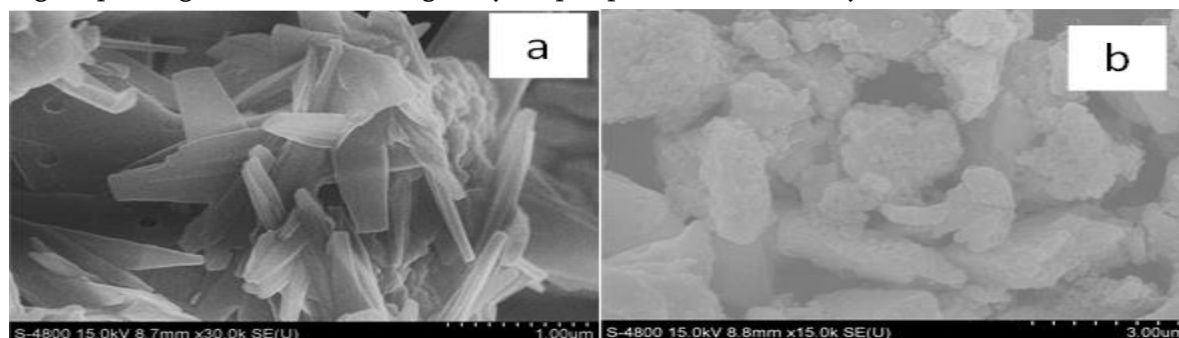
Figure 2: SEM images of 0.8 % Eu^{3+} doped YVO$_4$ prepared by: (a) CM and (b) SSD Method

Furthermore, recent studies revealed that the VUV energy is absorbed in a very thin layer at the surface of the phosphor particles[17,18], so the surface quality of phosphor particles seems to be very important for the luminescent efficiency. Milling and grinding processes are introduced in the phosphor prepared by conventional solid-state route, thus, the surface quality of phosphor is degraded, which is expected to influence the absorption of VUV energy significantly.

3.3 VUV Luminescence Studies

Emission spectra for samples prepared by CM and SSD methods of Eu^{3+}-doped YVO$_4$ phosphor shown in Fig. 3 along with insets, reveal the characteristic Eu^{3+} emission lines[19-21]. All the samples have been excited by VUV light of wavelength 147 and 172 nm, leading to an efficient energy transfer from the YVO$_4$ matrix to Eu^{3+} ions with subsequent f–f radiative relaxation ($^5D_0 \rightarrow {}^7F_J$) transitions. All the emission spectra consist of the characteristic lines from $^5D_0 \rightarrow {}^7F_J$ (J = 1, 2, 3 and 4) transitions of Eu3$^+$ ion at 596, 620, 653 and 702 nm, respectively, as shown in Fig. 3 along with insets, respectively. In all emission results, red emission line at 619 nm, attributed to the electric dipole transition $^5D_0 \rightarrow {}^7F_2$ of Eu^{3+} ions, is found to be intense. The excitation spectra of 0.8 % Eu^{3+}-doped YVO$_4$ sample, prepared by two different methods, recorded at the emission wavelength of 619 nm are shown in the insets of Fig.4. Fig.5 illustrates the plot of Eu^{3+} concentration versus the emission intensity of the red line (at 619 nm) in the Y$_{1-x}$Eu$_x$VO$_4$ phosphors synthesized by two different methods. The optimum Eu^{3+} concentration of the samples, synthesized by SSD and CM technique, is observed to be 8 %. As a case, the luminescent efficiency of the Eu^{3+} under the excitation at wavelength 147 and 172 nm depends strongly on the absorption efficiency of the host. As mentioned above, the phosphor powders obtained from CM route have higher luminance than those obtained from SSD route, since they have higher absorption efficiency of energy due to their excellent morphology. The emission spectrum of Eu^{3+}-doped YVO$_4$ prepared by low temperature method CM method shows very similar characteristics with that from high temperature SSD with difference in emission intensity.
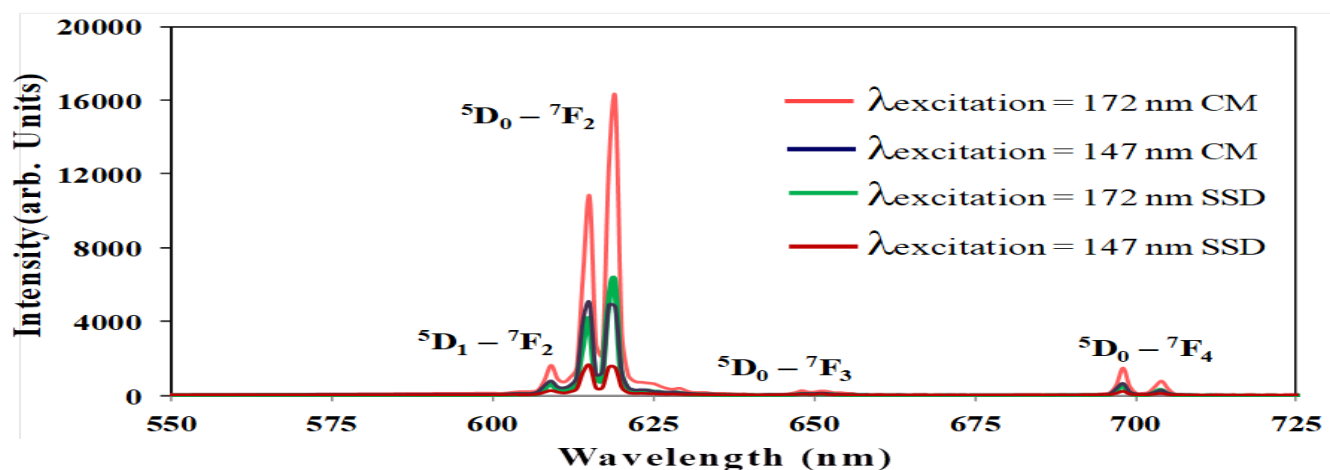
Figure 3: Photoluminescence emission spectra of YVO$_4$:xEu^{3+} prepared by: (a) CM and SSD method (λex = 147 and 172 nm).

The intensity ratio of $^5D_0 \rightarrow {}^7F_1$ to $^5D_0 \rightarrow {}^7F_2$ bands varies with the changing of the preparation method at different excitation. It is interesting to note that the emission intensity of Eu^{3+}-doped YVO$_4$ crystals prepared by the CM method is about 2 times as much as that by the SSD method. The difference in the emission intensity of Eu^{3+}- doped YVO$_4$ crystals prepared by different methods can be explained if we consider the morphology of crystals and the phase formation during the processes.
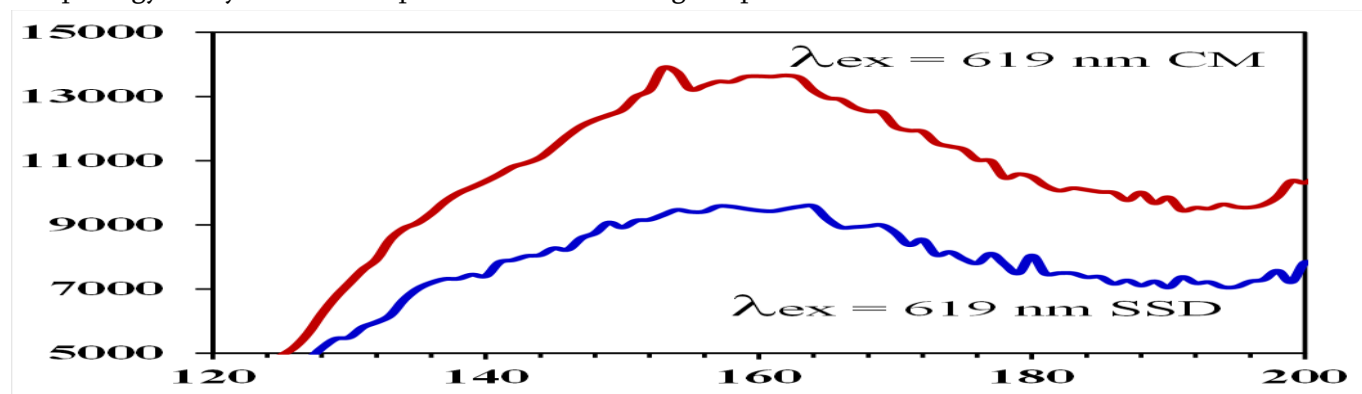
Figure 4: PL excitation spectra of the optimum Eu^{3+}-doped YVO$_4$ samples prepared by CM and SSD route (λemi = 619 nm)
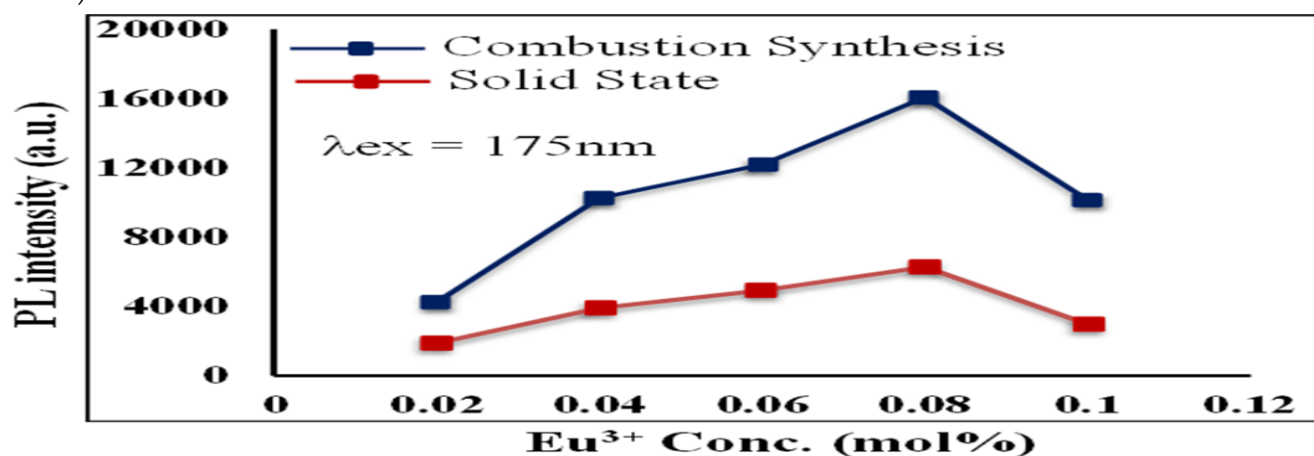
Figure 4: Plot of PL emission intensity as a function of Eu^{3+} concentrations of Eu^{3+}-doped YVO$_4$ prepared by combustion route and solid-state route (λex = 172 nm)

The particles of the YVO$_4$ prepared via the high temperature method were agglomerated (Fig.2b) and the extent of crystallization of YVO$_4$ prepared from the high temperature process is lower than that obtained from the low temperature CM method (Fig.2a). As mentioned earlier in the process of photoluminescence of Eu^{3+}-doped YVO$_4$ crystals, the energy is absorbed by the host lattice YVO$_4$ first and then it is transferred to the activator Eu^{3+} ions then lead to the luminescence. The absorbed energy by the host lattice in the agglomerated Eu^{3+}-doped YVO$_4$ particles would be lower than that in the YVO$_4$ crystals with uniform shape. Furthermore, there would be more defects in the crystals with lower crystallization obtained from the high temperature system.

IV. CONCLUSION

Solid-state and solution combustion methods were used to synthesize the red-emitting phosphor for PDP applications. By comparison, advantages of low temperature solution combustion method are summarized as follows: lower calcinations temperature, excellent particle morphology, and higher compositional homogeneity. YVO$_4$:Eu^{3+} phosphors have strong excitation bands in VUV range, indicating high VUV energy absorption. The phosphors prepared by low temperature solution combustion method have superior luminescence, since they have excellent particle morphology and high compositional homogeneity, compared with those prepared by solid-state reaction route.

V. ACKNOWLEDGEMENT

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In Vitro Antimicrobial Activity Of 3-Thio-4-Aryl-5-Tolyl-[1, 2, 4]– Dithiazolidines [Hydrochloride]

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ABSTRACT

A series of novel 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] have been synthesized by the interaction of several Ammonium aryl dithiocarbamate with *N-p*-tolyl-*S*-chloro isothiocarbamoyl chloride in refluxing chloroform medium. These compounds were screened for their antibacterial and antifungal activities against– *E. coli, P. vulgaries, S. aureus, S. typhimurium, K. pneumonie, Ps. aeruginosa, A. niger and C. albicance.* The newly synthesized compounds have been characterized by analytical and IR, ^{1}H NMR and Mass spectral studies.

I. INTRODUCTION

Any chemical substance inhibiting the growth or causing the death of micro-organisms is known as antibacterial agent. Chemical substances are used for treatment of diseases and have been known since the 1500's. The chemical substances used for the treatment of infectious diseases and diseases caused by the proliferation of malignant cell are called as chemotherapeutic agents. Antibacterial drugs that destroy bacteria or stop its growth. An antibiotic is a chemotherapeutic agent that stops the growth of micro-organisms, such as bacteria, fungi or protozoan's. "Antibiotic" is considered to be a substance which is anti-bacterial, anti-fungal, or anti-parasitical. It is very important to know the specific mechanism by which chemotherapeutic agents inhibit or kill micro-organisms. This information has wide application. It may suggest some chemical entity as superior drug e. g. similar compounds but with some modification in its configuration. It provides better understanding of the cell. More often than not, chemotherapeutic agents have been discovering by screening experiments i. e. by trial or error. New chemotherapeutic agents are intensively investigated in order to establish their mode of action.

Dithiazolidine constitutes a major role in the synthesis of various heterocyclic moieties. They act as active precursors in synthetic heterocyclic chemistry. Synthesis of a series of novel five member ring containing nitrogen and sulphur are well known[1]. A small heterocyclic ring containing nitrogen and sulphur have been under investigation for a long time because of their important properties. Synthesis, structural properties and antimicrobial activities of various [1, 2, 4]-dithiazolidine have been reported earlier[2]. The literature survey revealed that the [1,2,4]- dithiazolidine have been found to possess potent anti-tumors, anti-tuberculosis[3], anti-diabetic and anti-cancer[4] and anti inflammatory[5] properties.

Thiocarbamides and their heterocyclic derivatives have gained recently much interest as inhibitors of Human Immunodeficiency Virus (HIV)[6] and Therapeutic agents[7]. Some of the heterocyclic derivatives of thiocarbamides are found to possess diverse pharmacological activities like antifungal and anti-tubercular agents. In view of utility of thiocarbamides, N-aryl-S-chloro isothiocarbamoyl chloride have been used in synthesis of substituted [1, 2, 4] dithiazolidine by interacting with Ammonium aryl dithiocabamates. The drug containing 1, 2, 4-dithiazolidines show a diverse range of physiological activities, antimicrobial[8-9], anti-inflammatory[10-12], anti-ulcer[13-14], and anti-cancer[15]. Here is reported the synthesis of several 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] (3a-g) have been synthesized by the interaction of several Ammonium aryl dithiocarbamate (1a-g) with *N-p*-tolyl-*S*-chloro isothiocarbamoyl chloride (2). The required Ammonium aryl dithiocarbamate (1a-g) were obtained by the interaction of different amines with carbon disulphide and Ammonia.

II.   RESULTS AND DISCUSSION

These compounds show appreciable activity towards *E. coli, P. vulgaries, S. aureus, S. typhimurium, K. pneumonie, Ps. aeruginosa, A. niger and C. albicance.* The product was found to be non-desulphurrizable when boiled with alkaline lead acetate solution. The IR spectra of products shows bands due to Ar-H, C-H, C=N, C-C, C-N, C=S, C-S, S-S stretching and ^{1}HNMR spectra of products distinctly displayed signals due to aromatic protons and Acetyl protons. The Mass spectrum of product was also observed. The identities of these new 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] have been established on the basis of usual chemical transformations and also IR, ^{1}H NMR and Mass spectral studies[16-18].

III. EXPERIMENTAL

General Methods
All the newly synthesized dithiazolidine were screened for their antibacterial activities against pathogenic bacteria like *Escherichia coli, Proteus vulgaris, Staphylococcus aureus, Salmonella typhimurium, Klebsiella pneumonie, Pseudomonas aeruginosa,* and antifungal activities against *Aspergillus niger* and *Candida albicans.* 1,2,4-dithiazolidines, compounds have been synthesized as follows:

Several 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] (3a-g) have been synthesized by the interaction of several Ammonium aryl dithiocarbamate (1a-g) with *N-p*-tolyl-*S*-chloro isothiocarbamoyl chloride (2). in CHCl₃. After condensation, the solvent was distilled off to obtain a sticky residue. This residue was triturated several times with petroleum ether (60-80⁰C) to afford a pale yellow solid (3a-g).

All chemicals were research grade. Melting points determined are uncorrected. IR spectra were recorded in KBr on a FT-IR Perkin-Elmer RXI(4000-450cm⁻¹) spectrophotometer. ^{1}H NMR measurements were performed on a Bruker DRX-300 (300 MHz FT NMR) NMR spectrometer in CDCl₃ solution with TMS as internal reference. The Mass spectra were recorded on a THERMO Finnigan LCQ Advantage max ion trap Mass spectrometer. Thin layer chromatography (TLC) was performed on silica Gel G and spots were visualized by iodine vapour. The compounds describe in this paper were first time synthesized by the multistep reaction protocol.

Synthesis of Ammonium aryl dithiocarbamate[19] (1a-g)

The compound Ammonium aryl dithiocarbamate was prepared by drop wise addition of Amine [9ml] in ice cold mixture of ammonium [15ml, density 0.88] and carbon disulphide [7.5ml] followed by the vigorous shaking. The reaction mixture was allowed to stand for 30min heavy precipitate of Ammonium aryl dithiocarbamate separates out. Filter it and dry it.

Synthesis of *N-p*-tolyl-*S*-chloro isothiocarbamoyl chloride (2)

N-p-tolyl-S-chloro-isothiocarbamoyl chloride (**2**) was prepared by passing a calculated amount of chlorine from *p*-tolyl isothiocyanate.

3a:- Synthesis of 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride]

A mixture of Ammonium phenyl dithiocarbamate (1a-g) and N-tolyl-*S*-chloro isothiocyanocarbamoyl chloride was gently refluxed for 2 hr during which evolution of HCl was noticed. The progress of reaction was monitored by TLC. After completion of the reaction, the reaction mixture was brought to room temperature and the solvent removed under reduced pressure to obtain residue. This residue was triturated several times with petroleum ether (60-80°C) to afford a pale yellow solid (**3a**).

3a: IR (KBr) :υ 3155.5 (Ar-H), 2951.0 (C-H aliphatic), 1593.2 (C=N), 1508.3 (C-C), 1131.0 (C-N), 1143.7 (C=S), 752.2 (C-S), 503.4 (S-S), cm^{-1}; ^{1}H NMR (δ in ppm, CDCl$_3$): δ 7.94-7.22 (9H, m),; δ 2.358-2.353 (3H, s, CH$_3$) Mass (m/z): 316 (M$^+$), 300, 225, 211 , Anal. Calcd for C$_{15}$H$_{12}$N$_2$S$_3$, HCl: C, 56.96; H, 3.79; N, 8.86; S, 30.37; Found: C, 56.92; H, 3.75; N, 8.90; S, 30.35.

On the basis of all above facts the product with m. p. 122°C was assigned the structure 3-thio-4-phenyl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride]

When the reaction of *N-p*-tolyl-*S*-chloro-isothiocarbamoyl chloride was extended to several other Ammonium phenyl dithiocarbamate corresponding 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] (3b-g) have been isolated.
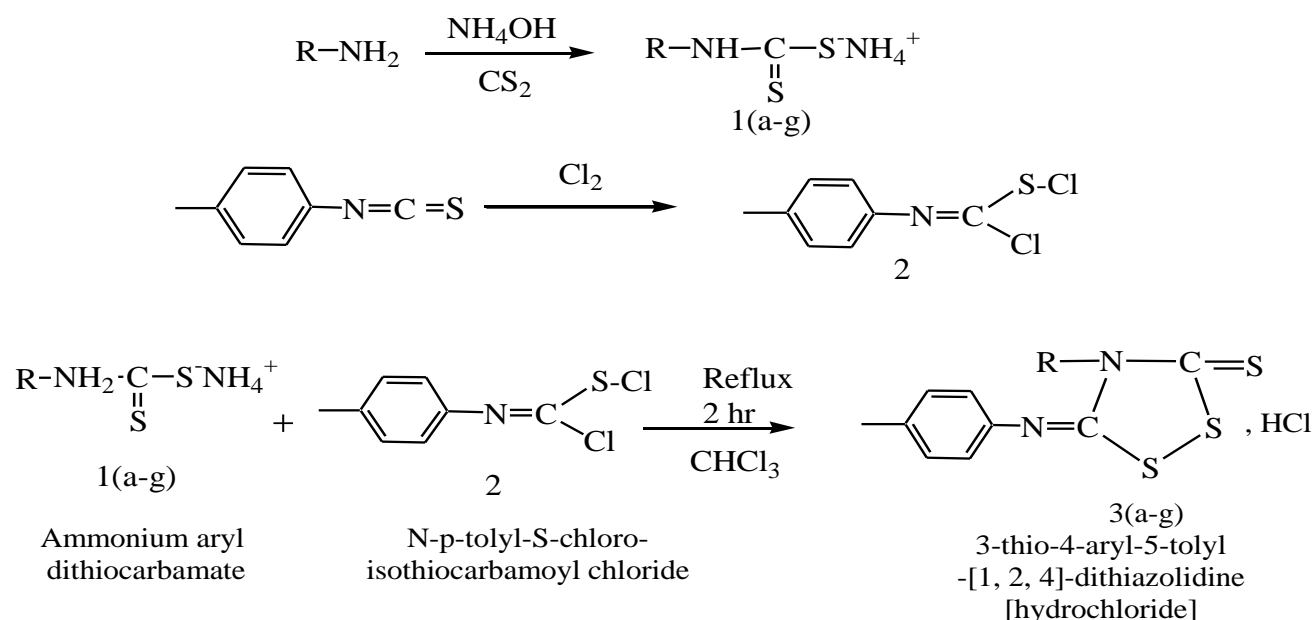
Where, R= (a) Phenyl, (b) *o*-Cl-phenyl, (c) *m*-Cl-phenyl, (d) *p*-Cl-phenyl, (e) *o*-tolyl, (f) *m*-tolyl (g) *p*-tolyl.

3c: IR (KBr) :υ 3032.1 (Ar-H), 2769.7 (C-H aliphatic), 1593.2 (C=N), 1541.1 (C-C), 1131.0 (C-N), 1207.4 (C=S), 715.5 (C-S), 532.3 (S-S), cm^{-1}; ^{1}H NMR (δ in ppm, CDCl$_3$): δ 7.94-7.22 (8H, m),; δ 2.358-2.353 (3H, s, CH$_3$) Mass (m/z): 350 (M$^+$), 335, 315, 259, Anal. Calcd for C$_{15}$H$_{11}$N$_2$S$_3$Cl, HCl: C, 51.42; H, 3.14; N, 8.00; S, 27.42; Found: C, 51.46; H, 3.10; N, 8.02; S, 27.46.

3g: IR (KBr) :υ 3147.8 (Ar-H), 2949.1 (C-H aliphatic), 1554.6 (C=N), 1512.1 (C-C), 1311.5 (C-N), 1143.7 (C=S), 711.7 (C-S), 532.3 (S-S), cm^{-1}; ^{1}H NMR (δ in ppm, CDCl$_3$): δ 7.35-7.09 (8H, m),; δ 3.53-2.30 (6H, s) Mass (m/z): 330 (M$^+$), 314, Anal. Calcd for C$_{16}$H$_{14}$N$_2$S$_3$, HCl: C, 58.18; H, 4.24; N, 8.48; S, 29.09; Found: C, 58.16; H, 4.28; N, 8.52; S, 29.02.

Table -1: Physical data for characterization of compounds (3a-g)

Compd	Yield %	R$_f$	M.P. ^{0}C	Analysis (%): Found (calcd)	
				N	S
3a	80.00	0.67	122	8.90(8.86)	30.35(30.37)
3b	71.46	0.72	110	8.03(8.00)	27.40(27.42)
3c	69.39	0.48	101	8.02(8.00)	27.46(27.42)
3d	55.34	0.51	123	7.96(8.00)	27.38(27.42)
3e	83.00	0.55	138	8.42(8.48)	29.06(29.09)
3f	82.88	0.60	127	8.46(8.48)	29.10(29.09)
3g	75.00	0.63	170	8.52(8.48)	29.02(29.09)

C and H analysis was found satisfactory in all cases.

IV. MATERIALS AND METHODS

The antimicrobial activities of these compounds were determined in vitro by using disc diffusion method[20]. The medium used for antibacterial study was Muller-Hinton agar (Hi-media Pvt. Ltd, India)

Composition of Muller-Hinton agar

Beef infusion from	300.00g
Casein acid hydrolysate	17.500g
Starch	1.50g
Agar	17.0g
Distilled water	1000mL
pH	7.3

Medium used for antigungal activities was Potato dextrose agar (Hi-media Pvt. Ltd, India).

Composition of Potato dextrose agar

Potato infusion from	200 g/lit
Dextrose	20 g/lit
Agar power	15 g/lit
pH	5.6$\pm$0.2

Test Procedure:

The media was prepared by dissolving weighed ingredients and was sterilized at 121°C and 15lbs/inch^2 pressure for 15 min. After sterilization it was cooled down at about 50°C and poured into sterile Petri plates and allowed to solidify. The plates were seeded with 24 hr old active nutrient broth culture of the test organism in order to obtain lawn culture.

All the compounds have been screened for both antimicrobial and antifungal activity by using disc diffusion assay[21-22]. For this sterile filter paper disc (6mm) impregnated with fixed doses of compounds were placed on pre-inoculated Mullar-Hilton plate. The disc bearing plates were incubated at 37^0C for 24 hrs. Inhibition zones read after incubation at 37^0C for 24 hrs. for bacterial strains and for fungal strains inhibition zones read after incubation at 35^0C for 48 hrs. The compounds were taken at a concentration or 1mg/ml using dimethyl sulphoxide as a solvent .Amikacin (100 ug/ml) was used as standard for antibacterial and Fluconazole (100ug/ml) as a standard for antifungal activity. The compound were screened for antibacterial activity against *Escherichia coli, Proteus vulgaris , Staphylococcus aureus , Salmonella typhi , Klebsiella pneumoniae , Psudomonas aeruginosa in* Mullar-Hilton medium   *Aspergillus niger* and *Candida albicans* in potato dextrose agar medium. The zone of inhibition observed and interpreted by using antibiotic zone reader. The results were cited in Table 2

V. RESULTS AND DISCUSSIONS

3.3Table 2: Zone size of 3-thio-4-aryl-5-tolyl-[1, 2, 4]-dithiazolidine [hydrochloride] (Scheme 1-3)(a-f)

Comp ounds	E. Coli	S. aureus	P. vulgaris	P. aeruginosa	S. typhi	K. pneumonie	A. niger	C. albicance
IIIa	++	+++	--	++	+++	++	+++	+++
IIIb	++	++++	--	--	++	--	++	++
IIIc	--	++	++	++	--	--	--	++++
IIId	++	++	+++	--	+++	--	++	--
IIIe	--	++	++	++	--	++	+++	++
IIIf	+++	+++	+++	--	++++	++	+++	+++

++++	Strong activity (above 18mm)
+++	Moderate activity (above 14 to 18mm)
++	Weak activity (above 8-14mm)
--	Inactive (below 8mm)

The compounds **IIIa** and **IIIb** exhibited moderate to weak inhibitory activity against *E. coli, S. typhi, P. aeruginosa*, *A. niger* and *C. albicans* while it had no inhibitory activity against *P. vulgaris* and *K. pneumonie.* **IIIb** exhibited good activity against S. aureus.

The compounds **IIIc** and **IIId** exhibited moderate to weak inhibitory activity against *P. vulgaris, S. aureus.* While for other bacteria and fungi it showed weak to no activity. The compound **IIIc** showed strong inhibition against *C. albicans.*

The compound **IIIe** and **IIIf** exhibited moderate to weak inhibitory activity against *S. aureus, P. vulgaris, K. pneumonie, A. niger* and *C. albicans*. **IIIf** showed promising activity against *S. typhi.*

Amikacin (100μg/mL) was used as a standard for antibacterial activity and Fluconazole (100μg/mL) was used as a standard for antifungal activity.

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Study of Potential Energy Curves for Ground State of GaCl, GaBr, GaF and GaI Molecules

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India

ABSTRACT

The diatomic molecules Gacl, GaBr, GaF and GaI, are spectroscopically studied by the many workers. The accurate ground state constant of these molecules, derived from latest Fourier transform spectroscopic analysis are used to construct the RKR curves. The Hulbert-Hirschfelder, extended Rydberg and Zavistsas potential energy functions are used and are compared with their respective RKRV curves. The error curves are also studied.

Keywords: Potential energy curve, Diatomic molecule, extended-Rydberg, H-H, Zavitsas Potential

I. INTRODUCTION

The importance of diatomic molecular spectroscopy is well-known in Physical sciences, Chemical physics, Thermodynamics, Molecular physics and Astrophysics. In general, the studies in above branches need spectroscopic information like molecular constants, dissociation energies, bond lengths etc.

Group IIIA halides are of great interest to the molecular spectroscopists as few of them show the potential laser transitions [1,2]. Under optimal experimental conditions GaCl, GaBr, InBr etc molecules show strong emission bands in visible region. There are some bound free transitions in these molecules and therefore the situation is favorable for lasing action. Besides these few band systems like $A^3\Pi_0$ - X $^1\Sigma^+$ and B^3 Π_1 - X $^1\Sigma^+$ show intense bands [3,4]. Many workers and the references therein have studied the band spectra of GaCl in emission as well as in absorption. The emission band spectra of GaCl, especially in UV region consists of two overlapping violet degraded band systems namely $A^3\Pi_0$ - X $^1\Sigma^+$ and B^3 Π_1 - X $^1\Sigma^+$. The spectra of GaCl in the region 28,000 to 30,000 cm^{-1} is obtained using a Fourier Transform Spectrometer BOMEM DA 8 with an apodized resolution of 0.035 cm^{-1}.The quartz UV beam splitter and a photomultiplier detector with proper filter gave a good signal to noise ratio in sixty scans [5].

The emission source used is a electrode less microwave discharge lamp excited by a RF Oscillator operating at 2450 MHz, 180 W. There are several isotopes of Ga. But ^{69}GaCl was used for this purpose. The molecular constants derived from these studies are reported in table1.

II. THE RKRV CURVES AND THE POTENTIAL ENERGY FUNCTIONS

The RKRV curve [6-9] of the ground state of Gacl, GaBr, GaF and GaI are plotted using standard procedure. The Hulbert- Hirschfelder (H – H) [10-11] potential function, extended Rydberg potential function [12-13] and the Zavitsas potential functions [14-15] were used to construct the potential curves. The Functions are as follows

2.1. The Hulbert-Hirschfelder potential function: This function is an extension of a Morse function and is defined as follows.

$U_{H-H}(r) = D_e \{ [1 - \exp(-x)]^2 + cx^3 (1 + bx) e^{-2x} \}$ …………….. (1)

Where $x = x_1(r - r_e)$; $x_1 = (\omega_e x_e / B_e)^{1/2} / r_e$

$c = 1 + a_1 (D_e / a_o)^2$; $b = 2 - \{[(7/12) - (D_e - (a_2 / a_o))] / c \}$

$a_o = \omega_e^2 / 4 B_e$; $a_1 = -1 - \{\omega_e x_e / (6 B_e)^2 \}$ and

$a_2 = (5/4) a_1 - (2/3) (\omega_e x_e / B_e)$

This function employs the spectroscopic constants like ω_e , $\omega_e x_e$, B_e and D_e etc.The potential energies U_{H-H} could be calculated by substituting the values of the constants and different r values.

2.2. The extended Rydberg Potential function

Murrell and Sorbie [16] and Huxley and Murrell [17] have suggested a potential function, which is based on the force field parameters and is similar to Rydberg potential function. It has the form

$U_{exR}(r) = D_e - D_e \{ 1 + a_1\rho + a_2\rho^2 + a_3\rho^3] e^{-a_1 \rho}$ …………….. (2)

Where $\rho = r - r_e$; a_1, a_2 and a_3 are the constants should not be confused with the constants appearing in H-H function. They are defined through following discussion. The constant a_1 is determined from the solution of the following quartic equation :

$D_e a_1^4 - 6 f_2 a_1^2 - 4 f_3 a_1 - f_4 = 0$ …………….. (3)

The parameters f_2 , f_3 , f_4 are called force field parameters and are defined as :

$f_2 = 4 \pi^2 \mu \omega_e^2 c^2$

$f_3 = - (3 f_2 / r_e) [1 + (\alpha_e \omega_e / 6 B_e)^2]$

$f_4 = (f_3 / r_e)^2 \{15[1 + (\alpha_e \omega_e / 6 B_e^2)] - (8 \omega_e x_e / B_e)\}$

Usually the largest positive root of equation (3) is selected as a_1. The other parameters a_2 , a_3 appearing in equation (2) could be calculated from following equations :

$a_2 = (1/2) [a_1^2 - (f_2 / D_e)]$

$a_3 = (a_1 a_2 - (a_1^3 / 3) - (f_3 / 6 D_e)]$

This potential function was studied further and was compared with Dimitreva– Zenevich [18] potential function by Bhartiya and Behere[19]. Birajdar [20] applied it to a large number of molecules and found to give satisfactory results.

2.3. The Zavitsas potential energy function.

This recently suggested potential function by Zavitsas [14] is based on electro negativities of the constituent atoms forming a diatomic molecule. This function is also a modification of Morse function but the constant β appearing in Morse function is no more a constant in this function. The function is

$U_z(r) = D_e [\exp(-2 \beta_\pm x) - 2 \exp(\beta_\pm x)]$ …………….. (4)

$\beta_M = 8.486\,(k_N)^{1/2}$; $x = r - r_e$,   Where $k_N = k_e / D_e$.

The variables $\beta_{\pm}$ are calculated separately for $r < r_e$ and $r > r_e$.

For $r < r_e$ $\beta_- = \beta_M \{1 + m\,u^{1/2}\}$

For $r > r_e$ $\beta_+ = \beta_M \{1 + a_1 u^{1/2} + a_2 u^{1/2} + a_3 u^{3n} + a_4 u^{5n}\}$

Where, $u = \exp(-2\,\beta_M x) - 2\,\exp(-\beta_M x) + 1$

m and n are calculated as follows :

$m = -0.025 r_e + 0.70\,\exp(-7.41\,x10^3\,k_N\,r_N) / z_1 z_2 + 0.042\,/\Delta\chi\,/$

and $n = 0.70 - 0.03 r_e + 0.096 / ((10^3 \times k_N\,r_N - 0.3) + 0.55\,(\Delta\chi)^2 / r_e^{1/2}$

Where $r_N = r_e / D_e$

For all species $a_1 = -0.32m$; $a_2 = 0.15$; $a_3 = 0.2 - 0.6m$ and $a_4 = (0.21-3m)\,(\Delta\chi)^2$.

Zavitsas has taken D_e in kcal /mol, bond length in A° and ω_e in cm^{-1} , μ is in amu the electro negativity difference $/\Delta\chi\,/$ is from Pauling scale[21]. We also retained same units but finally converted the engries in cm^{-1} which otherwise come in kilocalories.

Table 1: Spectroscopic constants of the ground states of GaCl, GaBr, GaF and GaI molecules

Molecules/ Constants	GaCl	GaBr	GaF	GaI
μ	23.199015	37.220586	14.8932747	44.666098
ω_e	365.668	263.0	622.2	214.64
$\omega_e x_e$	5.910	0.81	3.2	0.46
$\omega_e y_e$	--	--	0.0005	--
B_e	0.149913	0.081839	0.3595161	0.0558935
α_e	0.0007936	0.0003207	0.002864	0.000179
D_e	39865	34813	47897	27530
r_e	2.20178	2.35248	1.774369	2.57467
References	[22, 23]	[23]	[23]	[22, 23]

Note: All constants are in cm^{-1} except r_e, which is in Å and μ, is in amu

Table .2: Parameters of H-H, extended Rydberg and RPC potentials for the ground states of GaCl, GaBr, GaF and GaI molecules

Molecules/ Parameters	GaCl	GaBr	GaF	GaI
H-H Parameters				
a_0	222984.48	211295.95	269204.093	206063.00
a_1	-3.1520817	-3.09885668	-3.297814846	-3.04969765
a_2	6.8651914	5.405320187	7.660576343	6.139194488
c	-0.3327725	-0.25784355	-0.391039937	0.114704824
b	0.6468252	0.80840879	0.006233524	-0.06497459

x_1	1.0741562	1.05622625	1.3361116647	1.06261347
Extended Rydberg Parameters				
a_1	1.9544359	1.3057899	2.495005	1.8588966
a_2	0.7457452	-0.24847139	1.315455	0.6147680
a_3	0.6356054	0.3961592	1.444968	0.3199788
Zavitsas Parameters				
B_m	1.074581	1.047587	1.336547	1.053198
κ_e	1.827798	1.516979	3.397309	1.212507
κ_n	0.01604	0.015244	0.024814	0.015405
r_n	0.019322	0.02364	0.01296	0.032717
Z_1	3.45	3.45	3.45	3.45
Z_2	5.75	6.05	4.85	6.05
e_1	1.81	1.81	1.81	1.81
e_2	3.16	2.96	3.98	2.66
m	0.005206	-0.00819	0.050641	-0.02787
n	10.98822	2.693792	7.03926	1.340753
a_1	-0.00167	0.00262	-0.01621	0.008917
a_2	0.15	0.15	0.15	0.15
a_3	0.196877	0.204914	0.169615	0.21672
a_4	0.354263	0.31022	0.273474	0.212126
RPC Parameter				
ρ_{ij}	1.209011	1.331371	0.812407	1.514516
References	[22,23]	[23]	[23]	[22, 23]
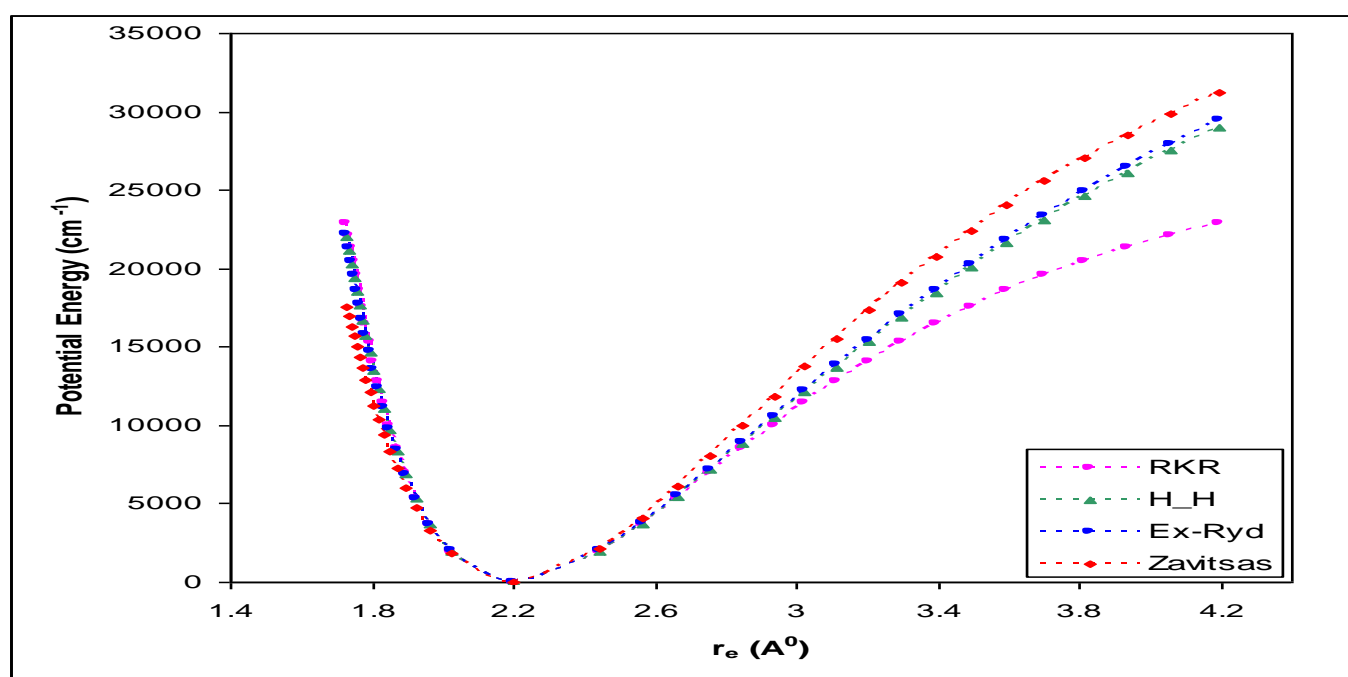
Figure 1 (a): RKR, H-H, Extended- Rydberg & Zavitsas Potential energy curves for the ground state of GaCl molecule
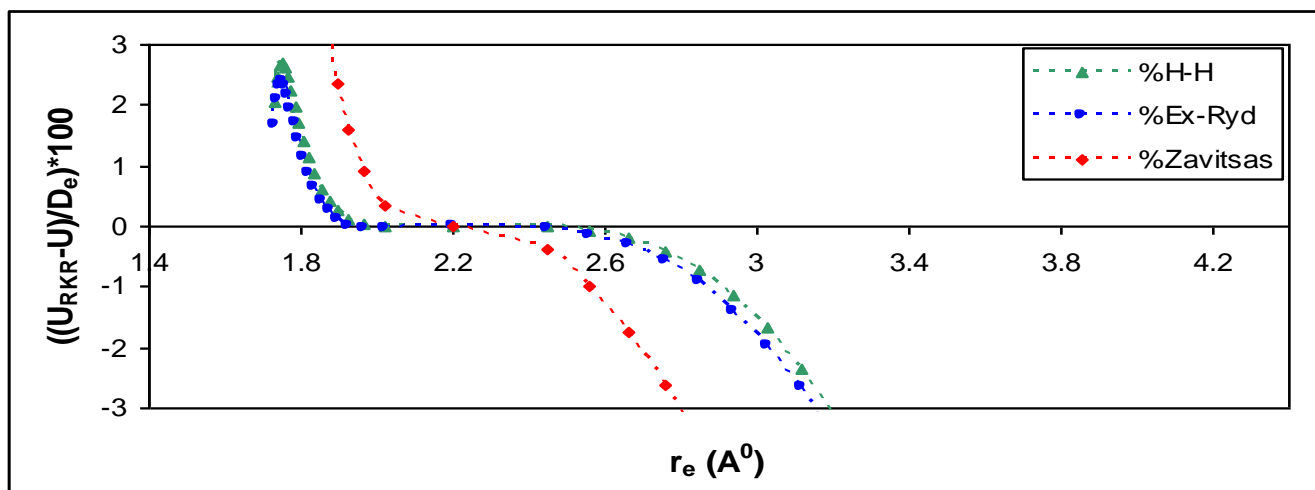
Figure1 (b): % Deviation of H-H, Extended- Rydberg & Zavitsas Potential energy curves for the ground state of GaCl molecule
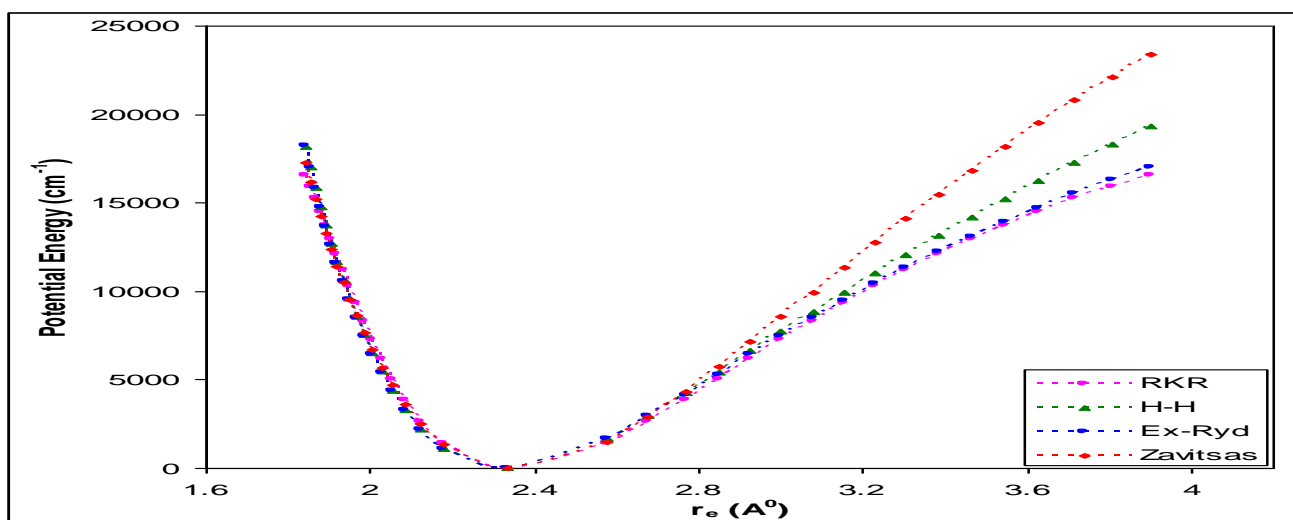
Figure 2 (a): RKR, H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaBr molecule
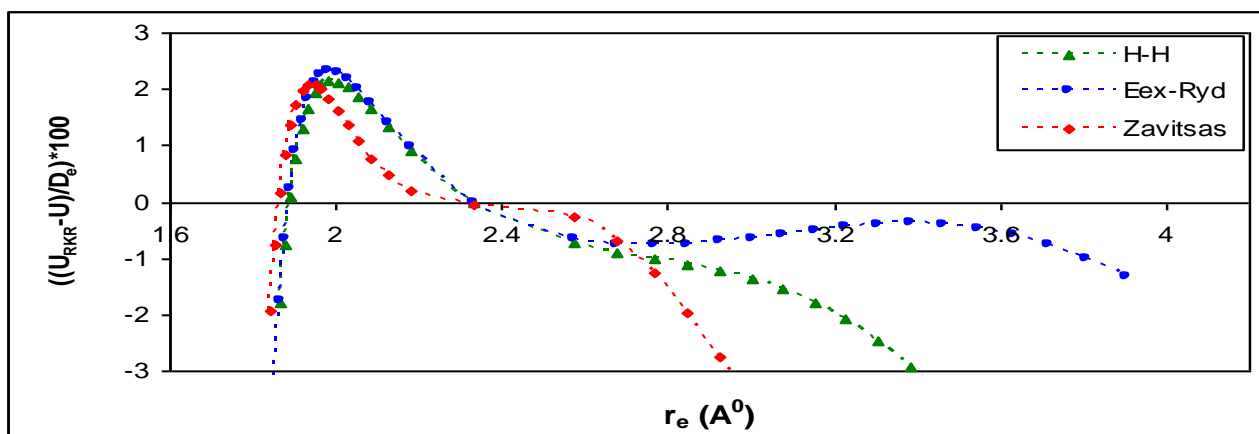
Figure 2 (b): % Deviation of H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaBr molecule
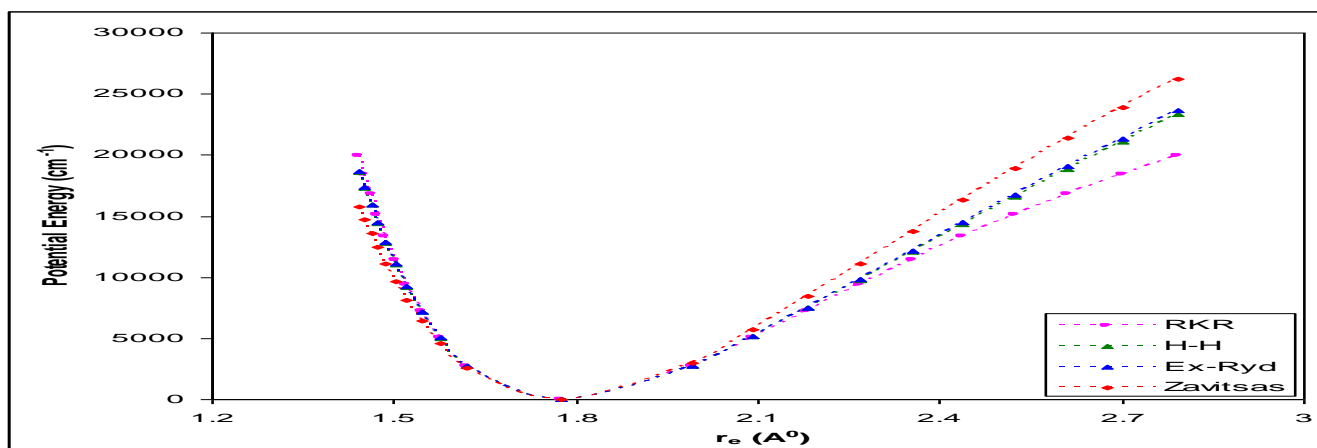
Figure 3 (a): RKR, H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaF molecule
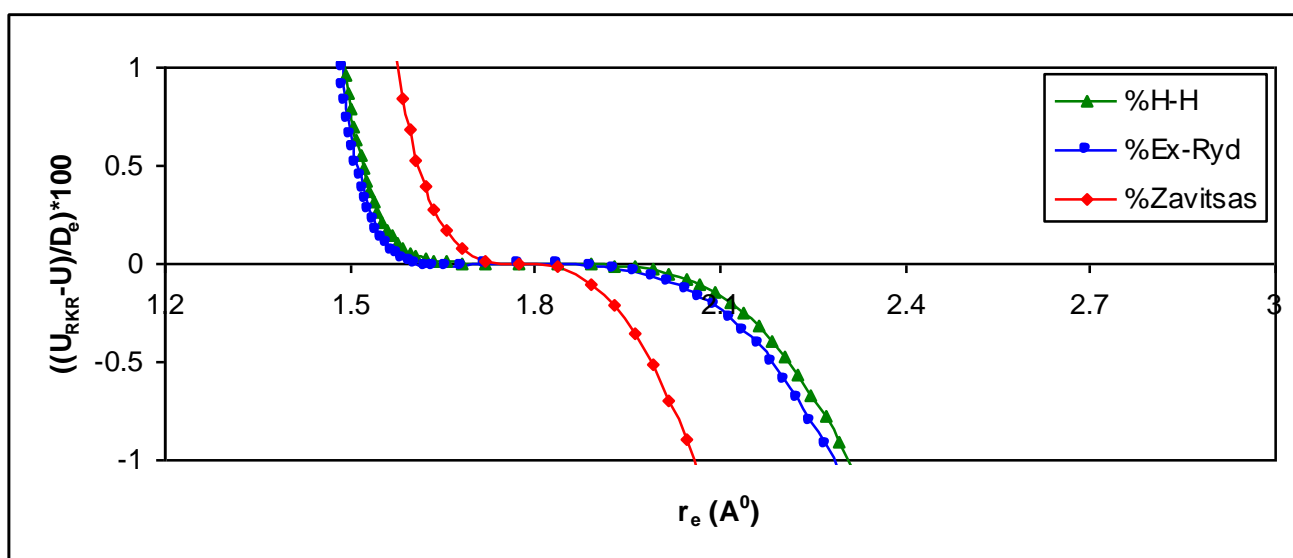
Figure 3 (b): % Deviation of H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaF molecule
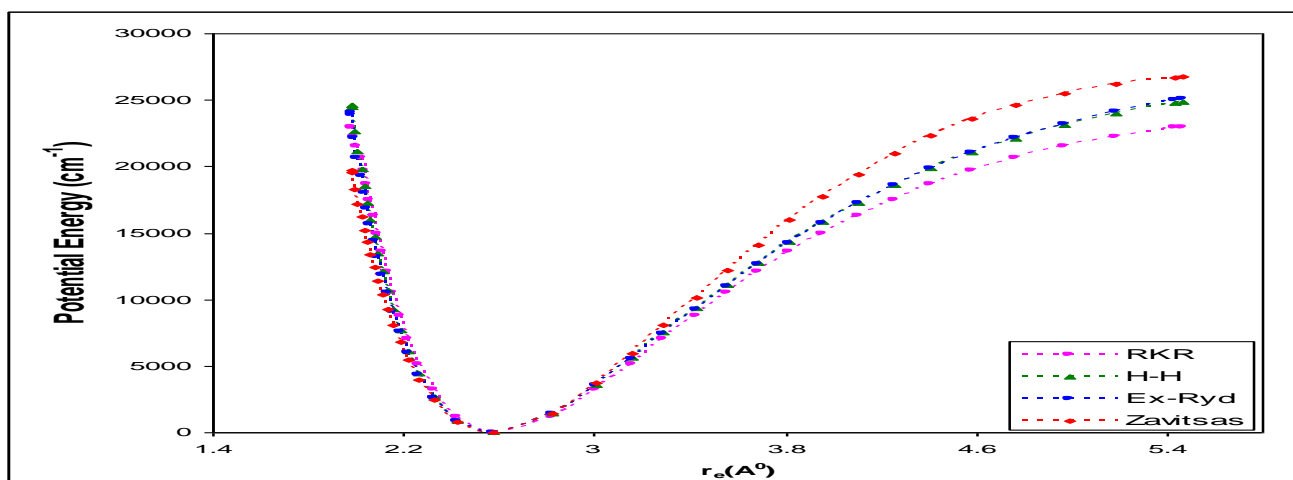
Figure 4 (a): RKR, H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaI molecule
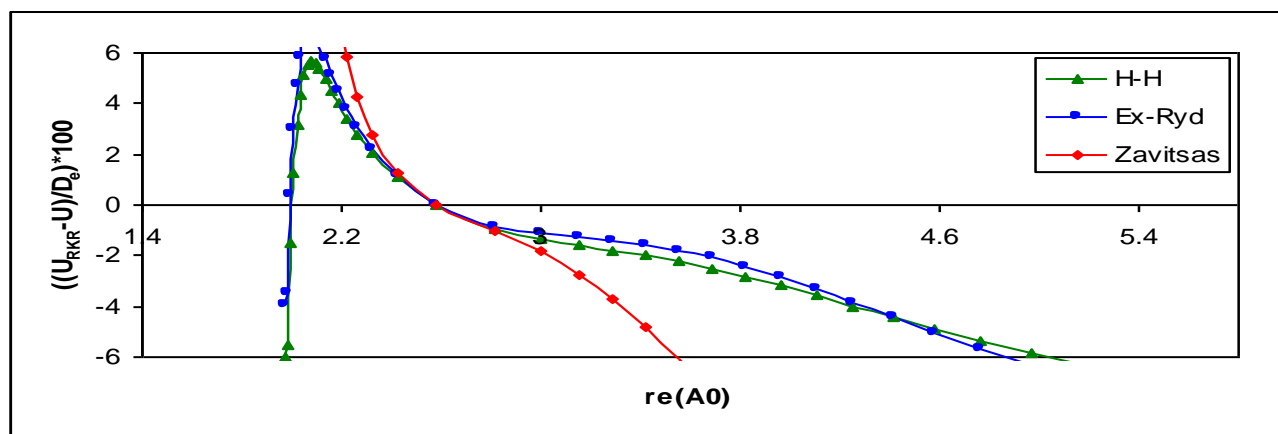
Figure 4 (b): % Deviation of H-H, Extended- Rydberg & Zavitsas potential energy curves for the ground state of GaI molecule

III. COMPUTATIONS

The data of turning points i.e. rmin and rmax values obtained from RKRV curves of these molecules are substituted in equations 1, 2 and 4 respectively for H-H, extended Rydberg and Zavitsas potential functions along with the corresponding parameters shown in Table 2. The potential energies obtained plotted against r values yield a potential energy curve for that potential for that particular molecule. For comparison purposes all the potential energy curves of each molecule are drawn on same scale along with their respective RKRV curve. These curves are shown in Fig 1 to 4 along with their error curves i.e. the % deviation from RKRV energies.

IV. RESULTS AND DISCUSSION

The RKRV curves are plotted for the ground states of these molecules viz GaCl, GaBr, GaF and GaI. Majority of the PE curves are drawn to cover the vibrational levels up to 60% of their respective dissociation energies. Specifically for GaCl (61%), for GaBr (53%), for GaF (41%) and for GaI (72%). Figures 4.1(a), 4.2(a), 4.3(a) and 4.4(a), show the comparisons of H-H, extended Rydberg and Zavitsas potential with their corresponding RKR curves for the ground states of GaCl, GaBr, GaF and GaI. Below 4.1(a), 4.2(a), 4.3(a) and 4.4(a) curves their corresponding errors curves 4.1(b), 4.2(b), 4.3(b) and 4.4(b) are shown at the same abscissa scale. From these graphs it is clear that the Zavitsas potential energy curves distinctly deviate from RKR. As per discussion with Zavitsas [95], the potential is mainly suitable for covalent molecules rather than ionic molecules. Moreover the electro negativity values of the atoms forming a diatomic molecule also can cause deviations. The H-H and Extended Rydberg potential functions almost overlap on each other and fall in between the Zavitsas and RKR curves. The error comparison shows that nearly 3 to 4% deviations occur in the potential energies from RKR values.

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Ethnobotanical Studies of Wild Edible Plants Used By Tribal of Jawhar Taluka, Palghar (M.S.)

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ABSTRACT

Ethnobotany is the study of relationship between people and plants. It is a new discipline studying the knowledge and traditional practice of the indigenous and ethnic societies in conservation and use of biodiversity for human health and nutrition. Ethnic peoples are using this approach of including food of medicinal and nutritional value in their diet since ages. Keeping this view in mind, the present study has been carried out in tribal dominated Jawhar taluka of Palghar District in the year 2019-21. Jawhar is a mainly tribal region and different tribes like Thakur, Kokana, Mahadev Koli, Dhor Koli, Katkaris and Varli live in this region. During the study 58 medicinal & edible plants from 32 different families were identified from study location which is used by tribal peoples as home remedies to cure various ailments. The common & painful diseases like, jaundice, anemia, piles, diarrhea, skin diseases, intestinal worms, menstrual irregularities, snakebite, diabetes, dysentery, typhoid fever, urinary stones, scabies, cough, cold & bacterial infections etc. are cured by using the traditional medicines.

Keywords: Ethno-botany, Jawhar, wild edible plants', tribals

I. INTRODUCTION

India is always known for its natural heritage and rich biodiversity. This rich biodiversity is the result of the variations in the climate and topography (Oak et al, 2015). In India, More than 43% of the total flowering plants are known for medicinal purpose (Sharma et. al., 2012). Recently, World Health Organization (WHO) estimated that 80% of people worldwide rely on herbal medicines for some part of their primary health care. Ethnobotanical study deals with the direct traditional and natural relationship between human and plant. India is also very rich in an ethnobotanical knowledge which is inherited from generation to generation among tribal people living in hilly and diversity rich areas of the country (Khan et al, 2016). Throughout these years, tribal people used various wild plants having ethnobotanical value for meeting their food requirements with Vitamin and mineral necessities. The tribes such as Kokana, Katkari, K-Takur, M-Thakur, Mahadev-koli, Dhorkoli, Varli have been using these plants from time immemorial. These Tribal Peoples are completely amalgamated with the nature. The knowledge and experience about the medicinal plants has been handed down by the elderly folks among aboriginal peoples to their descendents. These aboriginal people use the plants according

to their knowledge either gained by experience or taught by their ancestors and belief healing properties of various ailments, role in their religious and social ceremonies which are manifested in their folk behaviour. In each village, they're supposed to be exist a local Medicine Man or Vaidu (Bhagat) or Mukhiya (Mhorkya), who is expertise in ethnobotanical information, but now a days, these medicine men are becoming rare and traditional ethnobotanical knowledge also depleting day by day (Sonawane et. al. 2012). The present study will be useful to find out the medicinal and nutritional characteristics of wild edible as well as medicinal plants. Hence this is the right time to, conserve the ethnobotanical information, compile the data and create awareness among tribes residing in tribal areas which will definitely conserve the medicinal plants and their over exploitation from natural habitats before they become extinct.

The scientific research work on the ethnobotany is also taking place on larger scale but similar reports from tribal areas of Palghar district are scarce and need more research to be done. Ethnobotanical studies are carried out from Tal- Mokhada by Sonawane et al (2012). Similar studies on edible plants used by tribal women of thane district are conducted by Oak et al (2015). Work has been also done on some herbal remedies used by tribals of Nashik district (Patil et al, 2006) and medicinal plants used by Konkani tribals of Nashik district to cure cuts and wounds. Recently Khan and Ahmed (2013) conducted an ethnobotanical survey of Palghar and Thane district. But the survey is done on larger scale with least specifications. Hence, there is a need to collect and analyze the ethnobotanical wealth of wild edible plants from the tribal inhibited forest of Jawhar of Palghar district of Maharashtra.

II. METHODS AND MATERIAL

Jawhar belongs to Palghar District (formerly Thane District), which is located in western part of Maharashtra state. The range of Western Ghats extends in the district and is a predominantly tribal district. The ethnobotanical studies are carried out from Jawhar; it is geographically located 19054'20.82"N latitude and 73013'49.15"E longitude. The Jawhar Taluka is rich reservoir of medicinal plants and associated ethnobotanical practices. The tribal hamlets and forest of the Jawhar taluka is visited frequently. The information of wild edible plants having ethnobotanical importance collected from local tribal peoples or aged men, women. The local medicine men, Vaidyas (Males) and Daiyas (Females), traditional practitioner were interviewed during field study. The information verified through questionnaires, discussion and personal experience. The specimens of medicinal flowering plants collected and identified referring standard literature (flora and keys). The voucher specimens will be deposited at Herbarium of Department of Botany, Arts, commerce and Science College, Jawhar, Dist – Palghar. Information regarding Botanical name, family name, vernacular name, parts used and medicinal uses for each plant were also collected and documented.

III. RESULT AND DISCUSSION

The study revealed use of 58 edible as well as medicinal plants from 32 families as a home remedies to cure various ailments and also as a part of diet (Table 1). The analysis of data reveals that the tribal people use these plants to cure about 38 major & minor ailments. The most of ailments are common but painful, associated with the gastrointestinal diseases like diarrhoea, dysentery, stomach-ache, acidity and other stomach related disorders. The prevalence of such diseases may be due to the lack of clean drinking water, hygienic conditions, and poor food quality. Most of wild edible plant species are also used to treat skin diseases, 9 species for fever, 8

species for cough and cold, 9 species to control fever, 6 for asthma and jaundice and others for snakebite, piles, scabies and diabetes.

TABLE 1: LIST OF WILD EDIBLE PLANTS USED BY TRIBALS OF JAWHAR TALUKA AND THEIR MEDICINAL USES

No.	Plant Family	Botanical Name	Local Name	Part used	Medicinal Uses
1	Acanthaceae	*Adhatoda vasica* L.	Adulsa	Leaves	Leaf extract is given orally in cough, asthama and bronchitis
2		*Amaranthus spinosus* L.	Kate Math	Roots	The juice of root is used for diarrhea and dysentery
3		*Carvia Callosa* Nees.	Karvi	Leaves	Leaf juice is used to cure stomach ailments
4	Amaranthaceae	*Achyranthes aspera* L.	Aghada	All parts	Root powder is used in Dysentry Leaf juice (nostrils) for Cough Dried plant material in boiling water is given in Fever
5		*Celosia argentea* L.	Kurdu	Seeds	Seeds are used to treat urinary stones
6	Anacardiaceae	*Mangifera indica* L.	Aamba	Fruits, leaves	Skin diseases, urinary tract infections, anaemia and bleeding
7		*Semecarpus anacardium* L.	Bibba/ Bhilawa	Fruits and seeds	Fruits are eaten to releive indigestion, cough and cold. Seed oil is used for scabies
8	Apocynaceae	*Carissa congesta* Wt. Icon	Karvand	Fruit	Intestinal worms, Scabies
9		*Holorrhena antidysentrica* (L.) Wall.	Kuda	Leaves, Bark	Leaf juice is taken orally during stomachache and dysentery
10		*Rauwolfia serpentine* Benth.	Sarpa-gandha	Roots	Roots are used to treat blood pressure, intestinal disorders, snakebite and facial paralysis
11		*Wrightia tinctoria* R. Br.	Kala Kuda	Fruit, Bark, seeds	Fruits are used in Fever Bark for Urinary stones and Seeds for Jaundice
12	Araceae	*Amorphophallus commutatus* (Schott) Engl.	Shevla	Rhizome and tubers	In piles, Bacterial infections can be treated with rhizome
13		*Colocasia esculenta* (L.)Schott	Aalu	Leaves	Leaves are used as vegetable to clear bowel habit
14	Arecaceae	*Acorus calamus* L.	Vekhand	Root	Root and stem reduce infection,

				and stem	improve brain power and increase appetite
15	Asclepiadaceae	*Calatropis gigantean* L.	Safed Rui	Flowers	Dried flowers are given in bronchial asthma with honey
16		*Hemidesmus indicus* (L.) Schultes	Anant Mul	Roots	Root powder is taken internally for urinary troubles and snakebite.
17	Bombaceae	*Bombax ceiba* L.	Katery Saver	Bark and flowers	Bark is useful to treat wounds, skin diseases, and haemorrhoids. Flowers with sugar is good tonic
18	Caesalpinaceae	*Cassia fistula* L.	Bahava	Root, seeds, leaves	Root powder is useful in infant fever. Leaves and flowers in skin diseases and ringworm. Root extract is used for common fever
19		*Bauhinia racemosa* Lam. Encycl.	Aapta	Bark	Bark extract is given in indigestion, skin diseases
20		*Cassia tora* L.	Tarota	Whole plant	Seeds are laxative, anthelmintics Whole plant extract is used to cure psoriasis
21	Combretaceae	*Terminalia arjuna* (DC) Weight and Arn	Arjun	Bark	Bark is used as febrifuge, coolant and cardiac stimulant. It is used with cow milk in chest pain
22		*Terminalia bellerica* Roxb.	Beheda	Fruits	Fruits are used in preparation of 'Triphala churna', in throat infection, leprosy, cough, cold, piles, indigestion and fever
23		*Terminalia chebula* Retz.	Hirda	Fruits	Purgative astringent fruit
24	Crassulaceae	*Kalanachoe laciniata* (L.)DC	Panphuti	Leaves	Daily chewing of leaf at morning cure urinary stone
25	Cyperaceae	*Cyperus rotundus* L.	Nagermotha	Stem & seed	Stem and seed decoction is used to treat fever rheumatism
26	Discoraceae	*Dioscorea bulbifera* L.	Kadu-kanda		Anticancer, Weight gain
27	Euphorbiaceae	*Emblica officinalis* Gaertn.	Aawla	Bark, fruits	Stomach troubles, vomiting, boosts memory power, strengthens nervous system, aphrodisiac, improves reproductive system
28		*Jatropha Curcas* L.	Ran errand	Root and leaves	Root powder is taken internally in dysentery and flatulence. Seed oil is useful in muscular pain and body inflammation

29		*Ricinus communis* L.	Airand	Leaves	Leaf extract is used to treat jaundice and leaves to treat fever in children
30	Fabaceae	*Abrus precatorius* L.	Gunj	Whole plant	Ash made from whole plant is applied on wounds. Seed extract can be used as blood purifier
31		*Tamerindus indica* L.	Chinch	Fruits	Improves digestion and rehydration
32	Lamiaceae	*Ocimum sanctum* L.	Tulsi	Leaf	Leaf juice is used in kidney stone, cough and cold
33	Liliaceae	*Allium sativum* L.	Lasun	Bulb	Bulds are helpful for indigestion and recover fractured bones
34		*Aloe vera* L.	Korphad	Leaves	Leaf cake is taken internally to purify blood and to impart glow to skin, leaf pulp is useful in skin diseases, fever
35		*Gloriosa superba* L.	Kal-lavi	Roots, bulb, leaves	Root paste for periodic fever, Leaf paste for asthma in children, bulbs are used to treat jaundice, in release of placenta
36	Lythraceae	*Lagerstroemia parviflora* Roxb.	Bondara	Bark	Stem bark is used on scabies and skin diseases
37		*Lawsonia inermis* L.	Mehendi	Leaves	Leaves are helpful in treatment of jaundice and anemia
38	Malvaceae	*Hibiscus aculeatus* Roxb.	Ambadi	Fruits	Fruits are used in scurvy and inflammation during urination. It is also used to treat acidity
39	Menisperma-ceae	*Tinospora cordifolia* (Wild) Miers	Gulvel	Root and stem	Stem extract is best remedy for diabetes, acidity, jaundice and liver diseases
40	Moraceae	*Ficus exasperate* Vahl.	Bhui umber	Bark	Filtrate made up of bark is used promote fertility
41		*Ficus racemosa* L.	Umber	Bark	Bark extractis used to cure jaundice and increase apetite Stem latex is used to treat piles and diarrhea. Fruits are edible, astringent and carminative and useful in relieving stomachache
42		*Ficus religiosa* L.	Pimpal	Whole plant	Plant extract is taken orally for proper digestion. Fruits used in diarrhoea, gastric problems, skin diseases, tonic

43	Moringaceae	*Moringa oleifera* Lam.	Shevga	Leaves, Pods	Wormicidal and anticancer
44	Myrtaceae	*Syzygium cumini* (L.) Skeels	Jambhul	Fruits	Wormicidal and useful in diabetes
45	Papilionaceae	*Butea monosperma* (Lam.)Taub.	Palash	Flower, bark and seeds	Flowers are used to remove body toxins, inflammation, Swelling. Seeds are anthelmintic, laxative Stem Bark is used to treat Asthma, cough and cold
46		*Pongamia pinnata* (L) Pierre	Karanj	Twigs, Seeds	Skin diseases, Piles, worm infection
47	Poaceae	*Eleusine coracana* (L.)Gaertn.	Nagli	Roots	Root infusion for abdominal distension
48	Rhamnaceae	*Zizyphus jujube* Mill.	Bor	Fruit, bark	Improves digestion, cough and mouth cleanser
49	Rubiaceae	*Gardenia gummifera* L.f.	Dikamali	Gum seed	Dikamali gum powder with honey used in teething troubles in children
50		*Meyna laxiflora* Robyns	Aaliv	Fruits	For the treatment of inflammation and gastrointestrinal disorders
51	Sapotaceae	*Madhuca indica* ˋJ.F. Gmel	Moh	Fruits	Skin diseases, urinary tract infections, menstrual irregularities
52	Solanaceae	*Withania somnifera* (L.)Dunal	Ashwagandha	Root & leaves	Root powder increases immunity and useful in asthma.
53	Sterculiaceae	*Helicteres isora* L.	Murad sheng	Bark and roots	Root extract is given internally for diabetes. Bark powder helps in snakebite
54	Verbanaceae	*Lantana camera* L.	Ghaneri	Leaves	Leaves are used in chicken pox, and asthma
55		*Tectona grandis* L.	Sag	Bark, leaves	Bark powder is used in snakebite, Dysentry, anaemia, swellings, liver related troubles
56		*Vitex negundo* L.	Nirgudi	Leaves	In irregular menstruation, leaf juice with cow's urine is given to women and fresh leaf juice with sugar is helpful in fever
57	Zingiberaceae	*Curcuma aromatic* (Salish.)	Ranhalad	Roots, stem	Rhizome has antibiotic properties and helps in digestion
58		*Zingiber officinale* Roscoe	Ale	Rhizome	Rhizome either fresh or dried is used in cough and cold and as antiseptic

In India, several researchers have already documented the use of wild edible plants in the diet by tribal people of various parts. (Rekha & Kumar, 2014; Rasinga, 2012; Jadhav, Mahadkar and Valvi, 2011). Most of them stressed the need for revival of traditional knowledge and need to conserve it.

IV. CONCLUSION

There is need of further study for the documentation of wild edible plants used by the tribal community and conservation of them before it is lost. As many of these plants used by tribals have great potential to be developed as standard preparation for various diseases. There are some unexplored or underexplored regions which need further attention and documentation. Efforts should be taken by the government and other organizations for the conservation of the traditional and precious knowledge of wild edible plants and to create awareness among the tribals and also common peoples. Local market for these medicinal plants and competitions like wild vegetable recipes can be arranged for this purpose. Such studies may provide new materials to workers in the field of phytochemistry and Pharmacognosy. Therefore, the present data will be helpful in conservation and exploration of traditional ethnobotanical knowledge of wild edible & medicinal plants.

V. ACKNOWLEDGEMENT

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Photo-Frame 1 - S<small>OME</small> W<small>ILD</small> E<small>DIBLE</small> plants of E<small>THNOBOTANICAL</small> I<small>MPORTANCE</small> from J<small>AWHAR</small>

Gloriosa superba

Amorphophalus commutatus
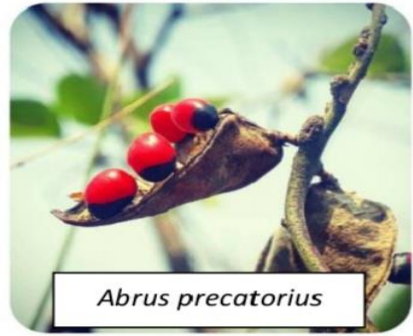
Abrus precatorius

Holorrhena antidysentrica

Meyna laxiflora

Carrisa congesta

Cassia fistula

Helicteres isora
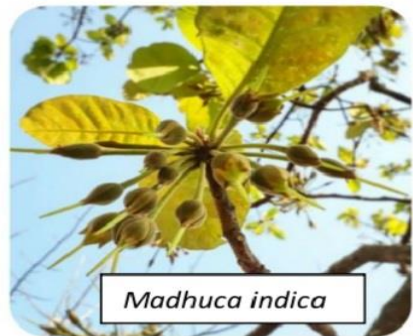
Madhuca indica

Butea monosperma

Vitex negundo

Kovali Bhaji Festival by tribals

Green Synthesis of α-hydroxyphosphonates by using DES Catalyst

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ABSTRACT

Synthesis of series of bioactive α-hydroxy phosphonates (2a-i) stirred by the benevolent choline chloride-based Urea a deep eutectic mixture wasemployed as an efficient and green ionic liquid catalyst for solvent free condition at room temperature. The current approach to generate sustainable catalyst in place of volatile organic compounds to 2-chloroquinoline-3-carbaldehyde (1a–i) with triethylphosphite. The reaction is furnished in short time and products were obtained in good yield.

Keyword- α-hydroxy phosphonates, deep eutectic mixture, volatile organic compounds

I. INTRODUCTION

The α-hydroxyphosphonates have drawn much attention due to their wide range of applications and their significance as synthetic transitional for additional biologically vital α-substituted phosphoryl compounds [1]. Noteworthy, attempts have been grownup for the formulating hydroxyphosphonates with the Abramov reaction symbolizes one of the highly fitmethods for the synthesis of α-hydroxyphosphonates [2]. The process involves a condensation between an aldehyde and triethylphosphite promoted by series of Lewis or Bronsted acid catalyst such as KH_2PO_4[3], sulphamicacid[4],camphor sulphonic acid[5],tartaric acid[6],succinic acid, guanidine hydrochloride[7], I_2catalyst functions as acid catalyst[8], $ZnBr_2$[9], β-cyclodextrin[10], Ammonium metavandate and Bismuth (III) nitrate pentahydrate and TMSCl found to be efficient catalytic system[11].However, these methods come across some drawbacks such as longer reaction time, use of volatile hazardous organic compounds VOC and expensive catalysts, harsh reaction conditions followed by low yield of product hence do not acknowledge with green chemistry. Therefore, many synthetic methods for the construction α-hydroxyphosphonates in the presence of catalyst or activator have been developed.

To overcome these drawbacks, new methodologies based on ultrasound, microwave, and use of ionic solvents have published in recent times. Owing to their significant taskin the synthesis of biologically active component, the progress of ecologically bearable synthesis of α-hydroxyphosphonates is desirable. The fresh development in chemical synthesis, the largely focusonreaction effectiveness, decrease of waste,moveaway from the harmful reagents, and theprecise utilization of resources have grown into the main objective.Deep eutectic solvents(DESs) have been stirring a lot of advantage than toxic organic acids based ionic liquid. A DES blend of choline chloride and Urea form a steady Lewis acidic liquid [12] and performances as a powerful alternate for the

usuallyactive risky ionic liquid to carbonyl oxygen, crafting the C=O bond extraelectrophilic. Choline chloride–Urea initiatedionic molten clear liquid has been successfully used for the pyrrole derivative,Fischer indole synthesis, [13] O-acetylation of cellulose and monosaccharides, [14]and protection of carbonyl compounds. [15]We report here our results of ChCl 2Urea catalyzed modified Abramov reaction.

Quinolines [16a]are an important class of heterocyclic compounds and have been screened for numerous biological activities such as bactericidal [16b], antitumor [16c], anti-inflammatory [(16d], and antimalarial [16e] . Quinolines such as 2-chloroquinoline-3-carbaldehyde capture a noticeable position as they are key intermediates for extend annellation and for several functional group interconversions [17a]. It is furthermore reported that organophosphates are effective pesticides which have wide variety of application [17b]. Recently, some new vinyl phosphates have been reported as convincing inhibitors of phosphatase [17c] and phosphodiesterase [17d].
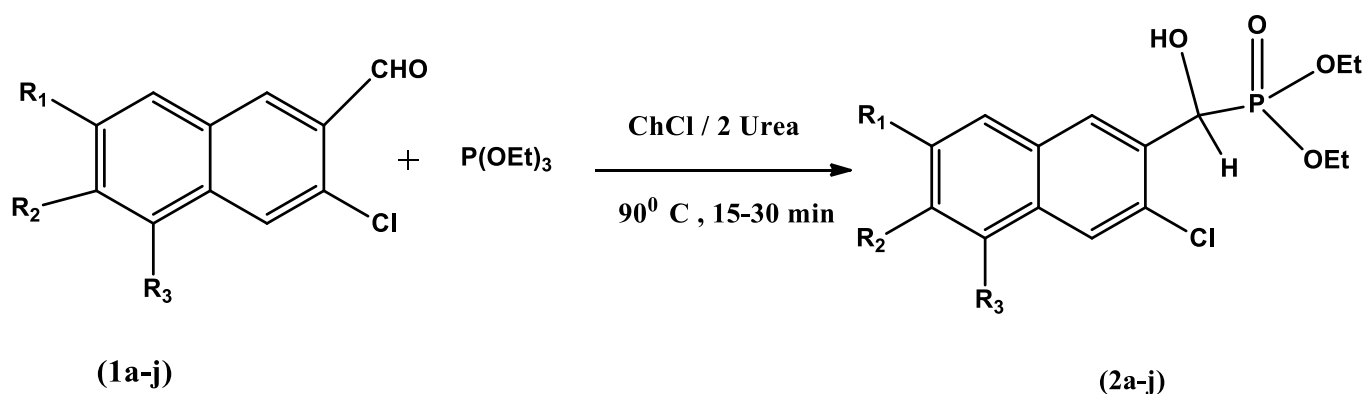
Scheme: Synthesis of [2a-j] from [1a-j] by using Deep eutectic catalyst

II. RESULTS AND DISCUSSION

The original work of Abramov reaction involved the heating under microwave of an aldehyde or a ketone withtrialkylphosphite at 70-100°C for several hours in sealed tube[18]. Under these stringent conditionsdialky-α-alkoxyalkylphosphonates could be isolated in various yields.To overcome these difficulties in attempting Abramov reaction silyl halide can be usedalong with the carbonyl compounds and the phosphorous reagent [19]. Removal of the residual silylester linkages at the phosphonate Centre is accomplished with water or alcohol under mildconditions. Hence the Abramov reaction with such modification is referred as "ModifiedAbramov Reaction".α-hydroxyphosphonates may serve as precursors for the synthesis of alpha aminophosphonates which are analogs of alpha amino acid [20]. Hence a search for new biological activecompound has stimulated recent studies on the synthesis of α-substituted phosphonates.In continuation of our work on phosphorus chemistry, [21], herein several examples ofmodified Abramov reaction on 2-chloroquinolin-3-carbaldehydes (**1a-j**) are presented to afford α-hydroxyphosphonates (**2a-j**) compounds.

The one pot two-component reaction between triethyl phosphite (2 mmol), and quinoline 3-carbaldehyde (2 mmol), was chosen as a model reaction. All the reaction conditions were optimized using $ChCl_2$/2Urea as a catalyst[22]. The reaction mixture was stirred at room temperature under solvent-free condition. It was observed that initially the reaction mixture was clear and after 10 min the solid product formation started. It is noteworthy that, no significant product formation was observed under similar reaction conditions in the absence of catalyst even after 5 h (Table 1)

Table 1.DES facilitated synthesis of a-hydroxyphosphonates.

Entry	R_1	R_2	R_3	Time (min)	Yield (%)	MP (°C)
2a	H	H	H	25	87	128-130°C
2b	CH₃	H	H	21	88.8	145-147°C
2c	H	CH₃	H	20	82.6	141-143°C
2d	H	H	CH₃	22	82.5	172-174 °C
2e	OCH₃	H	H	19	84.1	156-160 °C
2f	H	OCH₃	H	18	83.2	166-170 °C
2g	H	H	OCH₃	24	77.2	149-151°C
2h	OCH₂CH₃	H	H	23	85.9	168-170°C
2i	H	H	CH₂CH₃	27	73.2	149-151°C
2j	Cl	H	H	25	79.9	115-119°C

III. EXPERIMENTAL SECTION

General Procedures.

2-Chloroquinoline-3-carbaldehydes were prepared in the laboratory by thereported method. [23]triethylphosphitewere procured from Sigma Andrich. methanol andhexane,Choline chloride, Urea, were procured from S. D. Fine-chem.All melting points were determined in open capillaries on Kumar's melting point apparatus. The products were characterized by their spectral data. ^{1}H NMR spectra were recorded on a Varian INOVA-500 (500 MHz) spectrometer.Chemical shifts are reported in ppm from the solvent resonance as the internal standard (DMF-d7; 8.03 ppm) or tetramethylsilane (0.0 ppm) resonance as the internal standard (CDCl₃). Data are reported as follows: chemical shift, integration, multiplicity (s = singlet, d = doublet, t = triplet, br = broad) and coupling constants (Hz).Infrared spectra were recorded on a FT/IR-300E spectrometer.Mass spectra were recorded onMicromass Quatrro-II using electrospray Ionization technique, showing (m+1) peak as a basepeak. Analytical thin layer chromatography (TLC) was performed on Merck precoated TLC plates (silica gel 60 GF254, 0.25 mm). Other simple chemicals were purchased and used as such.

General procedure. Diethyl (2 –chloro-quinolin-3-yl) (hydroxy) methylphosphonate. (2a)

Amixture of2-chloroquinoline-3-carbaldehyde (0.95 gm, 3 mmol) and triethylphosphite (1.66 gm,6 mmol) all the reaction conditions are optimized usingChCl.2Urea mixture as catalyst. The reaction was added with constant stirring. Progress of reaction was monitored on TLC. Aftercompletion of reaction (25min.), the mixture was concentrated on rotary-evaporator underreduced pressure, to obtain an oily residue. The oily residue was dissolved in methanol. This methanolic solution was concentrated, dissolved indichloromethane and reprecipitated with hexane. Thus, obtained solid was filtered, washed withhexane and dried in oven at 40°C. (Choline chloride–Urea-based DES preparation-The choline chloride–urea deep eutectic solvent was prepared according to the literature. In a 250-mL flask with constant magnetic stirring, Urea (300 mmol) and choline chloride (150 mmol) were mixed, and heated at 70 °C until a clear liquid appeared. The obtained deep eutectic solvent was used without any further purification).All of the a-hydroxyphosphonates is known compounds to which the spectroscopic data were compared.

(2a).diethyl ((2-chloroquinolin-3-yl)(hydroxy)methyl) phosphonate- (1.02 gm, yield 87%, m.p. 128-130^{0}C).IR (KBr), cm^{-1}: 3245 (- OH); 1218 (- P=O); 104(-P-O-C). ^{1}H NMR (CDCl$_3$), δ ppm: 1.2 (t, 3H,O-CH$_2$-CH$_3$); 1.4 (t, 3H, O-CH$_2$-CH$_3$); 2.1 (s, 1H, -CH-OH); 4.1 (m, 4H, O-CH$_2$-CH$_3$ and OCH$_2$-CH$_3$); 5.5 (d, 1H, -CH-P=O); 7.4 (t, 1H, Ar-H, C$_6$); 7.9 (t, 1H, Ar-H, C$_7$); 7.7 (d,1H, Ar-H,C$_5$); 8.1 (d, 1H, Ar-H, C$_8$); 8.5(s, 1H, Ar-H, C$_4$). ES-MS: m/z 330 (m+1) base peak and 332(m+3).Elemental analysis: C$_{14}$H$_{17}$ClNO$_4$P Calculated: C: 51.01 %, H: 5.19%, N: 4.25 %; Found: C: 51.03%, H: 5.389 %, N: 4.355%.

(2b).diethyl ((2-chloro-6-methylquinolin-3-yl)(hydroxy)methyl) phosphonate-Yield 80.8 %, m.p. 145-147 ^{0}C. IR (KBr), cm^{-1}: 3278 (-OH); 1218 (-P=O); 1037 (-P-O-C). ^{1}H NMR (CDCl$_3$), δ ppm: 1.2 (t, 3H, O-CH$_2$-CH$_3$); 1.3 (t, 3H , O-CH$_2$-CH$_3$); 2.4 (s, 1H, -CH-OH); 2.5 (s, 3H , ArCH$_3$); 4.1 (q, 2H , O-CH$_2$-CH$_3$); 4.2 (q, 2H , O-CH$_2$-CH$_3$); 5.6 (d, 1H , CH-P=O); 7.5 (s, 1H , Ar-H, C$_5$); 7.6 (d, 1H , Ar-H, C$_7$); 7.9 (d, 1H , Ar-H, C$_8$); 8.5 (s, 1H , Ar-H, C$_4$). ES-MS: m/z 344 (m+1) base peak and 345.9 (m+3). Elemental analysis: C$_{15}$H$_{19}$ClNO$_4$P Calca.: C: 52.41 %, H: 5.57 %, N: 4.07 %; Found: C: 52.50 %, H: 5.67 %, N: 4.17 %.

(2c).diethyl ((2-chloro-7-methylquinolin-3-yl) (hydroxy)methyl) phosphonate - Yield82.6 %, m.p. 141-143 ^{0}C. IR (KBr), cm^{-1}: 3278 (-OH); 1218 (-P=O); 1037 (-P-O-C). ^{1}H NMR (CDCl$_3$), δ ppm: 1.2 (t, 3H, O-CH$_2$-CH$_3$); 1.3 (t, 3H , O-CH$_2$-CH$_3$); 2.4 (s, 1H, -CH-OH); 2.5 (s, 3H , ArCH$_3$); 4.1 (q, 2H , O-CH$_2$-CH$_3$); 4.2 (q, 2H , O-CH$_2$-CH$_3$); 5.6 (d, 1H , CH-P=O); 7.5 (s, 1H , Ar-H, C$_5$); 7.6 (d, 1H , Ar-H, C$_7$); 7.9 (d, 1H , Ar-H, C$_8$); 8.5 (s, 1H , Ar-H, C$_4$). ES-MS: m/z 344 (m+1) base peak and 345.9 (m+3). Elemental analysis: C$_{15}$H$_{19}$ClNO$_4$P Calca.: C: 52.41 %, H: 5.57 %, N: 4.07 %; Found: C: 52.50 %, H: 5.67 %, N: 4.17 %.

(2d).diethyl ((2-chloro-8-methylquinolin-3-yl)(hydroxy)methyl)phosphonate-Yield 82.5 %,m.p. 172-174^{0}C. IR (KBr) cm^{-1}: 3277 (-OH); 1222 (-P=O); 1037(-P-O-C).), δ ppm^{1}H NMR(CDCl$_3$: 1.1 (t, 3H, O-CH$_2$-CH$_3$); 1.3 (t, 3H, O-CH$_2$-CH$_3$); 2.7 (s, 1H, -CH-OH); 3.9 (s, 3H, Ar-O-CH$_3$); 4.2 (q, 2H, O-CH$_2$-CH$_3$); 4.3 (q, 2H, O-CH$_2$-CH$_3$); 5.8 (d, 1H, CH-P=O); 7.0 (s, 1H, Ar-H, C$_5$); 7.5 (d, 1H, Ar-H, C$_7$); 8.1 (d, 1H, Ar-H, C$_8$); 8.8 (s, 1H, Ar-H, C$_4$). ES-MS: m/z 360(m+1) base peak and 362 (m+3).Elemental analysis: C$_{15}$H$_{19}$ClNO$_5$P Calculated: C: 50.08 %, H: 5.32 %, N: 3.89 %; Found: C: 50.10%, H: 5.42 %, N: 3.99 %.

(2e). diethyl ((2-chloro-6-methoxyquinolin-3-yl) (hydroxy)methyl) phosphonate-Yield 84.1%,m.p. 156-160^{0}C. IR (KBr) cm-1: 3265 (-OH); 1219 (-P=O); 1034 (-P-O-C). 1H NMR (CDCl$_3$), δppm: 1.1(t, 3H, O-CH$_2$-CH$_3$); 1.3 (t, 3H, O-CH$_2$-CH$_3$); 2.7 (s, 1H, -CH-OH); 4.0 (s, 3H, Ar-OCH$_3$);4.3 (q, 2H, O-CH$_2$-CH$_3$); 4.4 (q, 2H, O-CH$_2$-CH$_3$); 5.7 (d, 1H, CH-P=O); 7.2 (d, 1H, Ar-H,C$_6$); 7.4 (s, 1H, Ar-H, C$_8$), 7.8 (d, 1H, Ar-H, C$_5$); 8.7 (s, 1H, Ar-H, C$_4$). ES-MS: m/z 343.9 (m+1) base peak and 346 (m+3).Elemental analysis: C$_{15}$H$_{19}$ClNO$_5$P Calculated.: C: 50.08 %, H: 5.32 %, N: 3.89 %; Found: C: 50.27%, H: 5.52 %, N: 4.21 %.

(2f).diethyl ((2-chloro-7-methoxyquinolin-3-yl) (hydroxy)methyl) phosphonate-Yield 83.2 %,m.p. 166-170 ^{0}C. IR (KBr) cm-1: 3258 (-OH); 1235 (-P=O); 1049 (-P-O-C). 1H NMR (CDCl3), δppm: 1.2 (t, 3H, O-CH2-CH3); 1.4 (t, 3H, O-CH2-CH3); 1.3(t, 3H, Ar-O-CH2-CH3); 3.3 (bs, 1H,-CH-OH); 4.2 (q, 2H, O-CH2-CH3); 4.3 (q, 2H, O-CH2-CH3); 4.3 (q, 2H,, O-CH2-CH3); 5.5 (d,1H, CH-P=O); 7.2 (s, 1H, Ar-H, C5); 7.4 (d, 1H, Ar-H, C7); 7.7 (d, 1H, Ar-H, C8); 8.5 (s, 1H, Ar-H, C4). ES-MS: m/z 374 (m+1) base peak and 376 (m+3). Elemental analysis: C$_{16}$H$_{21}$ClNO$_5$P Calculated.: C: 51.41 %, H: 5.66 %, N: 3.75 %; Found: C: 51.581 %, H: 5.772 %, N: 3.91 %.

(2g). diethyl ((2-chloro-8-methoxyquinolin-3-yl) (hydroxy)methyl) phosphonate-Yield 72.2 %, m.p. 149-151^{0}C. IR (KBr) cm-1: 3252 (-OH); 1223 (-P=O); 1041 (-P-O-C). 1H NMR (CDCl3), δppm: 1.2 (t, 3H, O-CH2-CH3); 1.35 (m, 6H, O-CH2-CH3 and Ar-CH2-CH3); 2.3 (s, 1H, -CHOH); 3.25 (q, 2H, Ar-CH2-CH3); 4.2 (m, 4H, O-CH2-CH3 and O-CH2-CH3); 5.6 (d, 1H, CHP=O); 7.5 (t, 1H, Ar-H, C6); 7.6 (d, 1H, Ar-H, C7); 7.7 (d, 1H, Ar-H, C5); 8.5 (s, 1H, Ar-H, C4). ES-MS: m/z 359 (m+1) base peak and 361 (m+3). Elemental analysis: $C_{15}H_{19}ClNO_5P$ Calculated.: C:53.71 %, H: 5.92 %, N: 3.92 %; Found: C: 53.82 %, H: 5.99 %, N: 4.05 %.

(2h).diethyl ((2-chloro-5-ethoxyquinolin-3-yl) (hydroxy)methyl) phosphonate Yield 85.9 %, m.p. 168-170 ^{0} C. IR (KBr) cm-1: 3255 (-OH); 1234 (-P=O); 1049 (-P-O-C). 1H NMR (CDCl$_3$), δ ppm: 1.2 (t, 3H, O-CH$_2$-CH$_3$); 1.3 (t, 3H, O-CH$_2$-CH$_3$); 1.4 (t, 3H, Ar-O-CH$_2$-CH$_3$); 3.4 (bs, 1H, -CH-OH); 4.1 (q, 2H, O-CH$_2$-CH$_3$); 4.2 (q, 2H, O-CH2-CH3); 4.3 (q, 2H,, O-CH2-CH3); 5.6 (d, 1H, CH-P=O); 7.0 (s, 1H, Ar-H,C5); 7.4 (d, 1H, Ar-H, C7); 7.9 (d, 1H, Ar-H, C8); 8.4 (s, 1H, ArH, C4). ES-MS: m/z 374 (m+1) base peak and 376 (m+3). Elemental analysis: $C_{16}H_{21}ClNO_5P$ Calcd.: C: 51.41 %, H: 5.66 %, N: 3.75 %; Found: C: 51.527 %, H: 5.793 %, N: 3.85 %.

IV. CONCLUSION

We have shown a facile and efficient procedure for the one pot synthesis of α-hydroxyphosphonates using environmentally ionic liquid. This method to avoids the use of acidic and highly toxic reagents as catalysts. In addition, operational simplicity, mild reaction conditions, considerably short reaction time, high yields, reusability of the catalyst, and cost effectiveness make this protocol an important addition to the existing methods of α-hydroxyphosphonates synthesis. Further work is in progress to broaden the scope of choline chloride-based moisture stable ionic liquids to the other organic transformations in a deep eutectic solvent. In addition to short reaction times, wide scope ofsubstrates, the use of biodegradable andinexpensive DESas solvent and catalyst are the distinct features of thisprocedure.

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Automation and Monitoring of Greenhouse with Arduino

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ABSTRACT

Automation and monitoring of greenhouse is very beneficial for farmers in India, especially in rural India. The main objective of this work is, to develop a simple and cost-effective system which monitor and control the environmental parameter in the greenhouse to maintain the best possible environment for crops and to get maximum yield. This system is also minimizing the labor cost of farmers.

Keywords: Greenhouse, Arduino

I. INTRODUCTION

In an agriculture field climate change is one of the major reason for low production & loss of crops. Which results in a shortage of food production. [1] To overcome this problem it needs to get crop production in control environment such as a greenhouse.

In this work greenhouse automation system is make using Arduino, with three necessary sensors namely LDR for light sensing, HTU21D sensor for temperature and humidity sensing, and soil moisture sensor to find the water content in the soil. Also, for controlling the various actuators & motors relays are used. LCD is used to display real-time values of temperature, humidity, light intensity & soil moisture level.
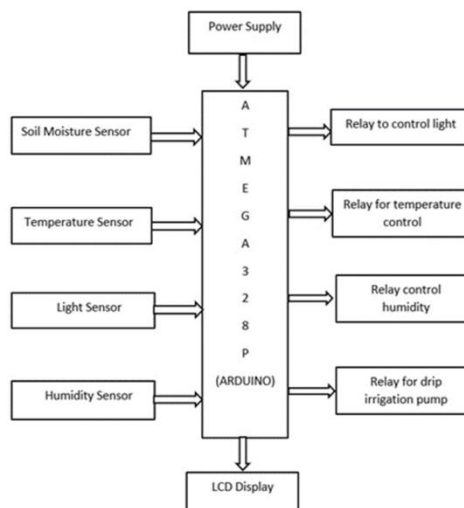
Fig 1: Block Diagram

II. METHODS AND MATERIAL

This system is developed by using three sensors (Temperature & moisture, Light sensor, Soil moisture sensor), Arduino UNO & relays.

1) System Hardware

A. Arduino Uno

Arduino UNO is the open-source development board. I consist Atmega 328P (DIP package) microcontroller. This board have total 6 analog input pin, 14 digital input/output pins, 1 UART port, 1 I2C port & 1 SPI port

Fig 2: Arduino Uno

Analog input pins are used to read the sense value of the light sensor and soil moisture sensor while digital pins are used to switch relay also a temperature and humidity sense through the I2C port.

B. Temperature and Humidity Sensor (HTU21D)

It is a high-resolution, high-speed temperature and humidity sensor. This sensor is connected with an Arduino using an I2C port. With this sensor, the temperature T(in^{0}C) is calculated by inserting temperature signal output S_{Temp} into the formula

$T = - 46.85 + 175.72 \ \text{xx} \frac{S_{TEMP}}{2^{16}}$ while relative humidity % RH is calculated by inserting relative humidity signal output S_{RH} into formula % RH= - 6 + 125 $ \ \text{x} \ \frac{S_{RH}}{2^{16}}$

Fig 3: Temperature and Humidity Sensor (HTU21D)

The main work of this sensor is to monitor and maintain the greenhouse temperature and humidity within the desired range. If this parameter is below or above the desired range then the microcontroller sends signals to the respective device such as cooler or heater for temperature control and humidifier for humidity control.

C. Light Sensor (LDR)

The LDR stands for Light Dependent Resistor. This sensor is used to measure the light intensity level. When the light intensity is below desired value then the microcontroller turns on the light.
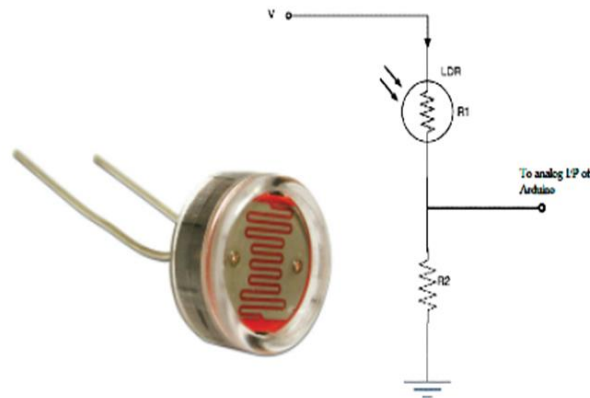
Fig 4: Light Sensor (LDR)

D. Soil Moisture Sensor

The soil moisture sensor has two metal plates. These metal plates are immersed in soil whose water content is to be measured. Now the resistance between two plates depends upon the water content of the soil
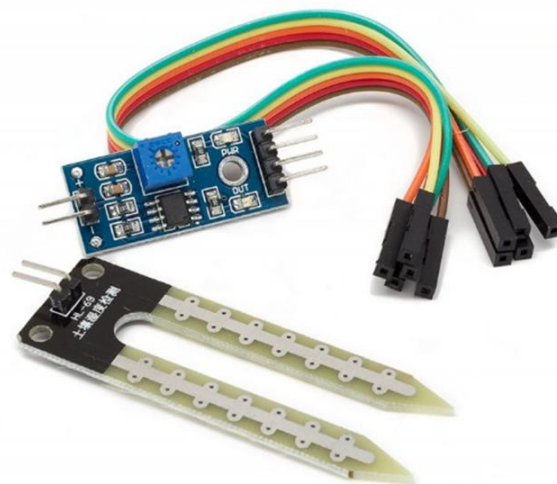
Fig 5: Soil Moisture Sensor

If the Water content is low, the resistance between plates is high and vice versa. This change in resistance changes the analog output value of the sensor. If the soil water content is below or above the range then the microcontroller turns on or off the drip irrigation system.

2) System Software

The system software is developed in C language using Arduino IDE.
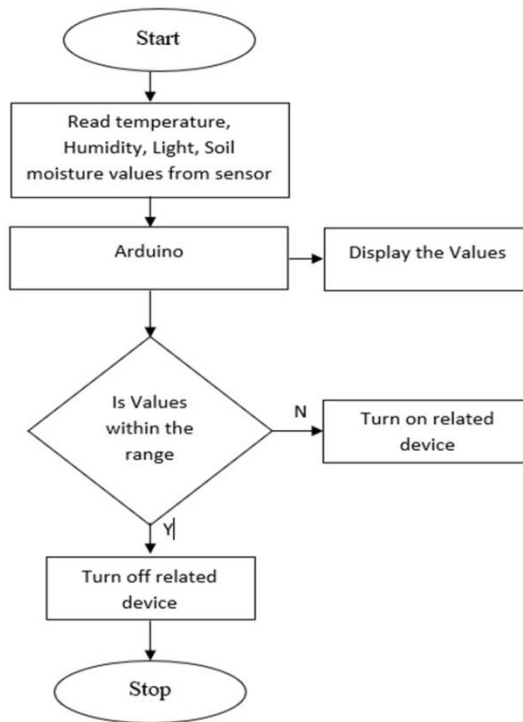
Fig 6: Flow chart

Fig 7: IDE software

III. RESULT

It is observed that if climate parameter such as temperature, humidity, light, soil water content is out of range then the corresponding device is controlled by relays. If the temperature goes below or above desired range

then the system turns on the heater/cooler. If the light intensity is low system turn on artificial light. It is also observed that if soil water content is below range then the system automatically turns on drip irrigation pump and turn off the pump when the desire water content level is achieved. Similarly, humidity is maintained within the range by turning on or off the humidifier
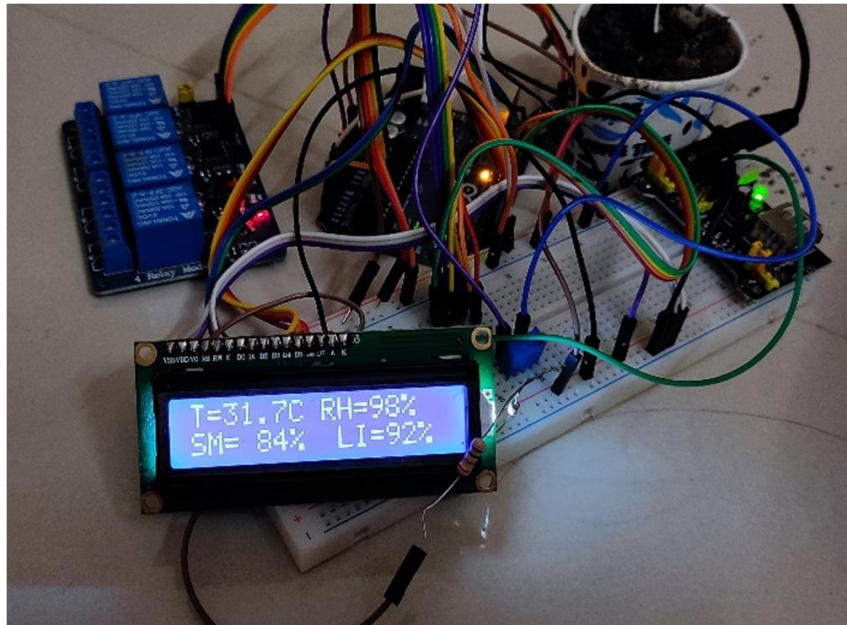
Fig. 8: Working model

IV. CONCLUSION

This system is used to implement in the greenhouse. The accuracy of this system is far more than a manual system and hence eliminates human error. Using this system farmers can get healthy crops all over the year hence maximize their income. This system is also useful for the nursery & garden.

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Synthesis of Substituted 2-Amino-4-Pheyl Thiazole Derivatives for Anti-Microbial Applications

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ABSTRACT

In present work a novel series of Substituted 2-Amino 4-Pheyl Thiazole has been synthesized from 2-Chloro, 1- phenyl Ethan-1-one and Thiourea on refluxing in ethanol. The reaction was monitored on TLC plate, the synthesized compounds are confirmed on the basis of elemental analysis and spectroscopic data such as IR, H1NMR etc. these compounds screened for in-vivo Antibacterial activities against a strain of E-Coli, B. Subtilis ,

Keywords: 2- Amino 4-Pheyl Thiazole, E-Coli, B. Subtilis etc

I. INTRODUCTION

Thiazole is a five member ring containing Sulfur and Nitrogen atom at 1,3 position to each other this is an interesting scaffold has shown remarkable pharmacological activities such as antimicrobial1, antioxidant2, antiviral3, anticonvulsant4, anti-inflammatory5, anti-tubercular6, antifungal7, anti-diabetic8 properties , and anticancer9 against different cell lines . therefore 2- amino thiazole essentially used in drug development for treatment of many diseases, some drugs contain 2-amino thiazole as an active pharmacophore such as Famotidine , Cefdinir , Abafungin

In addition sulfur and Nitrogen containing natural product such as Caliceamycin, Ecteinascidin, and penicillin have an important place in medicinal and drug chemisty. Thiazole moiety also present in vitamin B1 Thiamine so its applications In drug and medicinal chemistry play an vital role. This precursor is very useful for the total synthesis of drugs containing thiazole moiety.
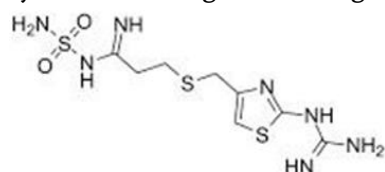
Famotidine
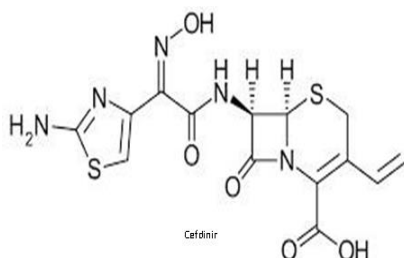
Cefdinir
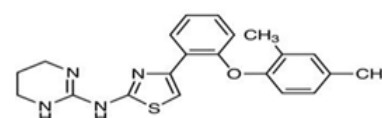
Abafungin

II. METHOD OF PREPARATION

The novel 2-amino-4-phenylthiazole derivatives were synthesized from on condensing 2- chloro-1-(4-substituted phenyl)ethan-1-one(0.01 mmol) with thiourea(0.01 mmol) in ethanol by adding catalytic amount of iodine the reaction was monitored on TLC plate for confirmation of product to get 2-amino-4-(4-substituted phenyl)1,3-thiazole, the structures of newly synthesized compounds were confirmed on the basis of elemental analysis such Melting points of the synthesized compounds were determined by open capillary method and are uncorrected. The IR spectra of synthesized compounds were recorded in potassium bromide discs on Schimadzu FTIR Spectrophotometer . The 1H-NMR spectra of the synthesized compounds were recorded in DMSO and tetramethylsilane (TMS) as an internal standard. the reaction yield was increased when a small amount of catalytic amount of Iodine added to reaction mixture also reaction time get reduced. All new compounds synthesized were recrystallised in Ethanol a shiny crystals obtained

2-chloro-1-(4-chlorophenyl)ethan-1-one   thiourea   4-(4-methylphenyl)-1,3-thiazol-2-amine

Reaction Scheme
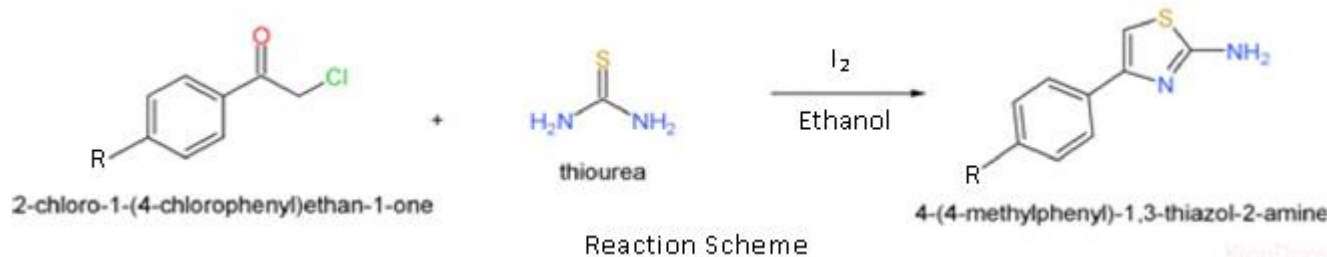
Where R = H, OCH3, CH3, Cl, F, NO2

III. MICROBIAL ASSAY

These new synthesized compounds were screened for in-vivo antimicrobial activities against some species of bacteria such as E-coli, B. Subtilies against standard drug penicillin. A moderate to good activity are observed, the compound containing electron donating group at para position to phenyl ring show better activities in comparison with electron withdrawing group.

The cup diffusion technique was employed to study the antibacterial activity of synthesized compounds against B. subtilis , E. coli

Dimethylformamide was used as a control. Sterile nutrient agar was inoculated with the test organisms (each 100 mL of the medium received 1 mL of 24 h broth culture), and then seeded agar was poured into sterile petri dishes. Cups (8 mm in diameter) were cut in the agar, and each cup received 0.1 mL of the test compound solution. The plates were then incubated at 37 o C for 24 hr. The activities were estimated as zones of inhibition in mm diameter .

Compound	Antibacterial Activity (mm)	
	B. Subtilis	E Coli
H	14	15
OCH3	18	17
CH3	17	18
Cl	19	18
F	17	17
NO2	13	13
Penicillin	26	26

IV. RESULT AND DISCUSSION

The target compounds were prepared as outlined in Reaction Scheme . The purity of the compounds was monitored by TLC and the structure of the compounds was deduced on the basis of spectral data. The synthesized compounds were tested for activity against B. subtilis, E. colis. The results of antimicrobial activity are shown in table. It is evident from the results that the compound Fluro substituted compound was possessed potent antibacterial activity. Rest of the synthesized compounds were inactive to kill the target organisms.

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Einstein A - Coefficient of Isomer 3 of C_5H_2 Molecule

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ABSTRACT

Laboratory formation of four isomers of C_5H_2 molecule is reported. For identification of a molecule in cosmic objects, one of the required input data is Einstein A- coefficients (radiative transition probabilities) for the molecule. Here, we report Einstein A- coefficients for electric dipole transitions in the isomer 2 of C_5H_2 among the rotational levels of the ground electronic and ground vibrational states up to 21 cm^{-1}.

Keywords: C_5H_2 molecule, isomers, molecular data.

I. INTRODUCTION

More than 150 molecules detected in cosmic object, most of them are hydrogen-carbon compounds. After detection of C3H2, both linear as well as cyclic isomers in the cosmic objects, astronomers showed interest in the search of C_5H_2 molecule.

The isomer 3 of C_5H_2 (Penta-tetra-enylidine) molecule has been observed in laboratory by Gottlieb *et al.*(1998) . It is an asymmetric top planar molecule having an electric dipole moment μ = 4.8 Debye which is inclined with theaxes of inertia. So that its components along the a and b axes of inertia are μ_a= 2.84 Debye and μ_b = 3.86 Debye. Thus, this isomer like isomer1 has both the a and b type radiative transitions and therefore the rotational energy levels cannot be separated into two different groups, as is done in case of isomer 2. For this isomer only a type transitions have been observed and given in Table 2. The molecular and distortional data derived by Gottlieb *et al.* 1998. For this isomer of C_5H_2 are given in Table 1.
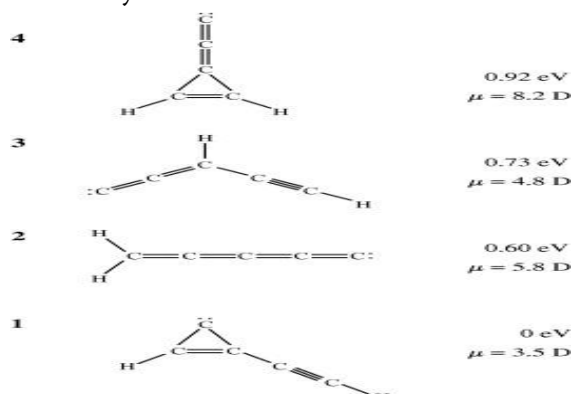
Fig. 1. Structure of four isomers of C5H2molecule along with electric dipole moment and their energy

Table 1: Molecular data of isomer 3 of C_5H_2 molecule

Constants	Isomer 3
A (MHz)	318166
B (MHz)	2865.77293
C (MHz)	2624.47953
Δ_J (MHz)	14.718×10^{-4}
Δ_{JK} (MHz)	-13.97×10^{-2}
μ_a (Debye)	2.84
μ_b (Debye)	3.86

Table 2: Measured rotational frequencies of isomer 3 of C_5H_2 molecule.

Transition	Frequency (MHz)
$1_{01} \rightarrow 0_{00}$	5490.247
$2_{12} \rightarrow 1_{11}$	10739.735
$2_{02} \rightarrow 1_{01}$	10978.956
$2_{11} \rightarrow 1_{10}$	11222.297
$3_{13} \rightarrow 2_{12}$	16108.601
$3_{03} \rightarrow 2_{02}$	16464.592
$3_{12} \rightarrow 2_{11}$	16832.396
$4_{14} \rightarrow 3_{13}$	21476.273
$4_{04} \rightarrow 3_{12}$	21945.622
$4_{13} \rightarrow 3_{12}$	22441.222

II. CALCULATIONS

For calculation of the Einstein A-coefficients, the required input data are the molecular rotational and distortional constants and the electric dipole moment are reported in Table 1. Details for calculations of Einstein A-coefficients for a-type rotational transitions in an asymmetric top molecule are discussed by Chandra and Sharma(1994) , Chandra and Rashmi (1998) .By using the data given in Table 1, values for a-type rotational transitions in the ground electronic and ground vibrational states of the isomer 3 of C_5H_2 among the levels up to 21 cm-1 are computed, and are given in Tables 3 and 4.

III. RESULT

The Einstein A-coefficients can be used for computing mean radiative lifetimes of the energy levels(Chandra, 2002) . One can easily find out that some pairs of successive levels connected by radiative transitions show that the mean radiative lifetime of the upper level is larger than that of the lower one.

Table 3: Einstein A-coefficients for a-type ortho transitions in isomer 3 of C_5H_2.

Transitions	A- coeff. (s-1)	Transitions	A- coeff. (s-1)
$1_{10} \rightarrow 1_{11}$	6.61×10^{-13}	$2_{12} \rightarrow 1_{11}$	3.50×10^{-8}
$2_{11} \rightarrow 1_{10}$	3.99×10^{-5}	$2_{11} \rightarrow 2_{12}$	5.95×10^{-10}
$3_{13} \rightarrow 2_{12}$	1.50×10^{-7}	$3_{12} \rightarrow 2_{11}$	1.71×10^{-7}
$3_{12} \rightarrow 3_{13}$	2.38×10^{-11}	$4_{14} \rightarrow 3_{13}$	3.88×10^{-7}
$4_{13} \rightarrow 3_{12}$	4.43×10^{-7}	$5_{15} \rightarrow 4_{14}$	7.94×10^{-7}
$5_{14} \rightarrow 4_{13}$	9.06×10^{-7}	$5_{14} \rightarrow 5_{15}$	1.49×10^{-10}
$6_{16} \rightarrow 5_{15}$	1.41×10^{-6}	$6_{15} \rightarrow 5_{14}$	1.61×10^{-6}
$6_{15} \rightarrow 6_{16}$	2.92×10^{-10}	$7_{17} \rightarrow 6_{16}$	2.28×10^{-6}
$7_{16} \rightarrow 6_{15}$	2.60×10^{-6}	$7_{16} \rightarrow 7_{17}$	5.18×10^{-10}
$8_{18} \rightarrow 7_{17}$	3.45×10^{-6}	$8_{17} \rightarrow 7_{16}$	3.93×10^{-6}
$8_{17} \rightarrow 8_{18}$	8.57×10^{-10}	$9_{19} \rightarrow 8_{18}$	4.96×10^{-6}
$9_{18} \rightarrow 8_{17}$	5.65×10^{-6}	$9_{18} \rightarrow 9_{19}$	1.34×10^{-9}
$3_{31} \rightarrow 1_{12}$	2.23×10^{-9}	$3_{31} \rightarrow 3_{12}$	1.60×10^{-9}

Table 4: Einstein A-coefficients for a-type para transitions in isomer 3 of C_5H_2

Transitions	A- coeff. (s-1)	Transitions	A- coeff. (s-1)
$1_{01} \rightarrow 0_{00}$	5.29×10^{-9}	$2_{02} \rightarrow 1_{01}$	4.98×10^{-8}
$3_{03} \rightarrow 2_{02}$	1.80×10^{-7}	$4_{04} \rightarrow 3_{03}$	4.42×10^{-7}
$5_{05} \rightarrow 4_{04}$	8.82×10^{-7}	$6_{06} \rightarrow 5_{05}$	1.54×10^{-6}
$2_{21} \rightarrow 2_{02}$	1.27×10^{-9}	$2_{20} \rightarrow 1_{01}$	1.00×10^{-9}
$2_{20} \rightarrow 3_{03}$	3.22×10^{-10}	$3_{22} \rightarrow 3_{03}$	3.19×10^{-9}
$3_{22} \rightarrow 2_{21}$	1.00×10^{-7}	$3_{21} \rightarrow 2_{02}$	2.71×10^{-9}
$3_{21} \rightarrow 4_{04}$	7.29×10^{-10}	$3_{21} \rightarrow 2_{20}$	1.00×10^{-9}
$7_{07} \rightarrow 6_{06}$	2.48×10^{-6}	$4_{23} \rightarrow 4_{04}$	5.74×10^{-9}
$4_{23} \rightarrow 3_{22}$	3.22×10^{-7}	$4_{22} \rightarrow 3_{03}$	5.35×10^{-9}
$4_{22} \rightarrow 5_{05}$	1.14×10^{-9}	$4_{22} \rightarrow 3_{21}$	3.33×10^{-7}
$8_{08} \rightarrow 7_{07}$	3.71×10^{-6}	$5_{24} \rightarrow 5_{05}$	8.92×10^{-9}
$5_{24} \rightarrow 4_{23}$	7.43×10^{-7}	$5_{23} \rightarrow 4_{04}$	9.19×10^{-9}
$5_{23} \rightarrow 6_{06}$	1.49×10^{-9}	$5_{23} \rightarrow 4_{22}$	7.46×10^{-7}

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Metabolic Profile of Cassia Auriculata L. Extracts by High Performance Liquid Chromatography

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ABSTRACT

Present study involvescharacterizationof medicinallysecondary metabolitessuch as phenolic compounds namely Ellagic acid, Catchol, Gallic acid, Quercetin, anthrquinone were detected byqualitative High Performance Liquid Chromatography (HPLC) analysis. *Cassia* family is well known source of anthrquinone glycosides and its derivatives in the various parts of plants. The simple high performance liquid chromatography method was developed and validated for the determination of anthrquinone in the extract from *Cassia auriculata.* The extracts were analyzed on C-18 column isocratic mobile phase in HPLC equipped with UV detector at 270 nm. The limits of detection obtained for the analyte were in the range of 2.5 to 1.5μg/ml.

KEYWORDS: HPLC, *Cassia auriculata*, phenolic compounds.

I. INTRODUCTION

Plants up regulate and down regulate their biochemical paths in response to the local mix of herbivores, pollinators and microorganisms (Lin coln. 2006). The secondary metabolites and pigments can have therapeutic actions in humans which can be refined to produce drugs. Plants synthesize wildering variety of phytochemical but most are derivatives of a few Bio chemicals such as alkaloids, phenols and their derivatives terpenoids, glycosides and others. The secondary metabolites possess some therapeutic properties therefore some plants are also classified as herbs.The pharmacological activities of any plant sample are due to the presence of metabolites. Secondary metabolites and secretary products in it (Gupta *et al.*, 2012). These usually consist of the phenolic compounds, alkaloids, tannins, saponin, carbohydrates, glycosides, flavonoids, steroids etc. Most phenolic compounds such as flavonoids, glycosides, triperinoids, flavones, carbohydrates and antraquinone are found and distributed throughout the plant kingdom (Harbone J B., 1973). Similarly the polyphenolic compounds most commonly found in plants extracts are the phenolic acids, flavonoids and tannins (Naik *et al.,* 2006; Sati *etal.,* 2010). Plants form the *Cassia* family are identified as a potential source for herbal medicine. These plants contain anthrquinone, glycosides and their derivatives and the derivatives are potentially known for their laxative

property and skin and respiratory diseases. The main objective of present studywas to determine the chromatograms of standards phenolic chemical compounds which are commonly found in medicinal plants samples by HPLC using methanol and water (5:95) mobile phasewith different elution gradients and run times.

II. MATERIAL AND METHODS

Collection and extraction of medicinal plant material:

The raw material of medicinal plant *C. auriculata*was collected from different regions of Parbhani district India. The voucher specimen was deposited at Department Botany D.S.M College, Jintur. The dried powdered of plant material a flower was extractedseparately with methanol using soxhlet apparatus for 48 hrs. The solvent was distilled off at lower temperature under reduced pressure in rotary flash evaporator and concentrated on water bath to get the crude extract which is stored indesiccator for future use.

III. PREPARATION OF SAMPLE SOLUTION

The phenolic acids were extracted as per the method of (Singh *et al.*, 2002). The extract was dissolved in HPLC grade methanol having approximate concentration 500mg/L in stock solution. Prior to use, the mobile phase was filtered through 0.45μm filter paper with filtration assembly followed by sonication for 10 min. For the complete removal of air bubble/dissolve oxygen. Sample analysis was carried out by using same conditions and results were compared with authentic standards.

High Performance Liquid Chromatography Analysis

HPLCanalysis was performed on isocratic system with UV detector for the detection phenolic compounds. The instrument specification and analysis conditions were optimized. Isocratic system from shimadzu (Asia pacific) Pvt. Ltd. Model No. LC-10 Advp with UV detector was used. The sample volume was kept 20μ with 20μL peodyne injector system. The analytical column with 250×4.6 mm id 5μm was used. The mobile phase prepared from the HPLC grades. The flow rate was kept at 0.6 ml/min and detection was carried out at 270 nm.

Table 1 HPLC analysis of *Cassia auriculata L.* extract

Peak	Retention time	Area	Area percent
1	2.165	123170	14.81
2	2.859	524215	63.05
3	3.723	60767	7.31
4	4.416	47485	5.71
5	4.853	21699	2.61
6	21.781	54108	6.51

IV. RESULT

In the present studythe HPLC finger prints of the crude extracts of *C.auriculata* flowers shows the anthrquinone and flavonoids. Although a primary objective of carrying out HPLC may be to standardize dosage, more information may be obtained during the course of a run, if appropriate detection hardware and software are used. The fig.1 shows the chromatogram of fraction collected form flowers of *Cassia auriculata*. The fig are clearly

show the presence of desired components in the fraction collected through column with C-18 column are detected 270 nm in UV detector. The retention time of all components are matching with the retention time of standards.

The HPLC finger print of the methanolic extract of *Cassia auriculata* shows major peaks at the retention times of 2.165, 2.859, 3.723, 4.416, 4.853 and 21.781 at a wavelength of 270 nm. The retention time for flavonoid is found the value is compare with the standard deviation. The retention time for anthrquinone is (2.165) found. Linearity curves for standards and samples are carried out for method is used to confirm the linearity of all components. The table.1 represents the HPLC data of linearity for these standards.

According to Bouer and Tittel 1996 and spring field *et al* (2005), they reported HPLC finger printing is the best was for chemical characterization and therefore this study also established HPLC finger print for the active phenolic acids that can act as antioxidant, antifungal, antibacterial and antiflammatory. The diverse pharmacological activities have been accredited to phenolic acids for instance, Gallic acids is reported to be anti-inflammatory (Kores *et al.*, 1992) and antibacterial (Raven *et al.*, 1989). Recent researches indicate that the polyphenols being secondary metabolites are present in rich amount in several plants.
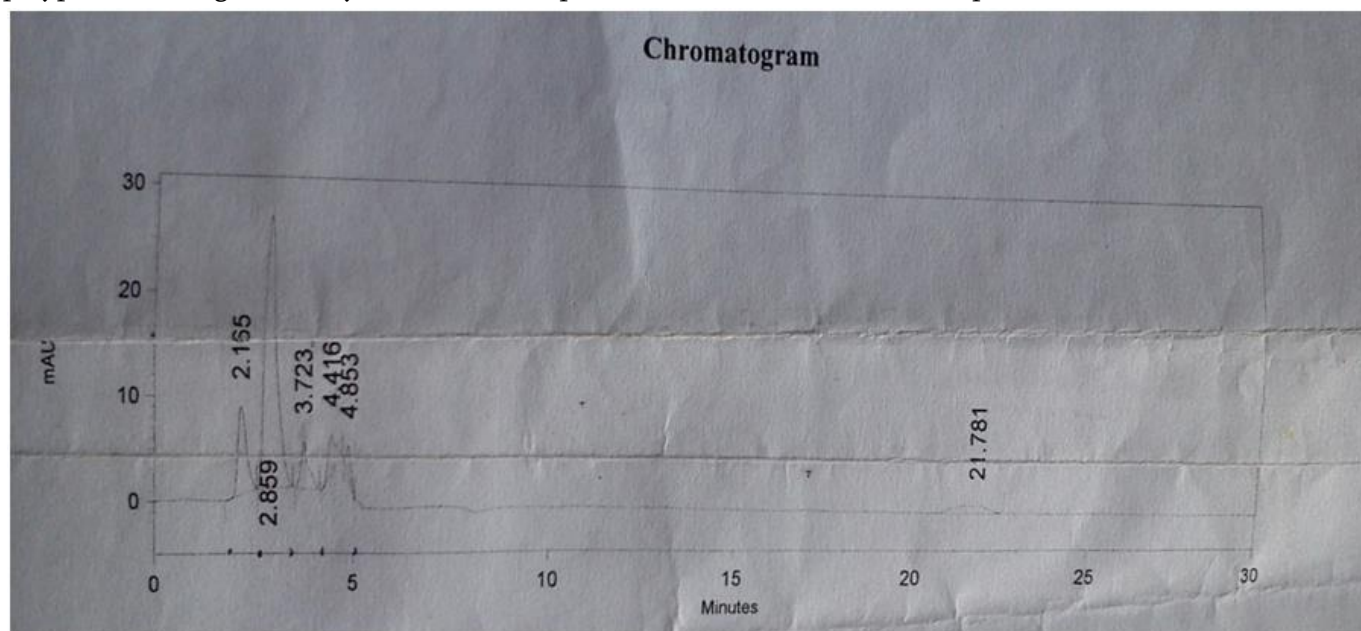
Figure 1 HPLC analysis of methanolic extract of *Cassia auriculata L.*

V. DISCUSSION

The HPLC finger prints of these standards phenolic compounds obtained using the methods. Described above would serve the purpose of established benchmarks for future plant research. The qualitative and quantitative analysis of the actual phenolic compounds present in any unknown plant sample would be facilitated by means of comparison with such standard chromatograms enabling identification and confirmation of presence of these phenolic compound in the research sample. The use of multiple methods involving different mobile gradient phase would increase the validity and reliability of the obtained results. Alkaloids like berberine, palmatine temberaine, choline, tinosporin and magnoflorine have been isolated form the non-polar fraction of extracts of stem and root of *T. Cordifolia* (Jagetia and Rao. 2006). A simple method was developed, optimizes and validated by ultra-fast liquid chromatography for the analysis of quercetin3-O-rutinoside & quercetin in *Cassia auriculata* extracts. (Girme AS *et al.*, 2018). From the GCMS study, 12 phytocompounds were identified from *C. alata* flowers,

9 compounds from *C. auriculata* flowers, 12 compounds from *C. fistula* flowers and 13 phytocompounds identified from the *C. occidentalis* flower extract. A compound namely, Pregna-5, 8, 16-triene-3à-ol-20-one acetate (its chemical name is 16-Dehydropregnenolone acetate) found first time in *C. occidentalis* flowers, which is used in the preparation of anti-cancer agents. Savarinayagam H. Socrates and Shanmugavadivelu C. Mohan, (2019) Studies on the plants of *Acacia pennata*, *Cassia auriculata*, *Glycomis pentaphylla* and *Tadehagi triquetrum* have reported the presence of several bioactive compounds whose biological and pharmacological applications can further be investigated. Phytochemical analysis showed that the antimicrobial activity of *C. auriculata* was due to the presence of Phytochemical compounds like alkaloids, carbohydrates, fixed oils & fats, tannins, gum & mucilage, flavonoids, saponin, terpenoids, lignin and sterols(Raja *et al.*, 2013).It is quite evident from this review that *Cassia auriculata* contains a number of phytoconstistiuents which reveals its uses for various therapeutic purposes. The Plant or its individual parts can be used as Antidiabetic, anthelmintic, hepatoprotective, antifungal and antimicrobial, anti-inflammatory, antipyretic, antioxidant, antihyperlipidemic activity (Guru Prasad C. Nille and K.R.C.Reddy2015). It is quite evident from this is *Cassia auriculata* contains a number of phytoconstistiuents which reveals its use for various therapeutic purposes. Our results suggest that *Cassia auriculata* is a very good potential source of antioxidant and antimicrobial agents, anti-inflammatory(M. Monisha*et al.*, 2017).It was evident from the previous studies that polyphenols exert remarkable antioxidant activity and also inhibit the damaging effect on DNA occurring due to harmful UV radiation. Also it substantially nullifies various adverse biochemical events occurring due to solar UV radiation (Krantisinha Hanumant Randive*et al.*, 2019).The observed effect may be due to the presence of biologically active ingredients in the flower extract. Hence, from the results obtained it can be concluded that *C.auriculata* flower extract can be used for the treatment of diabetes mellitus (G. Sriram Prasath*et al.*, 2019).The studies cited in this review suggest that this plant and its extracts may be of therapeutic value with regard to several pathologies (Vandana Meena*et al.*, 2019). Studies have be done on its bioactive principles of *Cassia auriculata*, which are responsible for the health befits offered by these plants so that the bioactive compounds could give some leads for new drug discovery to various chronic diseases (Salma B., *et al* 2020).From above literature it is concluded that *Cassia auriculata Linn*. Is responsible for the various therapeutic potentials especially in diabetes. It contains a number of phytoconstistiuents and amino acids(Dr. Pranam Suresh Kharche*et al.*, 2020).

VI. CONCULSION

Conventional column chromatography and sample HPLC technique are used to separate therapeutic agents like rhein, embodin, and chrysophonic acid, flavonoids from *Cassia auricualata.*Many therapeutic bioactive compounds found in flower extract and showed antifungal and antioxidant activity.*Cassia auriculata L.* has been examined scrupulously for its phytochemical and pharmacological activities In future, this flower extract could be used for a novel wide-spectrum antimicrobial formulation.. From the above review, it is concluded that *Cassia* has been used as an important curative agent for patients. It is a very useful herbal plant and needs to explore more to know the exact mechanism. In both in vivo and in vitro studies, *Cassia auriculata L.* has various pharmacological properties.

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Study of Structural Impact on Annealed CDs Thin Films by Spray Pyrolysis Method

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ABSTRACT

A thin film of CdS is use for in the fabrication of hetero-junction solar cell. The CdS thin film deposited by spray pyrolysis technique shows the direct band gap 2.4 eV on glass substrate of different thicknesses. CdS thin films were annealed in air from 1000C about 3 hours.. The XRD reveled that the films were polycrystalline in nature and with hexagonal phase. The crysternality of the films was improved by annealing in air at 1000 C.

Key Words: Annealed CdS, Spray pyrolysis, XRD, thin film,

I. INTRODUCTION

At present CdS thin films area widely used as the window material in several CdS based thin films solar cells It belongs to II-VI compound semiconductor materials Thin films of CdS by spray pyrolysis. This method is simple, inexpensive and suitable for water soluble salts and films are so produced have good adherenceto moderately heated substrates The spray pyrolysis [1] is one of the most popular techniques. CdS[2]and [3]. The chemical prepared CdS films is more ideal window material solar cells. The optical energy band gap is 2.24 to 2.40 eV[4]. But the films prepared by using spray paralysis are quite few in number. In the present work, structural properties of CdS thin films annealed and unannealed of various thicknesses is studied.

II. EXPERIMENTAL DETAILS

The certain amount of pure cadmium chloride (CaCl2) and thiourea of equimolar concentration (0.01M) was used .CdS films have been produced by spraying the aqueous solution of CdCl2 and (NH2)2CS in a 1:1 (by volume) onto the microscope preheated glass substrates. the solution was thoroughly sprayed by specially designed glass sprayer on a amorphous preheated cleaned glass substrate at 350^0C .The thickness of films was determined by weighing method. The annealing of the sample was carried out in air for about 3 hours at 100. The absorption and transmission spetra of annealed and unannealed samples were recorded using Elico SL 159 UV-VIS spectrophotometer. The XRD patterns of annealed and unannealed CdS thin films were recorded with Phillips X-ray diffractometer.
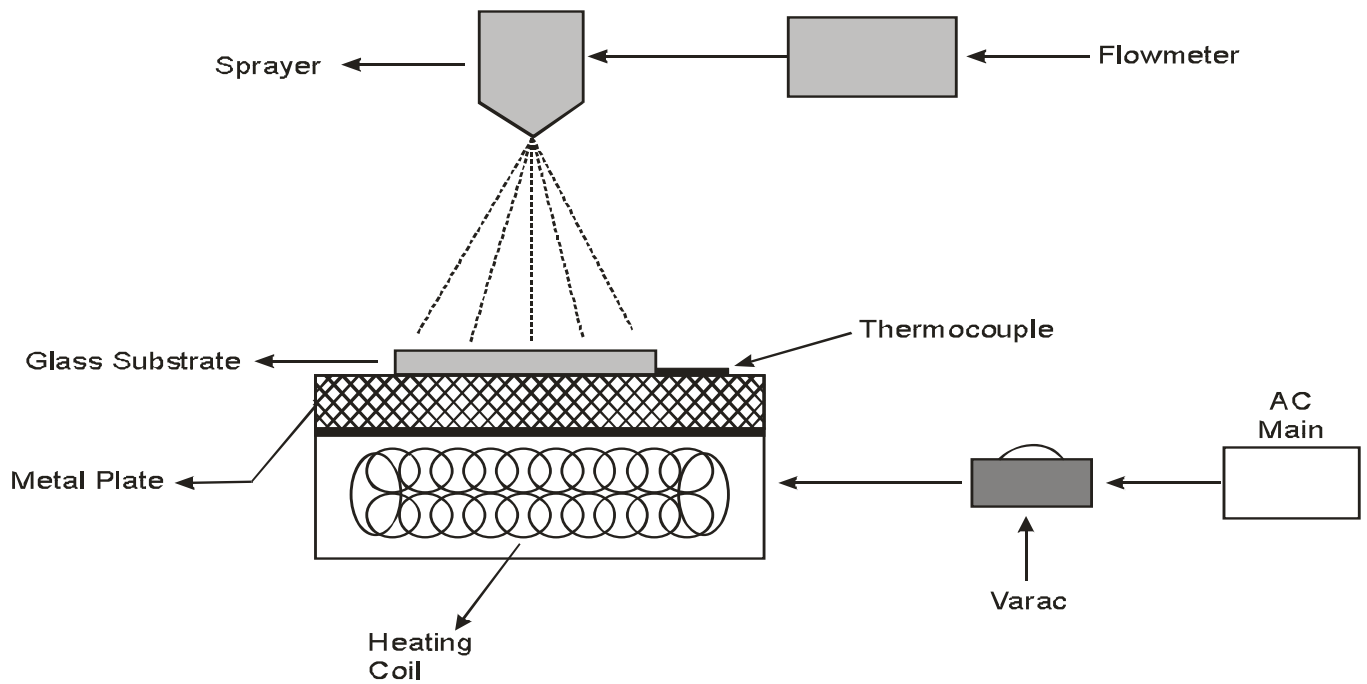
III. RESULT & DISCUSSION

The CdS films were deposit using pyrolysis method containing various thickness. The film deposited by eqimolar concentration of cadmium chloride and thiourea found to have uniformity and adhesion characteristic and the film thickness depends on amount of solutions sprayed.The semiconductor band gap Eg was determined by analysis the optical data

Energy band gap (Eg) of materials is related to absorption coefficient α as

$$\alpha = \frac{A}{h\nu}(h\nu - Eg)^{1/2}$$ ....(1)

where A is constant , ν is incident photon energy, h is the Plank's constant and Eg is band gap.

Fig. 1: Band gap of CdS)
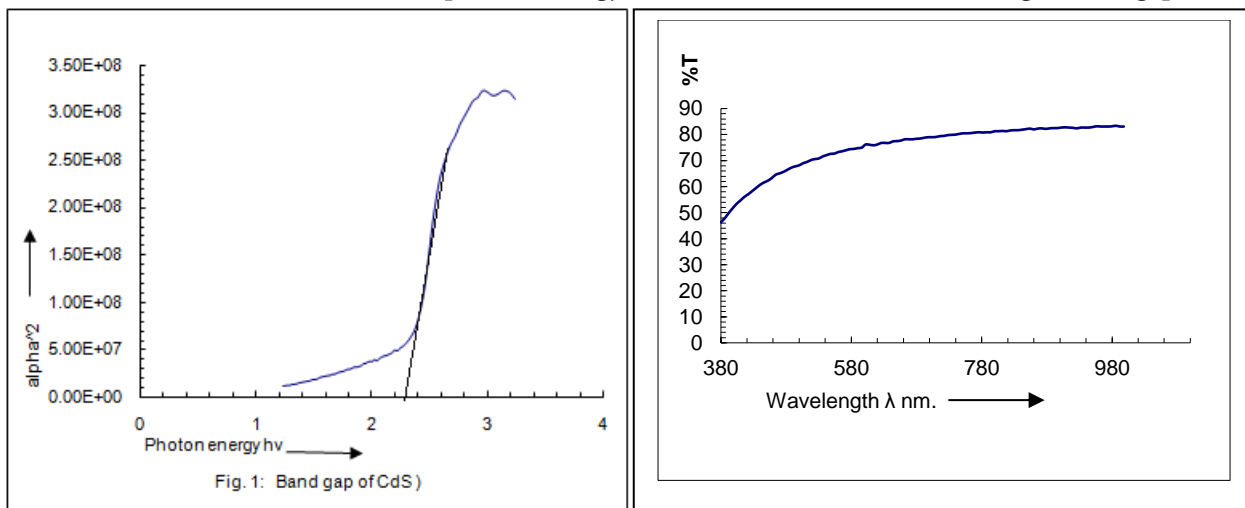
A plot of $(\alpha h\nu)^2$ Vs $(h\nu)$ in shown in fig. (1) for different thickness gives fairly good straight line. The band gap Eg was 2.4 eV.[5].
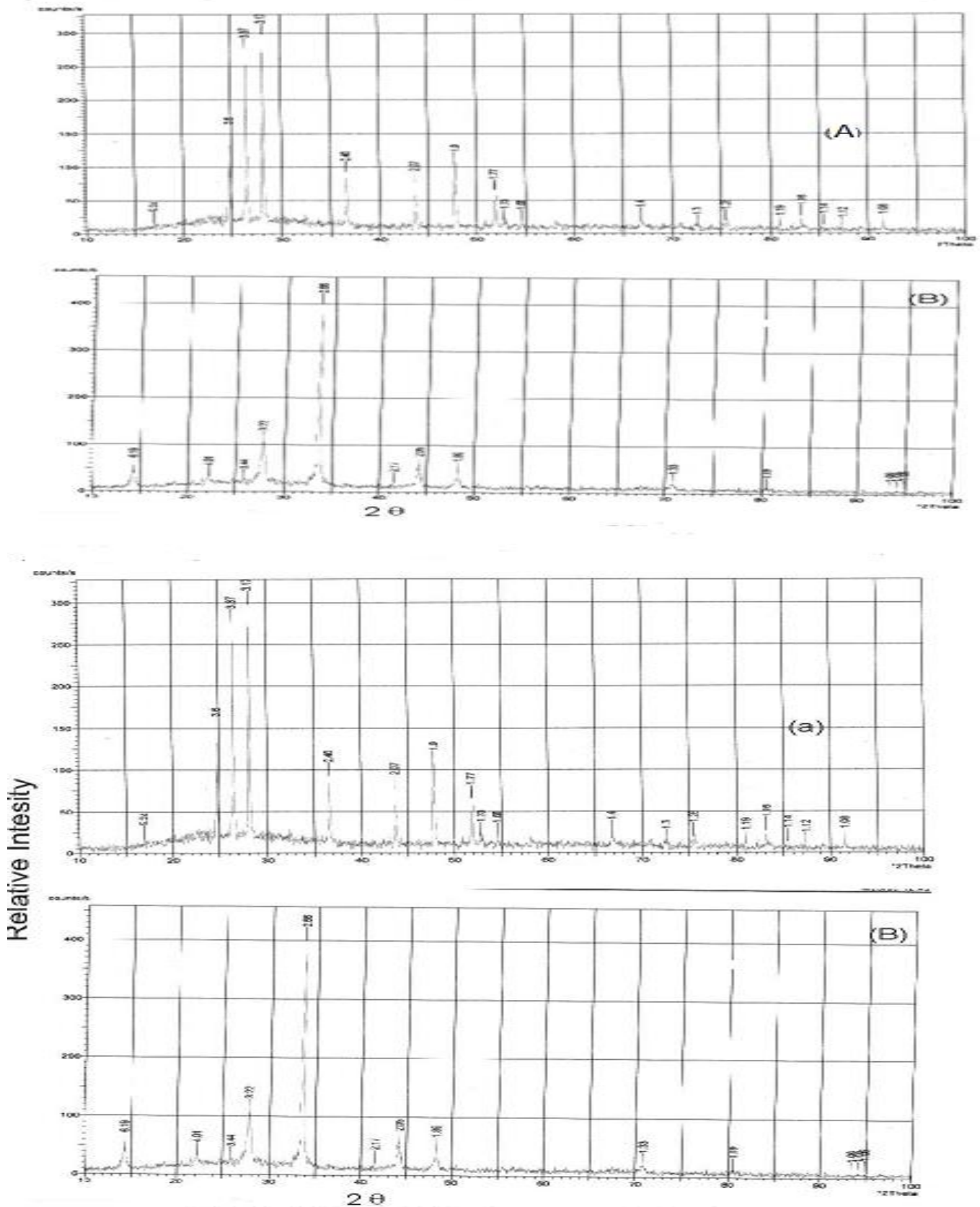
Fig. 2: XRD of CdS a) auannealed and
b) annealed

Fig. (2) shows XRD, XRD was used to confirm the crystal structure of CdS thin film annealed for about 3 hours in air The crystanality incases with annealing [6]

IV. CONCLUSION

The structural properties of films were studied as a function of substrate tempreture, molarity of solution. The range of band gap is 2.35 – 2.4 eV. The CdS thin film prepared by pyrolisis have good adherence and thickness uniformity after annealed. The film is polycrystalline in nature The crystanality incases with annealing of CdS thin film. Hence these films are best suited for solar cell applications.

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HPTLC Profiling and Antimicrobial Studies of Some Commonly Used Indian Spices

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ABSTRACT

Indian medicinal system is one of the most believable and traditional system of medicine in the world where we find importance of spices and condiments in daily life. Spices have been in use as food additives since ancient times. They are used as flavoring agent and also as preservatives. Most of the spices are indigenous in origin with characteristic aroma and strong taste. These spices not only add flavor to dishes but also they have lots of medicinal properties. By considering their polyvalent significance in present investigation we have made an attempt to study antimicrobial potential and HPTLC profiling of *Curicumalongi, Cinnamomumverum, Cuminumcymenium, Piper nigrum.*Chromatographic analysis (HPTLC) showed presence of several phytochemical compounds with variable Rfvalus and concentration. The antibacterial activity showed significant growth inhibition against *Escherichia coli,Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa*, *Streptococcus pyogenes,* and*Streptococcus pneumoniae.*The mixture of phytochemical compounds present in the extracts might be responsible for the antibacterial activity against these bacteria. The results obtained support the application of these spices in several traditional ethnomedicinal applications. Furthermore, HPTLC fingerprint developed may be useful in the correct identification of these spices and in detecting adulterations in preparation of commercial spice pockets.

Key Words: HPTLC, Antimicrobial Activity, Spices.

I. INTRODUCTION

Forest resources have been a valuable source of natural products for a long period of time tomaintain human health, especially with more intensive studies in the last decade for natural therapies (Gisleneet al.,2000).Spices and herbs have been long used for thousands of centuries by many cultures to enhance the flavor and aroma of foods. Early cultures also recognized the value of using spices and herbs in preserving foods and for their medicinal value. Scientific experiments since the last 19th century have documented the antimicrobial properties of some spices, herbs and their components (Shelef, 1983; Zaika, 1988).

The spices used in Indian cooking have been used since ages for adding flavor and also for house-hold treatment of infectious diseases. It is imperative to study their antimicrobial activity against the common

human pathogens so that the best spices can be further exploited to determine their active component which can be used for developing drugs (Seema and Anurag, 2015).

TLC is an analytical technique often used both for analysis of phytoconstituents from plant and for plant identification. Also, quality assessment and evaluation of botanical materials can be done by the modern and automated version of TLC(HPTLC) as well as plant-derived foods. Taking into account that spices have botanical origin, this can be used as a rapid method to analyze raw materials, to control their quality andto detect the adulteration (Virgil et.al.2018).By considering the similar view, we are trying to obtain HPLTC profile of four spices most commonly used spices in Indian cooking. In addition to this we are presenting the results of antibacterial potential of these spices against some pyogenic bacteria.

II. MATERIALS AND METHODS

Collection of Plant material:

The plant materials *Curicumalongi*(rhizome),*Cinnamomumverum*(sticks*), Cuminumcymenium*(seeds),*Piper nigrum*(seeds)were collected from local market of Nanded. These material were brought to laboratoryand made in to powder form using mixture grinder.

Extraction of Plant Material:

About 20 gm of powder plants were extracted separately in 250 mlsoxhlet extractorusing 70% ethanol for six hours continuously. The obtained extracts were vaporized under reduced pressure on vacuum evaporator. Finally, the extract was stored at low temperature in refrigerator for further study.

Antibacterial Activity:

The ability to kill or inhibit the growth of pathogenic bacteria was evaluated by antibacterial screening of plant extract. This was performed by agar well diffusion method and the zone of inhibition (ZOI) was measured in mm for each bacteria. The different bacteria used in the study are *Escherichia coli*,*Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus pyogenes, Streptococcus pneumoniae*and*Pseudomonas aeruginosa*. The activated bacterial cultures were seeded on sterile nutrient media. Plant extract were poured in the central well and the zone of inhibition were measured against the standard antibiotic ciprofloxacin (Ahuja et. al. 2015).

III. HPTLC ANALYSIS OF EXTRACTS

HPTLC fingerprinting of extracts were carried out as per the method described by Monaet.al.(2012). Two microliters of the ethanolic extract was applied (band length −8.0 mm) on a precoated TLC aluminium sheets of silica gel G60 F254 of 200 μm thickness plate- 05 x10cm (Merck, Mumbai) using LinomatV TLC applicator (Camag, Muttenz, Switzerland) equipped with a 100-μL syringe. Prior application, the plate was pre-washed with methanol AR and dried at 60℃. TLC plates were developed using the mobile phase Tolune: ethyl acetate: diethyl amine (8:1:1) in a Camag HPTLC twin-trough chamber (10 x10cm). The chamber was saturated with filter paper for 15 minutes and plate equilibrium was carried out for 10 minutes. Plate was developed upto85.0 mm and dried under stream of air. Separated bands were quantified by HPTLC densitometric scanning using Camag TLC Scanner 4 in the absorption mode operated by WinCATS software (version 1.4.8). After scanning the spectra and tables thus obtained were analyzed to interpret the results.

IV. RESULTS AND DISCUSSION

Development of standard procedure through HPTLC is a new approach which may lead to proper standardization of different spices and ayurvedic drugs based on fingerprinting characteristics (Meena, et.al.2013).In India, the trend of consumption of spices and herbs in food or using them as medicine aims to maintain proper sanitation, health, and hygiene and to increase longevity of life. Several spices such as ajowan, clove, ginger, black pepper, cumin, and asafetida are commonly used in the Indian diet (RomikaDhiman, et. al. 2015)Spices have been used for not only flavor and aroma of the foods but also to provide antimicrobial properties (Nanasombat,et al., 2002).

Antimicrobials are agents that kill microorganisms or inhibit their growth. The antimicrobial effects of the plant extracts are sufficient in a way to cater the healing effect. The antimicrobial effect of spices extracts also helps to prevent diseases in many forms (Bhawana, et.al. 2014).

HPTLC Plate at 366 nm

[Tracks S1-*Cinnamomumverum*;S2-*Cuminum cymenium*;S3 *Piper nigrum* ;S4*Curcuma longi*]
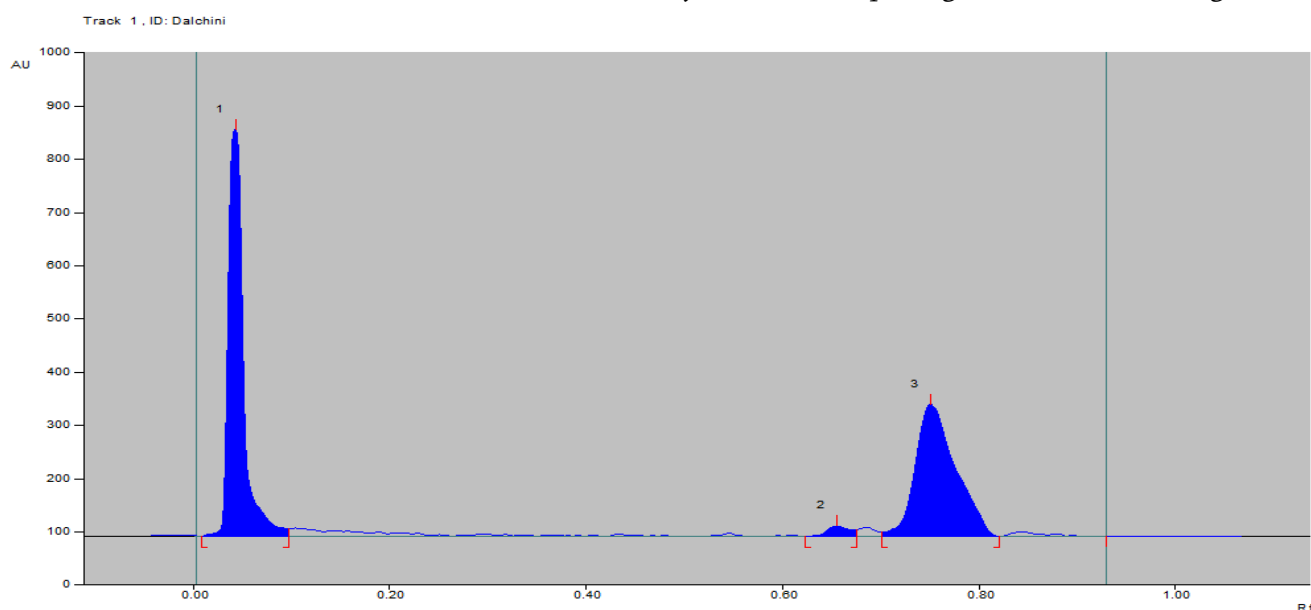
Fig1: HPTLC profile (Peak Display) of *Cinnamomumverum*sticks.

Track 1, ID: Dalchini

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	0.1 AU	0.04 Rf	765.2 AU	74.05 %	0.10 Rf	13.7 AU	10158.2 AU	53.49 %
2	0.63 Rf	0.2 AU	0.66 Rf	19.8 AU	1.92 %	0.68 Rf	12.8 AU	394.3 AU	2.08 %
3	0.70 Rf	7.6 AU	0.75 Rf	248.3 AU	24.03 %	0.82 Rf	0.1 AU	8438.9 AU	44.44 %

Fig 2: HPTLC profile (Peak Table) of *Cinnamomumverum*sticks

The results from HPTLC finger print scanned at wavelength 254 nm for ethanol extract of *Cinnamomumverum*sticks showed threephytochemical compoundwith corresponding ascending order of Rf values start from 0.04 to 0.75 in which highest concentration of the compound found to be 74.05% and its corresponding Rf value is 0.04.This is recorded in Figure1 and 2 respectively.
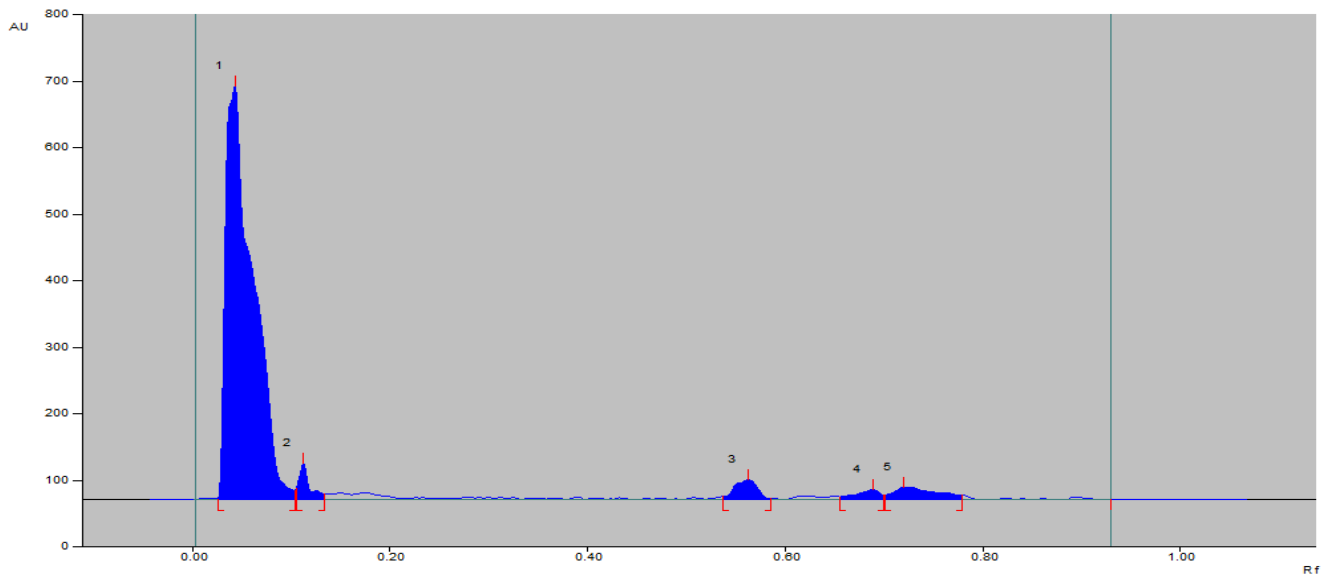
Fig 3: HPTLC profile (Peak Display) of *Cuminumcymenium*seed

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.03 Rf	0.4 AU	0.04 Rf	622.0 AU	83.99 %	0.11 Rf	13.3 AU	14472.6 AU	87.64 %
2	0.11 Rf	17.1 AU	0.11 Rf	55.0 AU	7.43 %	0.13 Rf	8.2 AU	464.1 AU	2.81 %
3	0.54 Rf	4.2 AU	0.56 Rf	29.8 AU	4.03 %	0.59 Rf	2.2 AU	589.2 AU	3.57 %
4	0.66 Rf	4.1 AU	0.69 Rf	15.1 AU	2.04 %	0.70 Rf	6.6 AU	303.9 AU	1.84 %
5	0.70 Rf	6.7 AU	0.72 Rf	18.6 AU	2.52 %	0.78 Rf	5.9 AU	684.0 AU	4.14 %

Fig 4: HPTLC profile (Peak Table) of *Cuminumcymenium*seed

The results from HPTLC finger print scanned at wavelength 254 nm for ethanol extract of *Cuminumcymenium*seed showed five phytochemical compoundsand corresponding ascending order of Rf values are from 0.04to0.72 in which highest concentrationof compound was found to be 83.99 % and its

corresponding Rf value is 0.04.This is recorded in Figure4. The corresponding HPTLC chromatogram is presented in Figure 3 which shows five peaks of phytoconstituents
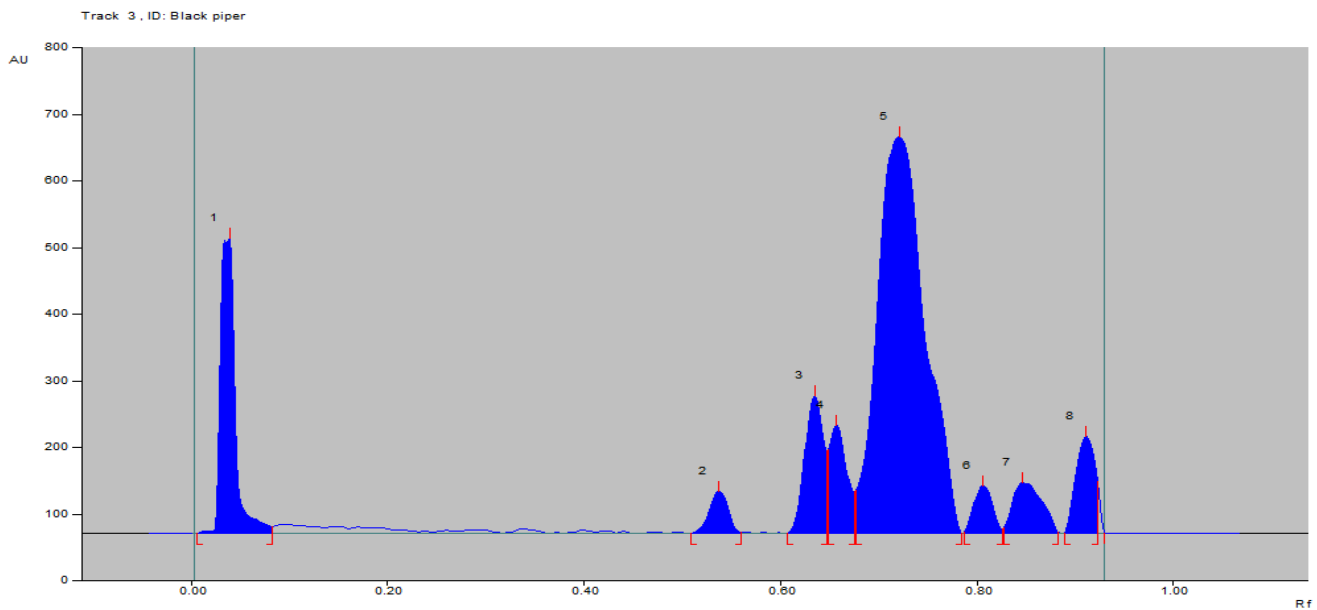
Fig 5: HPTLC profile (Peak Display) of *Piper nigrum*fruits*.*

Track 3, ID: Black piper

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	0.2 AU	0.04 Rf	442.2 AU	25.10 %	0.08 Rf	9.6 AU	5680.8 AU	13.62 %
2	0.51 Rf	0.1 AU	0.54 Rf	63.1 AU	3.58 %	0.56 Rf	1.5 AU	985.6 AU	2.36 %
3	0.61 Rf	0.2 AU	0.64 Rf	206.3 AU	11.70 %	0.65 Rf	24.2 AU	3253.6 AU	7.80 %
4	0.65 Rf	125.7 AU	0.66 Rf	162.7 AU	9.23 %	0.68 Rf	62.7 AU	2402.0 AU	5.76 %
5	0.68 Rf	64.3 AU	0.72 Rf	595.1 AU	33.77 %	0.79 Rf	0.7 AU	23956.6 AU	57.46 %
6	0.79 Rf	1.3 AU	0.81 Rf	71.6 AU	4.07 %	0.83 Rf	6.9 AU	1116.6 AU	2.68 %
7	0.83 Rf	8.2 AU	0.85 Rf	76.1 AU	4.32 %	0.88 Rf	1.6 AU	1898.6 AU	4.55 %
8	0.89 Rf	0.8 AU	0.91 Rf	145.1 AU	8.23 %	0.93 Rf	77.1 AU	2400.7 AU	5.76 %

Fig 6: HPTLC profile (Peak Table) of *Piper nigrum*fruits

The results from HPTLC finger print scanned at wavelength 254 nm for ethanol extract of *Piper nigrum*fruitsshowedeight polyvalent phytoconstituentsand corresponding ascending order of Rf values start from 0.04 to 0.91 in which highest concentration of the phytoconstituent was found to be 33.77 % with its corresponding Rf value 0.72.This is recorded in Figure6. The corresponding HPTLC chromatogram is presented in Figure 5 which shows eight peaks of phytoconstituents
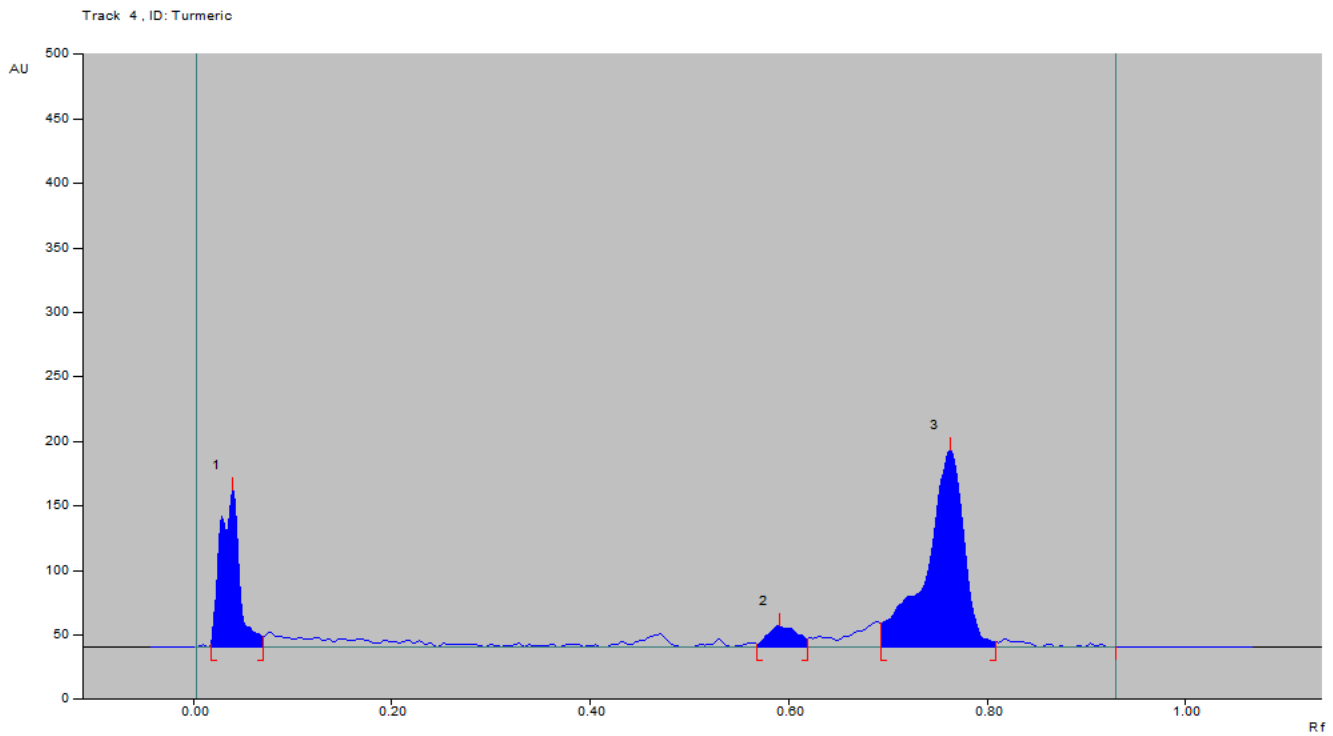
Track 4 , ID: Turmeric

Fig 7: HPTLC profile (Peak Display) of *Curcuma longi*powder

Fig 8: HPTLC profile (Peak Table) of *Curcuma longi*powder

The results from HPTLC finger print scanned at wavelength 254 nm for ethanol extract of *Curcuma longi*powder showed three polyvalent phytoconstituentsand corresponding ascending order of Rf values are from 0.04to0.76 in which highest concentration of the phytoconstituent was found to be 52.53 % with its corresponding Rf value 0.76.This is recorded in Figure8. The corresponding HPTLC chromatogram is presented in Figure 7 which shows three peaks of phytoconstituents

Table 1: Antimicrobial activity against pyogenic bacteria showing zone of inhibition in mm.

Sr. No	Test Organism	Plant Extracts				Ciprofloxacin (Control)
		Curicumalongi	*Cinnamomumverum*	*Cuminumcymenium*	*Piper nigrum*	
1	*Escherichia coli*	14	12	10	14	20
2	*Staphylococcus aureus*	12	10	09	11	19

3	*Staphylococcus epidermidis*	15	11	08	10	21
4	*Pseudomonas aeruginosa*	14	12	07	10	17
5	*Streptococcus pyogenes*	14	12	08	11	22
6	*Streptococcus pneumoniae*	10	11	05	12	20

The results of antibacterial activity of selected spices on some pyogenic bacteria are presented in table 1. From the results it is clear that extracts of these spices has shown significant antibacterial activity in comparison with standard antibiotic ciprofloxacin. The extracts of *Curicumalongi* found to be more inhibitory to *Staphylococcus epidermidis* (15 mm) flowed by *Pseudomonas aeruginosa, Escherichia coli* and *Streptococcus pneumoniae* (14 mm). Similarly *Piper nigrum* shows maximum zone of inhibition against *Escherichia coli* (14) followed by *Streptococcus pneumoniae* (12 mm) *Streptococcus pyogenes* and *Staphylococcus aureus* (11 mm). Likewise ethanoic extracts of *Cinnamomumverum* was found to be more toxic to *Escherichia coli, Pseudomonas aeruginosa* and *Streptococcus pyogenes* (12 mm). The extracts of *Cuminumcymenium* was found to be less inhibitory as compared to other spices tested. The results obtained supports the earlier findings of Abhishekh Seth, (2010). The obtained results justifies scientific and traditional inclusion of these spices in ayurvedicmedicine preparation. This preliminary study can be further extended in determining the active component of the spices so that effective medicinal preparations can be made. The use of plant extracts and phytochemicals, both with known antimicrobial properties, can be of great significance in therapeutic treatments.

Similarly, HPTLC is a powerful analytical method equally suitable for qualitative and quantitative analytical tasks. HPTLC is playing an important role in today's analytical world, not in competition to HPLC but as a complementary method. It combines fascinating art of chromatography with accuracy and quickness with better separation and resolution (Jadhav, 2018). HPTLC method deals with qualitative and quantitative analytical applications such as herbal and dietary supplements, nutraceuticals, and various types of medicines. It is used in quality control and in purity checks, in the detection and identification of pharmaceutical raw materials, drugs and their metabolites in biological media. HPTLC method is also a very powerful tool for identification of the presence of adulterants in herbal products based on the characteristic image produced and much useful for determining the presence and the quantification of both unwanted substitution as well as intentional adulteration in the formulation (Chidambaram et al. 2015). Therefore, the present piece of work finds its application in detecting different types of adulteration in preparation and marketing of spices

V. CONCLUSION

From the above study it is clear that the spices which are being used in Indian cooking process are having remarkable antimicrobial potentials. Since pathogens are developing resistance against present medicines, their antibacterial potential can be used as alternative to existing therapies. HPTLC data generated in the above study will be useful in finding unwanted mixing in spices.

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Fermentation of Banana Must Using Mango Fruit Inoculums

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ABSTRACT

Wine was prepared from eight different varieties of banana (Khozikodu, Karpurchakra keli, Palaykondan, Alpan, Pisang celyan, Lamby, Karpurvalli and Ardhapuri). Alcohol% of the wines produced using different varieties of banana were found to be in the range of 4.34 to 7.89. Highest Alcohol % observed was 7.89% in wine produced using ardhapuri variety.The Ardhapuri variety in which more alcohol production was found was used as reference in this study. This study was performed to investigate the effect of mango fruit must inoculum on fermentation of banana wine. The banana must was prepared from pulp of ripe banana fruits of Ardhpuri variety. Pectinase enzyme and potassium metabisulphite (KMS) were added to the juice. Then it was chaptalized to 19°Brix. Diammonium phosphate (DAP) was added to this and pH adjusted to 3.5. The inoculum of banana juice and mango juice was used at a concentration of 10% for the fermentation banana must separately. After inoculation the fermentation was carried out at 20°C for about 22 days. Physicochemical parameters were then analyzed and concentration of volatile acids (VFA) was determined by using gas chromatography (GC). Banana wine produced using banana juice and mango juice inoculum had °Brix (6.1and 6.5), alcohol (4.38 and 4.24%) and titratable acidity (0.93 and 0.83%) respectively. All nine volatile acids analyzed were detected in both wines. Significant effect was not observed on physicochemical parameters of banana wine produced by using different must inoculums.

Keywords: Banana must, banana wine, volatile acids, mango must

I. INTRODUCTION

Banana is one of the most important economic fruit crops. Because of high moisture content and textural characteristics, It is highly perishable in nature. By adopting proper post harvest management practices and processing into value added products, Post harvest losses of banana can be reduced. Banana wine is a nutritious alcoholic beverage with low alcohol content. The cost of production of banana based alcoholic beverages is much cheaper than other fruit based beverages.

Banana fruit is having good amount of sugar which can be used as a substrate for production of fruit wine and the wines thus produced are generally named after the fruit used such as apple,grape, banana, pineapple, orange, coconut, mango and strawberry wine (Reddy et al., 2012; Shweta et al., 2016; and Ranjitha et al., 2015). Mango fruits are also one of the the most common substrates for the production of fruit wine either by using

wild yeast present on the fruits or by adding suitable yeast starter. The fruit itself has plenty of fermenting normal flora which is used for production of wine. Thus we can employ mango fruits as a direct source of fermenting yeasts. Various reports on production of banana wine are increasing (Onwuka and Awam, 2001; Akubor et al., 2003; Cheirsilp and Umsakul, 2008; and Isitua and Ibeh, 2010). However as per our knowledge very less work is reported in India which focuses on fermentation of banana wine by using mango juice inoculum as well as on volatile acid analysis of such wines. Hence, the present study is aimed at evaluating physicochemical analysis of banana wine by using mango must inoculum.

II. MATERIAL AND METHODS

Preparation of banana must

Ripe banana fruits were procured from local market of Nanded, Maharashtra, India. These fruits washed with tap water, hand peeled, cut in to thin slices and then grind in mixer. This pulp homogenate was then mixed with water in 1:1 proportion. To this 0.02% of pectinase enzyme to reduce the viscosity and 100 mg/L potassium metabisulphite (KMS), to kill the unwanted microorganisms, were added and the mixture was held at room temperature for 4 h. Pectinase treated juice was then chaptalized to 19°Brix using table sugar, DAP at a concentration of 100 mg/L was added to this and its pH was adjusted to 3.5 using citric acid and calcium carbonate. Then it was kept at 10 °C until required.

Fermentation experiment

Healthy mango fruits were used for preparation of inoculum. Ripe mango fruits after removing seeds and peel were homogenized in a mixer grinder and homogenized mango musts were directly used as an inoculum for fermentation of banana must. Four hundred ml aliquots of banana musts were inoculated with 40 ml of mango musts which were prepared by grinding the mango in duplicates. After inoculation the fermentation was allowed to continue at 20 °C for about 22 days. Progress of fermentation was monitored by observing total soluble solid profile of the must.

III. PHYSICO-CHEMICAL ANALYSIS

The pH of the must was measured with a digital pH meter (Systronics, India), pre-calibrated with buffers of pH 4.0 and 7.0. Titratable acidity was determined by titrating with 0.1 N NaOH and alcohol % by specific gravity method as described by AOAC. Total soluble solids (TSS) were determined using Abbey's refractometer (0-32) in terms of °Brix (Jacobson, 2006). Moisture % was determined by oven drying at 100 - 105 °C. Volatile acidity was determined by titration of distillate samples and expressed as percent of acetic acid per 100 ml of wine. Concentration of metal ions was analyzed by using inductive coupled plasma-optical emission spectroscopy (ICP-OES) (Thermo Fisher-ICAP 6300 DUO) after digestion of wine samples. Concentration of volatile acids (VFA) was determined by using gas chromatography (GC) as mentioned previously.

IV. RESULTS AND DISCUSSION

Physicochemical parameters of banana wines fermented by using two different must inoculums were analyzed and are presented in table. Soluble solid of wine fermented with both strains was found to be same. Specific

gravity, TA, VA and alcohol% obtained by using mango must was also found to be different in both wines. Concentration of various elements was also analyzed in both wines and no large difference in concentrations was observed in both wines for almost all elements.

Table 1: Physicochemical properties of Banana wine inoculated with Banana Must and Mango Must

Parameter	Banana Must inoculum	Mango Must inoculum
°Brix	6.1	6.5
Alcohol %	4.38	4.24
Specific Gravity	0.9983	0.9981
Titratable Acidity (%)	0.93	0.83
Volatile Acidity (%)	0.012	0.016
Moisture %	97.72	97.81
Total Solid %	2.28	2.09

Table 2: Concentration (mg/L) of various elements in banana must & mango must inoculated wine

Elements	Banana Must inoculum	Mango Must inoculum
Ca (mg/L)	36.98	35.45
Fe (mg/L)	0.41	*0.32*
Mg (mg/L)	93.95	*94.38*
Mn (mg/L)	1.02	*0.95*
P (mg/L)	120.30	*101*.36
Zn (mg/L)	7.16	6.75

Table 3: Volatile acids detected in Banana wine inoculated with banana and mango must inoculum

Acid (mg/L)	Banana Must inoculum	Mango Must inoculum
Acetic Acid (AA)	185.51	258.12
Propionic Acid (PA)	5.26	4.30
Iso-Butyric Acid (IBA)	448.80	417.22
Butyric Acid (BA)	22.25	24.22
Iso-Valeric Acid (IVA)	15.17	12.76
Valeric Acid (VA)	1.21	1.77
Iso-Caproic Acid (ICA)	353.92	466.61
Caproic Acid (CA)	6.00	8.87
Heptanoic Acid (HA)	55.36	57.25

Nine different volatile acids present in banana wines fermented by using two different must inoculum, banana must inoculum and mango must inoculum were analysed (Table 3). The concentration of iso-butyric acid found to be higher as compared to other acids in wine with banana must . Its concentration in wine with banana must and mango must was found to be 448.80 and 417.22 mg/L respectively. Acetic acid was present at concentration of 185.51 and 258.12 mg/L in wines with banana must and mango must inoculum respectively.

Iso-caproic acid was also detected at high concentration in mango must inoculated wines. Its concentration is higher than other acids in wine with Mango must inoculated wine. The detected concentration in banana must and mango must inoculated wine was found to be 353.92 and 466.61 mg/L respectively. Valeric acid (1.21 and 1.77 mg/L), propionic acid (5.26 and 4.30 mg/L) and caproic acid (6.00 and 8.87 mg/L) were detected in lowest amount as compared to other acids in both the wines. Butyric acid was present at concentration of 22.25 and 24.22 mg/L in banana must and mango must inoculated wines respectively. Heptanoic acid was also detected at significant level in both wines .Various authors reported the volatile fatty acids from other wines (Shinohara, 1985, Perestrelo et al., 2006, Duarte et al., 2010, Reddy et al., 2010).

V. CONCLUSION

Significant effect was not observed on physicochemical parameters of banana wine produced by using mango must inoculums. However slight difference was observed in concentration of some volatile acids.

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Biodegradation of Para-Nitro Aniline from Soil Sample of Nanded District (MS), India

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ABSTRACT

Pesticides are used to control various pests and excess use may destroy the plants. They form one of the important groups of xenobiotics compounds. Parathion is one of the pesticides which is used for controlling foliar pests. it is hazardous to humans& animals also. During its use when it dropped in the soil. It undergoes microbial degradation and is converted into para-nitroaniline, which is also a hazard. The response of three bacterial strains showing tolerance to the para-nitroaniline i.e., Azotobacter, pseudomonas, and bacillus was selected and their degradation activity was studied by determining the susceptibility of the strain towards the para-nitroaniline and spectrophotometric analysis and observed MIC was 320 ppm and percent of degradationincreases with time. The MIC for Bacillus spp. is 320 ppm (31mm) Pseudomonas spp. is 160 ppm (12mm) and Azotobacter spp. 160 ppm (12 mm). After 96 hrs. of incubation, the percent degradation of Bacillus spp. is 42% Pseudomonas is 41% and Azotobacter is 40%.

I. INTRODUCTION

Nitro-aromatic compounds are used extensively in dyes. Pesticide, herbicide, plasticizers, explosive and solvent, for example, nitrophenol, nitro anilines are released into the environment as parathion (Sethunathan, N. and Yoshida, T., 1973), hydrolytic products of methyl parathion like phosphorous insecticides(Gupte, S.P. and Chaudhari, R.V., 1988), herbicides(De Steven, D., 1991) or industrial waste (Marvin-Sikkema, F.D., and De Bont, J.A.M., 1994;Spain, J.C.1995).Parathion is an organophosphorus pesticide that is used only for limited plants because of its high toxicity and risk, it is classified as Restricted use pesticide (RUP).It interferes with the activity of cholinesterase, an enzyme that is essential for the proper working of the nervous system of insects. Human parathion direct exposure to humans inhibits cholinesterase and produces incoordination, slurred speech, loss of reflexes, and paralysis of the body extremities and respiratory muscle death may be caused by respiratory failure or cardiac arrest.

Soil microorganisms degrade parathion by three different pathways into three different compounds. Parathion after its microbial degradation gets converted into Para- nitro aniline. At alkaline pH organism,*Pseudomonas*

alcaligens converts the parathion into Para- nitro aniline (Munnecke, D.M., 1980). Para-nitro aniline is the hazardous compound that is included in hazardous class 0.1 and CAS No.100-01-6. It is a yellow-colored compound that is less soluble in water, with high oxidizing and reducing capacities.

II. MATERIAL AND METHODS

The bacterial strain used to study the biodegradation of p-nitroaniline is *Pseudomonas* sp. *Azotobacter* sp. and *Bacillus* sp.These bacterial strains were obtained from the collected soil sample of NES Science College campus, Nanded (MS), India. The collected bacterial strains were then preserved on the media i.e., nitrogen-free mannitol broth, King's B media, and nutrient agar respectively. All media were sterilized at 15 IBS pressure for 15 min. (Atlas and Bartha., 2006).

Determination Of susceptibility:

The susceptibility of this bacterial species can be confirmed by determining the minimum inhibitory concentration (MIC) of P-nitroaniline for each bacterial strain.The MIC can be defined as the lowest P-nitroaniline concentration that inhibits the growth after incubation 37°c for 18-24 hrs doubling the concentration of p-nitroaniline (10.20.40.80.160.320.ppm). The media used for the MIC is MSG mineral glucose media.MSG media plates were prepared and bacterial isolates were inoculated uniformly on the surface of agar plates.Dilutions of the PNA were prepared to range from 10 ppm to 320 ppm(1 mg in 1000 ml D/W= 1 ppm). Sterile filter paper disc impregnated with the dilution of PNA was applied on the surface of the agar plate.Plates were kept at 37°c for 18 to 24 hrs.The result was recorded by the observing zone of inhibition surrounding the disc (Tani, K., Masuhara, M., Welikala, N., Yamaguchi, N., and Nasu, M., 1998).

Biodegradation of PNA:

All bacterial strains were grown in MSG medium 30°c. cells were aseptically harvested, washed twice in a sterile mineral salt solution, resuspended in 100 ml of MSG supplemented with PNA. The same culture in MSG medium without fortifying with PNA was used as control. These cultures were taken in 500 ml Erlenmeyer flasks and incubated in dark at 30°c on a rotary shaker (170 rpm). Their growth (biomass) and PNA consumption were monitored at regular intervals by spectrophotometry at OD 600 nm.Each bacterial inoculums (2gL-1) were taken in a 100 ml Erlenmeyer flask containing MSG medium (100 ml) fortified with 200 p-nitro anilines.After 24, 48, 72, and 96 hrs of incubation aliquots of broth were collected, centrifuged at 10,000 rpm for 10 min, and percent biodegradation in the supernatant was determined (Jain, R.K., Kapur, M., Labana, S., Lal, B., Sarma, P.M., Bhattacharya, D. and Thakur, I.S., 2005; Gisi, D., Stucki, G. and Hanselmann, K.W., 1997).

III. RESULTS AND DISCUSSION

Determination Of susceptibility:

The susceptibility of this bacterial species can be confirmed by determining the minimum inhibitory concentration (MIC) of P-nitroaniline for each bacterial strain as shown in Table 1.

Table 1: Minimum inhibitory concentration against PNA of *Azotobacter sp., Bacillus sp.*, and *Pseudomonassp.* at different concentrations.

The concentration of PNA (ppm)	Zone of inhibition(mm)		
	Azotobacter sp.	*Bacillus sp.*	*Pseudomonas sp.*
10	2	3	2
20	2	4	3
40	5	4	3
80	5	6	5
160	8	10	8
320	12	15	12
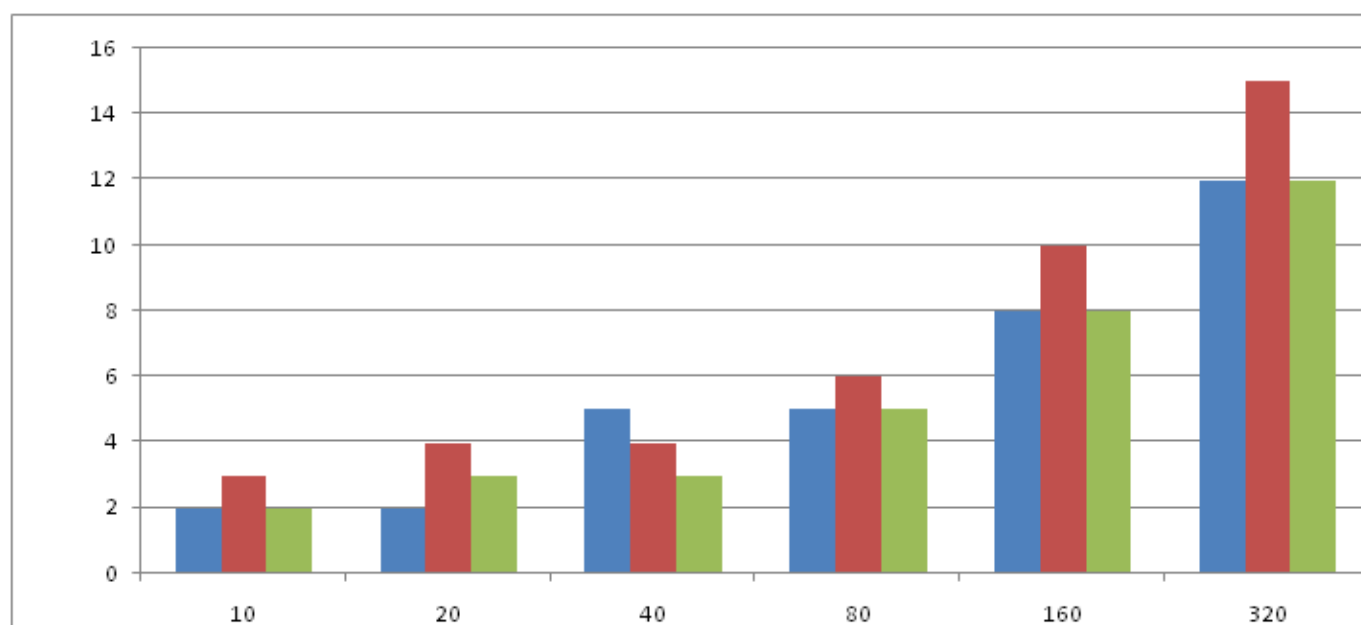
Fig.1: Minimum inhibitory concentration against PNA of *Azotobacter sp., Bacillus sp.*, and *Pseudomonas sp.* at different concentrations.

Biodegradation of PNA:

After 24, 48, 72, and 96 hrs of incubation aliquots of broth were collected, centrifuged at 10,000 rpm for 10 min and percent biodegradation in the supernatant was determined as shown in Table 2.

Table 2. Degradation of PNA (percent).

Time(hrs)	Percent Degradation of PNA		
	Azotobacter sp.	*Bacillus sp.*	*Pseudomonas sp.*
6	3	4	5
12	4	6	7
24	9	8	11
48	19	20	22
72	30	30	34
96	41	40	42
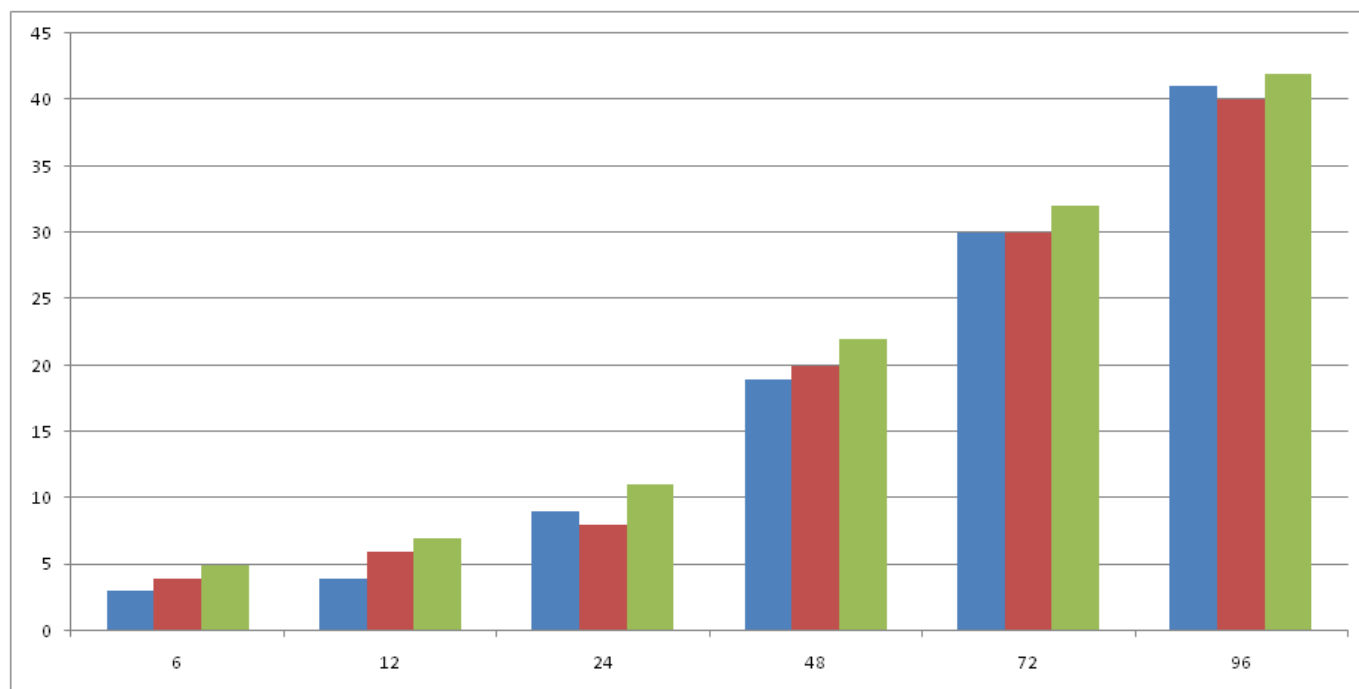
Fig.2: Degradation of PNA (percent).

IV. CONCLUSION

In the biodegradation of Para-nitro aniline. The methods applied are samples and from that, we can conclude that many bacterial strains like *Bacillus sp., Azotobacter sp.,*and*Pseudomonassp.*can able to degrade the Para-nitro aniline. From the all experiments that the performed *Bacillus* spp. can able to give rapid degradation than other species that are used i.e., 42%. As *Azotobacter*can fix nitrogen it can able to use nitrogen from PNA and hence it can be used in pesticide, fertilizer production. In the present project the experiment performed i.e., minimum inhibitory concentration checking and the percent biodegradation of Para-nitro aniline can be used as more suitable methods. The excess use of pesticides may affect the growth of seeds and hence to prevent this all these bacterial strains are used in fertilizers production.

V. ACKNOWLEDGMENT

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Isolation of Fusarium Oxysporum F.Sp. Lycopersici Causing Fusarium Wilt of Tomato and Their Control

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ABSTRACT

Diseases are a major limiting factor for tomato production. Diseases can be classified into two groups. The first are those caused by infectious microorganisms that include fungi, bacteria, viruses and nematodes. These diseases are contagious and can spread from plant to plant in a field, often very rapidly when environmental conditions are favourable. Present investigation of isolation and their control measures of fusariumwilt on tomato. the Pathogen was isolated from infected plant parts by tissue isolation technique on Potato Dextrose Agar (PDA) medium.

Keyword: - Tomato, Isolation, Fusarium, Control measures etc

I. INTRODUCTION

Diseases are a major limiting factor for tomato production. Diseases can be classified into two groups. The first are those caused by infectious microorganisms that include fungi, bacteria, viruses and nematodes. These diseases are contagious and can spread from plant to plant in a field, often very rapidly when environmental conditions are favourable. The second group includes those caused by non-infectious physical or chemical factors, such as adverse environmental factors, nutritional or physiological disorders and herbicide injury. Non-infectious diseases cannot spread from plant to plant; however, the distribution of the disease may be quite uniform and extensive if an entire planting was exposed to the adverse factor.

It is critical for effective disease control to recognize the difference between infectious and non-infectious diseases, and the type of microorganism causing an infectious disease be determined. For example, use of a fungicide to control a non-infectious disease, such as blossom-end rot, is a wasted expense that will not correct the problem.

Wilt diseases are caused by pathogens that invade the vascular system (xylem tissue) and disrupt water flow through the plant. Fusarium wilt is the major wilt disease of tomato in Oklahoma. Verticillium wilt is easily confused with Fusarium wilt.

The first symptom is usually a yellowing of the lower leaves, which gradually wilt and die. Symptoms may first occur on only one side of the plant (Figure 1). The disease progresses up the stem until all of the foliage is killed

and the plant dies. If stems or petioles from wilted areas of diseased plants are cut, a reddish-brown discoloration can be seen between the pith (center of the stem) and the outer green part of the stem (Figure 2). The fungus survives and persists indefinitely in field soil. The fungus is also seedborne and is thought to spread long distances in this manner. The disease is most serious in sandy soils and at temperatures between 80 F to 90 F. Soils become infested by planting infected transplants and from movement of infested soil by wind and water erosion or on farm implements.

Uys *et al.* (1996) studied tomato diseases and disorders in the main tomato growing regions of South Africa during survey between 1992-1995. Early blight caused by *Alternaria solani,* was the most prevalent leaf disease, followed by bacterial leaf spot.Ramgiry et al. (1997) survey conducted and report that Alternaria solani and *Pencillium notatum* were the most frequent causal agents of tomato decay in fields and vegetable markets in Jhabua of Madhya Pradesh.Bhatt *et al.* (2000) recorded the *Alternaria alternat*a as the causal agent of leaf blight disease of tomato and capsicum, which was the first confirmed record of this fungus from Kumaon hills of Uttar Pradesh. Kanjilal *et al.* (2000). Conducted the survey on field and post-harvest diseases of hybrid and desi cultivars of tomatoes in four districts of West Bengal, (India) and revealed that among fungal diseases, the blight caused by Alternaria sp.was the most predominant with the crop loss in the field ranged from 70 to 100 per cent.Tumwine et al. (2002) conducted survey on tomato early blight situation and current practices for disease management in Uganda during 1996-1999. Ten districts solani as major disease. Kamble (2006) conducted a survey in Thane and Raigad districts in Konkan region of Maharashtra on early blight of tomato caused by *Alternaria solani .*

II. MATERIAL AND METHODS

1) Collection of material

The present experiment conducted *In Vitro* at Department of Botany, MSP Art, science and K.P.T commerce, College, Manora District Washim. During this experiment, plant sample were collected from Tomato infected by fusarium wilt disease in growing track of washim

2) Isolation of *Fusarium oxysporum f.sp. lycopersici*method followed by C.V.Chudhary in 2006.

Pathogen was isolated from infected plant parts by tissue isolation technique on Potato Dextrose Agar (PDA) medium. Diseased parts were cut into small pieces with the help of sterilized blade. Pieces were washed with sterilized distilled water and disinfected with 1 per cent $HgCl_2$ solution for 10 seconds. Thus, obtained disinfected tissues were immediately washed thrice with sterilized distilled water and aseptically transferred on PDA plates. Inoculated Petri plates were incubated at room temperature (27±2 °C). The obtained culture was purified by using hyphal tip culture method, and maintained on same medium for the further investigations.

III. RESULTS AND CONCLUSION

1)   Isolated *Fusarium oxysporum f.sp. lycopersici* (fungus) from infected tomato leaves

Control Measures

Fusarium wilt can be difficult to manage once it is introduced and there is no known cure once it has become established within an area. However, there are preventative and disease reduction measures that can be implemented:

- **Select resistant varieties.** For fields with a history of Fusarium wilt, planting resistant varieties of tomato will inhibit severe symptoms. See the *Southeastern US Vegetable Crop Handbook* for a list of varieties with resistance. Seek guidance from a specialist to help identify which race is present in your field.
- **Use grafted tomatoes.** Tomato rootstocks that are resistant to Fusarium wilt are available and can be used with a susceptible scion variety. See vegetablegrafting.org for more information.
- **Crop rotations for 3-5 years**. Rotating away from tomato crops will reduce inoculum (spores) in the soil. This will not guarantee the elimination of disease, but will reduce the severity and incidence of infection on the subsequent crop. Weeds, such as pigweed, mallow, and crabgrass, can be hosts for the Fusarium wilt pathogen, so frequent maintenance of the infested area is necessary during this period of time.
- **Only plant healthy transplants.** Closely inspect transplants for symptoms of disease before planting to decrease the likelihood of introducing disease.
- **Wash tractors and equipment between fields**. Infested soil can be carried to other fields on equipment and tools. Frequent cleaning is highly recommended, particularly if moving from an infested field to a clean field.
- **Use sterile potting media**. If you are starting your own seedlings, use of a sterile soilless potting media is suggested to minimize the chance of introduction of the disease.
- **Manage soil pH**. Raising soil pH to a neutral range (6.5 - 7.0) by using lime will reduce the persistence of the pathogen.
- **Avoid excessive nitrogen**. High levels of nitrogen and low levels of potassium in the soil can increase a plant's susceptibility to Fusarium wilt. Avoid over-application of high nitrogen fertilizers and use a soil test to determine nutrient levels.

Chemical methods

The most effective method in preventing tomato from Fusarium wilt infections is by mixing the tomato seeds with chemical fungicides. However, the use of chemical fungicides can be harmful to other living organisms besides reduction of soil microflora.

There is a constant threat that pathogens may become resistant to fungicide treatment. As for example, various pathogens became resistant to methyl benzimidazole. Other classes of fungicides were tested against *F. oxysporum* f.sp. lycopersici. The demethylationinhibiting (DMI) fungicides (prochloraz, propiconazole and cyproconazole/propiconazole) act by inhibiting the demethylation step in the biosynthesis of sterols needed in fungal walls. Prochloraz proved to be the most effective fungicide against the Fusarium wilt pathogens of tomato.

Biological methods

Biological control is a non-chemical measure that has been reported in several cases to be as effective as chemical control.

However, the efficacy of biological control was occasionally inadequate and variability in control level may be high. Understanding the mechanisms involved in biological control might enable enhancing control efficacy and reducing the inconsistency and variability

IV. CONCLUSION

Treating fusarium wilt of tomatoes is not possible. Affected branches or entire plants can only be destroyed, as they will die eventually. Prevention is the only way to avoid the damage of fusarium wilt in your tomato garden. Start with varieties that resist the disease. Also, avoid planting tomatoes in the same spot year after year. The fungus persists in the soil for a long time. Make sure that the soil drains well where you plant tomatoes to deter fungal growth. Use raised beds, if necessary. If you have had issues with fusarium wilt in the past, or if you just grow a lot of tomatoes, practice good garden tool hygiene

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A Review on Medicinal Botany (Ayurvedic Herbs) and its Significance

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ABSTRACT

The usage of plants in the medical systems is of great significance in almost all countries and the medicinal plants became part of many modern medicines. There are many phytochemicals and metabolites isolated from plants including steroids, terpenoids, carotenoids, flavonoids, alkaloids, tannins and cardiac glycosides. Plants that are used as medicines have been referred to as "herbs" Originally, the term "herb" only applied to non-woody plants.

Today, "herb" refers to any part of any plant used for aroma, flavoring or medicine, including those that come from trees and shrubs. An "herb" may be a fruit, a bark, a flower, a leaf, or a root, as well as a non-woody plant. Although the term "herb" can also be used with food spices, it is generally used in reference to any plant, or any part of a plant, having nutritional and/or medicinal values. Most of the Ayurvedic herbs, thus formulated, are free of side effects or reactions. This is the reason why Ayurveda is growing in popularity across the globe. The Ayurvedic herbs that have medicinal quality provide rational means for the treatment of many internal diseases, which are otherwise considered incurable in other systems of medicine. Go through the following lines to learn all about the importance of herbs in order to lead a healthy, peaceful and disease-free life.

I. INTRODUCTION

Ayurveda is the traditional medicinal form, prevalent in India since 2000 B.C. The Ayurvedic treatment is entirely based on herbs, which have certain medicinal value or property. In the ancient times, the Indian sages believed that Ayurvedic herbs are one-stop solutions to cure a number of health related problems and diseases. They conducted thorough study about the same, experimented with herbs to arrive at accurate conclusions about the efficacy of different plants and herbs that have medical value.

A spice is a vegetative substance used in nutritionally insignificant quantities as a food additive for flavor, color, or as a preservative that kills harmful bacteria or prevents their growth. It may be used to flavor a dish or to hide other flavors. In the kitchen, spices are distinguished from culinary herbs, which are leafy, green plant parts used for flavoring or as garnish. Many spices are used for other purposes, such as medicine, religious rituals, cosmetics, perfumery, or for eating as vegetables. For example, turmeric is also used as a preservative; licorice as a medicine; garlic as a vegetable. All plants produce chemical compounds as part of their normal metabolic activities. These are divided into primary metabolites, such as sugars and fats, found in all plants, and

secondary metabolites, compounds not essential for basic function found in a smaller range of plants, some useful ones found only in a particular genus or species. The functions of secondary metabolites are varied. For example, some secondary metabolites are toxins used to deter predation, and others are pheromones used to attract insects for pollination. Pigments harvest light, protect the organism from radiation and display colors to attract pollinators. Phytoalexins protect against bacterial and fungal attacks. Allelochemicals inhibit rival plants that are competing for soil and light

II. IMPORTANCE AND SCOPE

Herbs are staging a comeback and herbal 'renaissance' is happening all over the globe. The herbal products today symbolise safety in contrast to the synthetics that are regarded as unsafe to human and environment. Although herbs had been priced for their medicinal, flavouring and aromatic qualities for centuries, the synthetic products of the modern age surpassed their importance, for a while. However, the blind dependence on synthetics is over and people are returning to the naturals with hope of safety and security. It has been estimated that in developed countries such as United States, plant drugs constitute as much as 25% of the total drugs, while in fast developing countries such as China and India, the contribution is as much as 80%.

Thus, the economic importance of medicinal plants is much more to countries such as India than to rest of the world. These countries provide two third of the plants used in modern system of medicine. Traditional systems of medicine continue to be widely practised on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments. Global estimates indicate that 80% of about 4 billion population can not afford the products of the Western Pharmaceutical Industry and have to rely upon the use of traditional medicines which are mainly derived from plant material. This fact is well documented in the inventory of medicinal plants, listing over 20,000 species. In spite of the overwhelming influences and our dependence on modern medicine and tremendous advances in synthetic drugs, a large segment of the world population still like drugs from plants. In many of the developing countries the use of plant drugs is increasing because modern life saving drugs are beyond the reach of three quarters of the third world's population although many such countries spend 40-50% of their total wealth on drugs and health care. As a part of the strategy to reduce the financial burden on developing countries, it is obvious that an increased use of plant drugs will be followed in the future.

III. CLASSIFICATION OF MEDICINAL PLANTS

Of the 2,50,000 higher plant species on earth, more than 80,000 species are reported to have at least some medicinal value and around 5000 species have specific therapeutic value. They are classified according to the part used, habit, habitat, therapeutic value etc, besides the usual botanical classification

1. **Based on part used**
i)   Whole plant: Boerhaavia diffusa, Phyllanthus neruri
ii)   Root: Dasamula
iii)   Stem: Tinospora cordifolia, Acorus calamus
iv)   Bark: Saraca asoca

v)   Leaf: Indigofera tinctoria, Lawsonia inermis, Aloe vera

vi)   Flower: Biophytum sensityvum, Mimusops elenji

vii)   Fruit: Solanum species

viii)   Seed: Datura stramonium

Based on habit:

i)   Grasses: Cynodon dactylon

ii)   Sedges: Cyperus rotundus

iii)   Herbs : Vernonia cineria

iv)   Shrubs: Solanum species

v)   Climbers: Asparagus racemosus

2.   Based on Ayurvedic formulations in which used

a) The ten roots of the Dasamoola (Dasamoolam)

i)   Desmodium gangeticum (Orila)

ii)   Uraria lagopoides (Cheria orila)

iii)   Solanum jacquinii (Kantakari)

iv)   Solanum indicum (Cheruchunda)

v)   Tribulus terrestris (Njerinjil)

vi)   Aegle marmelos (Koovalam)

b) The ten flowers of the Dasapushpa (Dasapushpam)

i) Biophytum sensitivum (Mukkutti)

ii) Ipomea maxima (Thiruthali)

iii) Eclipta prostrata (Kayyuniam)

iv) Vernonia cineria (Poovamkurunnil)

v) Evolvulus alsinoides (Vishnukranthi)

c) The four trees of the Nalpamara (Nalpamaram)

i)   Ficus racemosa (Athi)

ii)   Ficus microcarpa (Ithi)

iii)   Ficus relegiosa (Arayal)

iv)   Ficus benghalensis (Peral)

d) The three fruits of the Triphala (Thriphalam)

i) Phyllanthus emblica (Nellikka)

ii) Terminalia bellerica (Thannikka)

iii) Terminalia chebula (Kadukka)

Ginseng

Synonyms: Ninjin, Pannag, Panax.

Biological source: Ginseng is the dried root of various species of panax like Panax ginseng
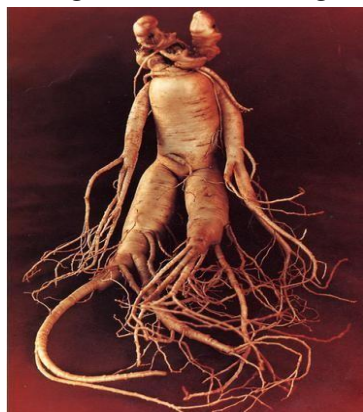
family: Araliaceae

Family: Solanaceae.

IV. CULTIVATION OF MEDICINAL PLANTS

Most of medicinal plants, even today, are collected from wild. The continued commercial exploitation of these plants has resulted in receding the population of many species in their natural habitat. Vacuum is likely to occur in the supply of raw plant materials that are used extensively by the pharmaceutical industry as well as

the traditional practitioners. Consequently, cultivation of these plants is urgently needed to ensure their availability to the industry as well as to people associated with traditional system of medicine. If timely steps are not taken for their conservation, cultivation and mass propagation, they may be lost from the natural vegetation for ever. In situ conservation of these resources alone cannot meet the ever increasing demand of pharmaceutical industry. It is, therefore, inevitable to develop cultural practices and propagate these plants in suitable agroclimatic regions. Commercial cultivation will put a check on the continued exploitation from wild sources and serve as an effective means to conserve the rare floristic wealth and genetic diversity It is necessary to initiate systematic cultivation of medicinal plants in order to conserve biodiversity and protect endangered species. In the pharmaceutical industry, where the active medicinal principle cannot be synthesised economically, the product must be obtained from the cultivation of plants. Systematic conservation and large scale cultivation of the concerned medicinal plants are thus of great importance. Efforts are also required to suggest appropriate cropping patterns for the incorporation of these plants into the conventional agricultural and forestry cropping systems. Cultivation of this type of plants could only be promoted if there is a continuous demand for the raw materials. There are at least 35 major medicinal plants that can be cultivated in India and have established demand for their raw material or active principles in the international trade

V. PROCESSING AND UTILIZATION

Medicinal principles are present in different parts of the plant like root, stem, bark, heartwood, leaf, flower, fruit or plant exudates. These medicinal principles are separated by different processes; the most common being extraction. Extraction is the separation of the required constituents from plant materials using a solvent. In the case of medicinal plants, the extraction procedure falls into two categories (Paroda, 1993). a) Where it is sufficient to achieve within set limits equilibrium of concentration between drug components and the solution. Eg. Tinctures, decoction, teas, etc. b) Where it is necessary to extract the drug to exhaustion, ie., until all solvent extractables are removed by the solvent. Both the methods are employed depending on the requirement although in industry the latter method is mostly used. In all industrial procedures, the raw material is pre-treated with solvent outside the extractor before changing the latter. This prevents sudden bulk volume changes (which are the main cause of channelling during extraction) and facilitates the breaking up of the cell walls to release the extractables. To facilitate the extraction, the solvent should diffuse inside the cell and the substance must be sufficiently soluble in the solvent. The ideal solvent for complete extraction is one that is most selective, has the best capacity for extraction and is compatible with the properties of the material to be extracted. These parameters are predetermined experimentally. The cost and availability of the solvent are also taken into account. Alcohol, though widely used, because of its great extractive power it is often the least selective, in that it extracts all soluble constituents. Alcohol in various ratios is used to minimise selectivity. The ideal alcohol ratio for woody or bark material is 75%. For leafy material, it is often less than 50% thus avoiding extraction of the chlorophyll which makes purification difficult

Formulation and Industrial Utilisation Medicinal plants are used as raw materials for extraction of active constituents in pure form (eg. alkaloids like quinine and quinidine from cinchona bark, emetine from ipecacuanha root, glycosides from digitalis leaves, sennosides from senna leaves), as precursors for synthetic vitamins or steroids, and as preparations for herbal and indigenous medicines. Products such as ginseng, valerian and liquorice roots are part of the herbal and health food market, as well as the food flavours, fragrance and cosmetic industries. Certain plant products are industrially exploited like liquorice in

confectionery and tobacco, papaine as meat tenderiser, quinine as soft drink tonic and cinchona as wine flavour. A large quantity of medicinal plant material is used in the preparation of herbal and medicinal teas, eg. chamomile. These herbal and food uses are of great importance, also to the exporters from developing countries. Hundreds of medicinal plants are items of commerce, however relatively small countries are used in formulated herbal remedies. Several formulations like herbal teas, extracts, decoctions, infusions, tinctures, etc are prepared from medicinal plants (Kraisintu, 1997).

1. **Herbal teas, Herbal remedies:** herbal tea or infusion mixtures are mixture of unground or suitably ground medicinal plants to which drug plant extracts, ethereal oils or medicinal substances can be added. Infusion mixtures should be as homogenous as possible.

2. **Drug extracts:** They are preparations obtained by extracting drugs of a certain particle size with suitable extraction agents (menstrua). The extract obtained after separation of the liquid from the drug residue is called miscella. It may already represent the final liquid dose form eg. as a so called fluid extract, or be used as an intermediary product which is to be further processed as quickly as possible.

3. **Aqueous drug extracts:** The following degrees of comminution are used for the extract depending on the type of plant parts. Leaves, flowers and herbs shredded (4000mm); woods, barks and roots shredded (2800mm); fruits and seeds (2000mm). Alkaloid containing drugs powdered (700mm).

VI. CONCLUSION

From the work cited in the work it can be concluded that herbals/botanicals have usefulness in the treatment of disease like immunomodulator or which may develops to other immune disorders.Ayurvedic drugs have promising profile as far as drug development from natural source is concerned. One can expect herbal to acts as lead compound for development of economical ,effective and nontoxic immunomodulatory agent. The Ayurvedic system of medicines not only provides that alternative, but also scores over the side effects and cost factor of allopathic medicine Immunomodulators are becoming very popular

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A floristic Survey of Trees and Shrubs in Digras City District Yavatmal, Maharashtra

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ABSTRACT

The present survey deals with the floristic diversity in Digras City with reference to the perennial angiosperms such as trees and shrubs. The multiple ecosystem services are provided by the green urban spaces in cities. The biodiversity of city is important as it is vital that native and endemic species of flora are conserved. The Present study documents a total of 127 species representing 40 families trees and shrubs. Among these trees were dominant having 82 species followed by shrubs having 45 species.

Keywords: Perennials, floristic diversity, conservation, Green space.

I. INTRODUCTION

India appears to be a favored child of nature, a land where most varied types of plants are to be found[8]. The conservation and sustainable utilization of natural resources for the future there is need of Biodiversity assessment which is the first and most fundamental step. Floristic diversity refers to the variety and variability of plants in given region.

To understand the present diversity status and conservation of biodiversity floristic study and diversity assessments are necessary. Floristic explorations and taxonomic studies can provide efficient and convenient information about the nomenclature, distribution, ecology, utility of various plant species, and thus about an ecosystem[2]. Floristically, cities have been observed to be richer than adjoining areas owing to high habitat heterogeneity as well as the presence of exotic species[1]. In cities, urban green spaces are of great importance because of the multiple ecosystem services they provide and may exist in the form of domestic, public or botanical gardens, unused fields, woodlands, campuses of educational institutes or urban forests/ wildscapes[5]. Therefore an attempt has been made to study the plant species present in the Digras city. The present survey deals with the floristic diversity of Digras with reference to the perennial angiosperms such as trees and shrubs. Trees are an important part of every community. Small height woody plants are called as shrubs. Shrubs are also the important component of plant community which forms background or understory canopy.

II. STUDY AREA

Yavatmal is one of the administrative headquarter in western Vidarbha region. Digras is a tehsil in Yavatmal district situated in between 20° 36′ 0″ N and 77° 25′ 48″ E. Digras city is Surrounded by green urban spaces like arunavati damp ecosystem , Sacred grove around Bhavani Tekdi Mandir, Farmlands hedges and dense forest areas like phetri and singad forest.
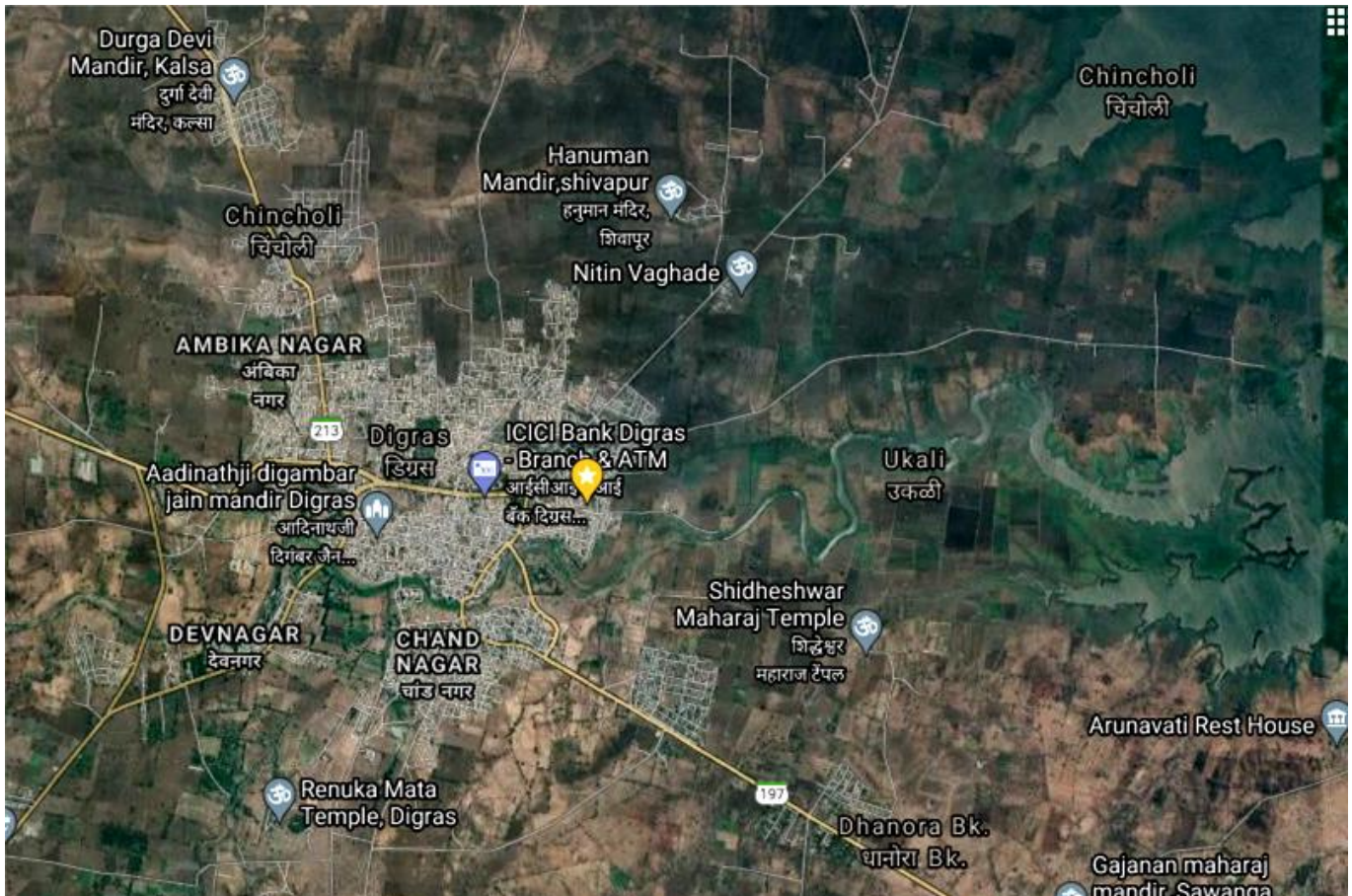
Map of Digras city and green spaces around city (Source: Google Map)

The study area has well demarcated four seasons as a hot summer, heavily raining monsoon, a brief autumn and a mild winter. The area has sub tropical climatic conditions with ample rainfall in the monsoon resulting in a rich diversity of vascular plants.

III. MATERIALS AND METHODS

The present floristic exploration began during rainy season in July 2020 till summer season of August 2021. The present investigation was divided into two sections.

a) Primary data- The preliminary data was obtained from extensive and intensive field surveys was done in morning and evening hours twice a week. During every visit, as many specimens as possible were collected and brought to laboratory for observation. Plant specimens were identified with help of standard regional floras (Flora of Maharashtra State, Singh et al[7], Flora of Yavatmal district, Karthikeyan S.[8], Flora of Kolhapur district, Yadav and Sardesai[9]) Cultivated and Ornamental garden exotics were confirmed from online database of Indian biodiversity portal, Flowers of India and also from experts. After identification plant specimens were pressed with standard protocols and mounted on standard herbarium sheets and labeled and preserved at the

Department of Botany Bapuraoji Butle Arts, Narayanrao Bhat Commerce and Bapusaheb Patil Science College Digras, District Yavatmal Maharashtra.

b) **Secondary data**- Literature surveys were carried out and publications those mentioned floristic diversity were extracted and cited. A comprehensive checklist was drafted from uniting all data from field notebooks and observations studied during exploration. Final list of about 104 species of trees and shrubs was compiled.

IV. RESULTS AND DISCUSSION

The Present study documents a total of 127 species representing 40 families of angiosperm perennials trees and shrubs are arranged as per Bentham and Hooker's system of classification (Table 1). Out of these 40 families of angiosperm perennials 38 families are of dicotyledonous and 2 are of monocotyledons. Dicotyledonous perennials are dominant with 95 % of total species while remaining 5% are of monocotyledonous perennials. The Perennial plants recorded in study area were broadly divided into into trees and shrubs. The higher percentage of trees (64%) in study area can be attributed to edaphic and climatic conditions and also due to plantation in city. The dominant tree species are *Acasia leucophloea, Acasia nilotica, Cassia siamea, Prosopis juliflora, Albizia lebbeck, Albizia procera, Alstonia Scholaris, Leucaena latisiliqua, Dalbergia sissoo.* Mimosaceae is the dominant tree family and Apocynaceae is the dominant shrub family in study area. Some Parts of city has monotonous plantation which cause biodiversity deterrence also there are prominent number of invasive alien species of trees and shrubs which are threat to native ecosystem.

Sr.No	Families	Plant Species	Local Name	Habit	Flowering and Fruiting period
1	Annonaceae	*Annona reticulata*	Ramphal	Shrub	May-Oct.
		Annona squamosa	Sitaphal	Shrub	May-Oct.
		Polyalthia longifolia	Ashok	Tree	May-June
2	Capparaceae	*Capparis grandis*	Pachonda	Tree	All year
3	Bombacaceae	*Bombax ceiba*	Katesawari	Tree	Feb.-Apr.
		Ceiba pentandra	Samali	Tree	Jan.-Mar.
4	Malvaceae	*Hibiscus rosa-sinensis*	Jaswand	Shrub	throughout
		Thespesia populnea	Indian Tulip	Tree	throughout
5	Sterculiaceae	*Sterculia foetida*	Jangali-badam	Tree	Mar.-Nov.
		Sterculia urens	Karai,Karu	Tree	Apr.-May
6	Tiliaceae	*Grewia tiliifolia*	Dhaman	Tree	Apr.-Sep
7	Malpighiaceae	*Galphimia gracilis*	Rain of gold	Shrub	Nov.-June
		Aegle marmelos	Bel	Tree	June-Sept
		Citrus aurantifolia	Limbu	Tree	May-Sep
		Citrus aurantium	Santra	Tree	Jan-Mar
		Citrus sinensis	Mosambi	Tree	May-Sep
		Limonia acidissima	Kawath	Tree	Mar-Sep
8	Rutaceae	*Murraya koenigii*	Kari-Patta	Shrub	Feb.-June
		Murraya paniculata	Kunti	Shrub	June-Mar.
9	Simaroubiaceae	*Ailanthes excelsa*	Maharuk,Ghodlimb	Tree	Jan.-Mar.
10	Meliaceae	*Azadirachta indica*	Kaduneem	Tree	Feb.-May
		Melia azedarach	Bakan nimb	Tree	Feb-May
11	Rhamnaceae	*Ziziphus mauritiana*	Bor,Ber	Tree	Apr.-Oct.
		Ziziphus oenoplia	Yeruni	Shrub	Aug.-Nov.
12	Sapindaceae	*Sapindus emarginatus*	Ritha	Tree	Oct.-Feb.
13	Anacardaceae	*Mangifera indica*	Amba, Aam	Tree	Jan.-May
		Semicarpus anacardium	Bibba	Tree	Oct-Feb
14	Moringaceae	*Moringa oleifera*	Shevga	Tree	Jan.-May
15	Mimosaceae	*Acasia auriculiformis*	Australian Babhul	Tree	Aug-Oct
		Acasia catechu	Khair	Tree	Jun.-Dec.
		Acasia leucophloea	Hivar	Tree	Aug.-Nov.
		Acasia nilotica	Babul	Tree	Jan.-Apr.
		Albizia lebbeck	Shirish	Tree	Mar.-Aug.
		Albizia procera	Pandharasiris	Tree	May.-Sep.
		Calliandra haematocephala	Red powderpuff	Shrub	Nov.-Feb.
		Dichrostachys cinera	Sagunkati	Shrub	Sep-Dec
		Leucaena latisiliqua	Su-Babhul	Tree	Oct.-Jan

Table 1: Enumeration of Trees and Shrubs according to Bentham and Hooker's system of classification

		Parkia biglandulosa	Chenduphul,Gongstick tree	Tree	Feb.-Apr.
		Pithocellobium dulce	Vilayati chinch	Tree	Jan.-June
		Prosopis juliflora	Bangali babhul	Tree	Apr.-Oct.
		Prosopis cineraria	Shami	Tree	Dec-Apr
		Samanea saman	Rain tree	Tree	May.-Sep.
16	Caesalpinaceae	*Bauhinia racemosa*	Apta	Tree	Apr.-July
		Bauhinia Variegata	Kanchan	Tree	March-June
		Caesalpinia pulcherrima	Sankasur	Tree	Apr-July
		Cassia fistula	Bahawa	Tree	Mar.-July
		Cassia Javanica	Java Cassia	Tree	May.-Sep.
		Cassia siamea	Siamese senna	Tree	Sep.-Jan.
		Delonix regia	Gulmohar	Tree	Apr.-June
		Hardwickia binata	Anjan	Tree	July-Aug.
		Peltophorum pterocarpum	Peelagulmohar	Tree	Aug.-Dec.
		Tamarindus indica	Chinch	Tree	May-July
17	Fabaceae	*Butea monosperma*	Palas	Tree	Feb.-Apr.
		Cajanus cajan	Tur	Shrub	Oct.-Feb.
		Dalbergia latifolia	Pahari sheesham	Tree	Sep.-Feb.
		Dalbergia sissoo	Sheesham	Tree	Mar.-Feb.
		Erythrina suberosa	Pangara	Tree	Feb.-Apr.
		Gliricidia sepium	Mexican lilac	Tree	Feb.-June
		Pongamia pinnata	Karanj	Tree	Feb.-May
		Sesbania grandiflora	Heti	Tree	Nov.-Mar.
18	Combretaceae	*Terminalia arjuna*	Arjun	Tree	Apr.-Oct.
		Terminalia bellirica	Behada	Tree	Apr-Oct
		Terminalia catapa	Deshibadam	Tree	Apr-Oct
19	Myrtaceae	*Callistemon citrinus*	Bottle brush	Tree	Oct.-Feb.
		Eucalyptus globules	Nilgiri	Tree	Dec
		Psidium guajava	Jamb	Trees	Oct-Mar
		Syzygium cumini	Jambhul	Tree	Apr.-July
20	Lythraceae	*Lagerstroemia speciosa*	Chota bondara	Shrub	Mar.-May
		Woodfordia fruticosa	Dhayti	Shrub	Jan.-Apr.
21	Carricaceae	*Carrica papya*	Papai	Tree	Sep.-Jan.
22	Araliaceae	*Polyscias crispatum*	Aralia	Shrub	Not Seen
		Polyscias scutellaria	Plum aralia	Shrub	Not Seen
23	Rubiaceae	*Anthocephalus cadamba*	Kadamba	Tree	Dec.-Mar.
		Gardenia resinifera	Dikemali	Shrub	Mar.-Aug.
		Hamelia patens	Firebush,Muna	Shrub	May-Oct.
		Ixora coccinea	Lokhandi	Shrub	Throughout

		Mitragyna parviflora	Karam	Tree	May-Sep.
24	Sapotaceae	*Manilkara zapota*	Chiku	Tree	Mar.-June
		Mimusops elengi	bakul	Tree	Feb-June
25	Ebenaceae	*Diospryros melanoxylon*	Tembhurni	Tree	Apr-May
26	Oleaceae	*Jasminum officinale*	Chameli	Shrub	throughout
27	Nyctanthaceae	*Nyctanthus arbor-tristis*	Parijatak	Shrub	June-Dec.
28	Apocynaceae	*Alstonia scholaris*	Saptaparni	Tree	Dec.-Feb.
		Carissa carandus	Karonda	Shrub	Feb-July
		Nerium indicum	Kanher	Shrub	Throughout
		Plumeria rubra	Chapha	Tree	Throughout
		Rauvolfia tetraphylla	Barachandrika,Milkbush	Shrub	Throughout
		Tabernamontana divaricata	Swastik,Tagar	Shrub	Throughout
		Thevetia peruviana	Pivala Kanher	Shrub	Throughout
		Wrightia tinctoria	Kalakuda	Tree	Mar-Dec
29	Ascelpiadaceae	*Calotropis gigantean*	Rui	Shrub	June-Mar.
		Calotropis procera	Rui	Shrub	Dec.-Mar.
30	Ehretiaceae	*Cordia dichotoma*	Bhokar	Tree	Mar-May
31	Convolvulaceae	*Ipomoea fistulosa*	Besharam	Shrub	Throughout
32	Bignoniaceae	*Millingtonia hortensis*	Akashneem	Tree	Oct.-Dec.
		Spathodea campanulata	African tulip	Tree	Dec.-Apr.
		Tecoma stans	Ghantiful	Shrub	Sep.-Feb.
33	Acanthaceae	*Adhatoda zeylanica*	Adulsa	Shrub	Aug.-Dec.
34	Verbenaceae	*Clerodendrum infortunatum*	Bhandira	Shrub	March-April
		Clerodendrum chinense	Chinese Glory Bower	Shrub	Throughout
		Duranta erecta	Skyflower	Shrub	Throughout
		Gmelina arborea	Shivan	Tree	Feb-May
		Lantana camara	Ghaneri,Tantani	Shrub	Throughout
		Lantana montevidensis	Raimuniya	Shrub	Throughout
		Tectona grandis	Sagwan	Tree	June-Dec.
		Vitex negundo	Nirgudi	Shrub	Throughout
35	Euphorbiaceae	*Acalypha wilkesiana*	Copperleaf	Shrub	Jan.-July
		Emblica officinalis	Awla	Tree	Feb.-Apr.
		Euphorbia neriifolia	Mingut	Tree	Not Seen
		Euphorbia cotinifolia	Red Spurge	Shrub	May-Jan
		Jatropha podagrica	Australian	Herb	Oct.-Dec
		Jatropha Integerrima	Peregrina	Shrub	Throughout
		Ricinus communis	Erand	Shrub	Throughout
36	Piperaceae	*Piper peepuloides*	Wild Pepper	Shrub	Apr.-Aug.
37	Moraceae	*Ficus benghalensis*	Wad	Tree	Apr.-June

		Ficus benjamina	Nandaruk,Weepingfig	Tree	Not Seen
		Ficus carica	Anjeer	Tree	Apr.-Aug.
		Ficus hispida	Auadumber	Tree	Feb.-July
		Ficus racemosa	Umbar	Tree	Feb.-June
		Ficus religiosa	Pimpal	Tree	Apr.-Aug.
		Morus alba	Shahtoot	Shrub	Apr.-Aug.
38	Casuarinaceae	*Casuarina equisetifolia*		Tree	May-Jun
39	Agavaceae	*Cordyline stricta*	Ti Plant	Shrub	Apr.-May
		Nolina recurvata	Ponytailpalm, Elephan's foot	Shrub	Not Seen
		Chrysalidocarpus lutescens	Areca palm	Shrub	Not Seen
40	Arecaceae	*Phoenix sylvestris*	Kharik, Wilddatepalm	Tree	Jan.-May
		Roystonea regia	Royal palm	Tree	Sep.-Mar
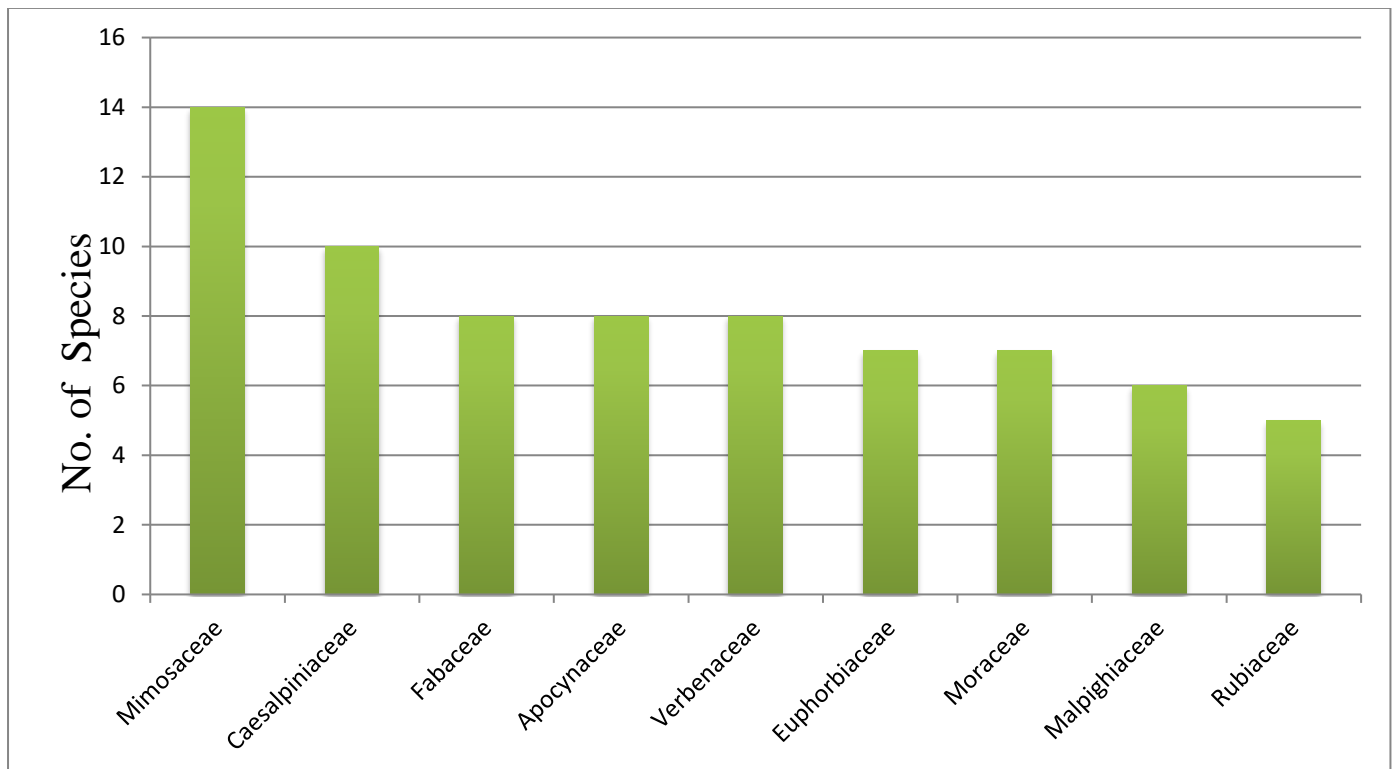
Fig.1: Plant Families with higher number of trees and shrubs in Study Area.

V. CONCLUSION

The survey of Trees and Shrubs of Digras City helps in inventorization of diversity which contribute towards a conservation task. The biodiversity of city is important as it is vital that native and endemic species of flora are conserved..The Present study reveal that the city is rich in native as well as exotic flora but the diversity among the species are less due to some areas covered under monotypic plantation of *Dalbergia sissoo, Polyalthia longifolia* and *Cassia siamea* and due to invasion of non native species. Although some undisturbed areas in city

has wild diversity of trees, shrubs and some climbers. Due to construction at various places some plants are under threat.

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Utilization of Local Plant Resources as Medicine by Tribal Communities in Mulchera Tehsil of Gadchiroli District in Maharashtra, India

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ABSTRACT

Ethnic groups usually depend on plant resources for treatment of different ailments. Usually they do not visit any doctor or a medical store asking for allopathic medicines. A survey has been conducted during last winter and summer seasons to collect the information from tribal people using different plants that commonly occur in this area for the treatment of various diseases. The data collected was obtained through personal interviews with elderly people and other local inhabitants during field survey. About 30 plants were observed to be in use for major diseases like jaundice, insomnia, white discharge, menstrual problems and kidney stones besides diabetes and common cold.

Key words: Tribal community, Ethnobotanical study, plant uses.

I. INTRODUCTION

India is one of the rich biodiversity spots of the world. About 43% of plants from Indian subcontinent (approximately 7,500 species) are reported to have medicinal value (Pushpangadan, 1995). Herbal forms of medicine is believed to be existed in India from thousands of years. It employs various techniques like leaf juices, bark and root powders etc, and uses different parts of plants to control many types of diseases. Native or local plants of an area support human livelihoods in various ways and help to solve locale problem by utilization of them. There is a significant relationship between ecosystem services of vegetation to human well-being (Patil et. al. 2015).

Use of plants as medicine is not a new concept. Since ages we Indians are using plants as medicines which is present in the Ayurved system. The use of plants for treatment in ailments in India dates back to prehistoric times. Ayurveda, an ancient traditional system of medicine that has been practiced in India since 200 B.C., employs a large number of medicinal plants used in prevention and treatment of wide number of diseases. (Deodhar and Shinde, 2015). A brief ethnobotanical survey of Gond and Halbi the tribes of Chandrapur and Gadchiroli districts has been conducted by Tiwari and Padhye (1993) and Tiwari (1994). Phanikumar and Chaturvedi (2010) published a work on ethnobotanical observations of Euphorbiaceae from Vidarbha region of Maharashtra.

Different plants and their parts are used in various ways like direct chewing of plant parts, juices, decoctions, solely or in combination with other plants or plant parts and honey. The tribal community of this area use different plants to treat various diseases. This traditional knowledge of herbal treatment to cure various diseases has been passed from generation to generation (Savithramma et.al., 2013).

The various tribal sects of India are repositories of rich knowledge on various uses of plant genetic resources, which have hitherto remained unknown (Khoshoo, 1996). Many diseases are being treated by herbal remedies. In many developing countries plant materials continue to play a major role in primary health care as therapeutic remedies (Zakaria, 1991). Tribal communities residing in the hilly areas are solely dependent on these readily available resources due to their traditional knowledge (Patil and Patil, 2012).

The reason why most people face problem for collecting the information from these tribal community is their fear of over exploitation of forest resources by urban population (including multinational companies), and second thing is they also fear of losing earnings due to competition from such learned people and companies.

II. GEOGRAPHICAL DETAILS OF STUDY AREA

Gadchiroli is the tribal and naxal affected remote district of Maharashtra state. Till today there is no connectivity with rail and air from other districts or states of India. A large area of the entire district is occupied by forests and small hillock areas with rich vegetation. Gadchiroli covers about 218,529 Hectares land as reserved and protected forest. Many plants of the district are used as Herbal medicine (Jakhi, PS, 2021).

A brief floristic survey of the district was done by Suresh and Sourav (2013). The other plants which are frequently found in this district include *Diospyros melanoxylon*, *Dioscorea bulbilifera*, *Terminalia tomentosa*, *Pterocarpus marsupiam*, *Terminalia arjuna*, *Phylanthus emblica*, *Pongamia pinnata*, *Azadirachta indica*, *Ficus bengalensis*, *Ficus religiosa*, *Ficus racemosa*, *Gloriosa superba*, *Madhuca indica*, *Aegle marmelos*, *Annona squamosa*, *Annona reticulata*, *Bombax ceiba*, *Buchanania lanzan*, *Manilkara hexandra*, *Semecarpus anacardium*, *Limonia acidissima*, *Mangifera indica*, *Momordica dioica*, *Phoenix sylvestris*, *Borassus flabellifer*, *Pithecellobium dulce*, *Ziziphus mauritiana*, *Ziziphus oenoplia*, *Terminalia bellirica*, *Syzygium cumunii*, *Terminalia chebula*, *Gardenia resinifera*, *Clerodendron species*, *Terminalia indica*, *Vitex nigundo*.

Mulchera Tehsil is in Gadchiroli district of Maharashtra state in India. It is located at 19° 39' 32.508'' N latitude and 79° 54' 51.984'' E longitude and it's altitude is 200 msl. The temperature goes to about 47 degrees in summer and falls to 6 degrees in winter. The average humidity is about 65%.

The population of Mulchera tehsil is dominated by tribal people, with about 61.2% come under Scheduled Tribe as per 2011 census data. Total number of villages in this Taluka is 68. The Languages spoken in this locality are Marathi and Hindi, gondi, bengali, Telugu.

Mulchera tehsil, in particular, is surrounded by large forest land. The weather mostly remains dry and hot throughout the year, having total average rainfall approximately 200 mm, therefore major forest type is dry deciduous in which Teak (*Tectona grandis*) is dominant species.
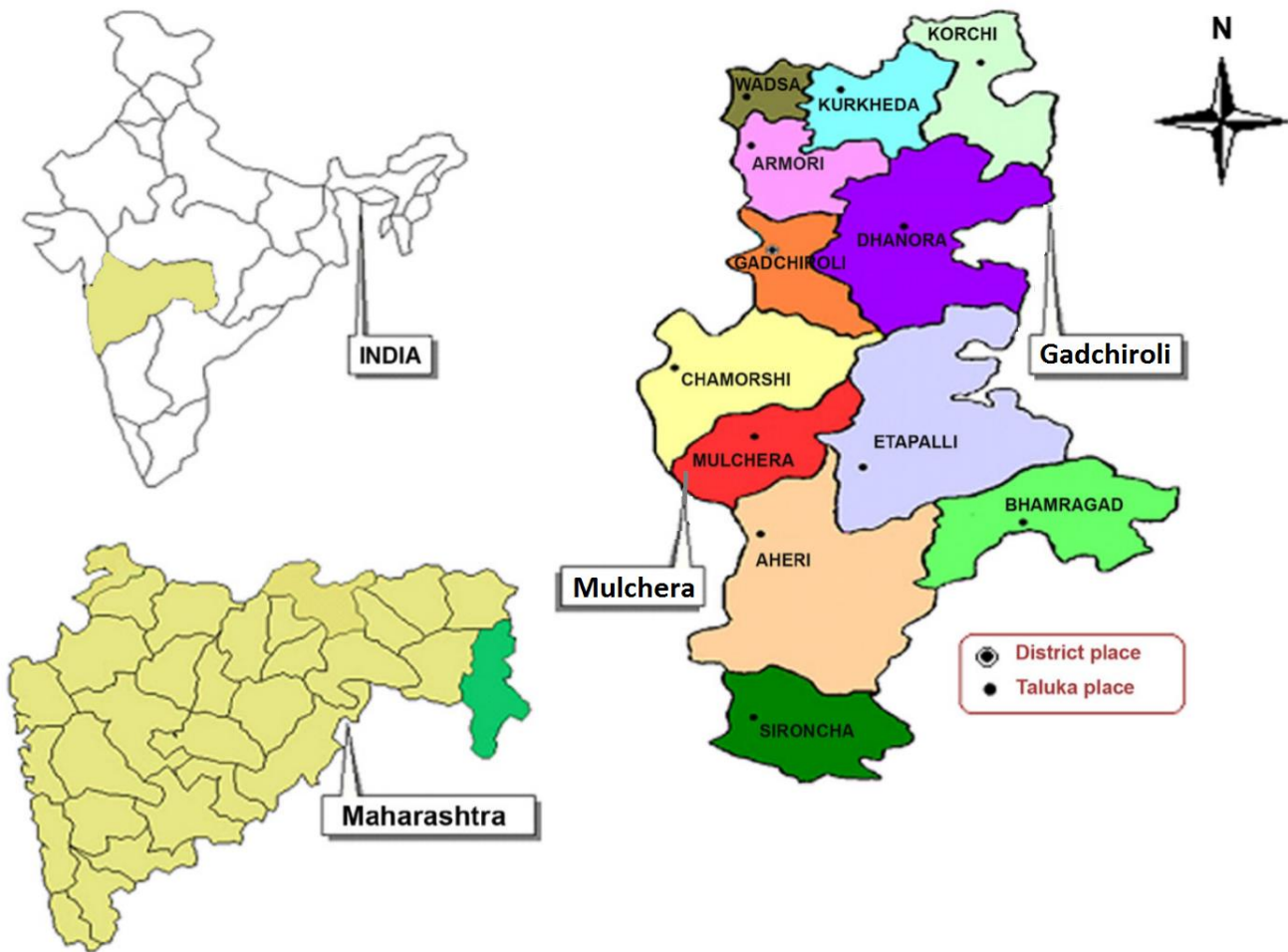
Fig.1: MAP OF STUDY AREA

III. METHODOLOGY

The information on herbal remedies was obtained from tribal communities in this tehsil area. A survey has been conducted during various field trips, and information was gathered from elderly people, village heads, medicine men and other knowledgeable persons through semi-structured questionnaire, personal interviews.

Ethnobotanical Studies:

Plants are being used as medicine since ancient times and are being used in several systems of medicine like Ayurveda, Homoeopathy and Unani. Even in this modern times there are several tribal communities who depend on many common and wild plants for the treatment of various ailments. Maharashtra is one of the states which inhabit tribes like Bhil, Gond, Madia, Halbi, Katkari (Kathodi), Koli, Kawar, Arakh, and Andh. Among these, Halbi and Gond-Madia are major inhabitants of Gadchiroli district.

The leaves of *Bryophyllum* are chewed in the treatment of Kidney stones. One leaf per day for at least one month. The stem juice (5 ml) of *Euphorbia nerifolia* is used to treat white discharge in women. About 10ml of leaf juice of *Cayratia trifolia* is taken directly to cure menstrual related problems. The entire plant of *Spermacoce hispida* is crushed and the fresh juice is poured on the spot of snake bite. The leaf juice of

Achyrathus aspare is used for snake bite.   The locals believe that growing *Aristolochia indica* plant in the house keeps the snakes away. The ash made from the stem parts of *Butea monosperma* is mixed with hot cow ghee and is taken for piles. A medium sized leaf of *Ricinus communis* is baked on pan and it is eaten to control blood piles, but only one leaf per day is to be used. Various ethnomedicinal uses of this plant in India was reviewed by Manpreet Rana et. al., (2012) and in Pakisthan by Srfaraz Khan et.al., (2017). The dried flowers of *Butea* and dried ginger (usually called sounth in local language and is available commercially) are boiled in water to make decoction, which is used in stomachic troubles. The dried The flowers are also used to cure kidney stones. The decoction made from about 15-20 leaves of *Commelina benghalensis* are used to control acidity. One spoon full leaf juice of *Costus speciosus* is used to control high fever.

Five ml leaf juice of *Justicia adhatoda* (Adulsa/ Vasaka) and 5ml ginger juice is mixed with 5ml honey is taken for cold and cough. In some areas old and yellow leaves are boiled in water to make decoction and is used for the treatment of cold. The leaf juice of *Hygrophila spinosa* (Gokulakanta) is taken on empty stomach early in the morning which increases hemoglobin content of RBC. It is supposed to be best for liver health also. Interestingly, the tribes believe strongly that keeping the short and young branches or leaves of *Ageratum conizoides* under the pillow is very much helpful to control insomnia. The stem epidermal peel of young branches of *Oroxylum indicum* is crushed to make juice and is used for Jaundice and Hepatitis C diseases.

The bark of *Terminalia arjuna* is dried and powdered, one spoon of which is mixed with 2 cups of water to make a decoction, and it is used in heart problems. The leaf juice (5ml) of *Nyctanthes arbortristis* is used to treat Malaria and Typhoid fevers. The leaves of *Andrographis paniculata* are used to cure fevers. The leaf juice of *Azadiracta indica* is mixed with turmeric powder and is applied on affected parts to treat allergies. *Carica papaya* leaf juice is used in Dengue fever, which is believed to increase platelets. Little mustard oil is applied on the leaves of *Calotropis procera* and is baked on pan, and then these leaves are tied with a cloth on knees. It is believed to get relief from knee joint pains. It is a known fact that the latex of this plant causes blindness if it comes in contact with the eyes. However, it is used to cure insect bites in this area. Whole plant of *Euphorbia hirta* is used in wound healing and asthma, the leaf to cure boils on skin.

The leaves of *Tridax procumbance* are crushed with bare hands and is applied on cuts and wounds. The leaves of *Achyranthes aspara* and *Cynodon dactylon* are also used to stop bleeding from cuts and wounds. *Achyranthes aspara* seeds are dried and powdered. This powder is used by tribals to cure toothache. In many villages, even today tooth paste is not used, rather they prefer twigs of some plants like neem (*Azadiracta indica*), pomegranate (*Punica granatum*), Aghada (*Achyranthus aspara*). Some tribals prepare their own tooth powder from ash of Brick Furnace and mix the dried seed powder of *Achyranthus aspara*. It relieves all types of tooth pains. The juice made from young branches (looks like compound leaves) of *Phyllanthus niruri* are used in diabetes. High levels of blood sugar are brought down in no time, as told by some patients. The leaves of *Tinospora cordifolia* are used to control diabetes. Two to three fresh leaves are eaten raw daily early in the morning. The leaves of *Vinca rosea* are chewed in the morning to control diabetes (blood sugar).

The research reveals that ingestion of *Helioptropium* plant is dangerous (Wongsatit Chuakul, 1999), however the tribal use the root of this plant to control blood sugar. *Stevia rebaudiana* leaves are used by these tribals as sweetener. It is best for diabetic patients. Recent research has reveled that *Stevia* plant in spite of containing more sweet, do not increase blood sugar levels and did not cause significant changes in the lipid profile of diabetic patients (Marjan A et.al. 2020).

TABLE 1: LIST OF PLANTS USED BY LOCAL TRIBAL COMMUNITY FOR MEDICINAL USE

Sr. No.	Name of plant	Family	Part used	Medicinal use
1	*Achyranthus aspara*	Amaranthaceae	Seeds, Leaves	Tooth pain; Stop bleeding from cuts Snake bite
2	*Adathoda vasica* (Syn. *Justicia adhatoda*)	Acanthaceae	Leaves	Cold and cough
3	*Ageratum conizoides*	Asteraceae	Young branches / Leaves	Insomnia
4	*Alternanthera paronychioides*	Amaranthaceae	Root	Tooth brush
5	*Andrographis paniculata*	Acanthaceae	Leaves	Fever
6	*Aristolochia indica*	Aristolochiaceae	Leaves	Snake bite
7	*Azadiracta indica*	Meliaceae	Root, Leaves, bark	Allergy
8	*Bryophyllum pinnatum*	Crassulaceae	Leaves	Kidney stones
9	*Butea monosperma*	Fabaceae	Stem, Flowers	Kidney stones, Piles, Stomachic
10	*Calotropis procera*	Asclepiadaceae	Leaves, latex	Joint pains
11	*Carica papaya*	Caricaceae	Leaves	Increases blood platelets
12	*Commelina benghalensis*	Commelinaceae	Leaves	Acidity
13	*Costus speciosus*	Costaceae	Leaves	High fever
14	*Cynodon dactylon*	Poaceae	Leaves	Stop bleeding from cuts Menstrual bleeding
15	*Euphorbia hirta*	Euphorbiaceae	Whole plant	Wound healing
16	*Euphorbia nerifolia*	Euphorbiaceae	Stem	White discharge in women
17	*Heliotropium indicum*	Boraginaceae	Roots	Diabetes
18	*Hygrophila spinosa*	Acanthaceae	Leaves	Hemoglobin in RBC
19	*Nyctanthes arbortristis*	Oleaceae	Leaves	Fever
20	*Oroxylum indicum*	Bignoniaceae	Stem peel	Liver problems & Hepatitis C
21	*Phyllanthus niruri*	Phyllanthaceae	Young branches	Diabetes
22	*Ricinus communis*	Euphorbiaceae	Leaves	Piles
23	*Spermacoce hispida*	Rubiaceae	Whole plant	Snake bite
24	*Stevia rebaudiana*	Asteraceae	Leaves	Sweetener
25	*Terminalia arjuna*	Combretaceae	Bark	Heart problems
26	*Tinospora cordifolia*	Menispermaceae	Leaves	Diabetes
27	*Tridax procumbance*	Asteraceae	Leaves	Stop bleeding from cuts
28	*Vinca rosea*	Apocynaceae	Leaves	Diabetes
29	*Vitex negundo*	Verbanaceae	Leaves	Vaginal discharge
30	*Vitis trifolia*	Vitaceae	Leaves	Menstrual problems

IV. CONCLUSION

The present ethnobotanical survey is conducted to explore the culture of local Gond tribal community, particularly in relation to use of plants for medicinal purpose. It is observed that the tribal people are losing their traditional identity due to several developmental activities around tribal areas which are not related to their welfare, resulting in a good deal of loss of such treasures of plant genetic resources (Shankar, 1995). However, the fact, the worlds don't know is that tribal people are known for their love to nature and they never destroy forests and use plant resources sustainably. Tribal community is the repository of traditional knowledge which they pass on to their own progeny by verbal communication only. No written documents are there. The plants used by these tribal people are mostly wild and foolproof in curing various ailments. The patients from nearby urban areas are also visiting for medication.

The authors also feel a lot of survey and research is yet to be taken to explore more plants having ethno botanical value. We strongly feel that it is the responsibility of the government to protect these tribal communities and their cultures. It is a known fact that they neither mingle with urban culture nor allow others to enter into their own culture.

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Fig. 2: Local plants used as medicines by tribal community in Mulchera tehsil

Adverse Effects of Excessive Mobile Phone Use

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ABSTRACT

The study of adverse effects of excessive mobile phone use were conducted as a questionnaire method in order to evaluate its effects faced by peoples due to excessive use of it. The study found that most of the people face an adverse effects of mobile phone at an early stage of their life (16-20). People face many problems such as headache, eye problems, impaired concentration and memory and also fatigue. The health problems faced by them. The respondents suggested that one should decide the time-limit for using cell phones and use glasses while working which blocks the blue light coming from it.

KEYWORDS: Smart phone usage, mental health, pros and cons of phone, pandemic, mental health

I. INTRODUCTION

Now-a- technology is getting advanced and it's becoming an important part of our day-to-day life. The most important rapidly growing technology is smart phone or mobile phone which contains video games, internet browser,etc. Which makes life easier and hence it attracts lots of people towards itself. Few years ago, mobile phones are used for only calling purpose but now it is use for chatting, for studying purpose, for clicking pictures, etc. Which made peoples life very easy and thus it becomes an important part of our life.

But, every good thing when abused can be harmful,so is mobile phone. It is not only useful but its excessive use is very harmful for our health. If we use excessive mobile phone adversely affects our physical as well as mental health. Excessive mobile phone use leads people physically lazy and mentally crazy. In 2020-2021 due to d Covid-19 pandemic schools, colleges and offices were totally closed, so all the students attend online lectures and working person doing work from home though their respective computing devices. Due to this most of the people suffer from eye problems, headache, impaired concentration and memory and also fatigue which adversely affects their normal function of life. Research found that in year 2020-2021 most of the children's and working persons suffer from eye problem and headache. Thus study of excessive mobile phone used is the most important part of knowing about the problem faced by the people. Information collecting method is the process of determining and analyzing of information searching about the adverse effects of excessive mobile phone use.

II. CONCEPT AND IDEOLOGY

It is the prompt use pattern which are used for searching and seeking information of the people.
Following factors are used in process:

1. Determine objective
2. Select respondents
3. Creating data analysis
4. Develop survey
5. Pre-test the survey
6. Conducting the survey
7. Data analysis
8. Results
9. Feedback related data

Purpose/objective of the survey:

To assess adverse effects of excessive use of mobile phone following objective have been set in this study.

- Assess opinion about the usage of mobile phones
- Find out if people facing any adverse effect of it
- Determining which problems they face
- Determining if people taking measures to reduce the adverse effects of it

III. METHODOLOGY

There are many types of methods used by researchers for the study but most of the researchers used **"QUESTIONNAIRE METHOD"** as it is easy and time consuming method of collection of data. About 72 people participated in this survey. Almost **77.8%** of people finding o that they suffers from various types of problem related to health because of using excessive mobile phones.

IV. DATA ANALYSIS

Here is the statistical information of opinion of people about the excessive mobile phone use.

TABLE 1: Analysis of various age group of people
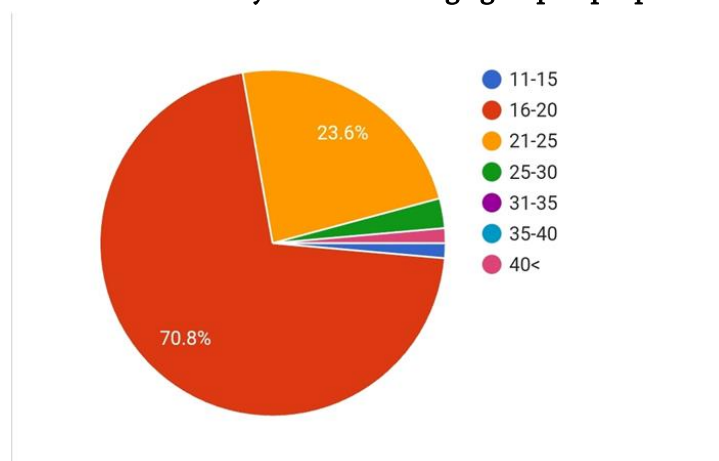
TABLE 2: Analysis of the age when they started using mobile phone
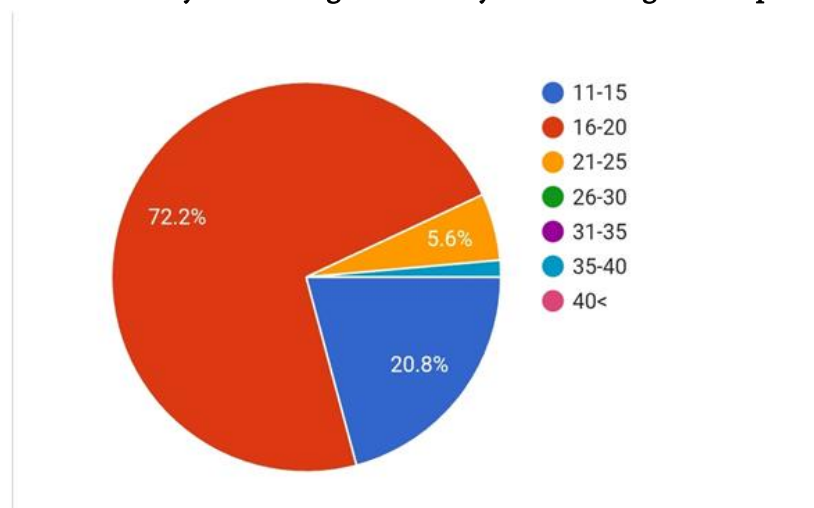
TABLE 3: Anaylsis of the problems faced by them
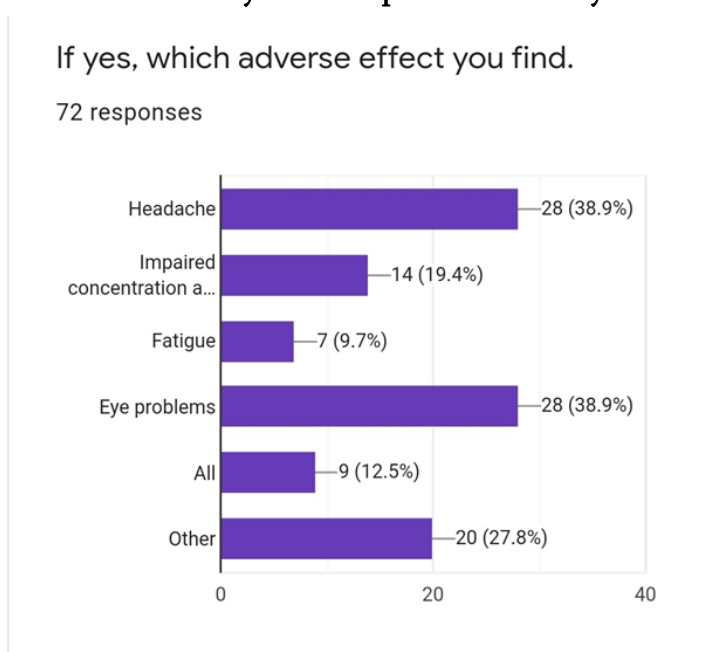
V. RESULTS AND CONCLUSION

Research finding indicate that the use of mobile phone may lead to a number of symptoms such as headache, impaired concentration and memory and also fatigue. The response rate is **77.8%**. Students between age group 16-20 and 21-25 used mobile phones at a large extent. Almost many peoples i.e. 72.2% starts using cell phones at the age of 16-20. Some people use mobiles at an early stage i.e. 11-15 which is 20.8%. Study also found that among 72 peoples almost 77.8% of people facing the adverse effects of mobile phones. In which 77.8% of people reported the symptoms of ill- health. 38.9% of people facing the problem of headache, 19.4% of impaired concentration and memory, 9.7% of fatigue, 38.9% of eye problems, 12.5% of facing all the above problems and 27.8% of facing other problems.

The health problems were also compared between males and female on the basis of the problem faced by them. Below is the table showing percentage of the problem faced by them.

Health problems	Male	Female
Headache	10	18
Impaired concentration and memory	08	06
Fatigue	04	03
Eye problems	11	17
All	05	04
Other	09	11

VI. DISCUSSION

Government or health proffessionist should conduct a camp for awaring the adverse effects of mobile phone use. There should be organized the camp of eye check-up for peoples. To avoid the radiation of mobile phones during calls there should be used wired-ear piece/ microphone hand free accessory. Using the phone on speaker mode, texting rather than speaking, keeping the phone on some distance from our body (as recommended in phone's user manual), even placing your thumb between the phone and ear while calling. Using a phone for long time calls adverse effects to avoid such effects best practice we can do is using mobile for less time and try to avoid using it in dark light as it can cause more bad effects on your eyes.

In today's world mobile is definitely very important in everyone's life but using it wisely with taking care of our self is best practice we all can do to avoid the adverse effect. High resolution screen and keeping the sensible distance can protect us from harmful radiation and adjusting screen setting can help a lot. Must try to reduce the use of cell phone. Switching of the wi-fi when not required or use airplane mode for gaming. Avoid using cell phone in moving car, train, bus. Limit calls in low network area, sleep without mobile phones.

For study purpose we must prefferred books rather than using mobile phones which helps to increase our reading interest also. One should decide time limit for using mobile also it should use on less extent and only for some reasonable purpose. When there is no need of computing devices switching off this which helps to break the addiction. Mobiles should not given to children below the age 15. At least after completing high school. Use glass which blocks the blue light coming from cell phone or laptops screen to avoid entering our eyes. Avoid conversation in lift, basement and limit our exposure.

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Synthesis and Antibacterial Screening of Metal β-diketonates

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ABSTRACT

1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl)propane-1,3-dione (DNTPD) and its transition metal complexes were synthesized. The β-diketone ligandis synthesized by employing Baker-Venkataraman rearrangement on 4-hydroxy-5-nitro-2-(thiophen-2-yl)oxyacetophenone which was previously synthesized by p-nitroresacetophenone and thiophene-2-carboxylic acid. The synthesized compounds were characterized by physical properties, elemental analyses, ^{1}H-NMR, mass spectra,IR spectra and electronic spectra and the geometry of metal complexes have been concluded by magnetic spectra. The thermal stability ofmetal complexes has been studied by Thermogravimetric analysis. The ligand and its transition metal complexes have been studied under pathogenic bacteria like *Staphylococcus aureus, Bacillus subtilis, Proteus vulgaris, Escherichia coli* and *Proteus aeruginosa* by filter paper disc diffusion method.

Keywords: β-diketones, Metal complexes, Baker-Venkataraman rearrangement,Thermogravimetric analysis, Antibacterial activity.

I. INTRODUCTION

β-diketones are among the most widely studied compounds.They are key intermediates for the synthesis of some core heterocyclic compounds likepyrazole[1], isoxazole[2], triazole[3], flavones[4], benzodiazepine[5], pyrimidine[6], etc. Their derivatives also have wide applications in diverse areas like gas chromatography, laser technology, polymer chemistry, solvent extraction and shift reagent in NMR spectroscopy[7,8].

β-diketones are known to have keto-enol tautomerism. As β-diketones exist mainly in the enolic form and that form considered as a 1-keto 3-hydroxy variant locked in the preferred double bond geometry through hydrogen bonding, having ability to inhibit bacterias and act as an excellent antibacterial agent[9]. It exhibits several other biological activities, such as antioxidant[10], antitumor[11], antiviral[12], insecticidal[13], anti-inflammatory and anticarcinogenic activities[14], antimutagenic activity[15-17] etc. It has been used as sunscreen agent because it is a good absorber in UV region. It has been shown to protect human lymphoid cells and used as UVA-filters. β-diketone is an important pharmacophores of HIV-1 integrase inhibitors[18].

Thiophene derivatives have been very well known for their remarkable pharmacological activities and therapeutic applications. Thiophene is a bioisostere of benzene ring thus benzene ring of a biologically active compound may often be replaced by a thiophene without loss of activity[19]. Number of thiophene derivatives

have been developed and widely used as chemotherapeutic agent. It exhibits several other pharmacological activities such as anti-inflammatory, anti-atherosclerotic, antihistaminic and also used in the treatment of Alzheimer's disease[20].

In present work, we synthesized and studied the properties of 1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl)propane-1,3-dione and its metal complexes. The title compound was synthesized from 4-hydroxy-5-nitro-2-(thiophen-2-yl)oxyacetophenone by employing Baker-Venkataraman rearrangement[21] which was previously synthesized by Resacetophenone. The synthesized compounds were characterized by various analytical techniques and screened for antibacterial study.

II. EXPERIMENTAL AND METHOD

p-Nitroresacetophenone 2

5.5g of dry resacetophenone**1** which was synthesized by Nencki reaction was dissolved in 25ml H_2SO_4 by heating it at 60-65°C for 15min. Then the reaction mixture was cooled below 10^0C and cooled nitrating mixture was added slowly maintaining the temperature of system below 10°C. It was kept 0-10°C for 15min, then poured into crushed ice with constant stirring and washed with cold water. Yield: 5.3g (74%) m.p. 142°C

4-hydroxy-5-nitro-2-(thiophen-2-yl)oxyacetophenone (HNTO) 3

0.02 mol of p-nitroresacetophenone**2** and 0.02 mol of thiophene-2-carboxylic acid were dissolved in 10ml dimethylformamide and cooled. Add 3ml $POCl_3$drop wise with constant stirring maintaining the temp below 10^0C. It was kept for 2 hours, then the reaction mixture was poured in crushed ice with stirring. Yellow solid was separated out which was washed with cold water. The product was filtered and recrystallized by alcohol. Yield: 82%; m.p.: 65°C.

1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl)propane-1,3-dione(DNTPD) 4

0.02mol of 4-hydroxy-5-nitro-2-(thiophen-2-yl)oxyacetophenone**3** was dissolved in18ml dimethyl sulfoxide in a 50ml bolt-necked flask and heated to 50°C. 0.03mol of potassium hydroxide was added with mechanical stirring which was powdered rapidly in a mortar preheated in an oven at 100°C and was stirred for 15min. The reaction mixture was then cooled to room temperature and acidified by adding 25ml of 10% aqueous acetic acid with stirring. The yellow-coloured compound so obtained was filtered and recrystallized from ethanol. Yield: 64%; m.p.150°C.

Bis(β-diketonato) Cu(II) complex 5a

Complexes of β-diketone compound **4** have been synthesized by dissolving ligand and copper acetate in 2:1 mole in ethanol. The olive coloured solid **5a** precipitated was filtered and washed with hot ethanol.

Similarly, the complexes of Cobalt, Nickel, Manganese and Zinc were prepared. The yield and colour of synthesized complexes have been given in **Table 1**.
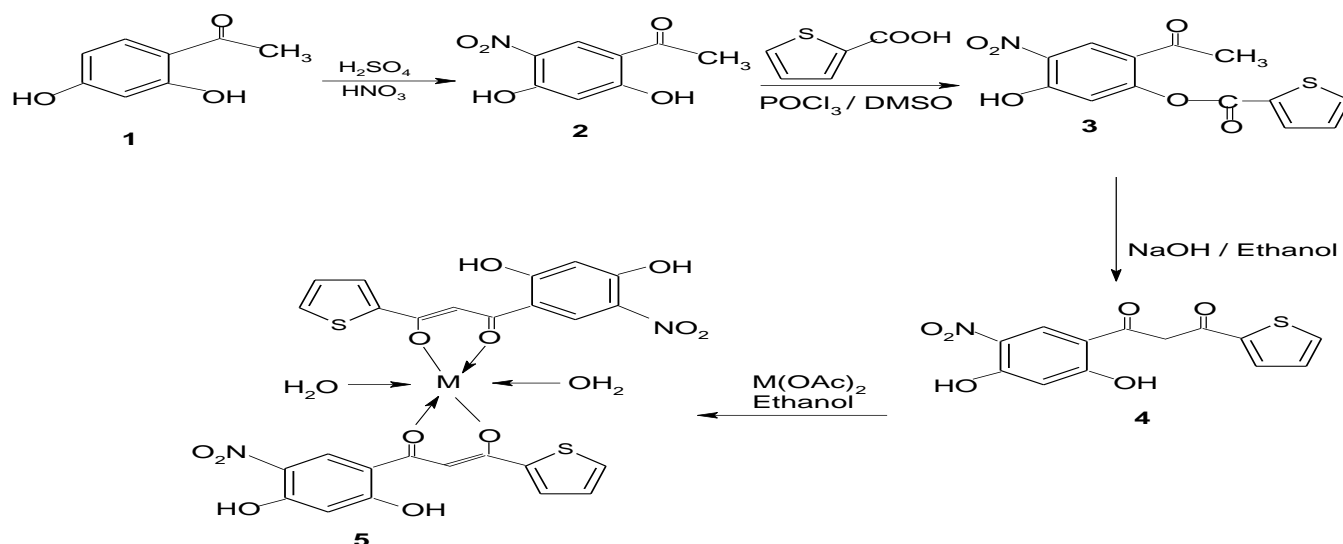
M = Cobalt, Nickle and Manganesecontains water of coordination however water of coordination is absent in copper and Zinc.

Scheme: Synthesis of reported compounds

III. RESULTS AND DISCUSSION

The synthesized compounds were characterized by its physical properties, elemental analyses, IR Spectra, 1HNMR, mass spectra, electronic and magnetic studies.

Elemental analyses

The elemental analyses of the ligand and its metal complexes were done using the Perkin Elmer 2400 CHN analyzer. It has been given in Table 1. The elemental analyses of the synthesized compounds were found in good agreement with the calculated data.

Table 1: Elemental Analyses of all the synthesized compounds:

Name of complex	Color	Yield (%)	Elemental Analyses							
			Found (%)				Calculated (%)			
			C	H	N	M	C	H	N	M
HNTO	White	82	51.58	2.81	4.02	--	50.81	2.93	4.56	--
DNTPD	Yellow	64	50.47	2.84	3.98	--	50.81	2.93	4.56	--
Mn(DNTPD)	Orange	64	44.28	3.54	3.87	7.04	44.25	3.12	3.97	7.79
Co(DNTPD)	Rust	63	45.11	3.51	3.60	8.73	44.00	3.10	3.95	8.31
Ni(DNTPD)	Chocolate yellow	85	43.97	3.15	3.97	8.97	44.00	3.10	3.95	8.28
Cu(DNTPD)	Olive	89	46.57	2.91	3.72	9.48	46.02	2.65	4.12	9.37
Zn(DNTPD)	Golden	78	45.34	2.54	4.72	9.78	45.90	2.65	4.12	9.61

Infra-red spectra

FT-IR spectra was recorded with disc on Perkin-Elmer spectrum Rx-I spectrometer. The IR spectrum of ligand and its metal complexes are summarized in Table 2 given below.

Table 2: Infrared data of 1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl) propane-1,3- dione and its metal complexes (cm⁻¹)

	C=O	C=C	-C-O Phenolic	-C-H Aromatic	>CH Alip	-OH Phenolic	-C-O Enolic	-C=S	M-O	M-H₂O Coordinated water	C-NO₂	-CH₃
1b	1708	1600	1527	3039	2918	3435	1269	689	--	--	1483	2973
Lig	1689	1602	1527	3029	2918	3435	1230	689	--	--	1483	--
Mn (DNTPD)	1667	1659	1538	3023	2932	3423	--	710	418	793	1489	--
Co (DNTPD)	1647	1614	1544	3031	2922	3460	--	708	416	785	1503	--
Ni (DNTPD)	1654	1618	1521	3022	2932	3460	--	710	416	785	1489	--
Cu (DNTPD)	1649	1597	1527	3034	2922	3430	--	700	443	--	1503	--
Zn (DNTPD)	1657	1596	1520	3021	2917	3418	--	689	462	--	1489	--

The band appearing at 1689 cm⁻¹ in case of ligand may be assigned due to the carbonyl group, which exhibited a lower shift in metal complexes. This shift indicates that the beta-diketo group of ligand may be coordinated with the transition metal ion through oxygen atom. These evidences were supported by emergence of new bands at 416 - 462 cm⁻¹ in the spectra of metal complexes which may be due to the metal–oxygen vibration.

¹H NMR spectra

Itwas recorded on Brucker AC-300F (300 MHz) NMR spectrometer using CDCl₃and DMSO-d^6as solvent and tetramethylsilane as an internal standard.

¹H-NMR spectra of DNTPD show a singlet at δ= 14.90 ppm for enolic –OH group, singlet at δ=11.87 ppm for phenolic –OH group near to carbonyl group and singlet at δ=5.66 ppm for remaining –OH group near to NO₂ group. Multiplets in the region of 7.41 to 7.43 ppm correspond to the presence of aromatic hydrogen. The singlet signal at δ=8.37 ppm corresponds to –CH= group.

¹H NMR spectra of copper complex of DNTPD shows no peak around 14.90 ppm indicates absence of enolic –OH group which indicates deprotonation and coordination of oxygen with metal ion. The peak for –CH= protonwhich was present in the ligand exhibits a downfield shift from 8.37 ppm to 8.52 ppm which again indicates the coordination of metal with two carbonyl groups of ligand. The singlet at δ=11.72 ppm was assigned for –OH groups near to carbonyl group and singlet at δ=5.24 ppm for remaining –OH groups near to NO₂ group. Multiplets observed in the region of 7.56 to 7.77 ppm may be due to the presence of aromatic protons.

Mass spectral analysis

Mass spectras were recorded on 70-S Mass spectrometer using m-nitro benzyl alcohol matrix.Mass spectrum of DNTPD showed a molecular ion peak at 306.9 m/z and M⁺¹ peak at 307.9 m/z. It showed several other peaks at

137 m/z which is a base peak, 125 m/z, 120 m/z, and 113 m/z. The expected fragmentation pattern have been shown below
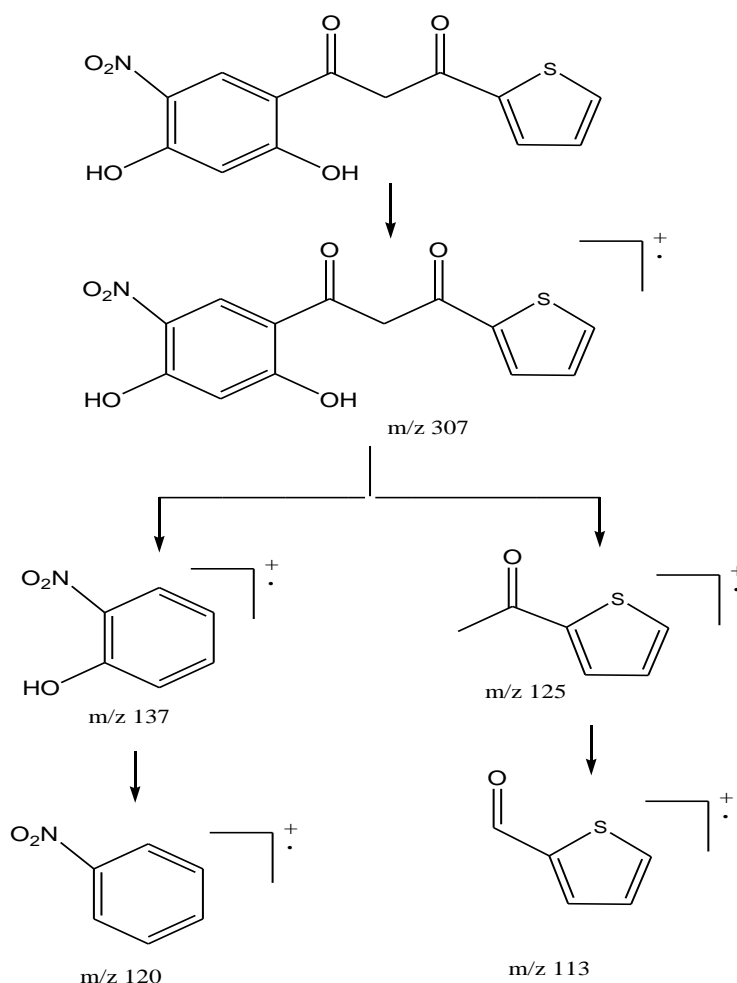
Figure 2: Expected Fragmentation Pattern of DNTPD

Magnetic and electronic spectral studies

Electronic spectra were scanned on UV-VIS-NIR Spectrophotometer Model Lambda 750 Perkin Elmer in the range of 200 – 1000 nm. Magnetic Susceptibility of the metal complexes were determined by Gouy's methodat room temperature on Sherwood Scientific Balance.

The magnetic susceptibility of the complexes were carried out at room temperature with (Hg[Co(NCS)$_4$]) as reference material. Molar susceptibilities were corrected for diamagnetism of the component atom using pascal's constant[22].

UV-Visible spectra were recorded on UV-VIS-NIR Spectrophotometer Model Lambda 750 Perkin Elmer in the range of 200 – 1000 nm. [Mn(DNTPD)$_2$.2H$_2$O] complex shows 2 bands at 31.35kK which can be due to charge transfer transition for octahedral geometry[23]. The [Co (DNTPD)$_2$.2H$_2$O] complex exhibited the bands at 19.76kK and 12.48kK, which may be due to^{4}T$_{1g}$(P) $\leftarrow$ ^{4}T$_{1g}$ and ^{4}A$_{2g}$ $\leftarrow$ ^{4}T$_{1g}$transition respectively, having octahedral geometry[24]. For [Ni(DNTPD)$_2$.2H$_2$O] complex, the bands observed at 16.39 kK and 25.19 kK which may be assigned to^{3}T$_{1g}$ $\leftarrow$ ^{3}A$_{2g}$ and ^{3}T$_{1g}$ (P) $\leftarrow$ ^{3}A$_{2g}$ transition respectively indicates octahedral geometry[25], while Cu(DNTPD)$_2$ complex exhibited two bands at 14.10 kK and 28.90kK which may be due to ^{2}E$_g$ $\leftarrow$ ^{2}B$_{1g}$ and charge transfer respectively for square planar geometry[26]. Since Zn(DNTPD)$_2$ complex is a d^{10} system and hence is dimagnetic in nature, however, on the basis of other spectral data, its most probable

geometry is suggested to be tetrahedral[27]. The magnetic moments (μ_{eff}) and electronic data of all the complexes have been reported in **Table 3**.

Table 3: Magnetic and electronic spectral data of Ligand and its metal complexes

	Effective Magnetic Moment (μ_{eff})	Absorbance (kK)	Assignments	Stereochemistry
Mn(DNTPD)$_2$. 2H$_2$O	5.35	31.35	Charge Transfer	Octahedral
Co(DNTPD)$_2$. 2H$_2$O	4.87	19.76 12.48	$^4T_{1g}$ (P) $\leftarrow$ $^4T_{1g}$ $^4A_{2g}$ $\leftarrow$ $^4T_{1g}$	Octahedral
Ni(DNTPD)$_2$. 2H$_2$O	3.37	16.39 25.19	$^3T_{1g}$ $\leftarrow$ $^3A_{2g}$ $^3T_{1g}$ (P) $\leftarrow$ $^3A_{2g}$	Octahedral
Cu(DNTPD)$_2$	1.56	14.10 28.90	^2E_g $\leftarrow$ $^2B_{1g}$ Charge Transfer	Square Planar
Zn(DNTPD)$_2$	diamagnetic	--	--	Tetrahedral

Thermogravimetric Analysis

Thermogravimetric analysis was performed on Perkin Elmer SII, Diamond TG/DTA Thermogravimetric analyzer, with a temperature range of 30-1100°Cat heating rate of 10^{0}C at atmospheric condition. Thermal data of complexes were shown in Table 4 and Thermograms are shown in Figure 3.1.

The TGA curves of all the complexes were almost similar and indicate a continuous weight loss till a stable metal oxide was formed. Weight loss of 5.03% - 5.13% between 150^{0}C - 180^{0}C has been observed for cobalt, Nickel and Manganese complex which indicate loss of two molecules of water of coordination.

Table 4: Thermal data of the complexes

Sr. No	Complex	Coordination water Obs(calc) (%)	Decomposition Temperature (^{0}C)	% Weight loss Obs(calc)
1.	Mn(DNTPD)$_2$. 2H$_2$O	5.06 (5.10)	515	89.55 (89.95)
2.	Co(DNTPD)$_2$. 2H$_2$O	5.13(5.07)	480	89.48(89.48)
3.	Ni(DNTPD)$_2$. 2H$_2$O	5.03(5.07)	532	89.29(89.47)
4.	Cu(DNTPD)$_2$	--	540	88.31(88.27)
5.	Zn(DNTPD)$_2$	--	435	87.86(88.03)
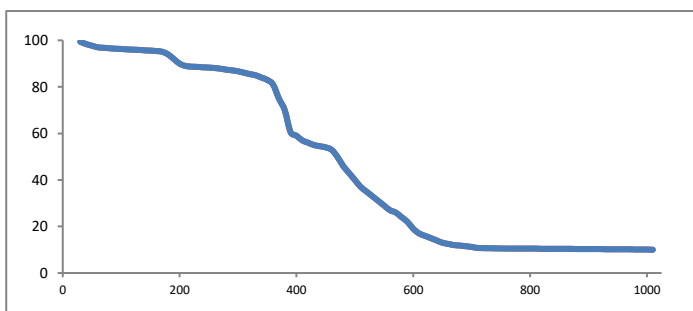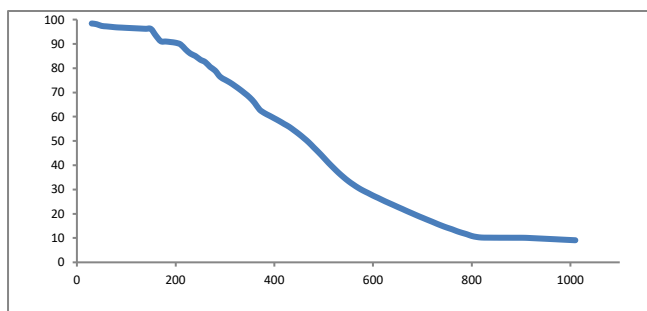
Thermogram for Mn(DNTPD)$_2$.2H$_2$OThermogram for Co(DNTPD)$_2$.2H$_2$O
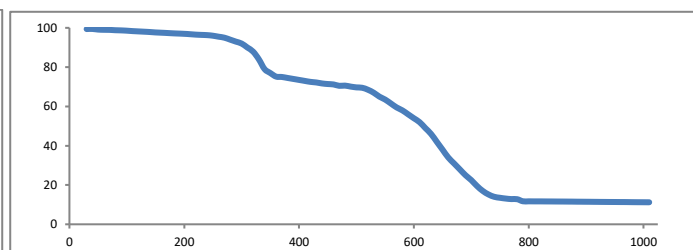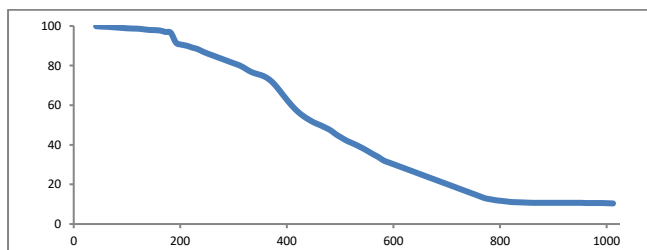
Thermogram for Ni(DNTPD)$_2$.2H$_2$OThermogram for Cu(DNTPD)$_2$
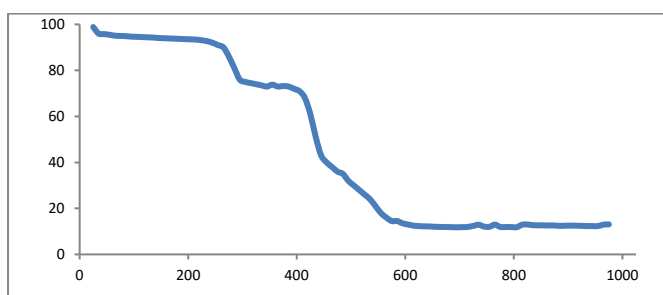
Thermogram for Zn(DNTPD)$_2$

Figure 3: Thermograms of the Metal complexes

Antibacterial screening

The antimicrobial activities of all the compounds have been carried by filter paper disc diffusion method. The synthesized compounds were screened against pathogenic bacteria such as *Staphylococcus aureus, Bacillus subtilis, Proteus vulgaris* (Gram-positive)*, Escherichia coli* and *Proteus aeruginosa* (Gram-negative)using filter paper disc diffusion method (Peach and Traey, 1950). Antibiotic drugs Ampicillin, Gentamicin and Erythromycin were used as reference. Selected pathogenic bacteria were maintained on nutrient agar medium for 36 hrs. Bacterial culture were inoculated into nutrient broth and incubated at $37 \pm 2^{\circ}C$ on a rotary shaker at 100 rpm. After 36 hrs incubation, the bacterial suspensions were used for further tests.

Antibacterial activity was then carried out using 100μg/mL of synthesized compounds. Filter paper disc soaked in solvent (chloroform) was used as negative controls while the discs soaked in standard broad-spectrum antibiotic solution (Ampicillin, Gentamicin and Erythromycin) were used as positive control. The results of tested compounds against these bacteria have been shown in **Table 5** given below. The Screening result indicates that the compounds showed moderate to excellent antibacterial activities.

Table 5: Antibacterial activity of compounds

| Source | Minimum Inhibitory Concentration (MIC) µgmL-1 Diameter of Inhibition Zone (in mm) | | | | |
| | Gram-negative | | | Gram-positive | |
	E. coli	*P. aeruginosa*	*P. vulgaris*	*B. subtilis*	*S. aureus*
DNTPD	16	11	06	21	09
Mn(II)(DNTPD)$_2$.2H$_2$O	09	06	--	--	17
Co(II)(DNTPD)$_2$.2H$_2$O	29	--	07	--	14
Ni(II)(DNTPD)$_2$.2H$_2$O	--	14	--	--	20
Cu(II)(DNTPD)$_2$	34	09	23	15	14
Zn(II)(DNTPD)$_2$	19	--	--	06	--
Ampicillin	8	--	--	11	25
Gentamicin	28	22	10	16	10
Erythromycin	31	19	08	21	07

IV. CONCLUSION

In the present work 1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl)propane-1,3-dioneand its transition metal complexes have been synthesized and characterized on the basis of various instrumental techniques such as IR, NMR and mass spectra.β-diketone compound acts as bidentate ligand and co-ordinate with the transition metal atom through β-diketo group. Co(II), Ni(II) and Mn(II) contains two coordinated water however in Cu(II) and Zn(II), water of coordination is absent.

On the basis of electronic and magnetic moment it is concluded that Manganese(II), Cobalt(II) and Nickel(II) complexes possess Octahedral, Copper(II) possess Square Planar as well as Zinc(II) possess Tetrahedral geometry.The Cobalt(II), Nickel(II), Manganese(II) and Copper(II) complexes were paramagnetic while Zinc(II) was diamagnetic in nature.

These synthesized compounds were screened for antibacterial activity and found to be good antibacterial agents.
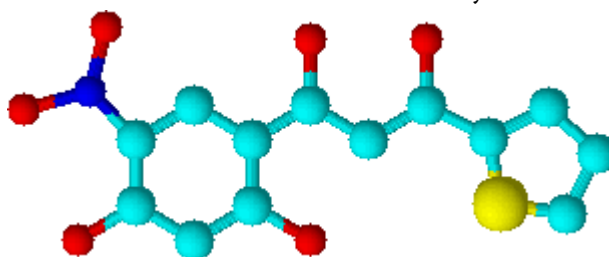
Figure 4: 3 Dimensional Structure of 1-(2,4-dihydroxy-5-nitrophenyl)-3-(thiophen-2-yl)propane-1,3-dione

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Investigation of Gamma Irradiation Effects on Conducting Polymer Based Composite

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ABSTRACT

In the present study, novel electrically conducting material polyaniline (PANI) and its composite with metal oxide (MgO) was synthesized by chemical oxidation method using ammonium persulfate as oxidizing agent. Various samples of PANI/MgO composites were prepared by varying the amount of MgO (5, 10, 15 wt% of aniline monomer). The irradiation effect on the prepared PANI based composite was investigated by means of DC electrical conductivity study. The irradiation process was carried out in air in a conventional gamma ray chamber, which uses 60C0 source, and the composite was exposed to gamma radiation dose of 40kGy under varying experimental conditions. The duration of irradiation of the samples by gamma rays were gradually increased from 0 - 8 mins. The experimental results showed that the DC electrical conductivity of the samples was significantly influenced by gamma irradiation.

Keywords: PANI/MgO, XRD, DC conductivity, gamma irradiation

I. INTRODUCTION

In recent years, Conducting polymers have emerged as a very important class of materials because of their unique electrical, optical, and chemical properties leading to the wide range of technological applications. This class of materials provide tremendous scope for tuning of their electrical conductivity from semiconducting to metallic regime by way of doping[1,2]. These characteristics have led to a large number of potential applications such as rechargeable batteries, semiconductor photo-anode production, in light-emitting, etc. In order to modify the transport, optical and mechanical properties of materials for certain applications, dopants are added into the host materials. Composite materials derived from conducting polymers such as polypyrrole (PPy) and polyaniline (PAni), associated with layered inorganic solids, is a line of investigation of increasing interest, not only for producing improved structural materials, but also for the preparation of new functional materials [3]. Gamma irradiation of polymers causes structural and chemical variations, which leads to variation in physical properties of the material. The effects of gamma irradiation on polymers have been first discussed by Charles and Chapiro. The previous authors used interferometric and other tools to study the effects of gamma irradiation on polymers [4].

In the present study, PANI/MgO composite was synthesized by the chemical oxidation polymerization of aniline in the presence of MgO in aqueous medium containing an oxidant. The effect of radiation on PANI/MgO composite was investigated by means of temperature dependent electrical conductivity in the temperature range of 303 - 373 K, with an intention to know the transport behaviour of the composites

II. METHODS AND MATERIAL

Chemicals used were Aniline hydrochloride, Ammonium persulphate and double distilled water for synthesis of PANI. While Magnesium Nitrate Hexahydrate [Mg $(NO_3)_2(H_2O)6$] and Sodium Hydroxide (NaOH) powder for synthesis of MgO powder. All chemicals used were of AR grade of high purity (LOBA Chemicals) in this work. The distilled water and Ethanol (AR grade 99.9% purity) was used as a solvent and washing reagent in the chemical reaction respectively.

A. Preparation of polyaniline (PANI)

Aniline hydrochloride (purum, 2.59 g, 20 mmol) was dissolved in distilled water in a volumetric flask to 50 ml of solution. Ammonium peroxydisulfate (purum, 5.71 g, 25 mmol) was dissolved in water to make 50 ml solution. Thus using above solutions 0.2 M aniline hydrochloride is oxidised with 0.25 M ammonium peroxydisulfate in aqueous medium. Both solution were kept for 1 hr at room temperature, then mixed in a beaker, briefly stirred, and left to rest in order to polymerize. Next day the PANI precipitate was collected on a filter, washed with 100 ml portions of 0.2 M HCl and similarly with acetone and then dried in air

B. Preparation of MgO powder

Initially the Magnesium Nitrate Hexahydrade (purum, 5.21 g, 0.2 M) was dissolved in 200 ml of distilled water. Then (0.8 g, 0.25 M) of NaOH was dissolved in 200ml distilled water. The prepared NaOH solution was added in the solution of [Mg $(NO_3)_2(H_2O)6$] drop-wise, the obtained solution was briefly stirred for 2 hr, and left to rest. The precipitate obtained was filtered and washed several times by using distilled water and Ethanol so as to get the final products. The final product was kept in vacuum oven at 80 °C for 4 hr for drying. This dried powder was then crushed using mortal pestle and calcinated at 400 ^{0} C for 3 hr. The obtained powder has particle size in nano range.

PANI and PANI/MgO samples both were synthesized by chemical oxidation method. Same procedure as that of PANI, was used to synthesize the composite samples with an additional step of adding the MgO into the prepared aniline hydrochloride solution by varying the amount of MgO (5, 10, 15 wt% of aniline monomer). Obtained samples were named as PM1, PM2 and PM3 respectively.

C. Irradiation of PANI/MgO composite

The obtained powders were converted into pellets of 20 mm in diameter and approximately 2 mm thickness by using hydraulic press. The PANI/MgO composite was exposed to gamma radiation from a $^{60}C_0$ source at room temperature in the presence of air.

III. RESULTS AND DISCUSSION

A. DC conductivity analysis

V-I method is used to measure the dc conductivity of the samples. The resistance of the samples is measured at different temperatures from 303-373K by Ohms law method. Initially the conductivity of virgin samples is

calculated. Thereafter 15% MgO sample is exposed to gamma radiation for 2, 4, 6, 8 and 10 mins. The 15% MgO sample has maximum conductivity as compared to others.
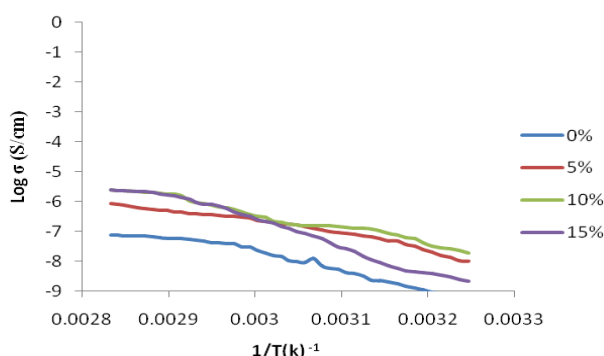
Fig 1: Variation of log σ versus 1/T

From Fig(1) it is observed that conductivity increases with increase in temperature due to increase in mobility of electrons. The curve is linear and its slope gives the value of activation energy. The experimental study revealed that the electrical conductivity of the samples increases with increase in temperature and the graph follows the Arrhenius relation.

$$\sigma = \sigma_0 \exp(-W/KT)$$

Where σ_0 (ohm-cm)$^{-1}$ is the pre-exponential factor, W(eV) is the activation energy, T(K) is the temperature and K is the Boltzmann constant respectively. From the slope of straight line the activation energy was calculated and plotted as shown in Fig (2).
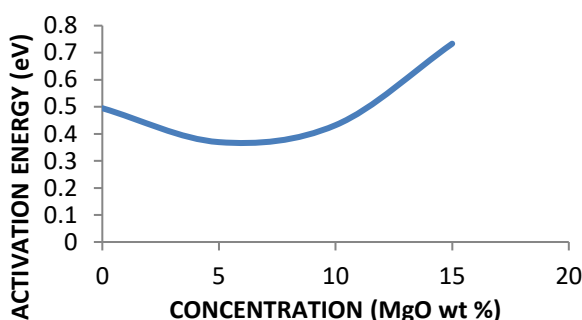
Fig(2): Variation of activation energy versus concentration

The obtained values of Activation Energy for PANI/MgO samples shows that the activation energy increases with increasing concentration of MgO and is maximum for 15% MgO. In such type of materials hopping of charge carriers through polymeric chains is responsible for the conductivity of sample.

The selected 15% MgO sample was selected and irradiating with gamma source for 4, 6, 8, and 10 min and the obtained results are shown in Fig(3) below,
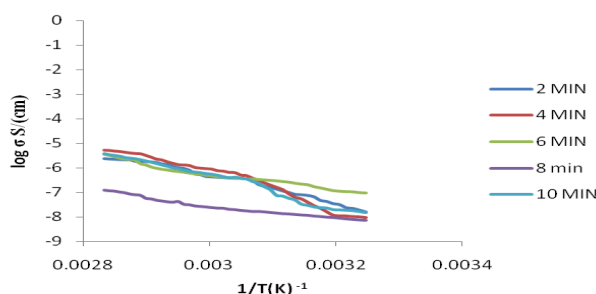
Fig(3): Variation of log σ versus 1/ T

From Fig(3) it is observe that the sample after irradiation for 6 min. shows the higher conductivity while the sample irradiated for 8 and 10 min. showed lower conductivity. The obtained values of activation energy for PM2 sample using different irradiation time is shown Fig(4) below,
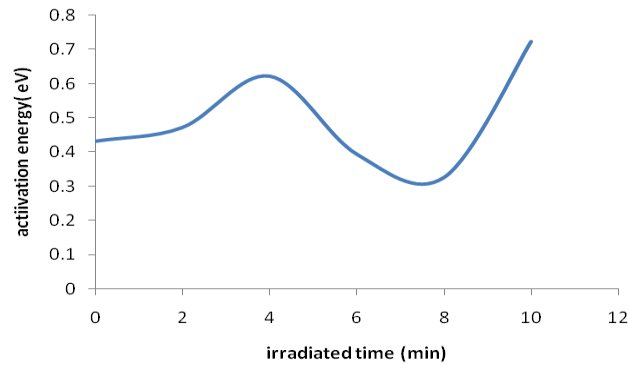
Fig(4):Variation of activation energy versus irradiated time

IV. CONCLUSION

The gamma radiation increases the conductivity of the polymer-composites due to either increase in the charge density of carriers or the mobility of charge carriers. The possibility of increase in the mobility of charge carriers is more. Actually in polyaniline MgO composite the hopping of polarons along the chain and charge transfer mechanism are responsible for conductivity. The gamma radiation dose increases the defect level in the composite which cause to increase the conductivity with higher dose of irradiation the polarons get trapped inside the defects and traps which could require more energy to release from it. Hence the conductivity gets reduced after higher dose.

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Growing Tasks of Academic Libraries and E- Resources

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ABSTRACT

The need for e-information services to theUsers are also growing and becoming very essential. The collision of web based e-leaming and teaching environment has influenced every aspect of library and information services in academic libraries and providing new opportunities and challenges to the library authority for participation in the knowledge based society along with electronic and multimedia publishing, Internet based-information services, global networking, web situated digital resources etc.

Librarians are accused with selecting and organizing resources and instructing patrons on how to detect and use these, and preserving information regardless of format or technology. The information revolution and the knowledge that is available on the Web have built new challenges to these traditional authority ethics. The appear challenges of acquiring and providing access to electronic knowledge resources require librarians to modify their tasks from traditional librarian to information scientist by learning and applying new skills to understand the evolving technologies to manage and provide quality on-line information service to the knowledge society. So the picture of the future academic library authority must be to create a World Class Networked Global Library and Information Centre to provide timely web based excellence information service to the user in duration in the e-leaming environment. The future need for changes in academic libraries, trends and challenges before the library authority in the e-leaming environment and the various growing tasks of the academic library authority also have been discussed in this study.

Keywords: Information Technology, Academic Library Authority, Web Technology, Technology Challenges, E-Resources, E-Leaming Environment.

I. INTRODUCTION

The information atmosphere around the world is growing every minute and growing at a tremendous speed due to the emergence of the web based Information and Communication Technologies (ICT), globalization of networks and Internet. Therefore ensuring and organizing approach to educational materials in the electronic environment is an important factor in determining realistic requests for development and advancement of education. The information revolution and the universal thinking that everything is available on the Web have created new challenges to the traditional library authority ethics. Acquiring and providing access to electronic knowledge resources require library authority to change their tasks from traditional librarian to information scientist by learning and applying new skills to understand the evolving technologies to manage and provide

quality on-line information service to the patrons of the knowledge society. Whereas, almost all the educational institutions, organizations, universities and academic associations have created their hold websites with the digital repositories upon Internet; the global networked environment has paved the way and opportunity to e-literacy. The collision of web based e-learning and teaching environment has affected very much on every facets of library and information services in Academic Libraries and providing current opportunities and Challenges to the library authority.

II. OBJECTIVES

The objectives of this study are given below
* The primary objective of this study is to analyze and explore the growing and the tasks of future academic library authority are accordingly to meet the changes and challenges in the e-learning environment.
* To document the various changes and challenges evolved before the academic library authority in the e-leaning environment.
* To define and explain **the** concept of e-literacy and digital learning environment in academic institutions which changes the role of library authority to the real situation.
* To discuss about the various skills needed for the library authority to meet the present
* Online and digital needs of the user.

The Future Academic Library Authority
Technology will continue to change, and libraries and librarians have to use the growing technology to provide the best access and service to their patrons. Electronic information establish challenges for the library community at its highly foundation, moving it away from the traditional paper-and-print format to an ethereal world of circuits and connectivity. The library is no more defined just as a building or a physical repository that houses information. So the essential future vision of the academic library authority to achieve the necessary information transformation and to face the digital information needs of the user should concentrate on the following:
* The future academic library authority must be to create a World Class Networked Global Library and Information Centre to provide web based quality information service to the User in time in the e-leaning environment.
* The librarians must change the library environment as pathways to high quality
* Information in a variety of electronic media and information sources.
* Library authority must assert their evolving tasks in more pro-active ways, both in the -context of their academic institutions and in the context of increasing competitive markets for information dissemination and retrieval.
* The 21st Century librarians must offer electronic teaching and learning both to guide and beckon the library profession as education leaders. They should shape the library programmer and serve as a tool for library media specialists to use to shape the learning of students in the academic institutions.

E-Learning Environments in Academic Institutions and the Digital Future of the Academic Libraries
E-learning could be suggests that of changing into literate, involving new mechanisms for communication, such as: computer networks, multimedia, content portals, search engines, electronic libraries, distance learning and web-enabled class rooms. Various web based applications such as email, real-time conference; Web Cam, etc. are used as important kits in the process of e-leaning.

Technological innovations have brought tremendous changes in the whole education process and have led to a paradigm shift from teacher based education **to a** learner based education system. Developments in the electronic networking border have changed the whole dimension of the education system. This has brought a shift from the 'just in cast education' to just in time education' system. Internet, different cost-effective solution of reaching out to the learners at a distance, is gaining ground throughout the world. It is playing as a catalyst for change in the education process. It has taken education after the classroom and lecture hall into a new era of networked and collaborative leaming.

Since the objective of e-leaning environment in education is to enhance students' learning opportunities by enabling them to partake in global, team established educational projects, during which they directly expertise completely different cultural contexts and access a spread of digital info sources via a variety of acceptable information and communication technology, the longer term educational library authority should change their task by developing new standards and skills accordingly to meet the future digital information needs of the users.

Today approximately all the academic institutions, universities and college libraries have been automated by library software and have become connected with Internet, intranet and extranet resources and through which they are supplying access to relevant e-journals and e-books by proxy-server based networks. So the time to come of the academic library services may be changed accordingly to fulfill the demand of the patrons in the e-leaning environment.

Libraries have a great potential as the third place, after home and work with learning, inspiration and entertainment. Hence it is highly vital to change the environment, structure and interiors of the academic libraries according to the digital information needs of the user and the future library should not have collection storage as its chief function. E-leaning opportunities must be enabled by the library authorities to the user in global level to access a variety of digital information sources via a range of appropriate World Wide Web technology.

E-Leaning is a catch-all term that covers a wide range of instructional material that can be delivered on a CD-ROM or DVD, over a local area network (LAN), or on the Internet. It includes Computer-Based Training (CRT), Web-Based Training (WBT), and Electronic Performance Support Systems (EPSS), distance or online learning and online tutorials. The major advantage to students is its easy access 14. So, providing access to online e-journals and e-books through networks will enhance the self-learning knowledge of the user.

Trends and Challenges before the Future Academic Library Authority in the E-Learning Environment

The first and foremost challenge before the library authority's to face the future academic needs of the user in the e-leaning environment is to provide electronic access to all relevant information and integrate it on networks beyond the world. The second challenge is to create a new physic& l library premises with computer network facilities, abandoning the old concept of library as a storehouse, and, the third challenge future library authority's is to develop new standards and skills for the library profession to meet the user needs in a proactive way. In this e-learning and e-publishing environment, electronic reference services and additional support services with different expertise and digital repositories are becoming a must.

The most pressing and pervasive issues and challenges that the library and information science. Authorities face in the present digital era for providing digital information service to the knowledge society is:

· New generation of learners
· Copyright
· Privacy/Confidentiality

- Online/Virtual crimes and Security
- Technology challenges
- Manpower
- Collection of digital e-resources
- Organizational Structure
- Preservation / archiving of digital e-resources
- Lack of clarity in vision

Impact of Web-based e-Learning Systems

The advent of web-based e-learning systems through Internet facility has great impact on every facet of library exercise and information services. Library and information authority of the future academic libraries look the following paradigm shifts due to the speedy developments in the ICT and WWW technologies:

- Transition from procuring and managing print media to electronic media Changes from passive user to active user in the e-literacy environment.
- Concept of web-based networked environment.
- Disseminating information on demand to proactive digital information services.
- Providing information service to facilitating access to e-information service.
- Transition of developing the normal collection to e-resources (e-books and e-journals)
- Individual works to team works.

Growing Tasks of Future Academic Library Authority

The growing task of library authority implies a set of updated skills needed for facing the challenges created by the latest web technologies in the e-learning environment. The emphasis will shift from technical skills in the library to communication, facilitation, training and management skills. Although technology presents the librarian with ethical challenges, the librarian is to be ready for the task of information authority in the connected networked world and they have to acquire kills that can be contributed to success in their new tasks.

Leadership Task

One primary task of librarians is to provide leadership and expertise in the design, development, and ethical management of knowledge-based information systems in order to meet the information needs and obligations of the patron or academic institution. In the future, as now, we can expect the virtual library to be the organization that identifies, selects, negotiates for, and provides access to an incredible range of information resources on our behalf. At present, lot of virtual libraries have been created and managed by various institutions and organizations for e-leaning and teaching authority. Hence library authority should enrich their management skills to play leadership task in the digital future, for organizing, managing and disseminating e-literacy to users.

Proactive Information Authority Task

The modem trend is for the task of the librarian to move from that of a passive intermediary task responsible for guiding patrons to appropriate information resources, towards that of a much more proactive authority task which includes analyzing and repackaging information, content information management systems and institute digital repository management systems.

Task of Librarians as Masters of Web

To face the challenges of the virtual learning environment in educational institutions, librarians are becoming masters of the Web. Librarians create powerful web sites such as the National Library of Medicine's Pub Med database. They create their own website as an easier way to share with others what they know. They gather

electronic information and create electronic pathfinders and front-end search tools to help users for accessing the required information. Academic Library authorities create online tutorials and instructional web pages to help patrons for performing the best searches. They provide links to websites on specific topics and lead patrons to these evaluated sites as a starting point for retrieving related and relevant information.

Task of Information Scientists in Digital Libraries and E-Literacy

Librarians have to change their task in the e-leaning environment by participating in e-leaning experiments and becoming involved in universities' e-leaning centers. They should induct in procuring e-leaning tools and software and should develop their e-learning and ICT skills. Hans Roes focused changes in education in general, and then focused on strategic opportunities in education for libraries. 22th opportunities for libraries, he mentioned, included:

- Developing digital libraries as natural complements to digit learning environments to support Educators with respect to the selection of adequate resources for a given ^course.
- Managing and indexing digital student portfolios and integrating them with other information resources offered by the library.
- Teaching information literacy to educate future knowledge workers, in traditional ways or via Internet-based instruction modules.
- Collaborating as part of multidisciplinary teams of experts to design courses.
- Providing a learning center to serve as a physical learning, environment suitable for more active learning styles.

Task of Digital Space Manager of Academic Institutions

The librarian has an important task in making digital space accessible to members of an academic community on campus and beyond in addition to providing physical space for assembling communities of interest. A number of faculty members have data sets that they may wish to post for review and comment by colleagues on or off campus. Some academic and research libraries have expanded the concept of providing access to scholarly work by becoming electronic publishers of faculty projects and by providing institutional repositories, where faculty can store their scholarly work under the stewardship of the library. Librarians also can participate in the institution's e-portfolio program, in particular, by providing advice and expertise on information policy issues and preservation strategies.

Task of E-Resource Managers

Academic and research libraries have a major task in ensuring that they and their home institutions remain vital players in the growing terrain of information and education. Faculty may not aware of copyright issues and do not know what material is electronically available or licensed by the library. Virtual learning systems can be connected to library systems, through the integration of library systems at the back end via the technology components, and through the close liaison and involvement of library staff in VLE development, i.e. the human component. Mac Coll says that: "VLEs are growing the way learning and teaching is delivered and will soon be ubiquitous. Libraries must assert their traditional task as resource managers in this new environment of web-based courses".

III. CONCLUSION

The outstanding growth of internet has created vital revolution altogether the areas of science   and technology, instead of using it as a tool for looking out and retrieving data, internet has become the king

of all media, by that we are able to access virtual data and may build a virtual library to supply timely, quality service to the users. Librarians of this digital era are within the position to vary their task as whimsical data scientists/gatekeepers and to satisfy the challenges of the internet. World Wide internet, and on-line access within the information society, so that they should enrich their information with special skills of the newest IT developments, to browse, access and retrieve a specific data across the world networks and to arrange and manage {the data the information the data} by building digital libraries and by that they will offer Quality e information service to the knowledge society. Library workers should be capable of operating effectively in partnership with school members to boost the strength of teaching and analysis. To make certain, there are several workers members of this sort in educational libraries these days. during this as in different respects, a part of the talents, library workers should develop is that the ability to coach school members, serving to them to grasp the facility and relevance of e-resources.

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Higher Education and Role of Libraries in India

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ABSTRACT

Education is a form of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training, or research. Education is commonly divided into stages such as preschool, primary school, secondary school and then college, university or apprenticeship. Education can take place in formal or informal educational settings.

I. INTRODUCTION

Higher Education in India- History & Present

After independence, the government of India was much busy in grappling with issues and problems of post-partition of the country. However, the government was very clear on the issue that till the human resources was developed and groomed in a manner to bring about socio-economic development it would not be possible for the country to be self-reliant. Then national leaders were well aware of the need of revamping the whole education system. Therefore, the first education commission was established under the chairmanship of the renowned educationalist Radhakrishnan in 1948-49, thereafter Kothari Commission (1964-66) and then the New Education Policy was declared in 1986. The government then decided to view the growth of higher education in the country through five years plans. India has one of the largest higher education systems in the world.

II. TYPES OF LIBRARY

(a) Academic Library
(b) Public Library
(c) Special Library

Role of UGC in development of Higher Education and Library System

The University Grants Commission (UGC) was established by an act of Parliament in 1956. It is an autonomous advisory organization for the promotion and co-ordination of
university education and for the maintenance of standards. The UGC directs higher education in India. It has played an important role in the improvement of university and college libraries.

Importance of Library Consortia in present age Higher Education

Due to the crunching financial assistance to the academic libraries especially university libraries and increase in the cost of the information sources, it has been very difficult for the libraries to procure all the information sources needed by their users. Solution to this financial crunch is library consortia especially in relation to electronic resources. Many initiatives have been initiated in India for the formation of library consortia. Many library consortia in India are doing well and many libraries are benefited but at the same time library consortia are not free from problems. Various issues related to consortia like uninterrupted online access, perpetual access to back issues, pricing, licensing, copyright and archival solutions etc are pinpointed and need to be strategically tackled and well addressed to get the best out of the consortia. A consortium is a group of organizations who come together with a combined objective that requires cooperation and resource sharing. A library consortium can be local, regional, state, national or international.

Libraries need consortia because of - Information explosion

- Diversity of user needs
- Financial crunch
- Impossibility of self-sufficiency

Important advantages of library consortia are:

- Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost.
- Optimum use of funds
- Facilities to create digital libraries
- Services like CAS and SDI
- Cost sharing for technical and training support
- Electronic journals demand neither library space nor shelving nor can they be stolen **Standards for Libraries in Higher Education by Association of College & Research Libraries (ACRL)**

Principles and performance indicators-

The standards consist of principles and performance indicators.

III. PRINCIPLES

Institutional effectiveness: Libraries define, develop, and measure outcomes that contribute to institutional effectiveness and apply findings for purposes of continuous improvement.

Professional values: Libraries advance professional values of intellectual freedom, intellectual property rights and values, user privacy and confidentiality, collaboration, and user-centered service.

Educational role: Libraries partner in the educational mission of the institution to develop and support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning.

Discovery: Libraries enable users to discover information in alt formats through effective use of technology and organization of knowledge.

Collections: Libraries provide access to collections sufficient in quality, depth, diversity, format, and currency to support the research and teaching missions of the institution.

Space: Libraries are the intellectual commons, where users interact with ideas in both physical and virtual environments to expand learning and facilitate the creation of new knowledge.

Management/administration: Libraries engage in continuous planning and assessment to inform resource allocation and to meet their mission effectively and efficiently.

Personnel: Libraries provide sufficient number and quality of personnel to ensure excellence and to function successfully in an environment of continuous change.

External relations: Libraries engage the campus and broader community through multiple strategies in order to advocate, educate, and promote their value.

IV. PERFORMANCE INDICATORS FOR EACH PRINCIPLE

1. **Institutional Effectiveness:** Libraries define, develop, and measure outcomes that contribute to institutional effectiveness and apply findings for purposes of continuous improvement.
2. **Professional Values:** Libraries advance professional values of intellectual freedom, intellectual property rights and values, user privacy and confidentiality, collaboration, and user-centered service.
3. **Educational Role:** Libraries partner in the educational mission of the institution to develop and support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning.
4. **Discovery:** Libraries enable users to discover information in all formats through effective use of technology and organization of knowledge.
5. **Collections:** Libraries provide access to collections sufficient in quality, depth, diversity, format, and currency to support the research and teaching mission of the institution.
6. **Space:** Libraries are the intellectual commons where users interact with ideas in both physical and virtual environments to expand learning and facilitate the creation of new knowledge.
7. **Management/administration:** Libraries engage in continuous planning and assessment to inform resource allocation and to meet their mission effectively and efficiently.
8. **Personnel:** Libraries provide sufficient number and quality of personnel to ensure excellence and to function successfully in an environment of continuous change.
9. **External Relations:** Libraries engage the campus and broader community through multiple strategies in order to advocate, educate, and promote their value.

V. CONCLUSION

Higher education in India has witnessed some creditable achievements in the post-independence era, but at the same time has resulted in bigger problems and issues in the field. Though there is manifold increase in the number of institutions of higher education, the accessibility to higher education in the country has not achieved the desired standards. Library services improve knowledge and skills for positive productivity as a tool for national development. Different types of libraries play a significant role on different styles in educating the citizenry of a nation. The utility of a library in education can at once be felt and generalized particularly when we look into the educational conditions of the poor.

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ICT is A Boon for Library

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ABSTRACT

This paper present's the effects of ICT on Libraries. The purpose of this paper is to find the use and implementation of ICT in college library. Computer and communication technology have brought revolutionary changes in the field of library management.

I. INTRODUCTION

A library is a social institution and it will keep growing like an organism that's way we say Library is a growing organism. A library will grow in terms of documents, readers, and staff. The ancient methods of maintaining it are no longer dynamic and efficient. For expeditious retrieval and dissemination of information and better service for the clientele, application **of** modem techniques has become absolutely indispensable.

The library plays a vital role in every educational institution and it also influences the people of a society to upgrade their knowledge and utilize that knowledge in day-to-day their life. At the same time the growth and development of ICT as well as use of computer is come up as blessings in the field of library and information science; housekeeping activities which reduces the work load and save the time of library professionals and make library services smooth and effective. In this ICT era we can see that the whole library concept has been changed in terms of collection development, organization and its services to the user. Apart from that the users are always in a hurry to get relevant information in their hand at a minimum time. For that reason the concept of library automation has brought up.

What is Information Communication Technology?

The term "ICT" describes the use of computer-based technology and the Internet to make information and communication services available to a wide range of users. The term is used broadly to address a range of technologies, including telephones, computer and emerging technology like internet which provide the mechanism for transforming data in a number of formats including text, images, sound and video.

Information and communications technology (ICT), is often used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary software middleware, storage, and audio-visual systems, which enable users to access, Store, transmit, and manipulate information. The term ICT is now also used to refer to the convergence of audio-visual and telephone networks

with computer networks through a single cabling or link system. There is not a universally accepted definition of ICT, because the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis. It is difficult to keep up with the changes - they happen so fast.

A good way to think about ICT is to consider all the uses of digital technology that already exist to help individuals, businesses and organizations to use information. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form.

So, ICT is concerned with the storage, retrieval, manipulation, transmission or receipt of digital data. Importantly, it is also concerned with the way these different uses can work with each other.

II. OBJECTIVES OF ICT

- To develop ICT capability in finding, selecting and using information.
- To use ICT for effective and appropriate communication.
- To monitor and control events both real and imaginary
- To use their **ICT** skills to develop their language and communication skills.
- To provide easier access information.
- To assist people to develop their ICT skill for accessing information.
- To give access to digital learning materials, which are set to increase in both quality and quantity?

III. IMPACT OF ICT ON LIBRARIES

Information communication technology has the power to change the society. Today's interrelated world, information and communication technology (ICT) is extensively used by our country and it affects our lives every day. In the current digital age everyday new technology comes as ICT. These new technologies have been accessible by people in their everyday life and increase their living standards. Now days, many ICT gadgets are used in our life and they facilitate with mobility thus used anywhere and anytime. These gadgets operate for Information, Speed, and Communication and reduce the physical and mental human work load. By that principles, modern day gadgets truly helped mankind in daily life. ICT has contributed a lot to change our everyday life such as letter to e-mail, market shopping to on-line shopping, classroom learning to e-learning, etc,

Libraries which were considered only as the storehouse of knowledge have got a new outlook in the modem Information Communication Technology era. The activities which were carried out manually in libraries with so much of pain and strain are being carried out smoothly with the help of ICT with greater effectiveness. Library organization, administration and other technical processing have become easier and more quantum of work can be done in relaxed mood.

The first and foremost ICT component, which can be adopted in the libraries, is the computer for library automation. Following impact of ICT on libraries work and services are bellow.

1) **Software:** for library automation there are so many library software available in the market. The software is compliant to international standards for bibliographic formats, networking and circulation protocols. The software is suitable not only for the academic libraries, but also for all types and sizes of libraries, even school libraries. We can do all housekeeping work of library through Library management software like Acquisition, Cataloguing, Circulation, Serial Control, OPAC, and all Administration work.

2) **OPAC:** OPAC stands for Online Public Access Catalogue. OPAC have enhanced usability over traditional card formats. The online catalogues does not need to be sorted statically; the user can choose author, title, keywords and they find the various books list on the computer. New days WEB-OPAC is come, now user can search on mobile are computer in the house also.

3) **E-Books and E-Journals:** Library is facing the problem of increasing prices of the Books and Journals but now ICT make it easy by using a E-books and E-Jounals by paying a some money library can store all E-books & E-jounals in the library. Some books and journals are free available on internet.

4) **Online information Service:** Online services promote the library materials to the user through online services. The various services include newspaper clippings. Abstracting services, Current awareness services, translation services, referral services, computerized services.

5) **Internet** Access: Libraries provide free or controlled access to the user depending upon the availability user can be given time slots for use of internet facility. Usually internet enabled terminals are provided in the library that can be used for internet access and email etc.

6) **Digital Library & Archives:** libraries are developing digital repositories of such recourses & providing internet access to the user. The main benefit of digital library is the ability to provide 24 hours remote access to high-demand materials for multiple concurrent users.

7) **Audio- Visual services:** Audio-visual materials play a vital role to access the information and by this tool user can understand easily what they see and heard from Audio-visual Aids.

8) **E-query Services:** E-query service is web-enable contemporary reference services offered to the registered member of the library and handle their query by E-mail by '^ · library staff. Library staff gives feedback of their queries within three working days.

9) **E-reference Service:** Conventional means of reference service are replaced by E-Mail and FAQs (Frequently Ask Question).

10) **Photocopying:** The technology of reprography made a big impact on the document delivery system. Most of the library has provided Xerox Machine for photocopy of any document on demand.

IV. CONCLUSION

The use of ICT in libraries is a essential part of the Library. ICT enlarges the scope of the libraries. It raised speed, reduces cost and over comes space, time, language and media barriers. ICT has brought many new avenues for librarianship to increase their own capabilities in organizing and retrieving information in the 21st century.

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Identification of Toxic Metals and TLC Separation by Using Aq. Humic Acid

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ABSTRACT

Thin layer chromatographic method is used for the separation and identification of metal ions. The separations were performed on thin layer of silica gel-G using aqueous humic acid as mobile phase. The chromatographic behavior of metal ions in surfactant mixed solvents was generally studied by using the thin layer of Silica Gel-G. Effect of concentrations, effect of pH. Effect of adsorbent effect on the Rf value of different metal cations were studied by using Aq. Humic acid as a mobile phase.

Key words: separation, TLC, aqueous, pH, adsorbent, metal ions

I. INTRODUCTION

The distribution of metals in the environment is governed by the properties of the metal and influences of environmental factors[1]. In generic term Heavy metals for metallic elements having an atomic weight higher than 40.04. The entry of Heavy metals in environment by natural and anthropogenic means. Like mining natural weathering of the earth's crust soil erosion, urban runoff, industrial wastage. Thin layer chromatography is a versatile technique for the identification and separation of organic and in-organic compounds [3,4]. The main factor which influences TLC separations is the coordination properties of solvent. Heavy metals have received considerable attention from analysts, because of their physical and environmental importance [5, 6]. Some of the metals like, T, As, Cr, Hg Tl, Cd, Ni, Zn, Pb, Cu, Fe, Mn, Co are harmful and toxic to human health. These metal ions can form complexes with bio-ligands containing Oxygen, Nitrogen and Sulphur atoms [7], which causes many problems by their redox processes in living organisms.

There are different analytical techniques of detection and separation of chromium including graphite furnace atomic-absorption spectroscopy 1891 atomic emission spectroscopy [10], normal phase and reverse phase thin layer chromatography [11,13] ion exchange chromatography (14,15] precipitation floatation [16].

This paper deals with the rapid separation of heavy metal ions present in three, as well as four component mixtures on non-impregnated silica gel G coated plates, using aqueous solution of Humic acid as a mobile phase. Humic acid is a principal component of humic substances, which are the major organic constituents of soil (humus), peat, coal, many upland streams, dystrophic lakes, and ocean water 1171 Generally biodegradation of dead organic matter produces humic acid. It is not a single acid but it is a complex mixture of many different

acids which containing phenolate and carboxyl groups so that the mixture behaves functionally as a dibasic acid or, sometimes as a tribasic acid The structure of Humic acid is as follows.
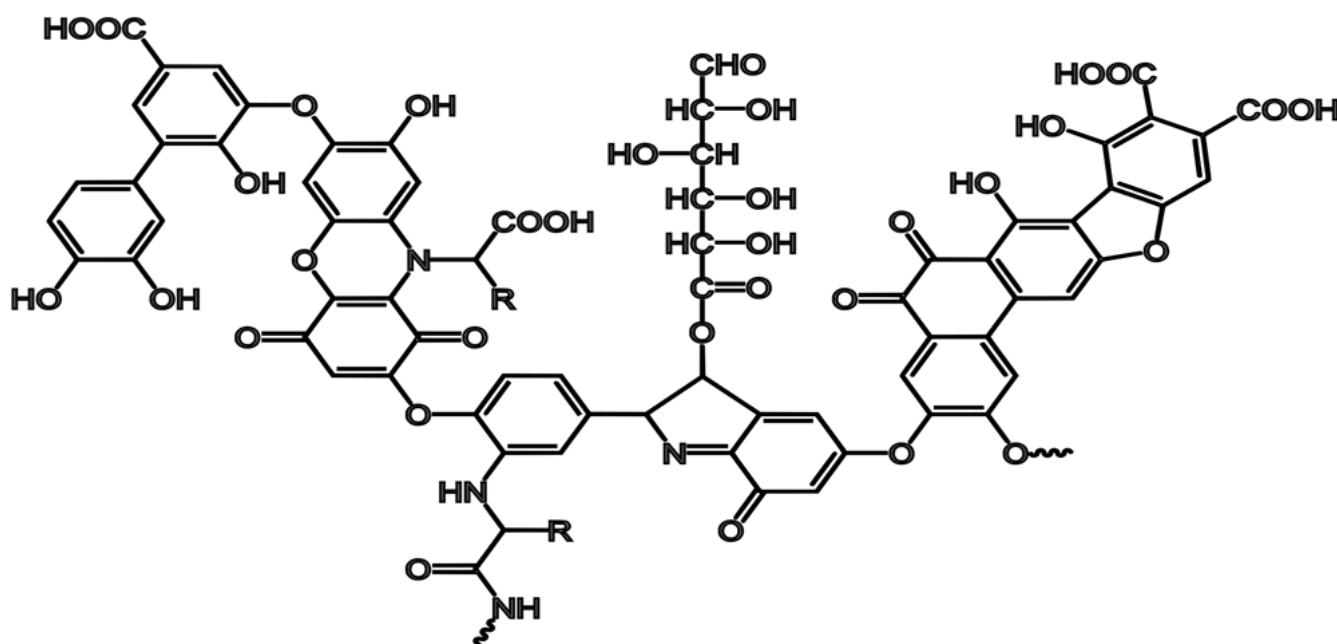
Fig. 1 Structure of Humic acid

II. EXPERIMENTAL SECTION

Apparatus

Glass plates of 4 x 20 cm size (coated with silica gel 'G'), 20 x 25 cm glass jars for the development of glass plates, glass sprayer for spraying reagents and El pH meter.

Chemicals and Reagents:

Humic acid, silica gel-G, HCl and sodium hydroxide

Metal ion studied:

Ni (II). Me (VI)Cr (VI). Cr (III) Co (II), Zn (II), Ca (II), and Fe(llI)

Stock Solutions:

Stock solutions of 1% of following salts were prepared in the 0.1 M HCl.

- Potassium salt of Cr (VI)
- Chloride of Zn (II), Cr (III), Fe (III) and Ni (II)
- Sulphate of Cu (II)
- Trioxide of Mo (VI)
- Nitrate of Co (II)
- The mobile phase was prepared in double distilled water

Detection Reagents:

For the detection of various cations, below regents were used

- 0.05 % Dithiozone in carbon tetrachloride.
- Saturated alcoholic $AgNo_3$

- Saturated alcoholic alizarin red
- 1 % Alcoholic solution of DMG
- 1 % Aqueous potassium ferrocyanide.
- Stationary phase Silica gel – G

Thin-layer chromatography (TLC)

- ### Preparation of plates

Slurry was prepared by mixing silica gel "G' in double distilled water in the ratio of 1:2 with constant steering for about 10 minutes. Then by using dipping method it was immediately applied to the glass plate 1211 and then plates were dried over night at room temperature.

- ### Running of TLC plates

The test solutions were spotted on the uniformly coated silica gel-G plates using fine glass capillaries and they were blow-dried with hot air. The aqueous humic acid of varying concentration was adjusted to the desired pH using sodium hydroxide and hydrochloric acid solution. The plates were developed for about 15 min in the glass jar which containing 15 ml aqueous humic acid solution At least 2 -3 mil of mobile phase was required to run the sample per plate.

- ### Development of TLC plates

The plates were dried and different metal cations were detected by spraying various detecting reagent, which are saturated alcoholic alizarin red, saturated alcoholic silver nitrate, dimethylglyoxime, potassium ferrocyanide and dithiozone in carbon tetra chloride. The R_f values of metal cations were measured in triplicate for each set of determinations. Various experiments were carried out to study the mobile phase to (0.005M – 0.1M), pH (1.0-7.0) and time (5 - 20 min) for the R_f values of the individual cations.

III. RESULTS AND DISCUSSION:

Effect of pH

Various experiments were carried out at different run time different pH and at different concentration of aqueous humic acid for determining optimum conditions for separation of the metal ions. The R values have been measured at pH 4.0 and 0.01% concentration of aqueous Humic acid. It was observed that metal ions shows a little difference in the R_f value of pH 3.5 but as the pH was increased To 4 there was maximum difference in the R_f value of different metal ions. The clear separation was observed only at pH 4.0 Thus separation measurement has Carried out at pH 4.0, which has been considered as optimum separating pH in aqueous Humic acid media.

Table 1. Effect of pH on the R_f value of metal ions

Metal ions	pH of Humic acid										
	1	2	2.5	3	3.5	4	4.5	5	5.5	6	7
Cr (IV)	0.97	0.96	0.97	0.98	0.98	0.98	0.97	0.97 DS	0.96 DS	0.90 DS	0.90 DS
Cr (III)	0.88	0.88	0.86	0.74	0.75	0.76	0.75	0.75	0.75	0.72	0.92
Co (II)	0.78	0.75	0.76	0.72	0.70	0.56	0.46	0.45	0.45	0.46	0.46

Ni (II)	0.89	0.87	0.86	0.86	0.84 Spr	0.64 spr	0.52 Spr	0.51 spr	0.52 Spr	0.53	0.53
Zn (II)	0.74	0.70	0.69	0.45	0.15 T	0.15 T	0.15 T	0.16 T	0.18 T	0.17 T	0.17 T
Cu (II)	0.73	0.70 spr	0.44 spr	0.43	0.36	0.15	0.14	0.14	0.15	0.14	0.13
Fe (III)	0.75	0.72 spr	0.45 Spr	0.44	0.31	0.12	0.11	0.12	0.11	0.10	0.10
Mo (VI)	0.48	048	0.45	0.44	0.36 T	0.15	0.15 T	0.14 T	0.14 T	0.15	0.15

Notation : T- Tailing, Spr – Spreading, DS – Double spot

IV. CONCLUSION:

Humic acid was found to be good mobile phase for separation of metal ions. Using the above mentioned optimum separating conditions, of pH aqueous humic acid 4.0, qualitative separation of various binary mixtures, ternary mixtures, five quaternary mixtures of metal ions have been carried out.

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Investigation of Phyllospheric Mycoflora of Chili from western Vidarbha, Maharashtra

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ABSTRACT

In the present research work phyllosphere mycoflora of Chili, was undertaken, to investigate different types of fungal mycoflora. The leaf, stem and fruit samples were collected from various field of Amravati and Akola region at the intervals of 15 days starting from seedling state up to its harvesting. The diseases samples were collected in all the stages of plant i.e. seedling, foliage, flowering and fruit-formation stage. The samples from plants were brought into laboratory in separate sterilized polythene bags for isolation of all possible phyllosphere mycoflora. The infected plant parts which were collected different stages of disease development and all the samples were carefully preserved in the form of herbarium to study the etiology of diseases. The symptoms of diseases were studied in the beginning as well as severity of infection. Phyllosphere isolation were carried out by different methods such as serial dilution, leaf impression, leaf washing methods, etc. The different types of fungal pathogens were also isolated by cutting small fragments of aerial diseased parts of plants from junction of infected and healthy parts. From the phyllosphere study it was concluded that mainly Deuteromycetean fungi were found to be associated with various parts viz. leaf, stem and fruit. The fungal isolated were identified with the help of available literature and stock cultures.

Keywords: - Chili, Pathogen, Symptoms, Morphology, Phyllospher, Mycoflora

I. INTRODUCTION

Various surveys and regional surveys were made on mycoflora of Indian subcontinent including fungi of Bombay, Wangikar and Ballal (1984). The present data revealed that mostly Deuteromyces fungi were associated not only with the leaves of various wild plants but also ornamental and crops of economic value. It has been reported that genera belonging to the from order moniliales such as Fusarium, Curvularia lunata, Helminthosporium sp., Bipolaris sp., Alternaria, Botrytis, Cladosporium, ; those belonging to the form order Melanconiales such as Colletotrichum, Glommerella, Melanconium, Polnema and of the order Sphaeropsidales like Phoma, Phyllosticta, Coelophoma, Macrophoma, Macrophomina, Phomposis, Sphaeropsis, Ascochyta, Botryodiplodia have worldwide distribution. From the available literature it is revealed that the distribution of

leaf spot fungi could not be restricted by ecological conditions and geographical barriers. Among all plant pathogens, fungi are the major disease causing agents and can be responsible for about 90% of agricultural yield loss (Maninegalai et al., 2011). It has been reported that various genera of fungal pathogen causing diseases on vegetables like brinjal are leaf spot and frost rot caused by Phomopsis vexans, colletotrichum fruit rot caused by Colletotrichum melogenae, brinjal wilt caused by Verticillium albo-atrum, etc.

Macrophomina phaseolina is an anamorphic fungus in the ascomycete family Botryosphaeriaceae (Crous et al., 2006). Macrophomina is primarily soil and seed-borne fungal pathogen that incites disease by producing microsclerotia or pycnidia (Pun et al., 1998). With a wide host range of approximately 500 species in 75 plant families, the pathogen exhibits heterogeneous host specificity i.e., the ability to infect monocots as well as dicots and exhibits non-uniform distribution in the soil (Mayek-Perez et al., 2001). M. phaseolina consists of only one species. In spite of being a mono-specific genus, M. phaseolina exhibits a high degree of morphological (Mayek-Perez et al., 1997), pathogenic (Su et al., 2001), it has worldwide distribution. From the available literature it is revealed that the distribution of the leaf, stem and fruit surface could not be restricted by ecological condition. In present investigation, the study of phyllosphere mycoflora was undertaken to screen the diseases causing fungi of the vegetable leaf, stem and fruit surface.

II. MATRIAL AND METHODS

Collection of materials and isolation of fungi:

A regular survey of phyllosphere fungi of vegetable from different region viz. Amravati and Akola region was made during the month of January 2013-January 2015. Various fungi causing diseases of vegetables were collected. Isolation of fungi was made by cutting the small pieces of leaves from the junction of healthy and infected region. Infected pieces were surface sterilized by sodium hypochloride and transferred aseptically to sterilized slant in culture tubes. The slant was prepared from Ashtana and Hawker, s medium 'A'.

Study of phyllosphere mycoflora by serial dilution plate method

Serial dilution plate method is one of the common method adopted for study of phyllosphere microflora. Fresh healthy leaves of all ages were collected from Tomato, field in fresh sterile polythene bags and brought into the laboratory.

Study of phyllosphere mycoflora by leaf impression method

This method was useful for superficial fungal spores. At the time of isolation fresh leaf was taken and pressed from its dorsal surface momentarily against surface of petri plate at three places. Same leaves were placed from ventral surface against the agar surface in same way like the first. Same procedure was repeated for other leaf sample. Incubation of plates was carried out at 26oC in an inverted position for 7 days.

Leaf washing method

This method was established by and describe as standard washing method for isolation micro flora of leaf. The process involved the cutting of 3 mm diameters uniform discs at random from leaf surface sample and washing them in 2-3 changes of sterile water. Aliquots of the final washing were placed out with the tap water agar and incubated to determine the efficacy of washing process. The results were taken after 3 days of incubation.

Identification of isolate

The isolates were identified from available literature Illustrated genera of imperfect fungi by Barnett and Hunter (1972); Morphological and taxonomical studies of all the fungi isolated were carried out. During the studies of phyllosphere fungi vegetative and reproductive characters were recorded to known the species identification.

Pathogenicity test

Pathogenicity of the organism was confirmed by Koch's postulate method. In order to pathogenicity, perfectly healthy, vegetable leaves of similar size were selected and thoroughly washed with sterile water. The fungus was claimed as pathogen only after satisfying Koch's postulates. Wherever more than one organism was isolate from a single lesion, pathogenicity of each organism was confirmed separately. During the studies the author made specific attention on variation in symptoms, month wise observation, nature of agriculture practices. All the data were recorded at the time of disease survey.

III. OBSERVATION AND RESULTS

Diseases of Chili: -

1) **Fulvia fulva**
Disease sample: - Fruit
Name of disease: - Fulvia fruit spot
Causal agent: - Fulvia fulva
Symptoms of Disease: - Pale green, yellowish spots appear on the upper surface of fruit, an olive-green to tan, velvety fungal growth appears on the lower surface of the spots. Under favourable conditions (long periods of humidity greater than 85 percent), complete defoliation can occur.
Morphology of pathogen: - Colony is greenish-black colour, thread-like, velvate, conidiophores dark, erect, slender, usually simple, septate, long; conidia hyaline, borne singly at apex or produced in chain 1- Celled, bunched of conodia mostly globus or ovoid, fusoid, in dry basipetal chain. Conidiophores are 100-150 μm in length and 2-4 μm in width, the conodia has 2-4 μm in diameter area.

2) **Alternaria solani**
Diseases sample: - Fruit
Name of disease: - Fungal Fruit Rot
Causal agent: - Alternaria solani
Symptoms of Disease: - Symptoms first appear as water-soaked, gray lesions that collapse and darken. Lesions turn velvety as spores are produced. Infection generally occurs at growth cracks, injuries or at the blossom-end of fruit. Internal colonization of pepper fruit without external signs of infection can occur when flowers are infected, the cracks appearing on leaf spot. The Alternaria solani occurs commonly, causing the characteristic leaf spots with concentric rings. The spots are mostly irregular, 6-9 mm in diameter and may coalesce to cover large areas of the leaf blade. Severely affected leaves may drop also infects the fruits causing large deep-seated spots. The infected fruits turn yellow and drop off prematurely.

Morphology of pathogen: -Mycelium is septate, branched, light brown and dark brown. Conidiophores emerge through stomata and dark colored. Conidia are single celled, muriform, beaked and produced in chains. The conidia are with 6-8 transverse septa and a few longitudinal or oblique septa.

3) Alternaria alternata(Fr) C. Keissler,

Disease- sample: - Fruit

Name of disease: - Alternaria Rot

Causal agent: - Alternaria alternate

Symptoms of Disease: -Symptoms first appear as water-soaked, gray lesions that collapse and darken. Lesions turn velvety as spores are produced. Infection generally occurs at growth cracks, injuries or at the blossom-end of fruit. Internal colonization of pepper fruit without external signs of infection can occur when flowers are infected.

Morphology of pathogen: - The pure culture was isolated on 27 ± 2^0 C produed colonies, olivaceous, black-grey, creamish yellow to black. Conidiophores arising singly or in small groups, branched, straight or curved; Colonies 5.5-6.0 cm diameter after 3-5 days at 27°C, reverse smooth, up to 40 μm long, 2 – 4 μm thick, with 1-2 or several apical conidia. Conidiaporospores often in branched chains, obclavate, ovoid, with a short conica or cylindrical beak, golden brown, up to eight transverse and several longitudinal, oblique septa, 25-65 μm long, 10 – 20 μm thick, beak pale, 2 – 5 μm thick.

4) Alternaria porri (Ellis)Cif.

Diseases sample: - Leaf

Name of disease: - Alternaria leaf spot

Causal agent: - Alternaria porri

Symptoms of Disease: - The disease causes characteristic leaf spots with concentric rings. The spots are mostly irregular and coalesce to cover large areas of the leaf blade. Severely affected leaves drop off.

Morphology of pathogen: - Alternaria porri colonies are rapid growing, cottony, and gray to black. The conidia develop in branching chains at the apex of the conidiophore, with the youngest conidium at the apex of each chain. The conidia are dematiaceous and muriform. The conidia are large breadth is 4-6 μm in diameter and their breadth is 40-70 μm in diameter.

5) Colletotrichum capsici (Syd.) Butl. Bisby

Disease sample: - Fruit

Name of disease: - Anthracnose fruit rot

Causal agent: - Colletotrichum capsicii

Symptoms of Disease: - Fruit lesions are the most important character of this disease. Fruit symptoms begin as water-soaked areas that turn tan or brown. Lesions may be small and circular, coalesce to cover large areas of the fruit. Under moist conditions, pink, salmon or orange masses of spores are formed, usually in concentric rings. Depending on the species present, black or brown flamentous structures may be visible in the lesion. Anthracnose can affect both green and ripe fruit, but symptoms are usually not visible until fruit ripen and turn red. Warm, wet weather generally favours infection and development of symptoms. Depending on the species of Colletotrichum present, optimal temperatures for infection range from 20° C to 27° C, free moisture is

necessary for infection. Fog and dew are conducive to disease development. Rain disseminates the pathogen's spores and often leads to severe losses, especially if fruit are wounded

Morphology of pathogen: -The isolates of C. capsici were obtained from the chili fruits infected with fruit rot. Each showed colony colour, pattern of growth on PDA. The isolate is white to light mouse grey, circular, mycelium with black coloured all over the colony growth. Whereas, isolate produced dark black to brown coloured circular flat mycelium with scattered and black coloured acervulus. The colony diameter after 5 days of incubation at 27±2°C was found. Conidia were hyaline, unicellular, fusiform curved with narrow ends. The average dimensions of conidia which possessed large oil globule in the centre, varied between the isolates in dark brown setae with several septations and pointed brown tips.

6) Colletotrichum acunatum

Disease sample: - Leaf

Name of disease: - Anthracnose leaf spot

Causal agent: - Colletotrichum acunatum

Symptoms of Disease: - Anthracnose affects all above-ground parts during any stage of growth. Seedling infection may be confined to cotyledons. Necrotic gray to brown spots may develops on leaves and stems. Fog and dew are conducive to disease development. Rain disseminates the pathogen's spores and often leads to severe losses, especially if fruit are wounded. These fungi can survive in infected seed and persist in leaf or stem lesions, in plant debris for long periods of time.

Morphology of pathogen: - Colonies are rapid growing, cottony, and gray to black with dark brown to black acervuli. The mycelium is branched, septat cottony thread. The acervuli are irregular in shape and consist of dark setae. Sometimes acervuli are also formed on the leaf. Acervuli are rounded, elongate, separate, superficial, erumpent, with conspicuous multicellular, dark seta, and 80-90 μm in diameter. Conidiophores are hyaline, single-celled, falcate, fusiform, spindle shaped, with acute apices, and measure 17-24 x 2.3-3.8 μm. Setae are brown with a dark swollen base and a pale rounded tip. Conidia single celled.

7) Cladosporium fulvum Link.

Disease sample: - Leaf

Name of disease: - Cladosporiumleaf spot

Causal agent: - Cladosporium fulvum

Symptoms of Disease: - The disease causes characteristic leaf spots. The spots are mostly irregular areas on the leaf. Severely affected leaves drop-off.

Morphology of pathogen: - The colony brown to black. Colonies are pale gray or grayish brown, thinly hairy on natural substrata cottony or loosely felted in culture. Hyphae creeping, conidiophores almost erect branced, and floccose, septate on the surface, often forming a turf, olive coloured conidia globose and ovate usually greenish terminal and then passed to the side. Cladosporium is characterized by erect, conidiophores with chains of conidia in tree-like heads. Conidiophores long, upright and branching at apex; conidia variable in shape oval, cylindrical or irregular and produced in chains, saprophytic or pathogenic. The lemon-shaped conidia which has well marked dark attachment scars and show considerable variation in size. The conidiophores are macronematous, straight or slightly flexuous, distinctly nodes, pale or mid-pale brown, smooth, up to 50 μm long or sometimes even longer in culture, 2-6 μm thick, with terminal and intercalary

swellings of 4-6 μm diameter. Conidia arise in terminal, in simple or branched chains. Conidia are cylindrical, rounded at the ends, ellipsoidal, subhyaline or pale olivaceous brown, smooth, 4-20 x 2-4 μm.

8) Alternaria sp.

Disease sample: - Leaf

Name of disease: - Alternaria leaf spot

Causal agent: - Alternaria sp.

Symptoms of Disease: - The disease causes characteristic leaf spots with concentric rings. The spots are mostly irregular and coalesce to cover large areas of the leaf blade. Severely affected leaves drop-off.

Morphology of pathogen: - Colonies usually brown to black, hyphae dark brown, branched. Hyphae are aseptate, 1.1-1.5 μm in diameter. Conidiophores dark, gray, mostly simple, rather longer, needle shaped, typically bearing simple conidia; 20-30 μm thick, 45 – 80 mm long.

9) Botrytis cinereaPers. ex Pers.

Disease sample: - Fruit

Name of disease: - Botrytis Fruit Rot (Grey Mold Rot)

Causal agent: - Botrytis cinerea

Symptoms of Disease: - Initial infection occurs when fruit are in direct contact with the soil. The fungus also colonizes in dying flowers and fruit through the stem end, growth cracks and wounds. Botrytis also infects cold-injured fruit. Soft rot may develop and consume the fruit entirely. Affected areas are gray to olive green, slightly sunken and have distinct margins. The epidermis peels away easily from lesions to reveal softened, watery underlying tissue. Under humid conditions, gray-brown mycelial develop on the surface, and grape-like clusters of spores can be seen with a hand lens.

Morphology of pathogen: -Colony is white to gray or grayish to brown, and spreading for a short distance in agar. The fungus is characterized by stout, brown, branched conidiophores supporting glistening gray heads of pale conidia. Conidiophores slender, long often darkly colored when viewed through, branching irregularly at end; terminal cells enlarged or rounded and bear clusters of conidia, which can be observed under low magnification of compound microscope. Conidiophores are brown, tall, upright, and septate and branched, up to 25 μm wide and 3 μm long. Conidia occur in clusters at the swollen rounded apices and at intervals along with conidiophores on short blunt teeth. Conidia are oval or egg-shaped, often with a slightly projecting point of attachment, colorless to pale brown, and measure 5-15 x 3 – 4 μm. Large, black, irregular sclerotia produced. They are rather flat in appearance and measure 4x3x3 μm. Conidiophores long, slender, hyaline or pigementd, branched, sometimes dichotomous; conidia hyaline or ash-coloured, gray in mass, 1-celled, ovoid; black irregular sclerotia frequntely produced; parasitic, causing gray mold of many plants.

10) Cercospora personata

Disease sample: - Leaf

Name of disease: - Cercospora Leaf Spot (Frogeye)

Causal agent: - Cercospora personata

Symptoms of Disease: - This disease affects the leaves, petioles, stems and peduncles of chili. Symptoms first appear as small, circular to oblong chlorotic lesions. Lesions later turn necrotic with a sporulating light-gray center and a dark-brown margin. Concentric rings may be observed as individual lesions expand. These lesions

often resemble frog eyes, giving this disease its common name. As the lesions dry, the centers crack and drop out. When the disease is severe, defoliation and reduction in fruit size occur.

Morphology of pathogen: - Conidiophores dark, simple, arising in clusters and bursting out of leaf tissue, bearing conidia successively on new growing tips; conidia hyaline or dark, filform, several celled; parasitic on higher plants, commonly causing leaf spot. Conidia hyaline to lightly pigmented, multi-celled with 5 or more septations, one end may be narrower than other; conidiophores produced in clusters. The fungus produces stromata which are globular. Conidiophores in mass are medium dark and slightly olivaceous brown in colour and paler towards the tip. Conidia are sub-hyaline to pale olivaceous. Conidiophores 20-30 μm in diameter and conidia are long septate 25-55 μm in diameter.

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Different Information Communication Technology Based Projects and Its Consequence on Students Performance in Higher Education

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ABSTRACT

ICT refers to technologies that enable telecommunications access to information. It is comparable to IT but mostly focuses on communication technology. In India, education has been aggressively pushed via the application of Information and Communication Technologies (ICTs). Using single way and interactive television, from radio to satellite India has tried and has successfully extended education to backward places. India has extensive expertise in both formal and informal education with broadcasting and digital technology. Various more digital technology-based initiatives in different parts of India have been implemented. Technology used in the name of education is not the goal of education, but rather an aid to it. The use of technology, which is one of the most powerful parts of the information age, encumbers individuals in order to strengthen citizens and occupation members in the face of events and concepts, as well as to simplify their daily routines. India now aspires to be a leader among knowledge-based societies, and it is working hard to achieve this goal. We can say that at this point in time, information and communication technology (ICT) has an impact on every element of human life. They play important roles in the workplace, in business, in education, and in the entertainment industry.

Keywords: Higher, Education, Information Communication Technology, Project, Student, etc.

I. INTRODUCTION

ICT stands for "Technology of Information and Communication." It refers to technologies that enable telecommunications access to information. It is comparable to IT but mostly focuses on communication technology. The Internet, the Wi-Fi networks, communication Telephones and other media this means that in the course of the teacher training, we now have more opportunity to use ICT and to increase teacher quality efficiently. According to United Nations, the "ICT" discipline and management information utilized for the processing, implementation and association of social, economic and cultural data is scientific, technological and engineering." "Teacher is the most educational aspect of our society's education. He works more in every field to better our society. Skilful teachers can use the form of a good social worker, politician, poet, philosopher for society for creative students. Professors can perform with the learner a friendly role. The quick technological

growth has creatively altered our technology and our society's demands. In order to minimize the gap in the education and learning technology between now and the future, recognizing the impact of these new Technologies in the workplace and in everyday life, teacher educational institutions aim to restructure their education programs and classroom facilities. Dynamic changes in society are being made through ICTs. All parts of life are influenced. In schools, the influences are increasingly felt. Since the ICTs offer greater options for students and instructors, forcing schools to respond appropriately to this technology innovation is a society.

II. DIFFERENT ICT BASED PROJECTS IN INDIA

In India, education has been aggressively pushed via the application of Information and Communication Technologies (ICTs). Using single way and interactive television, from radio to satellite India has tried and has successfully extended education to backward places. India has extensive expertise in both formal and informal education with broadcasting and digital technology. This involves the utilization of conferences on radio, TV and satellite. The finest instances of this effort are Gyan Darshan and Gyan Vani. Gyan Darhan is an educational channel based on satellites and Gyan Vani is a radio educational station. EDUSAT is an important step towards improving the quality of mass education. Various more digital technology-based initiatives in different parts of India have been implemented. Some initiatives are as follows:

- Project Gyandoot in Madhya Pradesh Dhar District
- Andhra Pradesh Government partnered with Tataliteracy.com, a platform that provides information and information in some of the state's poorest areas.
- Indoor projects in Tamilnadu, Baatchit, Infothela and Sari

➢ **Class:** The Computer Literacy and Studies (CLASS) project, initiated by MHRD, Department of Electrical Affairs, and NCERT, in 1984, was a cooperative venture. 42 resource centers and 2582 schools were included. It used the BBC's supplied microcomputers. The introduction of PC machines in line with the world trend has been a revised CLASS project from 1993-2004. The CLASS 2000 program was subsequently started to provide computer literacy in 10.000 schools, computer aid in 1,000 schools and computer-based education in 100 schools by the government. These 100 schools were named intelligent schools and are aimed to promote a broad use of computers in the process of teaching and learning.

➢ **Keli-Kali Karnataka radio program (AIR Government):** The radio project Keli-Kali was established in 2000-01 to promote the teaching of the classroom in two districts (Raichur and Gulbarga) in north Karnataka. Around 2.50,000 Class III pupils from 5,000 schools were able to enjoy the two radio stations broadcasting. The development procedure of the radio lessons included the following steps:
   i.   Identifying tricky spots;
   ii. Script development teacher training;

➢ **Radio Broadcasts in Andhra Pradesh and Himachal Pradesh:** In Andhra Pradesh, like Keli Kali, 'Vindam Nerchukundam' was initiated in 2002 for pupils in Class III in Vishakhapatnam. In 2003, Class IV was extended and Class V was extended in 2004. The programmes have been transmitted from 4 AIR stations. Some 29 lakh pupils and 1.5 lakh teachers were benefiting from the courses. Such a radio transmission termed "Gyankalash" was launched for Classes I-V students during the night time in Himachal Pradesh in 2000.

➢ **Azim Premji Foundation Technology Initiatives:** A mix of aspirations, wishes, and perceived advantages has

led to the access of more than 10,000 primary schools in India to computers. Although this accomplishment contributed to increased expectations, the lack of enough content for youngsters in the local language has had an effect on the effective use of these computers. To satisfy this criterion, the Azim Premji Foundation has begun to create content on CDs.

➤ **The Karnataka Mahiti Sindhu Program:** Initiated in 2000 in Karnataka, the Mahiti Sindhu program is being implemented in roughly 1,000 secondary schools. Three institutes are paid for by the state government that takes charge of teacher training and the computer maintenance in schools. Four periods a week are given for each class. Five computers with one server were installed in schools with fewer than 150 school children, nine computers had one server in schools with 150-250 students, and 14 systems were supplied at schools with 250-500 learners. The agencies provided subject-based CDs.

III. ICT AND IOT IN THE SYSTEM TEACHING

All studies have now confirmed that IoT has risen and grown as quickly as the Internet. The Internet of Things is today a part of developments and developments in many aspects of daily life and connecting of gadgets to the Internet. It is clear that currently this influences teaching practices because the Internet has deeply rooted in our colleges and e-learning in the American and world-wide systems has become a technique of learning. The efficiency of resources in light of the space, time, papers and physical needs of the teaching style is one of the key advantages of these applications. Teachers can also use this technology to produce "intelligent lessons" instead of traditional techniques. The new technology allows the teachers to track the teaching time, offer graphics and video presentations in real time, or construct and try algorithms with high computer capacities for a higher audience or hundreds of students. It is most convenient to explore the imagination of pupils. In 2016, Gartner, a research firm, estimates to have a network and cloud-related 6.4 billion items, up 30 percent from 2015. They expect that more than 20 billion devices will be connected by the end of the decade. It is certain that this evolution will influence the teaching instruments and will also produce new learning approaches. Smart technologies allow optimal usage of resources, starting with papers and all the time, distance and money involved in education.

IV. ICT APPLICATIONS ON LEARNING PROCESS IN HIGHER EDUCATION

Technology used in the name of education is not the goal of education, but rather an aid to it. Students who are proficient with computers, video CDs, mobile phones, and satellite equipment are encountered by education associations on a daily basis. If teachers do not improve their technology usage skills, they may encounter a variety of issues when transferring education in educational programs using traditional methods or technologies. The use of technology, which is one of the most powerful parts of the information age, encumbers individuals in order to strengthen citizens and occupation members in the face of events and concepts, as well as to simplify their daily routines. Understanding the function of technology and society in order to live in today's society and become more compatible with technological advances is a requirement for surviving and being more compatible with technological developments. Education can help you achieve your goals in life. Education takes the place of ignorance and leads to the realization of the obligations of human beings. The most essential thing to remember is to use and mix both technology and education in order to bring out the most stunning aspects of both at once. Students' views and behaviors are observed in this

specialized study, which is carried out at The American University, using specific observation procedures to acquire information about students' perceptions and behaviors. The accomplishments of students at the conclusion of academic terms, as well as their test results, are also included in the performance measuring variables. When it comes to achieving performance goals, one of the most significant elements to consider is the deployment of information and communication technology (ICT).

4.1. The impact of teachers' use of information and communication technology on students' performance in higher education

In the previous decade, information and communications technology (ICT) has evolved and transformed at such a rapid pace that developing countries have not been able to keep up with the pace and have therefore been abandoned, resulting in a lack of correspondence. ICT is considered to be the established foundation of the present world; as a result, knowing this innovation and its fundamental principles is considered to be an important component of the core of instruction. Innovation has the potential to transform the methods of instruction, the locations and modes of learning, as well as the roles of understudy and teachers throughout the educational process. ICT is altering the instructional process by bringing portions of solidarity to learning environments, including virtual environments, which is modifying the instructional process. Data and correspondence innovation is a powerful and engaging tool for providing instructive opportunities; as a result, it is difficult to conceive future learning environments that are not augmented by data and correspondence innovation.

Instructive establishments may use information and communication technology (ICT) to better prepare understudies with skills and information for the twenty-first century, to the point that it can increase overall availability to training, instructional correspondence, broadcasting of value-demonstrating learning programs, teachers' professional development, and assistance in obtaining a more viable educational administration. It follows that ICT can be used to peacefully address the key challenges of instruction, which are availability, consideration of others, and standardization. Improved training standards are achieved through the use of ICT, which facilitates learning through advancing dialogue, postponed-time chat, coordinated guiding, self-learning, basic reasoning, information seeking, and examination. The use of information and communications technology (ICT) can increase results, guidance, organization, and the development of vital capacities in poor gatherings, while also having an impact on educational guidance and research processes. Use of ICT in classrooms is essential because it allows educators and students to collaborate, conserve, control, and retrieve information in addition to advancing self-directed and dynamic education, which is essential in today's world. The use of information and communications technology (ICT) in learning includes a greater affinity for communitarian learning between students and educators, rather than just in the explicit classroom. For example, separate learning encourages instructors and students to participate in adapting even over the course of a school year, whereas educational learning encourages instructors and students to participate in adapting even over the course of a school year.

V. THE ROLE OF ICT IN DEVELOPING INDIAN EDUCATIONAL SYSTEM

India now aspires to be a leader among knowledge-based societies, and it is working hard to achieve this goal. Consequently, it is difficult to overstate the importance of the Information and Communication Technology (ICT) revolution in ensuring high-quality education and training for students everywhere. In India, classroom

computers were introduced in the early 1980s as a result of the efforts of a small number of private schools. It acquired pace as a result of several programs and schemes initiated by the Government of India from time to time, including: The Educational Technology (ET) Scheme was established in 1972 as part of the Fourth Five-Year Plan. Six State Institutes of Educational Technology (SIET) received 100 percent aid, and the states and UTs received assistance with the purchase of radio/cassette players and color televisions under the program. When the Government of India started the Computer Literacy and Studies in Schools (CLASS) project as a pilot project in 1984, it was considered a success. The objectives of the 6 project were to provide students with a broad understanding of computers and their use, familiarize students with the range of computer applications in all walks of human life as well as the potentiality of the computer as an information processing tool, demystify computers and develop a degree of ease and familiarity with computers that would be conducive to developing individual skills in computer applications. Another supposition is that computer literacy would have a liberalizing effect on schools if teachers were attentive to, and capable of employing, computers to improve the objectivity of instruction. The computer literacy program did not achieve much due to a lack of funding, insufficient teacher training, and the absence of a valid space for computing in the school timetable. It was unable to instill in children the ability to perform computations. Using the software, youngsters were able to recognize, identify, and be aware of alleged facts about computers, at the very best. The usage of computers in the classroom was restricted. When working in a Smart School, the teacher's function is that of a navigator, who would offer students with learning maps to sketch out their own learning courses. It boils down to saying that students should see information technology as a serious tool while still in school, rather than as something they will need later on. The report proposed that all educational institutions up to and including higher secondary/secondary school be equipped with computer systems by appropriate investments of 1-3% of total budget during the next five years, according to the report.

VI. CONCLUSION

We can say that at this point in time, information and communication technology (ICT) has an impact on every element of human life. They play important roles in the workplace, in business, in education, and in the entertainment industry. Many individuals also see information and communication technologies (ICTs) as catalysts for change; change in working conditions, processing and transferring information, instructional methods, learning approaches, scientific research, as well as accessing ICTs. In this digital age, the use of information and communications technology (ICT) in the classroom is critical for providing students with opportunity to learn and apply the necessary 21st century skills. It is important for teachers to use ICT to improve teaching and learning because it allows them to fulfill their role as producers of pedagogical settings. Teachers at all levels of educational programs benefit from the use of information and communication teacher to present their lessons in an engaging and easy-to-understand manner. One of the most important aspects in the technical evolution of learning systems is the increased freedom afforded to students today by ICT capabilities as well as by the Internet of Things' worldwide connectedness. Projects based on information and communications technology (ICT) have also had an impact on teaching practices.

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Impact and Contribution of Google Tools in Current Education System

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ABSTRACT

The technology has revolutionized every part of human life, and education sector is not an exception to this. The modern tools like various apps and software have offered very effective way to deliver the education to everyone who is interested, even across the national boundaries.

Google, one of the giants in technology has developed several tools which have become popular in a very short time. The tools like google docs, is a great tool these days. The Google Classroom is one of the most preferred tools to continue the teaching-learning in the challenging period of pandemic.

In the present article we have tried to highlight few of the useful tools of google which are really helpful in the current education system.

Keywords: Google tools, Google Docs, Google Classroom, Google Language Tools (GLT)

I. INTRODUCTION

Since the 1998 Google started its journey and become the world's largest and most-used search engine site on the web. Google made a revolution imparting education and knowledge accessible for all and made changes in the study of any aspect or term.

The main goal of the company is to systematically arrange all the information in the world and make it accessible and useful to users all over the globe.

Google is trying to implement an open technology in the education system and this open technology can bring a revolution in education system according to google.

The company developed the Google Apps and the company has nearly 40 million teachers, tutors, staff members, faculty members, and students who utilizes these apps.

Education system from many countries uses google devices like Chromebooks, designed by Google to access its educational platform. Nearly more than 70 best universities are using google apps and search engines out of best 100 American universities.

Google is helping educational institutions to work on their dreams of being paperless organization, staff development and new ways of student collaboration.

Google is working hard in providing easy access to maximum students regardless of their social and economic background, giving students the experience in simple way and making innovation in various educational tools for students.

II. THE ROLE OF GOOGLE IN EDUCATION

1. **IT gives strength and confidence to students:** Google is trying to build strength and confidence in students irrespective of their age, socioeconomic status, nationality, gender, religion, ethnicity, and other such factors. It empowers the students around the globe with an advantage of all the information, learning materials, and tools for their education. Google providing an experience to students to access limitless information. It also transformed the teacher from just information explainer to flag bearers for students.

2. **It offers a wide range of information to both teachers & students:** Google offers a wide and variety range of information to both educators and students in terms of compatibility with reading and educational devices. Google providing its wide range of information on its electronic devices like a smartphone, tablet, desktop, laptop, irrespective of manufacturer and operating software. Google makes its apps and search engines accessible from anywhere like home, in school, or on the move.

3. **Services like search-engine site are free of cost and the google apps with its low cost service gives everyone to afford it.:** educational institutions and workplaces all around the globe can access Google's free search-engine site and low cost (some free) apps. Its affordable and compatible educational devices are widely used by students from different age groups and from any socioeconomic backgrounds. The maintenance of the apps and devices is very much easy and users gets very less efforts to use it.

4. **Its apps and services foster brings up high degree of collaboration and teamwork:** The Google apps and sites have changed the teaching methods as well as the learning techniques The Google apps bringing the collaboration and teamwork among teachers and students. This developing the organizational skills and problem solving approach of young students

5. **Its apps enhancing the productivity, and effectiveness of the teachers and students:** The Google apps and products are managed by best employees in the world and these apps are superfast in speed. Google products helps to improve the efficiency, productivity, and effectiveness of the teacher and students. The products of Google can be easily customizable, easily manageable and easily operated.

Google the tech giant is a multibillionaire company ruling in technology industry, providing many benefits to the world in many aspects. Its applications and services are revolutionary in many field with their great uses in various areas. Google providing many customized application in free of cost for education purpose. Many education institutes, societies implements these application in education system. These application are greatly beneficial for teachers in teaching, learning and evaluation. With these tools teachers getting efficiency in doing administrative tasks, it is helping them in professional development, performing collaborative educational projects, helping them to create more interactive activity for their students.

For students starts to learn the online application and taking participation in it,they are using it for better understanding the concepts, also using it as learning content and becoming more creative. By training in using ICT tools to teacher giving support to daily teaching and the tech giant like google providing technological tools to accomplish it. Google providing new encouragement for education innovation and supporting latest technology.

In today's world, education changing from teacher-centred instruction based to student centred inquiry-based learning

III. DIFFERENT TYPES OF GOOGLE TOOLS

A. GOOGLE DOCS

One of the popular google tool is google docs, it is categorized as Web 2.0 technology, it is free google web based application that allow users to create and share online documents such as spreadsheets, presentations, and forms. It was released on October 10, 2006, with word processor on the basis of web and spreadsheets feature and on the September 17, 2007 the presentation feature has added.

Google docs is based on the cloud computing, networked computer system that make use of the resources of several servers to complete tasks and store data. Google Docs is not that much complex and having much have other advantages over traditional software. Google doc is not a desktop application which is not bound to the any single desktop Google docs no need to download and install on a particular machine. It need Internet to access because each user saves information to the cloud system, user can access the file from anywhere. There is no need to check about the latest version of the file to access it, it will always be saved in the Google cloud.

Another benefit is that many user can edit the same file from anywhere, this is known as online collaboration, and it could promote teamwork over the web. There's no need to worry about any unexpected change in file because Google doc allow their users to editing online and collaborate for gaining the knowledge from many users those having very little technical knowledge. Students have to engage in collaborative learning activities like group projects, presentations, and group discussion. These activities require large amount of collaboration and communication with classmates Google Docs, an online word processing application, is a potential tool for collaborative learning, there are many potential benefits of using Google Docs in an educational system students successfully utilized This new technology in their group collaborative writing. It is beneficial for student in enriching learning experiences, additionally, by using Google docs changed the system by which students communicated during their collaborative writing. Students also experienced that google doc is much better tool for communication than traditional communicative tools (e.g., Facebook and text messaging) and students also rely less on email increased use of Google Docs, Students with busy schedule has obvious benefits from Google Docs with less face-to-face meeting and near about no meeting outside of class Thus, Google Docs is well-suited as a tool for out-of-class collaborative assignments.
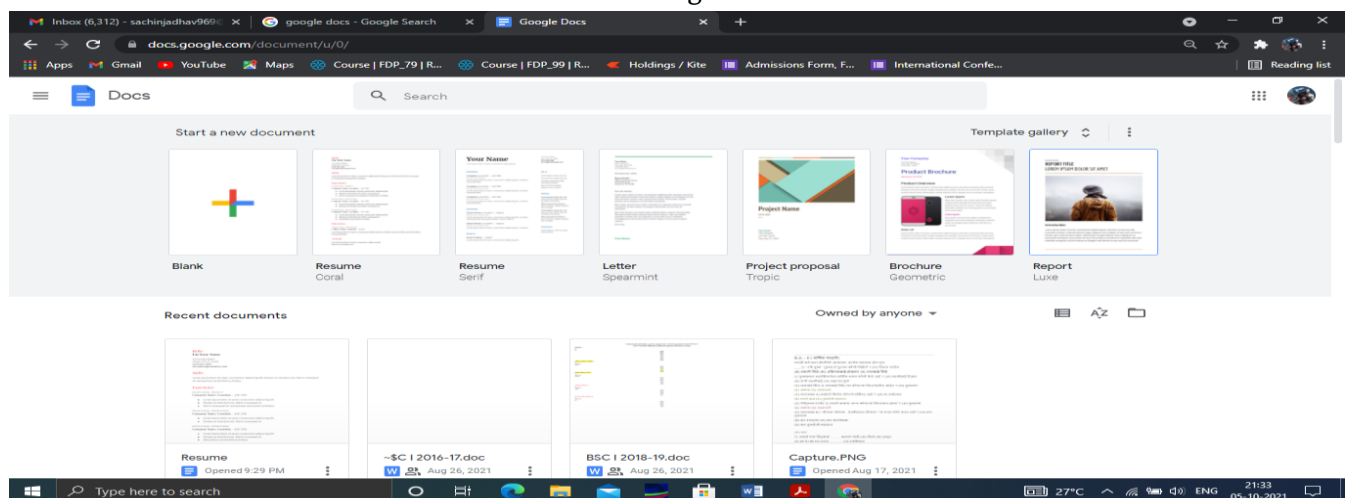
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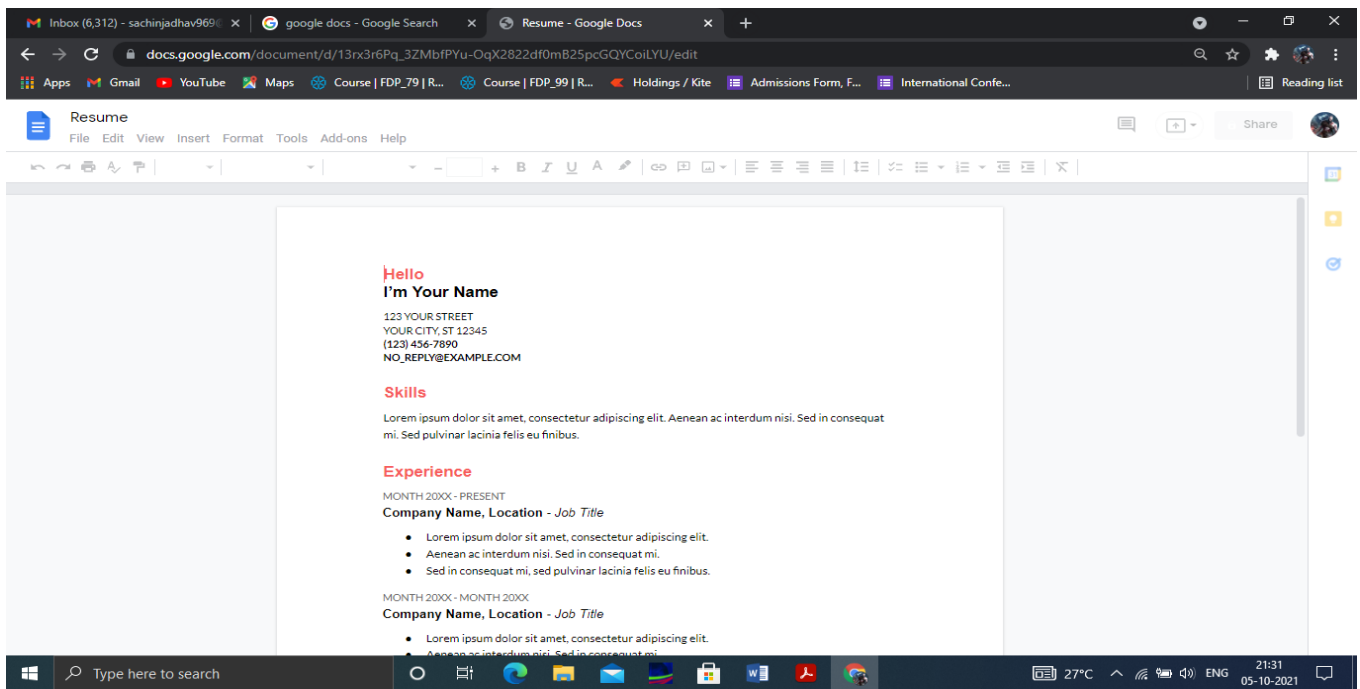
Interface of Google Doc

B. GOOGLE CLASSROOM

Google Classroom IS CONSIDERED TO BE A part of the online Google Apps for Education (GAFE), it is packed with many applications which increases productivity in teachers and students in learning and online collaboration. This service of google is free of cost and it must be installed in at the level of educational institutions. There are many popular apps google has developed for including Gmail, Google Calendar, and Google Drive, which anyone can access are also used in educational field, Google Classroom is the main application in online Google Apps for Education (GAFE).the main use of this application is to communicate with the students, sending feedback, providing study material and homework and performing the assessment and evaluation of the students. Google Classroom is very much efficient in time saving and its organizational features are very easy and simple to use. Google Classroom start with creation of classes along with addition of students then the teachers and students can explores the features found in this application such as sending information, starting discussions, distributing and collecting tasks.

Google classroom is a Learning Management System (LMS) offered by Google for teachers. The major uses of this application are communication between students and teacher, asking question and making assignments. In today's world of technology and digitization, Google Classroom made easier the online learning for digital learners today. Like many other new application Google Classroom has its unique interface, this interface helps teachers to organize classrooms uniquely according to their teaching methods. Because at start Google Classroom is completely blank and a teacher can mold it according to their need.

First of all, the teacher in Google Classroom have to create an online classroom for physical classes. Then the students are added in the classroom by teacher. While using Google Classroom the classes does not contain the actual physical classes but it contains the virtual classes associated with it. For example the distance learning classes and big school programs uses Google Classroom without student's actual physical presence.

A class teacher can comfortably use all the options in Google Classroom and can control what student can do on google classroom.

In this application there is a STUDENT section where we can find all the list of a student which are added in it. We can make changes as well as send an email to individual student or to a whole class. To use a google classroom, first we have to install Google Chrome on our personal computer, after that a teacher can display class codes to allow students to join classes and manually invite or delete students as needed.

- **The Basic Use of Google Classroom**

During first time while using the Google Classroom, it will ask whether you are a teacher or student. You have to choose it correctly. If you not select that you are a teacher, the app will automatically assign you as a student. We cannot access or control all the features and options of Google Classroom unless we are assigned as a teacher.
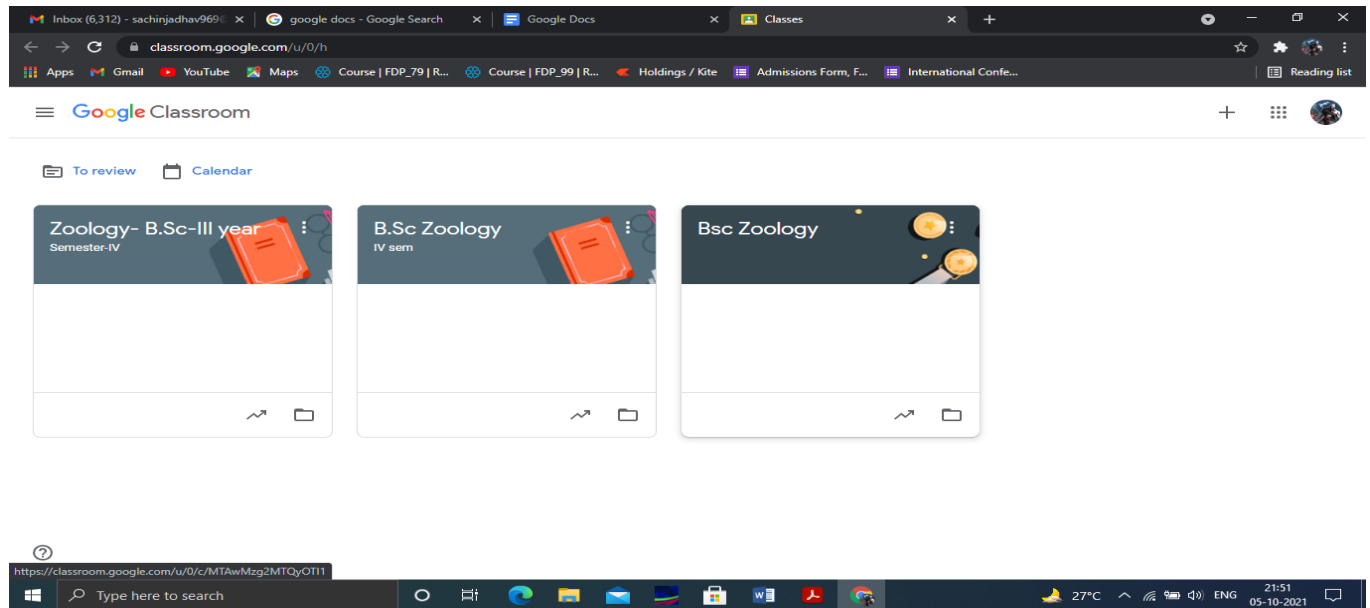
Interface of Google Classroom
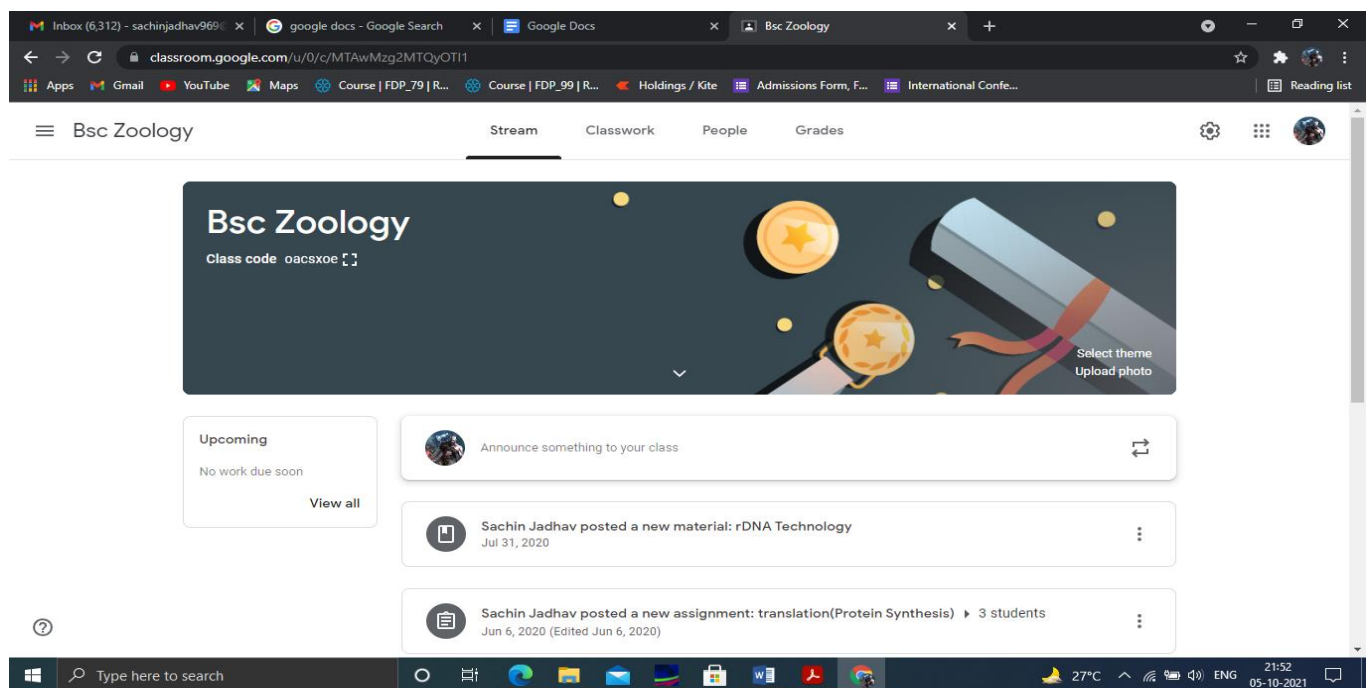
Interface of Google Classroom (Stream page)
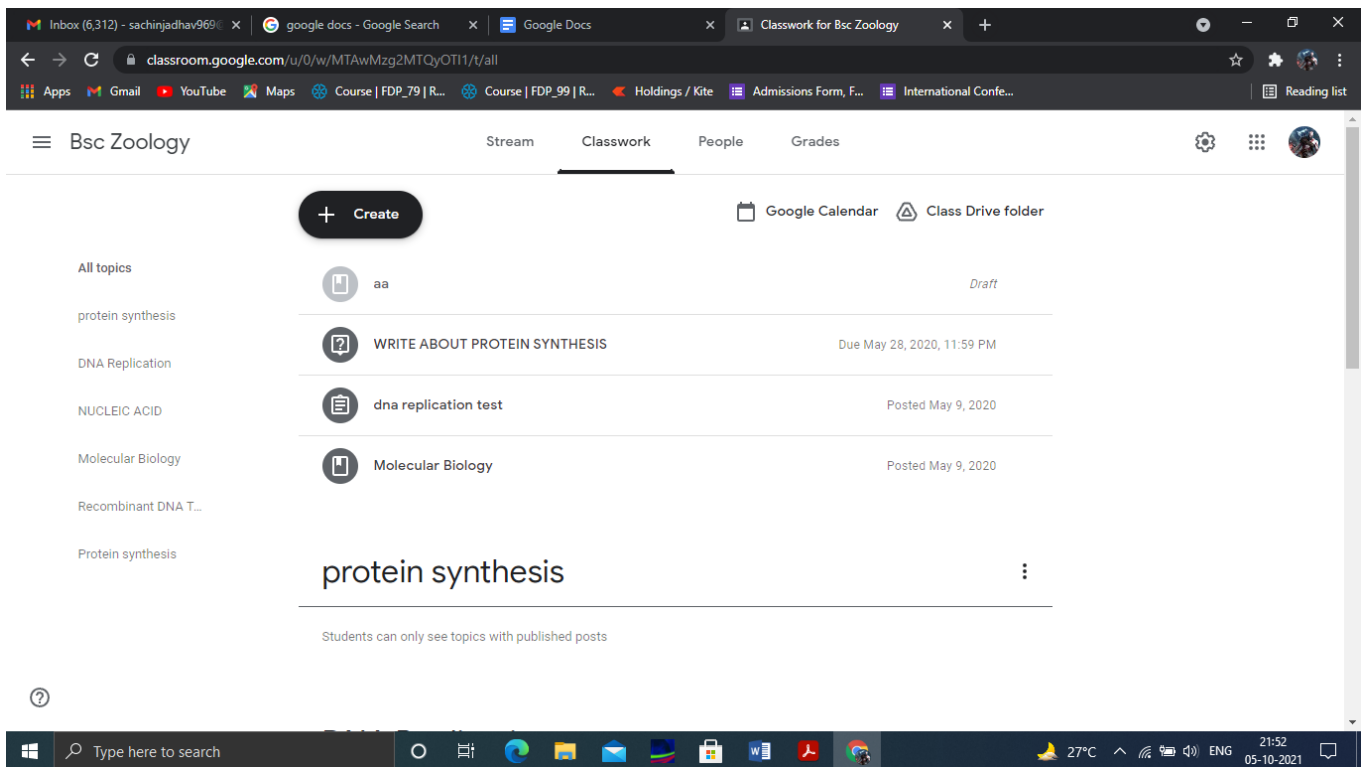
Interface of Google Classroom (Classwork page)
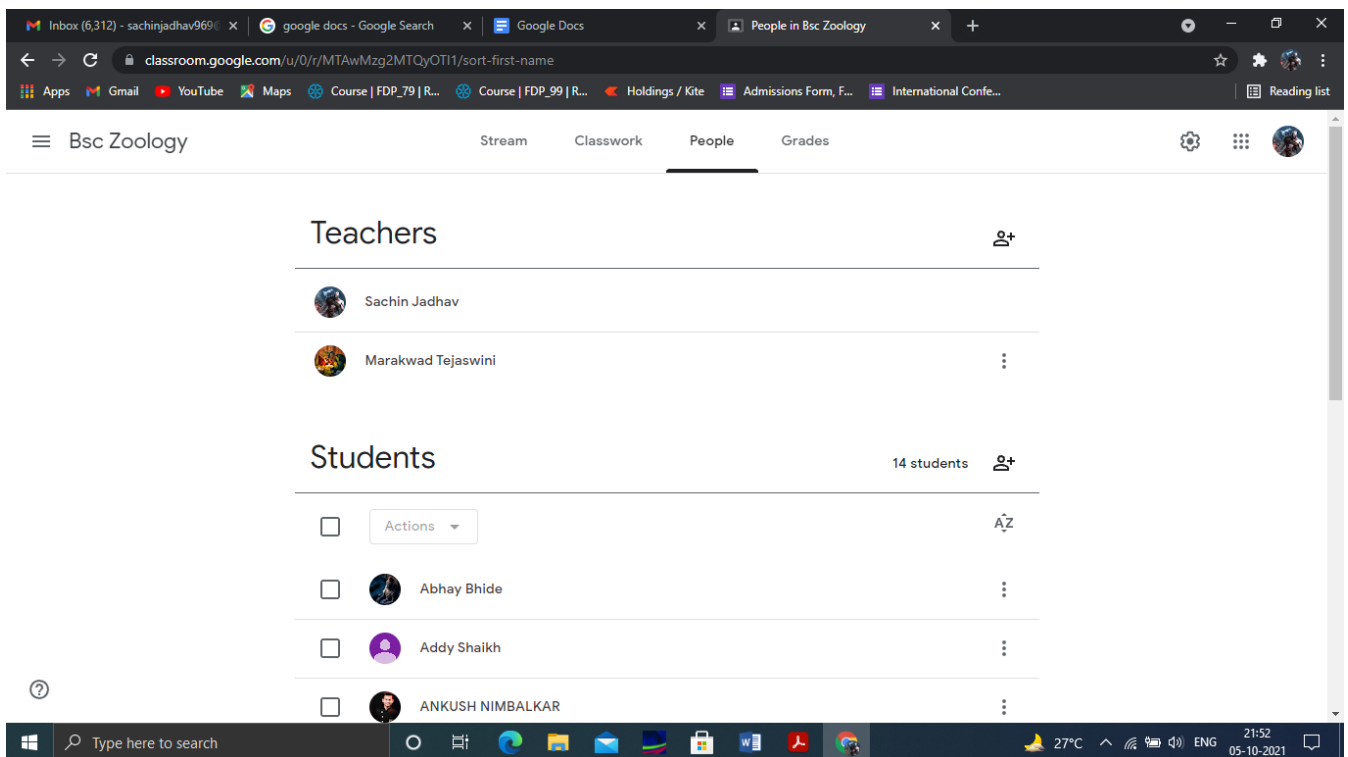
Interface of Google Classroom (People page)

Interface of Google Classroom (Grades page)

C. GOOGLE LANGUAGE TOOLS (GLT)

For accessing the rapid growing information web provide many opportunities to user all over the world. Web page plays crucial role in accessing the rapid growing information, Web pages are accessible on Internet and available internationally in many different language. All the web information which is incomprehensible is available in multilingual format which is also provide an opportunity directly for users all over the world. Web users find it hard to access the information online which is monolingual. The search engines which are Monolingual only give the result to users in their corresponding search engine's language. Users who don't know the other language are often unable to obtain relevant information from these web pages. User gets a limited information because of this language barrier. By considering this from 2004 search engines providing many web pages and information in multilingual formats. These search engines are categorized into regular search engines (such as Google, Yahoo, and MSN), meta–search engines (such as Exite, HotBot, and WebCrawler), and visualization search engines (Kartoo, Onlinelink, and Ujiko). Among these google is considered as best regular search engine with multiple language support. Google supported 37 different languages. This is the strongest translation tool among all the other search engines. Its translation system can directly translate the entire web without coping and pasting in a search results list. It also help in paragraph translation on 23 May 2007, Google launched its "Translated Search" in its Google Language Tools (http://www.google.com/language_tools) in addition to other language support services and tools

1) Google Language Tools (GLT) is integrated service that provides translation tools and other language support services. GLT presents its language support service on http://www.google.com/language_tools.   In this a search textbox appears in which a user type the translating word, user can select its language in which user want to search its word. User can also specify the language of the documents, it will automatically translate the word. GLT Search the search word and shows the search results in both query language and the desired

language in two separate columns.. For example to find information resources on artificial intelligence in Spanish, we type in "artificial intelligence" in the search box of GLT. We specify the query language as English from drop down menu and search pages written as simplified Spanish. For translation of word in google translation tool, google incorporated billions of words of text on its server.

GLT is a beneficial tool for many Web users. There are two types of users according to Ogden and Davis (2000) for this translating tool: bilingual users who use their native language to search the query and obtain the result in another second language and monolingual users who are interested in finding their query in other languages. GLT will be very beneficial to these two types of users, helping them to access any information on the Web.

Here are some possible uses of GLT:

- People coming from foreign country who knows little Spanish can Search about Spain government and much of central and South America related web pages as well as other documents for information about Spain.
- People who would like to invest in foreign companies can examine these companies and the market
- If student want to learn the foreign language can search their query in English to find the history in language that they want.
- Patient can find medical or treatment information from another country or region.

Google Language Tools provide multiple language support tools for Web users all around the world. These language nearly include 36 languages including monolingual search in user–desired language or country, machine translation of texts or Web pages, and online dictionary. Different types of Web users such as immigrants, investors, students, patients, and travellers may benefit from this service.
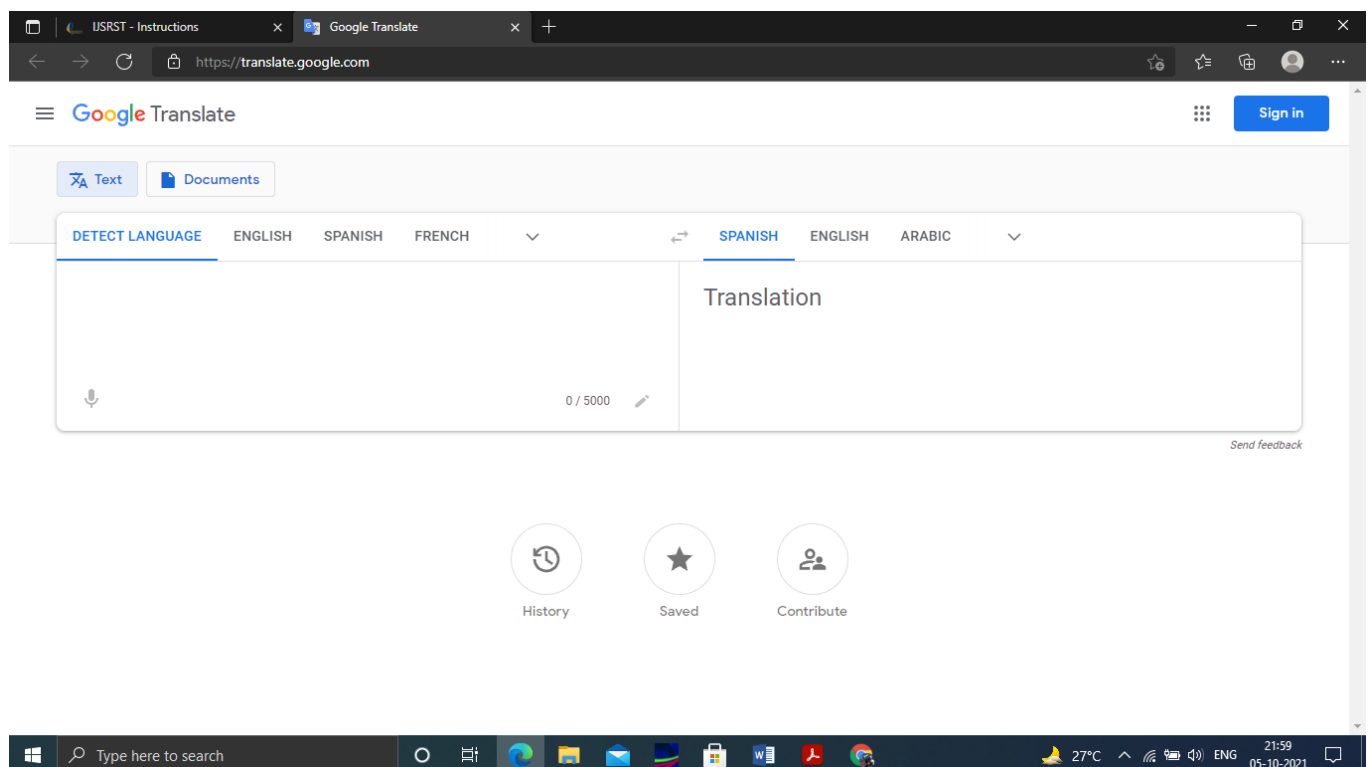
Interface of Google Translate (Stream page)

IV. CONCLUSION

Google plays a crucial role in education with making students and teachers more efficient and productive. Its apps and services develops higher degree of collaboration gives strength and confidence to student, its apps and services are free of cost (some are low in cost) which everyone can afford it and are used widely. It's GAFE (Google Apps for Education) Powerful Cloud-Computing Service on Which a Student Can Access Sit from anywhere and from Any Devices. These Platforms are used by thousands of schools and universities worldwide To make efficient use of available collaboration tools for students and faculties with the primary GOAL of improving teaching and learning. GAFE has advantages that it is considered as transformational in the educational system. Another benefit of GAFE IS GOOGLE GROUP PLATFORM, which promotes increased collaboration, discussion and QNA forums.in addition groups are used to to schedule meeting and project event among a group of classroom students.

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Carbon Sequestration by Blue Green Algae (Spirullina Species) Under the Fresh Water Ecosystem

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ABSTRACT

A typical Spirullina culture has been studied with the effect of different concentration of CO_2. The unisolated species were collected from fresh water ponds in Nagpur . Collected samples were isolated for Spirullina species with Streak plate and Pour plate method by using serial dilution, purification was done by antibiotic treatment. At different concentration of CO_2 and in different pH values the growth of Spirullina species was tested. This results concluded that the highest growth of Spirullina species was at 30% of CO_2 concentration, 7.4 to 8.0 pH values.At 30% of CO_2 concentration the highest growth of Spirullina species was reported . By this results it was estimated that the Spirullina species having good carbon sequestration potential as it can tolerate up to 40% CO_2 concentration in the medium, and can give excellent biomass accumulation under the 30% CO_2 contents in the medium. This Spirullina species can be exploited as good source of bio-fixation of environmental CO_2.

Key Words: sequestration, potential, bio-fixation

I. INTRODUCTION

The concentration of CO_2 in the air rose to 407ppm as recorded in 2018, from 200ppm in Ice Age, which is a direct consequence of industrialization. According to a study, the concentration of CO_2 would double and average temperature would rise by 1.5-3.0 degrees by the year 2030 if CO_2 continues to increase at the present pace. Carbon dioxide concentration increase in the atmosphere is associated to climate change and global warming.

The greenhouse gases (GHGs) cause depletion of ozone layer protecting the atmosphere against UV radiation, thereby warming the atmosphere. The average concentration of CO_2 increased from 315 ppm in 1960 to 380 ppm in 2007(IPCC, 2007). There has been a 35% increase in CO_2 emission worldwide since 1990.Carbon fixation by photoautotrophic algae has the potential to diminish the release of CO_2 into the atmosphere and in helping to alleviate the trend toward global warming.

Blue green algae are ubiquitous in nature. They occur in a wide variety of environmental conditions and wherever life is possible. Mainly The Cyanobacterian algae grow luxuriantly in the soil thats why the

occurrence and distribution is studied by number of phycologist throughout the world. Cyanobacteria are extraordinarily diverse group of Gram-negative, oxygenic photosynthetic prokaryotes that are distributed in all possible biotopes of the world. Due to their occurrence in diverse habitats, these organisms are excellent materials for investigation by ecologists, physiologists, biochemists, microbiologists.

The publications appeared during the second half of 20 th century have been confined to the blue green algae occurring within the soil.As blue green algae are productive in their nitrogen fixing ability and the nitrogen is the major requirement of paddy crop and the blue green algae are widely associated with this crop. Cyanobacteria also called blue green algae can fix CO_2 efficiently from many different sources, including the atmosphere, industrial exhaust gases and soluble carbonate salts. Cyanophyceae (blue-green algae), Chlorophyceae (green algae), Bacillariophyceae (including the diatoms) and Chrysophyceae (including golden algae) are the most frequently used micro-algae. Those species that exhibit the highest maximal specific growth rate will also have the highest biomass productivity that is, the best CO_2 bio-fixation potential was generally assumed (Eppley and Dyer, 1965).

Highly CO_2-tolerant microalgae and cyanobacteria for biological fixation of CO_2 such as Anacystis, Botryococcus, Chlamydomonas, Chlorella, Emiliania, Monoraphidium, Rhodobacter, Scenedesmus, Spirulina and Synechococcus (Sawayama et al., 1995; Sung et al., 1999). sufficient nutrients for micro-algal growth was provide from growth medium. Cyanobacteria i.e blue green alge have the ability to use CO_2 in the air as a carbon source and solar energy as an energy source. The cell concentration as well as the hydrogen production per gram cell will be increase by the CO_2 injection in the cell growth phase (Park et al., 2001). The aim of the current study is to isolate microalgae in lakes and ponds which can tolerate high CO_2 concentrations and high temperatures in order to bio-fix carbon dioxide and discover the optimal conditions for biomass production.

II. MATERIALS AND METHODS

Chemicals and media: Analytical grade chemicals (Merck, Germany) were used for the media preparation and for the heavy metal treatment solution.

Source of isolates: Microalgae (*Spirullina* sp.) were isolated from different lakes and ponds in Nagpur region. The physical properties (pH, color and light intensity), of water, lakes and ponds were also determined.

Culture medium: Medium BG-11 contained (g/L): $NaNO_3$, 1.5; $K_2HPO_4.3H_2O$, 0.04; $MgSO_4.7H_2O$, 0.075; $CaCl_2.2H_2O$, 0.036; citric acid, 0.006, ferric ammonium citrate, 0.006; Na_2EDTA, 0.001; Na_2CO_3, 0.02 and trace metal solution of 1 ml (including H_3BO_3 2.86 g, $MnCl_2.4H_2O$ 1.81 g, $ZnSO_4.7H_2O$ 0.222 g, $Na_2MoO_4.2H_2O$ 0.390 g, $CuSO_4.5H_2O$-79 mg and $Co(NO_3)_2.6H_2O$ 49.4 mg/L) at pH 7.4 (Rippka et al., 1979).

Isolation of carbon dioxide fixing microalgae: Samples were precultivated in an appropriate broth for 1 week and sub cultivated for another week, culture broth was smeared on different solid media and cultivated at 30°C for 1 week. Picked up the colonies and transferred it to the same media for purification. 100 conical flasks were taken and 20 conical flasks were used as a control (without CO_2) and 80 conical flasks were used as a sample (with CO_2). Before two or three days of passing CO_2 concentration (10, 20, 30 and 40%), the inoculation was carried out. Different percentage of CO_2 concentration was passed in each conical flask by bubbling method for 60 s. In 60 s, 0.5 kg of CO_2 was passed with the help of flow cytometer. CO_2 cylinder was prepared in Aditya

Air Product Private Limited, MIDC, Hingana Road, Nagpur. For the isolation of high CO2 tolerant stains, The culture broth was aerated with 10, 20, 30 and 40% CO2 at 30°C for 1 week.

Measurement of growth rate: The growth rate of microalgae was measured by optical density at 680 nm using UV-visible spectrophotometer (PG instruments, USA).

Effect of carbon dioxide on cell growth: Isolates were precultivated at 30°C in a 500 ml conical flask with 300 ml BG-11 medium and bubbled with air and air containing CO2 for 20 days. Microalgae growth was determined by optical density at 680 nm.

Table 1. Effect of different concentration of CO2 on *Spirullina* species growth.

CO2 Treatment	CO2 treatment period(days)						
	0	2	4	6	8	10	12
Control	0.55±0.01	0.85±0.01	1.13±0.00	1.31±0.01	1.51±0.05	2.02±0.01	2.11±0.00
10% CO2	0.60±0.01	1.16±0.00	1.21±0.01	1.30±0.06	1.80±0.01	1.82±0.01	1.93±0.07
20% CO2	0.93±0.01	1.02±0.00	1.20±0.01	1.51±0.01	1.51±0.01	1.84±0.01	1.85±0.01
30% CO2	0.70±0.01	1.31±0.05	1.34±0.01	1.52±0.00	1.72±0.01	2.12±0.01	2.20±0.01
40% CO2	0.83±0.01	1.18±0.01	1.50±0.01	1.54±0.01	2.02±0.00	2.01±0.01	2.17±0.01

Absorbance (optical density) was taken from Spectro photometrically at 680 nm. Age of the algae: 10 days old

Table 2. Effect of different concentration of pH on growth of *Spirullina* species

pH treatment	pH treatment period(days)						
	0	2	4	6	8	10	12
6.4	0.52±0.01	0.85±0.01	1.12±0.00	1.31±0.01	1.52±0.02	2.01±0.01	2.11±0.00
7.0	0.63±0.01	1.15±0.00	1.20±0.01	1.30±0.06	1.80±0.01	1.83±0.01	1.93±0.07
7.4	0.91±0.01	1.01±0.00	1.21±0.01	1.51±0.01	1.81±0.01	1.82±0.01	2.12±0.01
8.0	0.73±0.01	1.36±0.05	1.35±0.01	1.50±0.00	1.74±0.01	2.12±0.01	2.20±0.01
8.4	0.86±0.01	1.16±0.01	1.54±0.01	1.53±0.01	2.00±0.00	2.01±0.01	2.10±0.01

Absorbance (optical density) was taken from Spectro photometrically at 680 nm. Age of the algae: 10 days old

Treatment of pH

The growth of algae essentially depends upon H-ion concentration of the medium. Therefore, a series of experiments was performed to study growth of *Spirullina* species with pH ranging from 6.4 to 8.4, the pH was adjusted by 0.1 NaOH/HCl. The experiment was carried out for 30 days.

III. RESULTS

Effect of CO2 concentration on cell growth (*Spirullina* species)

The biomass concentration values measured as optical density (OD) at 680 nm for *Spirullina* species growing in the presence of four different concentrations of CO2 that is, 10, 20, 30 and 40%. OD was higher when *Spirullina* species grown under 30% CO2 concentration. The maximum OD (2.20±0.01) was in 30% CO2

concentration and minimum (0.60±0.01) in 10% CO_2 concentrations (Table 1). As compare to control the optical density was high in all four CO_2 concentrations.

Effect of pH on the growth

It was observed that the growth of *Spirullina* species at pH 7.4 showed marked increase in the growth, indicating the alkaline pH is necessary for growth of the micro-algae (Table 2).

IV. DISCUSSION

Effect of CO2 concentration on cell growth (*Spirullina* species)

CO_2 concentration (10, 20, 30 and 40%) shown remarkable growth at 30% CO_2 concentration. It was reported that maximum growth of HA-1 strain ,identified as genus Chlorella at 10% CO_2 enriched air flowing conditions, and under a broad range of physically controlled conditions showed a good growth rate. This result conclude that Chlorella KR-1 is a promising strain to grow at extremely high CO_2 concentrations (Sung et al., 1999). The Scenedesmus obliquus were significantly showed lower growth i.e 28.08% and 13.56% when growing on 6 and 12% CO_2 according to Morais and Costa (2007). The capture efficiency has been shown to be as high as 99% when operating under optimum conditions(Zeiler et al., 1995). The cultures under bubbling of 10% CO_2 tolerant microalgae was isolated and identified as Thalassiosira weissflogii H1 was reported by Ishida et.al.(2000).The growth yield under 20% CO_2 markedly decreased but there was no significant difference between the growth yields of this diatom under bubbling air, 5% CO_2 and 10% CO_2.

Effect of pH on the growth

Different pH values were selected (6.4 to 8.4) for studying the maximum growth. It was observed that the algae at pH 7.4 to 8.0 showed marked increase in the growth indicating that alkaline pH is necessary for the growth of micro-algae (*Spirullina* species). As it was reported that the intracellular pH value decreased from 7.0 to 6.4 when air-grown Chlorococcum littorale cells were exposed to 40% CO_2 for 1 to 2 h, but noticeable decline was not observed. Both air and 5% CO_2 grown cells of Chlorella species UK001, It is resistant to extremely high CO_2 concentrations grew in 40% CO_2 without any lag period. *Spirullina* species can be cultivated between pH ranges from 6.4to 8.4, This was the finding of the experiment..

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Malathion Induced Alterations in Liver of Major Carp Labeo Rohita

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ABSTRACT

Malathion is an insecticide of group organophosphorus showing strong insecticide properties accompanied by low toxicity for vertebrates. The present study shows the malathion induced alterations in the biochemicals of liver of major carp Labeo rohita exposed to sublethal dose for 30 days. Glycogen, Protein and Cholesterol of liver was estimated on 10th, 20th, and 30th day. The liver glycogen was found to be depleted significantly after 10 and 20 days of exposure. However, it increased after 30 days. Liver protein was elevated after 20 days of exposure, but after 30 days of treatment it depleted significantly. The fish exhibited elevated liver cholesterol during the exposure of 30 days.

Keywords: Malathion, Labeo rohita, Glycogen, Protein, Cholesterol.

I. INTRODUCTION

Pesticides are substances intended for preventing or destroying pest. It may be a chemical or biological agent used against any pest. Although there are benefits of use of the pesticides, some also have drawbacks such as potential toxic to humans and other animals. Pesticides are one of the most alarming toxic substances that are deliberately added to our environment. But it is matter of concern that along with the pest they prove harmful to many other living beings. Pesticides which are commonly used in India are those belonging to the organophosphorus groups, carbamates group, organochlorines and pyrethroid.

In recent year organophosphorus has gained importance due to ban on organochlorine groups i.e. DDT, Aldrin, Lindane and endosulfan. These pesticides have a tendency to persist and have potential to bioaccumulate in the body (Kamein M.A 1997). Malathion is an insecticide of group organophosphorus showing strong insecticide properties accompanied by low toxicity for vertebrate. Metabolism of malathion in bodies of vertebrates and invertebrates in complex. As a result of metabolic changes with contribution of phosphatase and carboxy esterase, many metabolites are produced (malaoxon) of varied toxicity, which may be reflected by the level of cholinestarase inhibition.The greatest accumalathion of pesticides in liver and kidney seen after intravenous administration to albino rat followed by an oral and dermal administration. Marrs TC etal. (2002).

II. MATERIAL AND METHOD

Fish - The major carp weighing about 125+2 gm were selected for the present study and were collected from state government fish farm Mahan (dist. Akola) and were disinfected in 1% $KMnO_4$ solution to avoid dermal infections. The dechlorinated aged tap water was used in the experiment. A static model ecosystem was established in the laboratory glass aquaria. Fish were fed with common fish food once a day in the morning at about 10:00 am.

Observation was made for 24 hrs. from which different concentration was selected for full scale experiment. Experiment was conducted with 25 lit. of pesticides treated water containing 10 starved fishes. The intermediate sets of concentration were prepared. LC 50 was calculated. The sublethal dose of malathion (0.5ppm) was determined to conduct final set of experiment. Final experiment has 2 group of fishes.

Group 1: Consist of control fishes (*Labeo rohita*, maintained in aged tap water in large aquarium.

Group 2: Consist of 10 experimental fishes (*Labeo rohita*) exposed to sublethal dose of malathion. During the experimental period of 30 days the water was continuously aerated. Fish were feed with mixture of rice bran and groundnut oil cake in the morning at about 10:00 am. Experiment were replicated and data was subjected to statistical analysis for students test.

Fishes in each group were used to study various biochemical parameters in liver. Liver was dissected out and washed in chilled fish saline, weighed and homogenized. Homogenates were prepared in different media as per the requirement of the techniques involved.

Glycogen, protein and cholesterol were estimated in control as well as experimental fishes. All the results of biochemical studies are expressed as means plus or minus SE of the means. Statistical analysis were carried out using student t test. The differences were considered statistically significant when $P < 0.05$.

III. RESULTS AND DISCUSSION:

TABLE 1

Alteration in liver biochemicals of the fish, *Labeo rohita* following exposure to sublethal concentration of malathion for 30 days.

Parameters	Control	Days		
		10	20	30
Glycogen (mg/g)	15.61 ± 00.28	10.29* ± 0.16 (-34.09)	13.16* ± 0.42 (-15.70)	18.66* ± 0.86 (+19.53)
Protein (mg/g)	131.86 ± 04.68	121.24[NS] ± 3.29 (-8.06)	196.40* ± 8.15 (+48.94)	74.72* ± 1.82 (-43.34)
Cholesterol (mg/g)	76.95 ± 01.24	89.72[NS] ± 4.28 (+16.59)	124.00* ± 2.66 (+61.14)	137.55* ± 2.16 (+78.75)

Values are mean ± SE of 5 individual observations

Values in parenthesis are percent change over control

*Values are significant of 5 % level (p<0.05); NS- Not Significant.
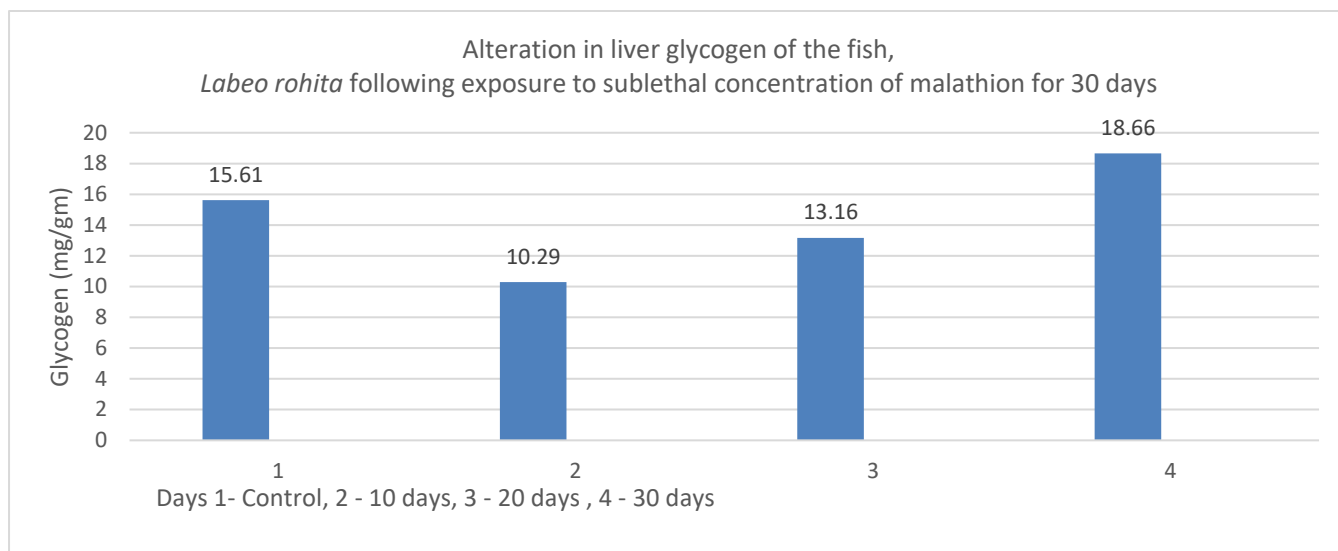
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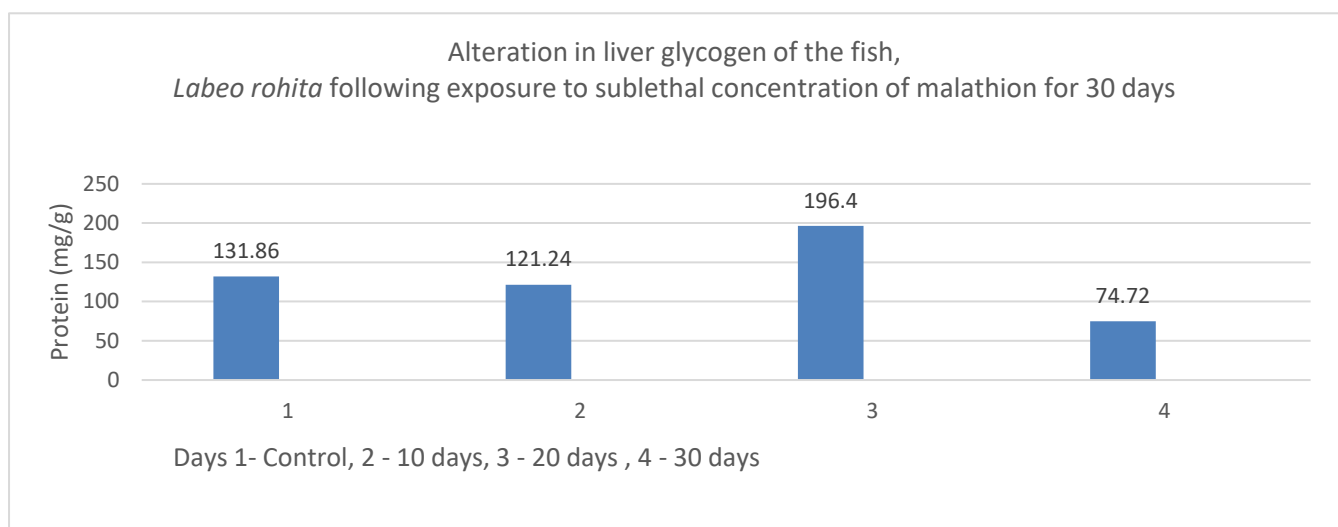
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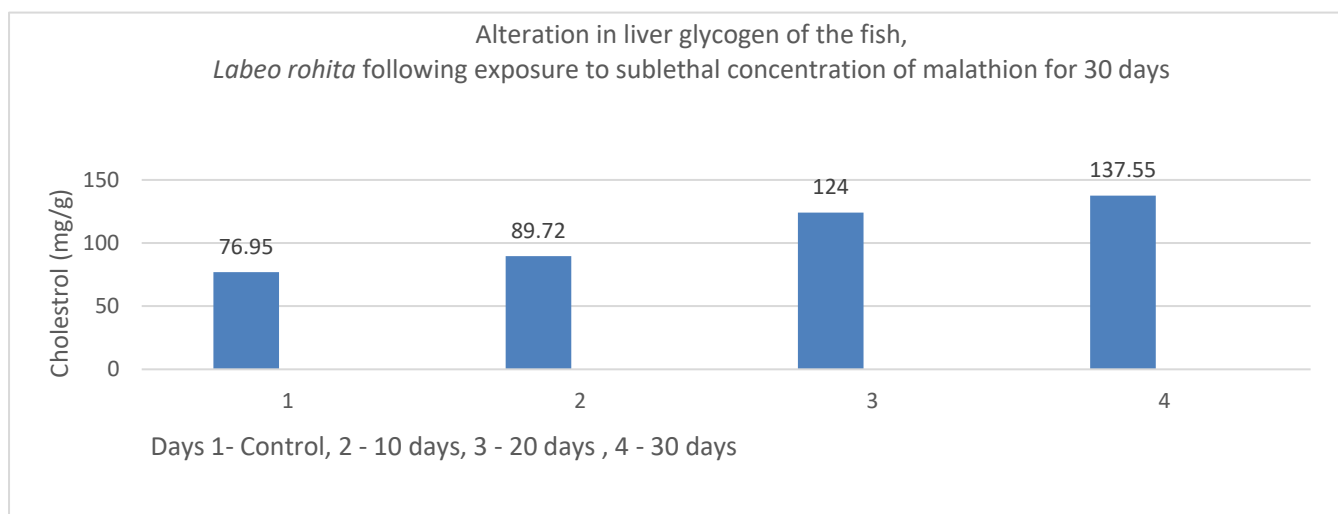
Fig. 3

Glycogen, protein and cholesterol was estimated in fish *Labeo rohita* after exposure to sublethal dose of malathion for 10, 20 and 30 days. The liver glycogen content was found to be depleted significantly after 10 and 20 days of exposure ($P< 0.05$). The depletion was 34.9% after 10 days and 15.7% after 20 days of exposure. However, a significant elevated level of glycogen was found after 30 days of exposure.

Liver protein were found elevated tremendously after 20 days of exposure (48.94%) but after 30 days of treatment there was a significant protein depletion in liver registering -43.34% over the control.

The fish exhibited elevated liver cholesterol content.

The decreased glycogen content in liver indicate that, liver, a vital organ of carbohydrate metabolism was adversely affected by malathion. Fish liver is a primary organ for detoxification and hence is expected that toxicants would reach there in abundance for detoxification and disposal. Dezwaan and Zandee (1972) stated that an overall decrease in glycogen levels in the tissues might be due to prevalence of hypoxic/anoxic conditions, which are known to increase carbohydrate utilization.

After 20 days of exposure there was a highly significant increase in the liver protein. The increase of protein content reflects simultaneous protein synthesis of detoxification enzymes at the expense of glycogen to meet additional energy requirements in synthetic activity of tissue.

The observed increase in cholesterol in the liver may be due to increased mobilization of fat and transport to the liver. The present result are in agreement with those of (Dezwaan and Zandee,1972 ; Vasanthi et.al;1990 ; Datta et. Al 1993 and Oluch 1999).

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Botanicals Sold by Herbal Vendors Employed for Skin Diseases in North Maharashtra

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ABSTRACT

Ethno-medicinal plants have traditionally occupy an important position in socio-cultural and socio-economic arena of rural and tribal societies. The present authors surveyed, Nasik, Nandurbar, Dhule, Jalgaon and Buldhana Districts of North Maharashtra for the traditional knowledge of herbal vendors, since July 2009. This paper particularly reports drugs sold by vendors to combat various skin diseases such as mouth sores, itching, boils-with pus, pimples, ringworms, black pots, eczema, scabies, bile, hair blister etc. Total 24 species belonging 24 genera and 19 angiospermic families are included. They employ various plants parts like rhizome, stem barks, leaves, flowers, fruits, seeds or entire plants and some domestic substances. The paper shows correct botanical names, local names, parts used types of medicinal recipes and doses prescribed by the herbal vendors. These drugs if studied on scientific lines, may yield valuable lead molecules and serve as additional sources of medicine.

Keywords: Herbal, Vendors, Ethnomedicine North Mahrashtra

I. INTRODUCTION

Medicinal plants have been crucial in sustaining the health and well-being of mankind. It is generally agreed that major section of population especially in developing and underdeveloped countries seek healthcare from sources other rhan conventional medicines. They also seek help of some organized systems of medicine like Ayurveda, Unani, Siddha etc. Apart from these every community or village has a wealth of herbal folklore. Our ancestors possessed a profound understanding of healing powers of plants. They used to try and test local plants for a range of common health problems. These ancient healing practices are still vogue in a period when different well-thought and organized systems of medicine are in practice all over the world. Their knowledge has been passed orally generation-to-generation since long past. India is one such country having the oldest system of healing in the world. Moreover, tribal and rural societies in India still have their choices of indigenous drug selection and application. A review of literature indicates the Herbal Vendors (Jadibutiwalas) and their traditional knowledge about plant drugs has remained untapped. They have been always ignored in

our country. In India Sinha (1998) has attempted on this line and studied Delhi and surrounding areas. The present authors investigated, some districts of north-western part of Maharashtea. *viz.* Dhule, Nandurbar, Nashik, Jalgaon and Buldhana. Information of 24 plants species used for various human ailments are being communicated in this paper.

II. MATERIAL AND METHODS

Herbal vendors wandering in north Maharashtra are tapped and enquiries w.r.t. plant drug, recipe, administration plant names, precautionary tips and diseases treated are noted. Plants samples or products are purchased / collected and presented scientifically. They are identified by using various regional, state and national floras in India. (Cooke, 1958; Naik, 1998; Sharma *et al.,* 1996 Singh *et al* 2000; Patil 2003 and Kshirsagar and Patil 2008) Repeated surveys were conducted in different villages, towns and cities of North Maharashtra. Information regarding remedies related especially to the human diseases was recorded. The data adduced is based on personal interviews, observations and experiences of vendors in the region. The data is compared with the classical literature (Anonymous 1948-1976; Ambasta 1986; Jain 1991; Watt 1889-1893 etc.). Asterisk to the plant species indicate reports in classical literature.

These are presented in the following table-I.

Observations: During our Intensive Survey the observations are Provided in Tabular Form

Table – I : Enumaration of identified botanical and utilities

Sr. No	Botanical Name (Family)	Vernacular Name	Part Used	Recipe and Administration
I	**Abitulon indicum** (L.) Sweet (Malvaceae)	Atiwalal Dabala	Stem bark	Decoction of stem bark is used for 7 days at night to cure black patches of skin.
II	*Alangium salvifolium (L.,f.) Wang. (Alangiaceae)	Ankol	Root's	Slurry obtained from roots is administered. One teaspoon twice daily for five days is advised to reduce Poisoning role of bile.
III	Alstonia scholaris R. Br. (Apocynaceae)	Saptaparni	Stem bark	Stem bark is burnt and smoke is passed over body and ash is wrapped over body of person suffering from skin itching.
IV	**Azadirachta indica A.Juss (Meliaceae)	Kadu-Nimb	Stem bark	1) The fresh slices of internal bark juice and one drop is mounted on eye's for three four night's against sore's in eyes. 2) Ash of stem Bark is mixed with coconut oil (Cocus nuecifora L.) and the paste after bath is applied morning and evening against scabies It is treated till it cures.

V	**Barleria prionitis** L. (Acanthaceae)	Kate-koranti	Leaves	Leaf juice of this plant mixed with powder of (*Cuminum cyminum* L.) orally twice daily for ten day's in complaints of burning micturation.
VI	**Cardiospermum halicacabum** L. (Sapindaceae)	Kapalphodi	Roots	Roots are boiled in half cup water and mixed in spoonfull mustard oil (*Brassica compestris* L.) Brassecaceae. This paste is applied on skin for ten days to cure skin diseases.
VII	**Carissa congesta** Wight. (Apocynaceae)	Karawand	Roots/ Seed's	Root powder is mixed with one two drops of lemon juice (citrus aurantifolia L.) and Camphor (*Cinamomum comphora* (L.) Presl) 1 to 2 ml of horse Urine and the paste is applied on affected parts of skin for ten days to cure white spots on skin.
VIII	*Cayratia auriculata (Wall. ex Wight & Arn.) Gamble (Vitaceae)	Ambatwel / Amlaparni	Leaves	A fistful of leaves are crushed and juice is squeezed out. It is applied once daily for four days after bath to cure ring-worms.
IX	*Chenopodium murale L. (Chenapodiaceae)	Bathua Chill	Seed's	one spoonful of Seed powder is mixed with honey and consumed at night for three days to cure bile problems.
X	**Cinnamomum zeylanicum Bl. (Lauraceae)	Dalchini	Stem bark	Stem bark powder is applied on infected parts of body for three days to cures scabies.
XI	**Cullen corylifolia** L. (Fabaceae)	Bhapad/ bawanchi	Leaves, Entire plants	1) Dried leaves are kept in sunlight for a day and fine powder prepared. It is applied on infected part for Seven days. It is useful against scabies. 2) Four to five plants are ground into fine paste, this paste, is applied at bed time for ten to fifteen days to clear white spots on skin.
XII	**Daucas carota** L. (Apiaceae)	Gajar	Roots	Crushed roots are heated and pinch of salt is added and paste is applied on skin for three days at night to cure eczema and ringworms.
XIII	*Emblica officinalis Gaertn. (Euphorbiaceae)	Avala	Seeds	Seed ash is mixed with coconut oil (*Cocus nuecifera* L.) and this paste is applied for four nights on scabies till it cures.
XIV	**Helicteris. isora** L.	Murad	Leaves	Paste of fresh leaves daily applied for three

	(Sterculaceae)	sheng		days at night to cure eczema till it cures.
XV	**Helianthus annuus** L. (Asteraceae)	Suryaful	Roots	Roots paste is applied on vagina at night for six days to cure itching and burning sensation of vagina
XVI	Jasminum officinale L. (Oleaceae)	Chameli	Leaves flowers	Leaf and flowers paste is applied on skin for three days to cure boils and skin related problems.
XVII	Mallotus philippensis (Lam.) Muell.-Arg. (Euphorbiaceae)	Sindur / shendri / Kapila	Stem bark	Twenty five gm stem bark powder of this plant mixed with oil of (*Sessamum oriantale* L.) then it is boiled and cooled. This oil is applied on affected skin for four days to cure ring worm and itching of skin.
XVIII	Ocimum basilicum L. (Lamiaceae)	Karpuri tulas	Entire plant	Three fistful of plants twigs are crushed and the paste is obtained. It is applied on twice a day for four day's to cure ring worms.
XIX	**Papaver rhoeas L. (Papaveraceae)	Lalbehaman Janglimudrika	Stem bark, latex	The latex is collected from incision of unripe capsule wall. If The latex is applied on legs for three night's to cure eczema.
XX	Pongamia pinnata (L.) Pierre. (Fabaceae)	Karanj	Seeds	1.Drid seed powder is made into paste and is applied on body for 4-5 days to releve skin problems. 2.Seed oil is applied on skin parts for one month to cure ring worms.
XXI	*Phyla nodiflora (L.) Greene (Verbenaceae)	Fikipalam/ jalpai / jalpimpri	Leaves Stem bark	Dried leaves and stem bark powder is mixed with honey and Castor oil (*Ricinus communis* L.) are mixed together. It is made in to pellets These pellets are advised twice daily for fifteen days to treat ratches and itching of skin.
XXII	**Plantago ovata Forssk.. (Plantaginaceae)	Esabgol	Seeds	Seed paste is applied on affected part of skin at four nights to cure eczema.
XXIII	**Vernonia anthelmintica (L.) Willd. (Asteraceae)	Kadu jira kalajira.	Seeds	Seed powder about one teaspoonful is taken orally for a month. is useful in treatment of skin allergy (black spots).
XXIV	**Wrightia tinctoria R. Br. (Apocynaceae)	Dhudhkudi kadukuida	Seeds	Paste of seeds powder is applied on affected part of skin for seven days at morning and evening as remedy against burning of skin.

III. RESULT

The present authors came across some botanicals used by vendors to treat various human skin diseases in North Maharashtra. Presently, botanicals belonging to 24 plant species of 24 genera belonging to 19 families are communicated. All are angiosperms. Of these, (01) species are exotic. The number of wild (19) and 06 species are used as supplementary (06) source. It is to noted that (05) plant species are cultivated ones. These are advised to employ botanical in the form of various medicinal recipes e.g. decoction (01), Powder (09), juice (02), paste (11), pillates (01), pulp (01), ash (03), latex (01) oil (02) and slurry (01). These recipes are prepared using Leaves (06), Seeds (05), roots (05), stem bark (06), entire plant (02), and flowers (01).

IV. DISCUSSION

Comparative study of ethno medicinal claims indicated that 16 species, which on Comparison with classical literature, are being reported useful for first time from India. There are Eleven species *viz. Abitulon indicum, Azadirachta indica, Barleria prionitis, Cardiospermum halicacabum, Cinnamomum zeylanicum, Daucas carota, Helianthus annuus, Papaver rhoeas, Plantago ovata, Vernonia anthelmintica, and Wrightia tinctoria.* Which are reported earlier useful for the affliction under study but the parts use employed are different. Even they are used raw or sometimes simply warmed. In many cases, they use them as a sole drug or occasionally supplemented by other botanicals or substances like honey, salt, oil, Leman juice, Camphor(06) etc. They used these to combat common (10) diseases such as sores in mouth, skin itching, piles, boils with pus, pimples , ringworm , black spots, eczema , scabies, white spots, bile, hair blister, sores in eyes etc. The herbal vendors carry on their business traditionally especially in publics places like, railway stations, bus-stations, weekly bazaar, famous temples, pilgrims, special gatherings, courts, government. Offices, main roads, etc. Even in modern period, many people purchase medicines from them. It is not scientifically verified by the vendors and hence it is advisable to testify these bio resources in laboratories. Such attempts will authenticate these claims and may add new or additional source of medicines

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A Comparative Experiment Study on Supervised Classifier SMO – Support Vector Classifier and Unsupervised Hierarchical Cluster for Chronic Kidney Disease Data Statistics

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ABSTRACT

The researcher using a classification method for the comparative study of chronic kidney patient analysis of data for Supervised with SMO – SVM and Unsupervised Hierarchical Clustering function. Now we are proposed best model by applying the Chronic kidney disease data contains 25 attributes and 400 instances including class, First, we are applying Supervised- classify – SMO- SVM- One Attributes – htnVs Class, Applying Cross- validation from 4 to 15 + 70% split, Calibrator: Logistic and Kernel: Polynomial, and found the result, the summary of classifier model value of ROC area for CV fold using 4 is 0.794 and the weighted average is same for all CKD, not-CKD class value is also 0.794, the accuracy of correctly classified instances 74.25 % as well as the result of a Confusion matrix is same for all Cross-Validation Folds from 5 to 15, the value of ROC area CCI is same for all CV folds from 5 to 15.

And similarly, the researcher is using Second, Step-2 by applying two attributes (htn, appetVs Class),– Two Attribute with Supervised- classify – SMO- SVM- Applying Cross-validation folds from 4 to 15 + 70% split, Calibrator: Logistic and Kernel: Polynomial function to check further prediction and trying to increase the better accuracy as compared to the earlier model, during practical research found the result the summary of classifier model value of ROC area is by using CV folds is 4 the value of ROC Area is 0.868 and CV fold is 5 the result of ROC area is 0.844. The accuracy of the result of summary classifier model by applying CV Fold is 4 and the accuracy of correctly classified instances is 83.33 %, the researcher also checks the CCI accuracy by increasing CV fold from 5 to 15, but the result is not getting the higher accuracy, as well as the value of Confusion matrix, is same for all Cross-Validation Folds from 6 to 15, the value of ROC area CCI is same for all CV folds from 6 to 15.

Similarly, research also trying to increased accuracy and allying Third, Step-3 (24-Full Vs Class) – by using Full Attribute, Supervised- classify – SMO- SVM- Full 24 Attributes – 24 Attributes Vs Class (CKD and not-CKD), Applying Cross-validation from 4 to 15 + 70% split, Calibrator: Logistic and Kernel: Polynomial

function and found the result of accuracy by the class value of ROC Area is near to value 1 i.e 0.988 with accepting the value of CV fold is 4,7,11,12,13 and the another highest accuracy value of ROC Area is 0.990 which is equal to value 1.000 with accepting the value of CV folds is 5,6,8,9,10,14,15 which is the highest accuracy, similarly the value of CCI is

98.50 % for CV fold is 4, 7, 11, 12 & 13 & 98.75 % for CV folds are 5,6,8,9,10,14,15, the result is same for confusion matrix also by using same CV folds.

Again researcher is also comparing the result with unsupervised, hierarchical clustering algorithm by applying full attributes i.e of 24 attributes with 400 instances, also found the best and accurate result and highest accuracy is the prediction of hierarchical algorithm model.

Therefore, found the best model prediction for Supervised- SMO in WEKA on the basis of three test using calibrator of logistic and kernel using polynomial function by applying Cross Validation Folds from 4 to 15(Train on a portion of the data and test on the remainder) with 70% split, and final prediction is, increasing the no of attributes the accuracy of Correctly Classified Instances (CCI), ROC Area value and Confusion matrix value increased. Similarly research is also found to confirm predict the result of Unsupervised Hierarchical Clustering algorithm by applying full attributes also confirm prediction is increasing the number of Clusters from 2,3,4 and 5 for both Euclidean and Manhattan Function, the accuracy of result in terms of better and accurate clusters found. The adopted methodology clears the process of practical.

I. INTRODUCTION

INTRODUCTION

to Now the computer science techniques likeoptimized association rule mining techniques is using for improved Genetic Algorithmsdata mining and machine learning are used to study the power of various parameters and make predictions of the based on different data sets. Data mining techniques is the process of identifying the hidden patterns from the big and tedious data.This may provide a vital role in the decision making for large data, not only agriculture but also health-related problems.Bharara et al. [3] reviewed to extractfor business operations using Data Mining techniques.Ariff et al. [2] studied RFID based systematic livestock health management system. Jinyin [7] performed a novel cluster center is the fast determination clustering algorithm. DilliArasu and Thirumalaiselvi [1] dealt for novel imputation techniques for the effective type of predictions of kidney disease patients. ZouChuan et al. [4] performed an applied study of Guangdong provincial hospital of traditional Chinatreatment.Guangzhou and explore clustering analysis for syndrome evolution peritoneal dialysis patients. Kunwar et al. [9] studied and analyzed Chronic in terms of permanent Kidney Disease harnessing of data mining for classification techniques. AnhLuong [5] applied K- Means

Approach to Clustering disease Progressions.Sabri [6] used data mining techniques for segmenting customers' information. Kumar and Lhatri[10] used WEKA is used for medical related data classification and to find early disease prediction.Khanna [10], NCBI [12] performed a study on the economics of Dialysis in India. J Nephrol [13] studied the occurrence of chronic kidney disease in India, and where are we heading?Uboltham et al. [11] performed a diagnostic study of acute kidney injury using the KDIGO guideline approach.This paper Experiment has carried out on chronic kidney disease patient based on their relationship attributes, nowadays chronic kidney disease patient in India is increased day by day because of their eating habit and other health issues. Still, from the last ten years, CKD patient numbers it is increased tremendously Indian Journal of Nephrology et al.[12], therefore, in future this kind of research which will be helpful to the doctors or medical industry for prediction of CKD and not CKD patient based on their other health parameters, to minimize the growth rate of CKD patients and to control further damages of the kidney. Data mining plays an active role in predicting future kidney-related health problems. In this research paper, three algorithms it has been analyzed one is NB Classifier, J48, and Random Forest Decision Tree.Data cleaning in DM is used to removal of noise and inconsistent data with data integration technique with the combination of multiple types of data.To evaluate the data, we have used secondary data and it is retrieved from UCI machine learning repository [14]. Jnephrol [13], with increasing life period and the frequency of lifestyle disease, the US has seen a 30% considerable growth in the widespread presence of CKD in the last decade. Unfortunately, from India, there is no longitudinal study and limited data on the incidence of CK. At present, the living standard of the people and the daily consumption of food are adversely affecting their health, especially their everyday living, which is increasing the number of kidney diseases in India every day. His anatomy also depended on the diet of people 40 years ago or older, but today, kidney disease is not only limited to people with diabetes or hypertension, but it has many causes. Chemical cereals, vegetables, fruits are the result of all these things, This is our daily food, and where the result is not where we are on the kidney, so the loss of kidney function slowly and then become kidney failure, such things are growing. According to reference Jnephrol [13], unfortunately, from India, there is no longitudinal study of CKD and limited data. So because of all of the above, we have tried to analyze acute kidney disease by using Naïve Bayes, decision tree J48, and random forest algorithm unprocessed learning technique. Indeed, the purpose of our research is to use our research to analyze kidney disease or whether it can cause kidney disease in the future.
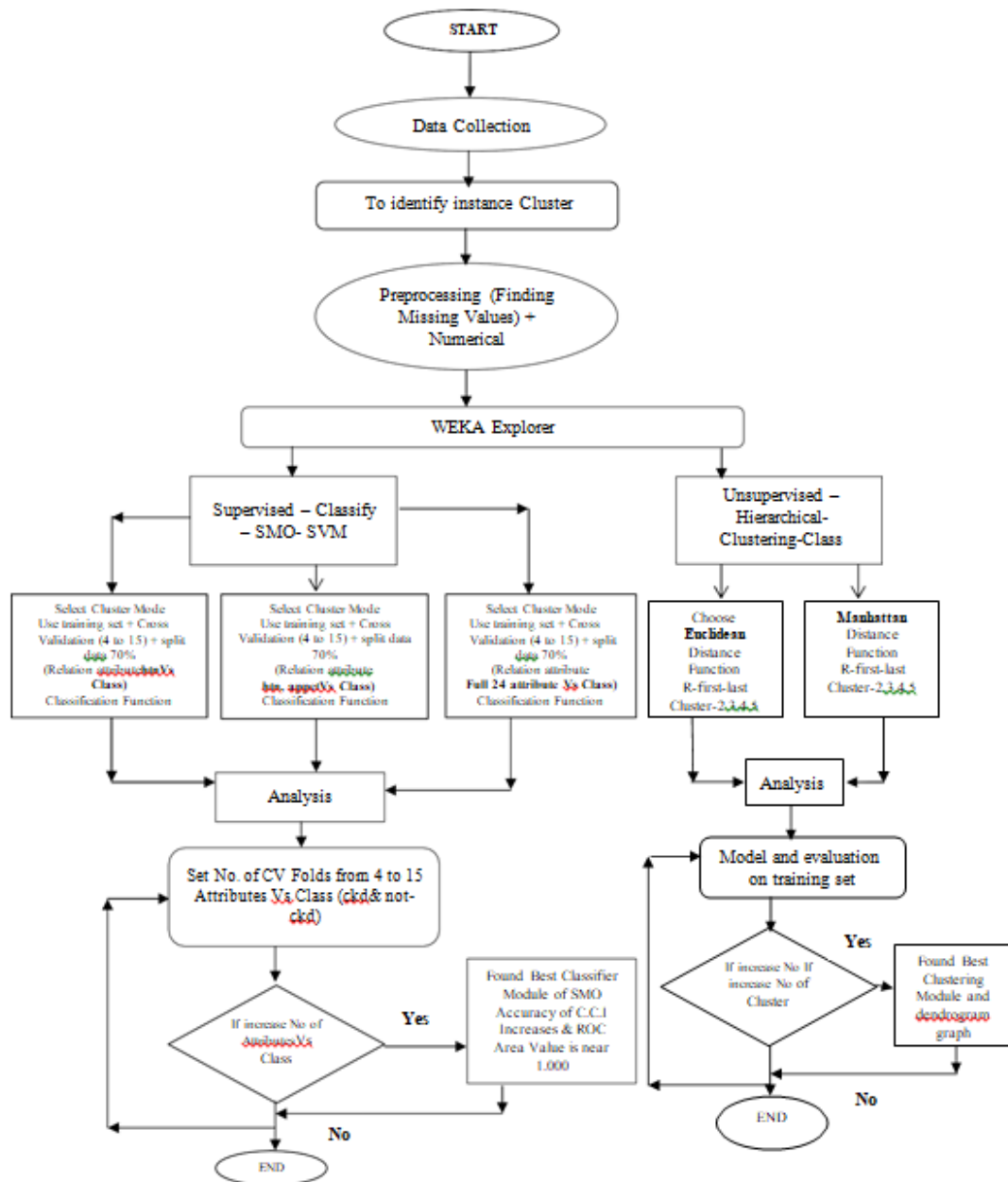
Figure 1: Adopted methodology flowchart

II. RESULT AND DISCUSSION

We are using a chronic kidney failure disease dataset, in dataset training database perfection for the Supervised SMO- SVM function and Unsupervised Hierarchical clustering techniques, and select   some parameters 1. RBC count 2. Hyper-tension (BP) 3.Diabetes M. 4.Coronary disease 5.Appetite 6.Pedal Edema 7. Anemia, we are using WEKA tool for classifying and Clustering algorithms of data usingLogistic and Polynomial function as well as Euclidean and Manhattan distance function.

The clinical data ofkidney disease of 400 records considered for analysis has taken from the standard Machine Learning website. The data obtained after cleaning and removing missing values for further analysis, the data

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contains 25 attributes in the dataset with class (CKD and Not-CKD) and Class distribution is (63% for CKD and 37% for not CKD).

III. RESULT & ANALYSIS

The result of experiment is to be compared of SMO Classification – SVM algorithm with Hierarchical Clustering algorithm are made established on the basis of performancein terms of high accuracy with a minimum period processing. The following algorithm is to analyze through data; the results and analysis of all three algorithms are as follows.

Supervised – Classifier – SMO–SVM- One , Two and Full Attributes Test Results using Calibrator: Logistic and Kernel : Polynomial

Step-1

Step-1 (htnVs Class) – One Attribute

Supervised- classify – SMO- SVM- 2 Attributes – htnVs Class Applying Cross validation from 4 to 15 + 70% split Calibrator: Logistic and Kernel: Polynomial
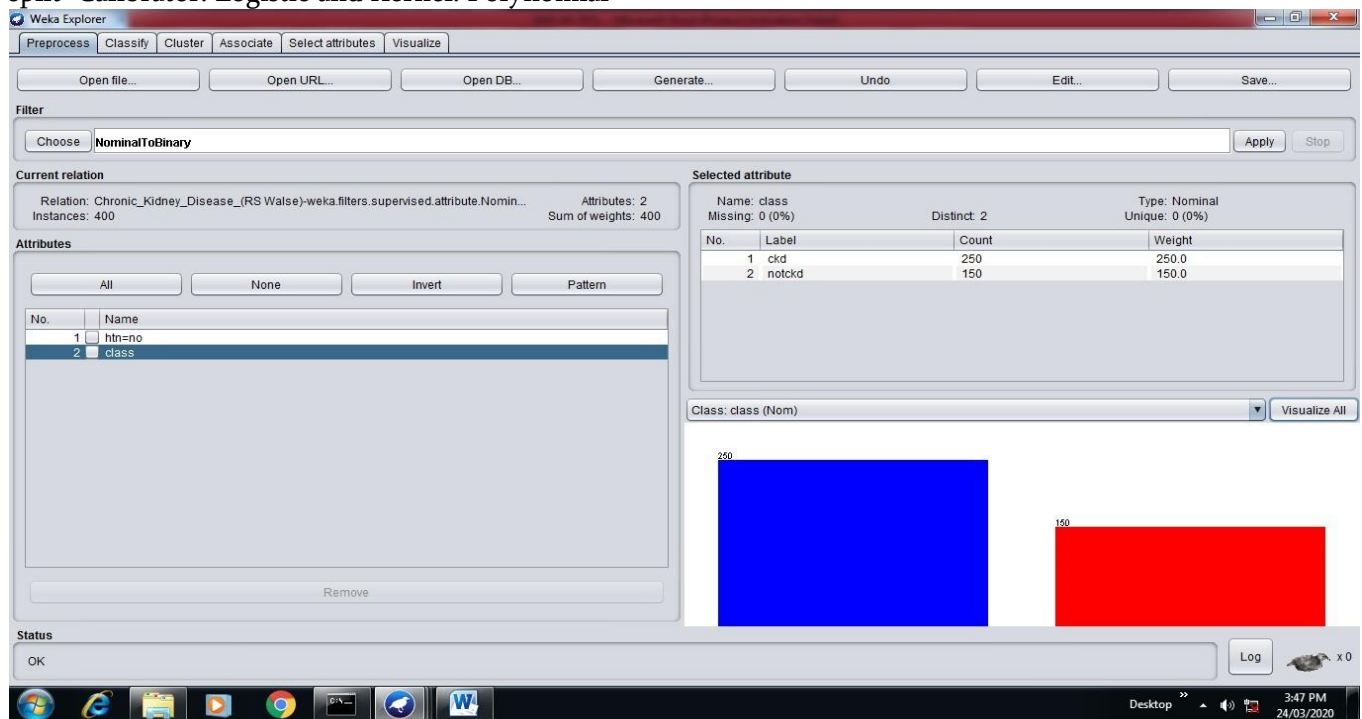
Figure: 2 Preprocess of imported data in WEKA
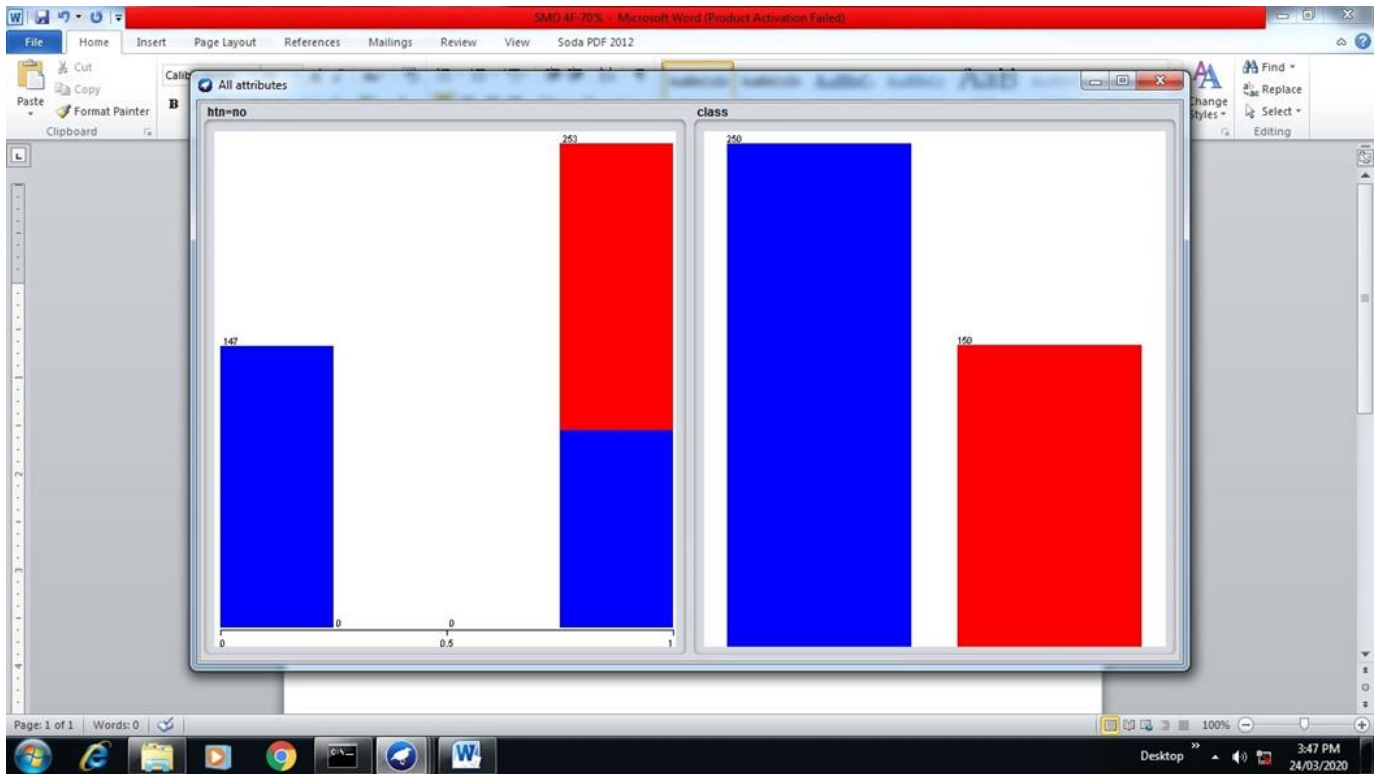
Figure: 3Histogram of data set in WEKA
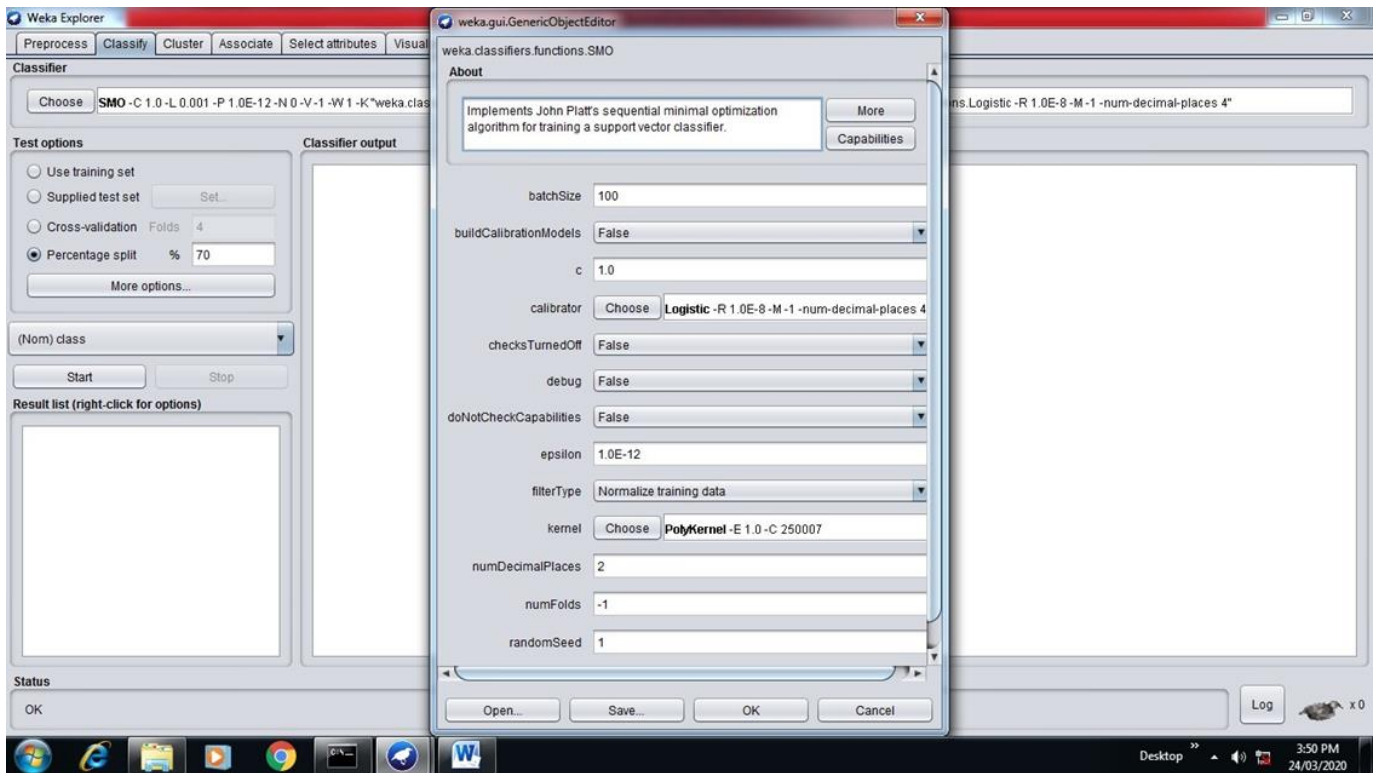
Figure: 4SMO – applying sequential minimal optimization algorithm for training a support vector classifier
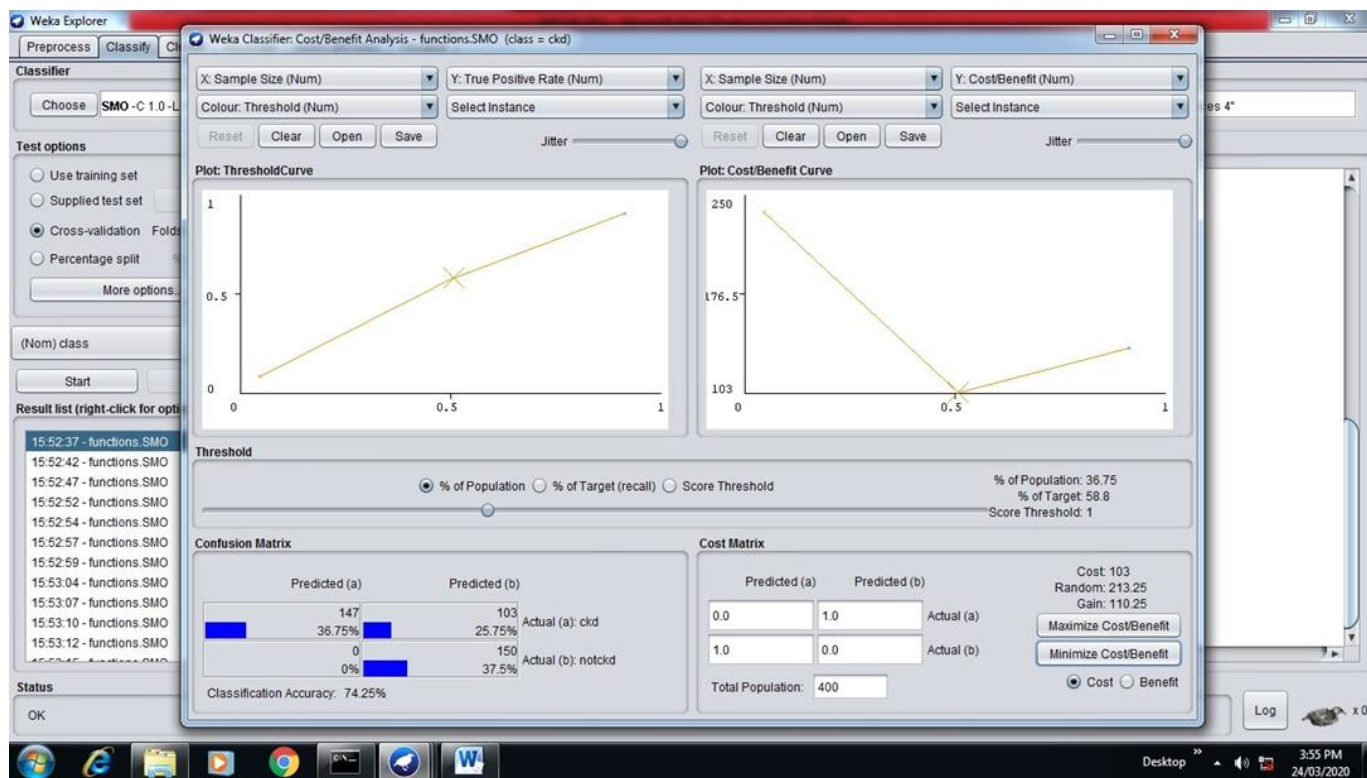
Figure: 5Wekaclassifier : Cost / Benefit analysis: Function SMO (class-Ckd)
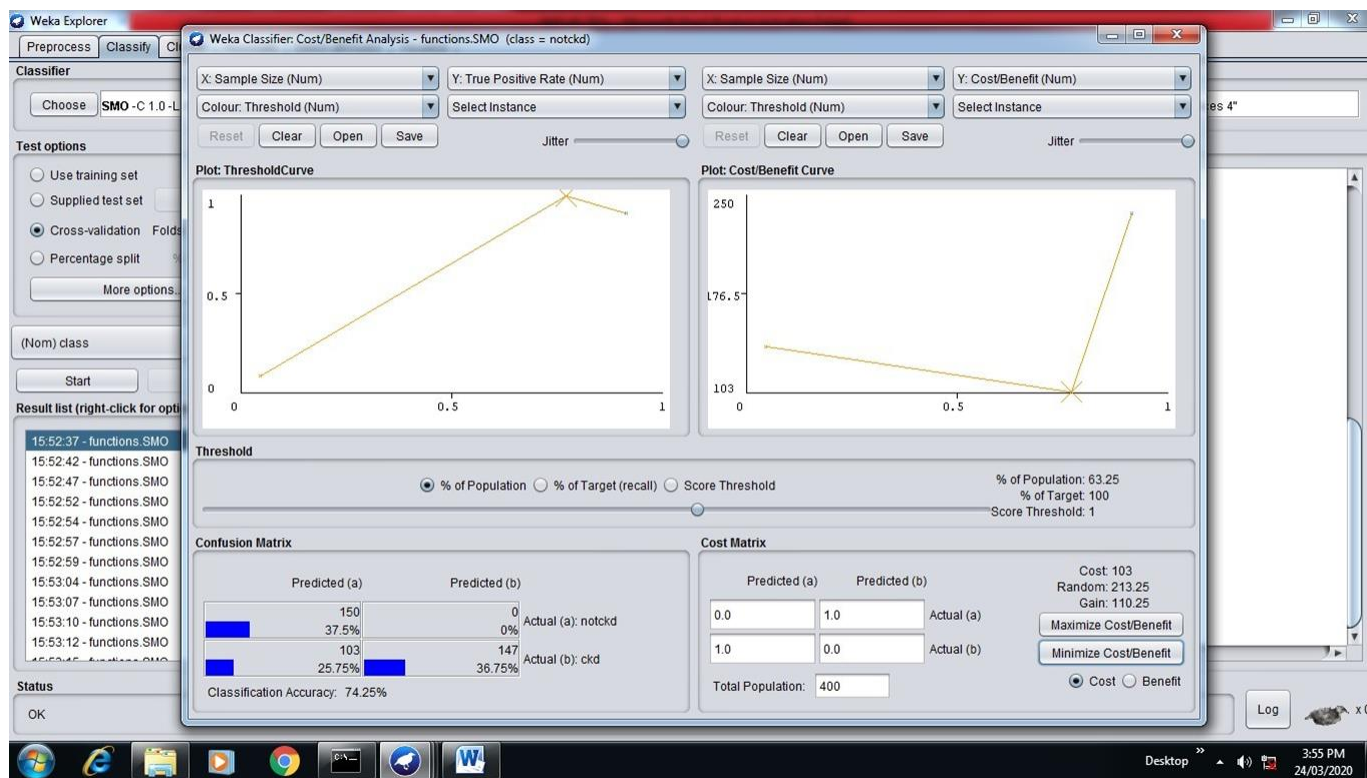
Figure: 6Wekaclassifier : Cost / Benefit analysis: Function SMO (class-Not-Ckd)

Supervised – Classifier – SMO Function Step-1

Step-1 (htnVs Class) – One Attribute

Supervised- classify – SMO- SVM- 2 Attributes – htnVs Class Applying Cross validation from 4 to 15 + 70% split Calibrator: Logistic and Kernel: Polynomial

=== Classifier model (full training set) ===, SMO ,Kernel used:Linear Kernel: K(x,y) = <x,y>

Classifier for classes: ckd, notckdBinarySMO, Machine linear: showing attribute weights, not support vectors.

2   * (normalized) htn=no, -1

COMPARATIVE STUDY SUPERVISED OF SMO, CALIBRATOR: LOGISTIC AND KERNEL: POLYNOMICAL USING CROSS VALIDATION FOLD 4 TO 15 WITH 70% OF SPLIT CLASSIFIER

Table 1:Detailed accuracy by Class for htnVs class

Cross Validation Fold	Class	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area
4	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
5	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
6	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
7	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
8	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
9	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
10	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
11	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
12	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593

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	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
13	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
14	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
15	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
	Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
	Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
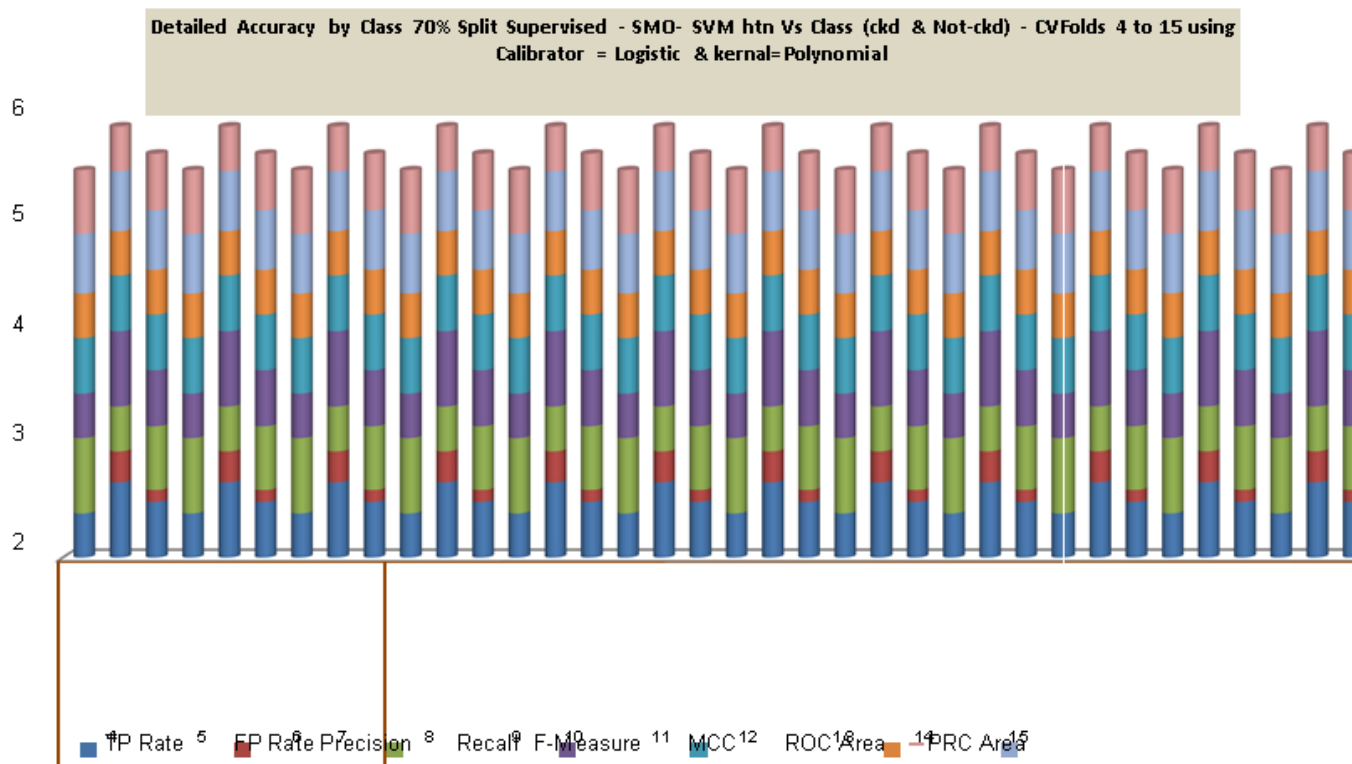
Figure: 7detailed accuracy by class Supervised SMo-SVM attributehtnVs class with CV folds 4 to 15 using Calibrator and Kernel function.

Table 2:S mmary of Classifier model (full training set) for htnVs Cla s

1.   Test Mode: split 70% , 2. Total Number of Instances=400

S r. N o .	Particul ar s	4	5	6	7	8	9	10	11	12	13	14	15

1	Correctly Classified Instances	74.25	74.25	74.25	74.25	74.25	74.25	74.25	74.25	74.25	74.25	74.25	74.25
2	Incorrectly Classified Instances	25.75	25.75	25.75	25.75	25.75	25.75	25.75	25.75	25.75	25.75	25.75	25.75
3	Kappa statistic	0.5177	0.5177	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517
4	Mean absolute error	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575	0.2575
5	Root mean squared error	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074	0.5074
6	Relative absolute error	54.90	54.9106	54.911	54.9098	54.91	54.91018	54.91031	54.91015	54.91017	54.9111	54.91013	54.911109	54.91114	54.91128
7	Root relative squared error	104.81	104.817	104.8165	104.8123	104.8121	104.8128	104.8172	104.8114	104.8113	104.8098	104.8122	104.8158
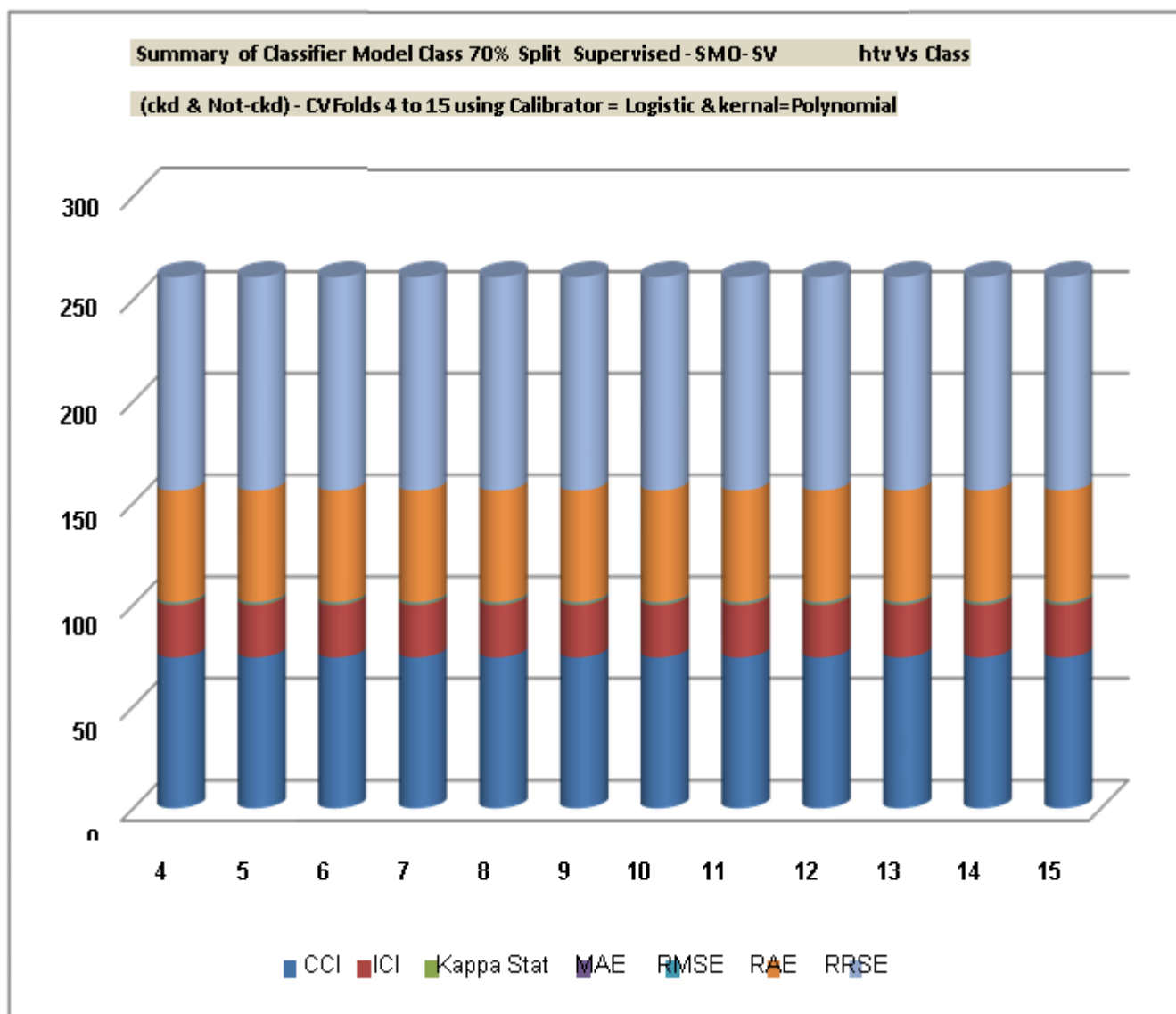
Figure: 8Summary of classifier model class SMo-SVM attribute htnVs class with CV folds 4 to 15 using Calibrator and Kernel function.

====== CONFUSION MATRIX ======

The above result for all Cross Validation Folds from CVF = 4 to CVF=15 is the same
Table 3:Confusion matrix (full training set) for htnVs Class

Sr. No.	CVF	Predicted (a)	Predicted (b)	< - Classified as
1	4	147	103	| a = ckd
		0	150	| b = not-ckd
2	5	147	103	| a = ckd
		0	150	| b = not-ckd
3	6	147	103	| a = ckd
		0	150	| b = not-ckd

		147	103	| a = ckd
4	7	0	150	| b = not-ckd
5	8	147	103	| a = ckd
		0	150	| b = not-ckd
6	9	147	103	| a = ckd
		0	150	| b = not-ckd
7	10	147	103	| a = ckd
		0	150	| b = not-ckd
8	11	147	103	| a = ckd
		0	150	| b = not-ckd
9	12	147	103	| a = ckd
		0	150	| b = not-ckd
10	13	147	103	| a = ckd
		0	150	| b = not-ckd
11	14	147	103	| a = ckd
		0	150	| b = not-ckd
12	15	147	103	| a = ckd
		0	150	| b = not-ckd
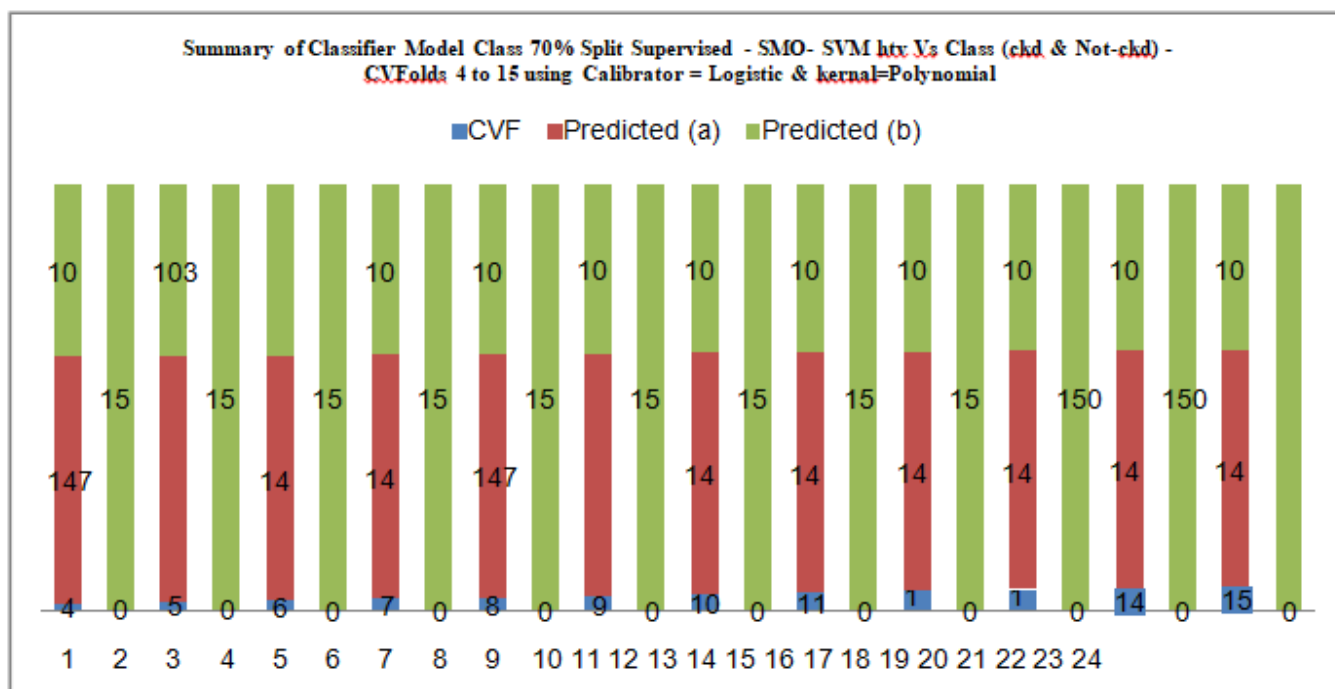
Figure: 9Confusion matrix SMO-SVM attribute htnVs class with CV folds 4 to 15 using Calibrator and Kernel function.

Supervised- classify – SMO- SVM- 2 Attributes – htn, appetVs Class Applying Cross validation from 4 to 15 + 70% split

Calibrator: Logistic and Kernel: Polynomial
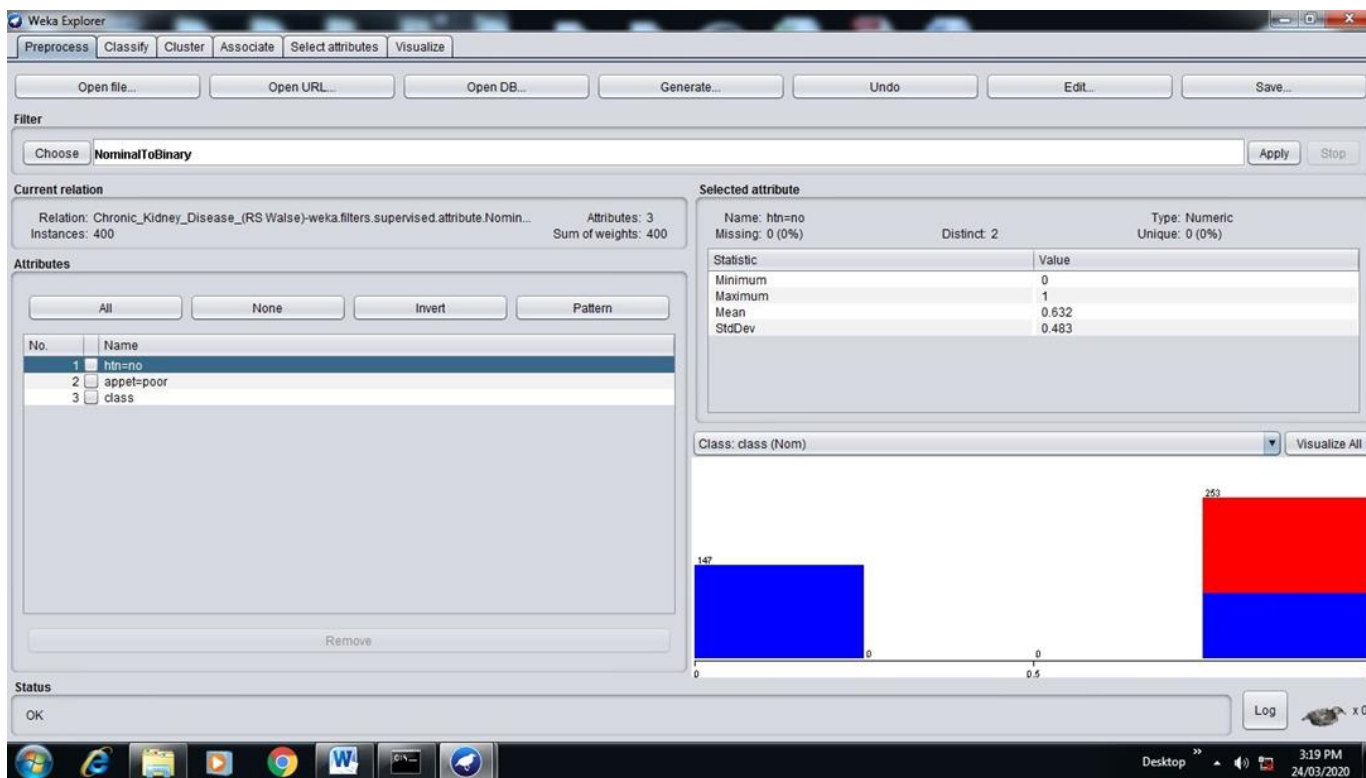
Figure: 10 Preprocess of imported data in WEKA selected two attributes
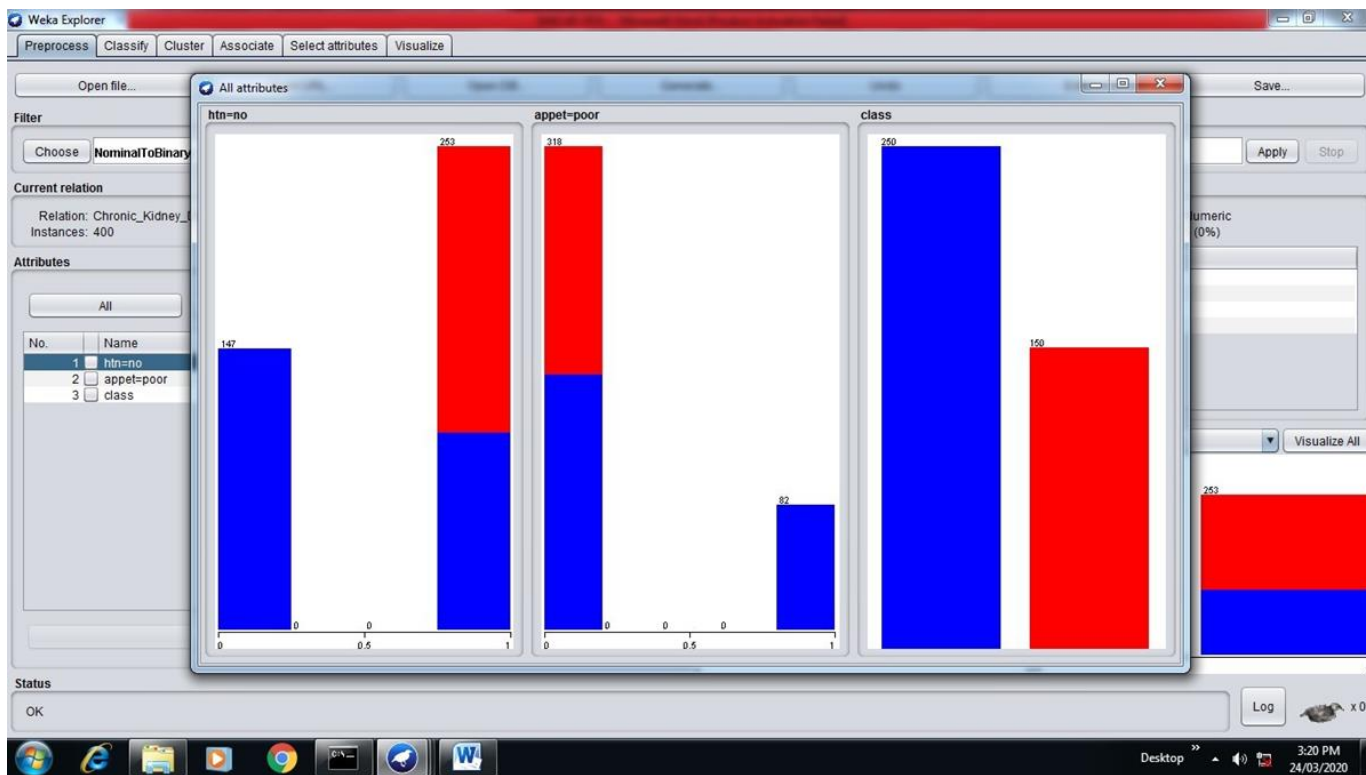
Figure: 11 Histogram of Two attributes Vs Class
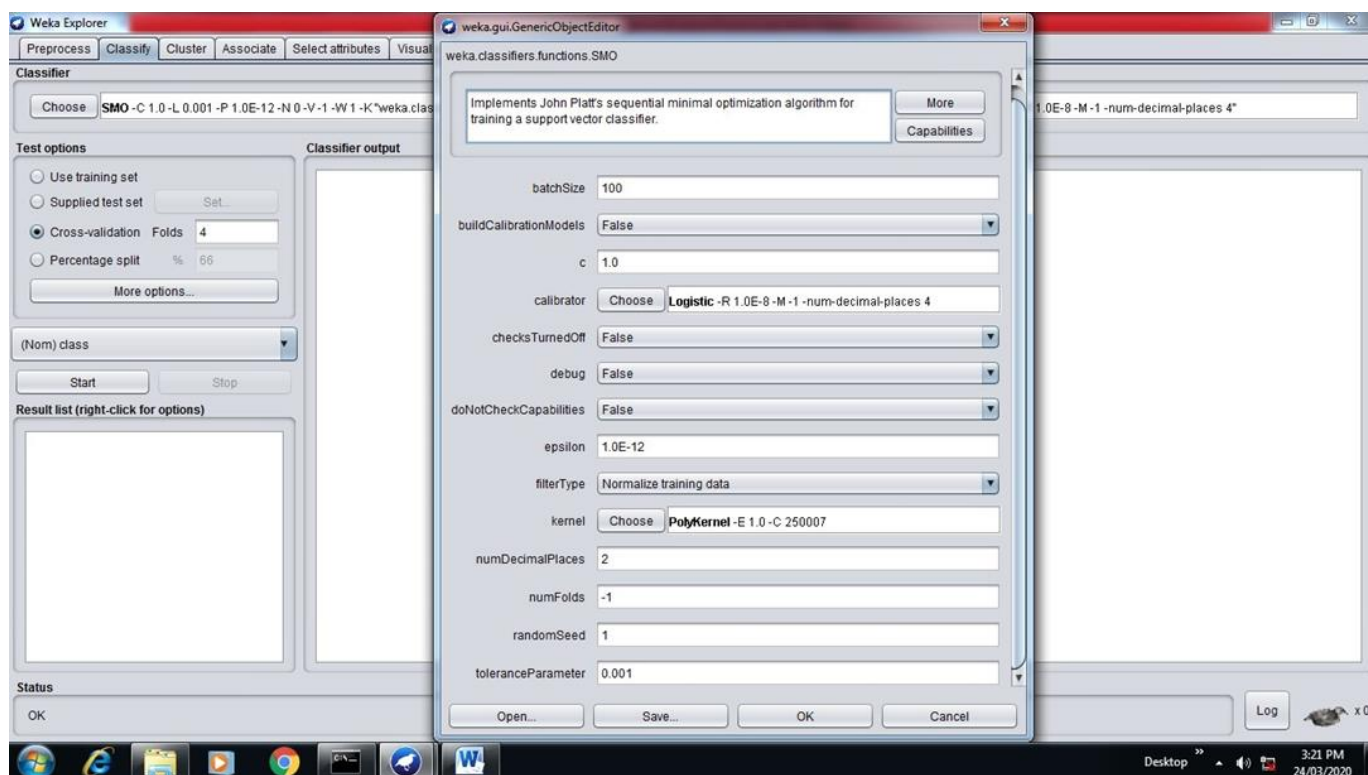
Figure: 12SMO algorithm with properties of Logistic and Polynomial function
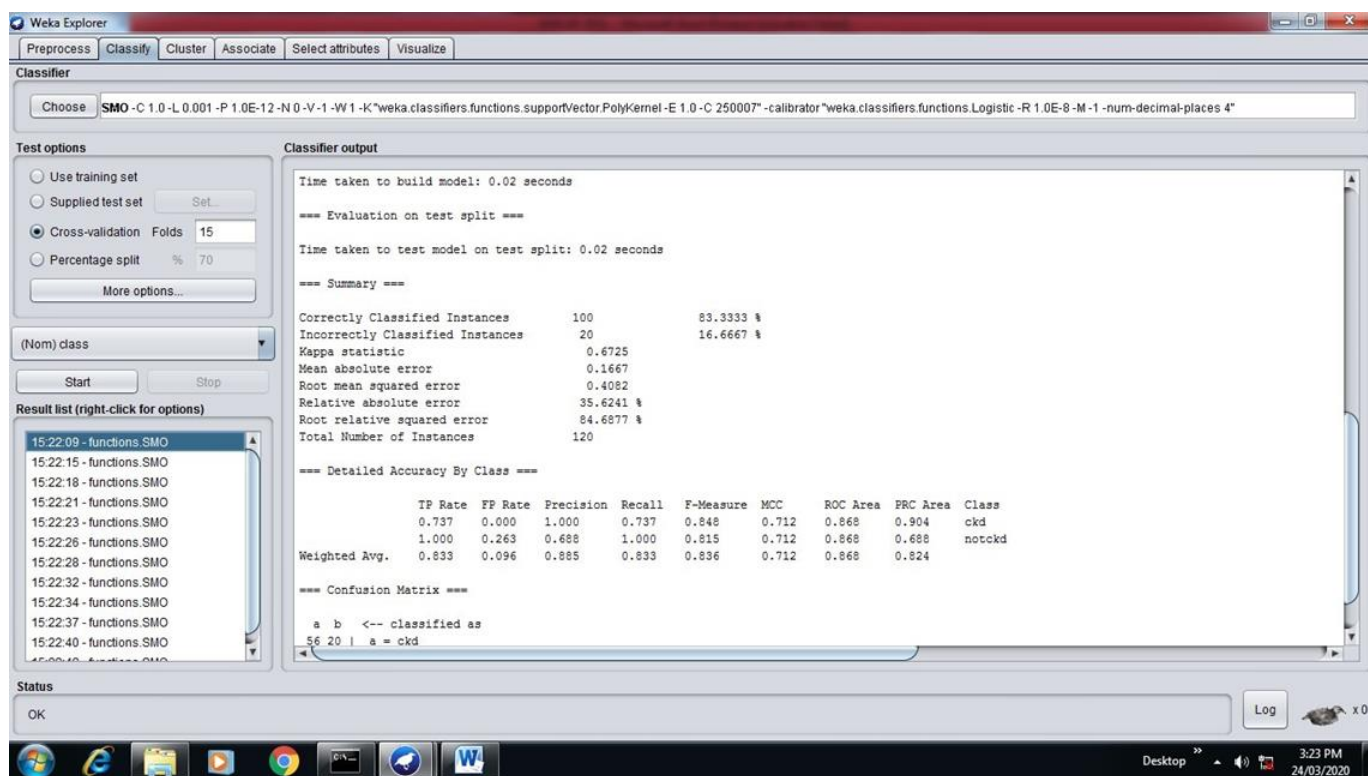
Figure: 13Output SMO classifier with two attributes with class
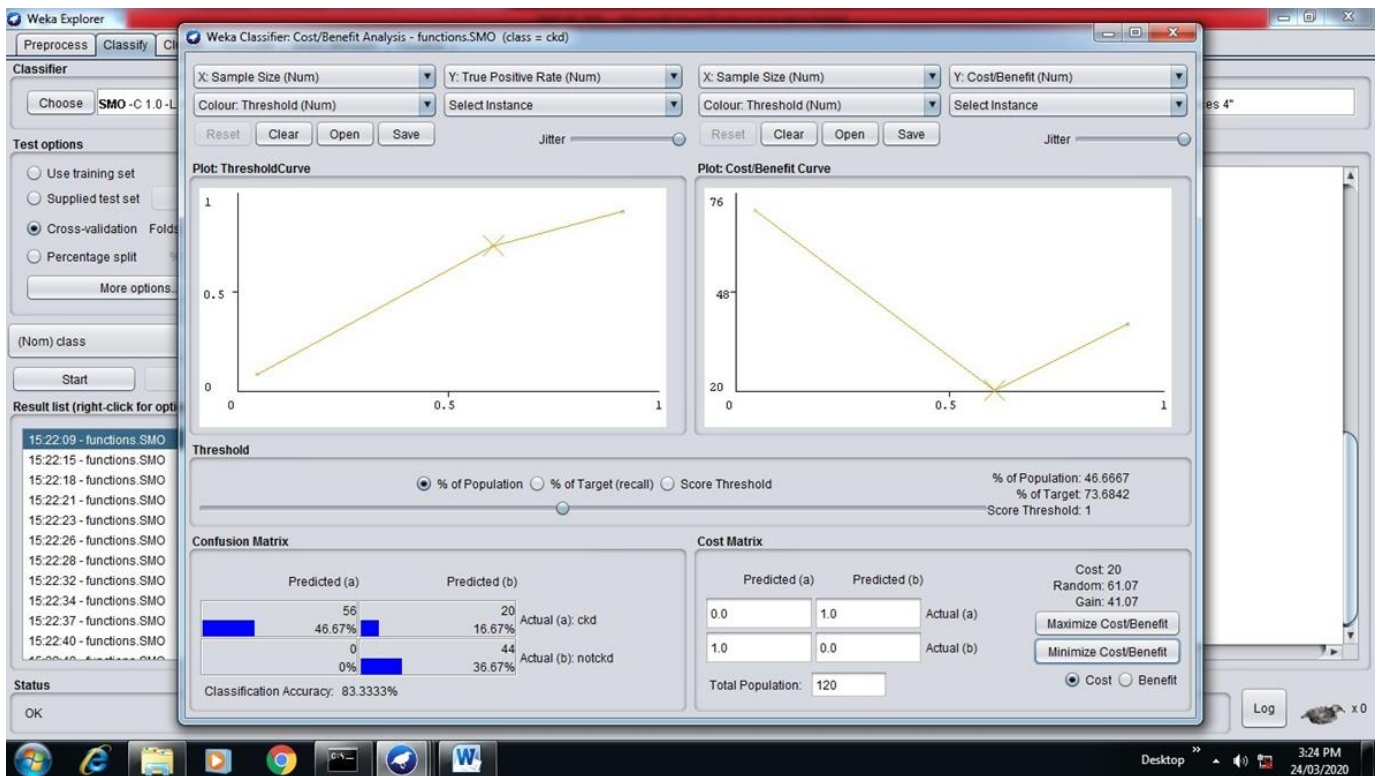
Figure: 14Weka classifier: cost / benefit analysis – function SMO class as ckd
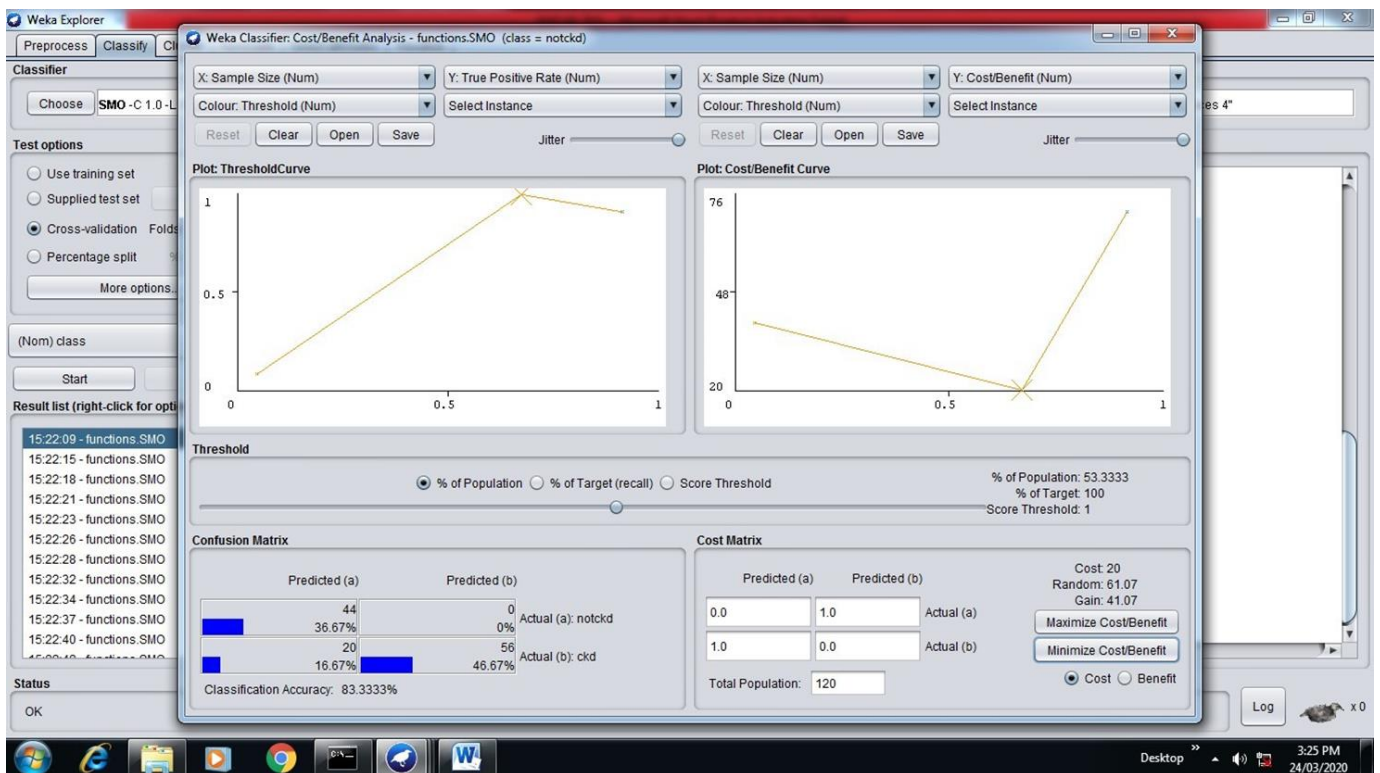
Figure: 15Weka classifier: cost / benefit analysis – function SMO class as not-ckd

Attributes: 3, htn=noappet=poorclassTest mode: split 70.0% train, remainder test

=== Classifier model (full training set) ===, SMO , Kernel used:Linear Kernel: K(x,y) = <x,y>

Classifier for classes: ckd, notckd ,BinarySMO , Machine linear: showing attribute weights, not support vectors.

2   * (normalized) htn=no

| + | -2 | * (normalized) appet=poor |
| - | 1 | |

COMPARATIVE STUDY SUPERVISED OF SMO, CALIBRATOR: LOGISTIC AND KERNEL: POLYNOMICAL USING CROSS VALIDATION FOLD 4 TO 15 WITH 70% OF SPLIT CLASSIFIER

Table 4:Detailed accuracy by Class with two attributes

Cross Validation Fold	Class	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area
4	CKD	0.737	0.000	1.000	0.737	0.848	0.712	0.868	0.904
	Not-CKD	1.000	0.263	0.688	1.000	0.815	0.172	0.868	0.688
	Weight Avg	0.833	0.096	0.886	0.833	0.836	0.172	0.868	0.824
5	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.799
6	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
7	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
8	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
9	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
10	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
11	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
12	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
13	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
14	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883
	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
	CKD	0.688	0.000	1.000	0.688	0.815	0.673	0.844	0.883

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15	Not-CKD	1.000	0.312	0.658	1.000	0.794	0.673	0.844	0.658
	Weight Avg	0.805	0.117	0.872	0.805	0.807	0.673	0.844	0.794
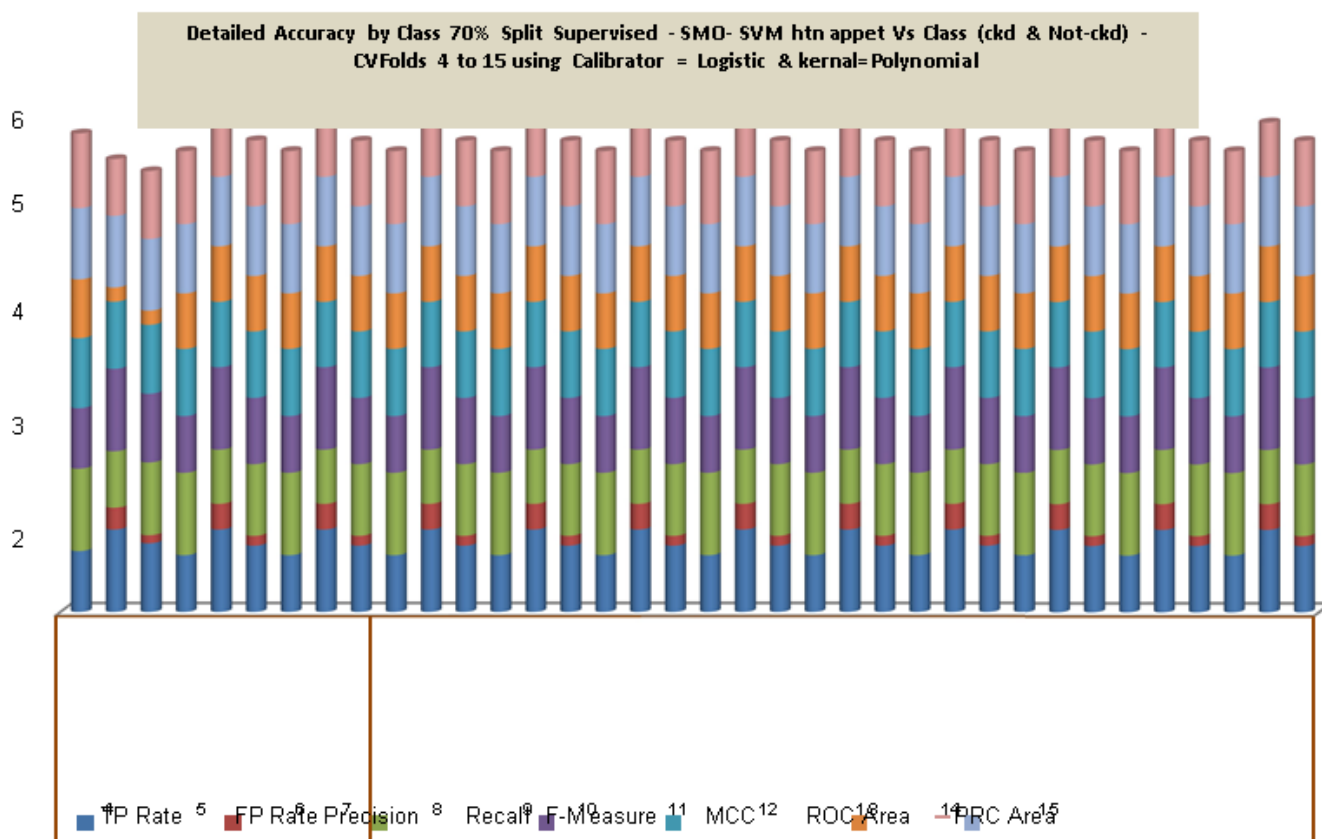
Figure: 16Detailed accuracy by class with two attributes, CVFolds 4 to 15

Table 5:Summary of Classifier model (full training set) with two attributes
1.   Test Mode: split 70%

Sr. No.	Particulars	4	5	6	7	8	9	10	11	12	13	14	15
1	Time taken to test model	0.02	0.03	0.01	0.03	0	0.02		0.03	0.01	0	0.02	0

2	Correctly Classified Instances	83.33	80.50	80.50	80.50	80.50	80.50	80.50	80.50	80.50	80.50	80.50	80.50
3	Incorrectly Classified Instances	16.66	19.50	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
4	Kappa statistic	0.6725	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232	0.6232
5	Mean absolute error	0.1667	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
6	Root mean squared error	0.4082	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416	0.4416
7	Relative absolute error	35.6241	41.5828	41.5831	41.5822	41.5824	41.583	41.5847	41.5827	41.5829	41.5824	41.5834	41.58445
8	Root relative squared error	84.6877	91.2139	91.2133	91.2096	91.2095	91.2002	91.2139	91.2089	91.2088	91.2075	91.2096	91.21227

9	Total No. of Instances	120	400	400	400	400	400	400	400	400	400	400	400
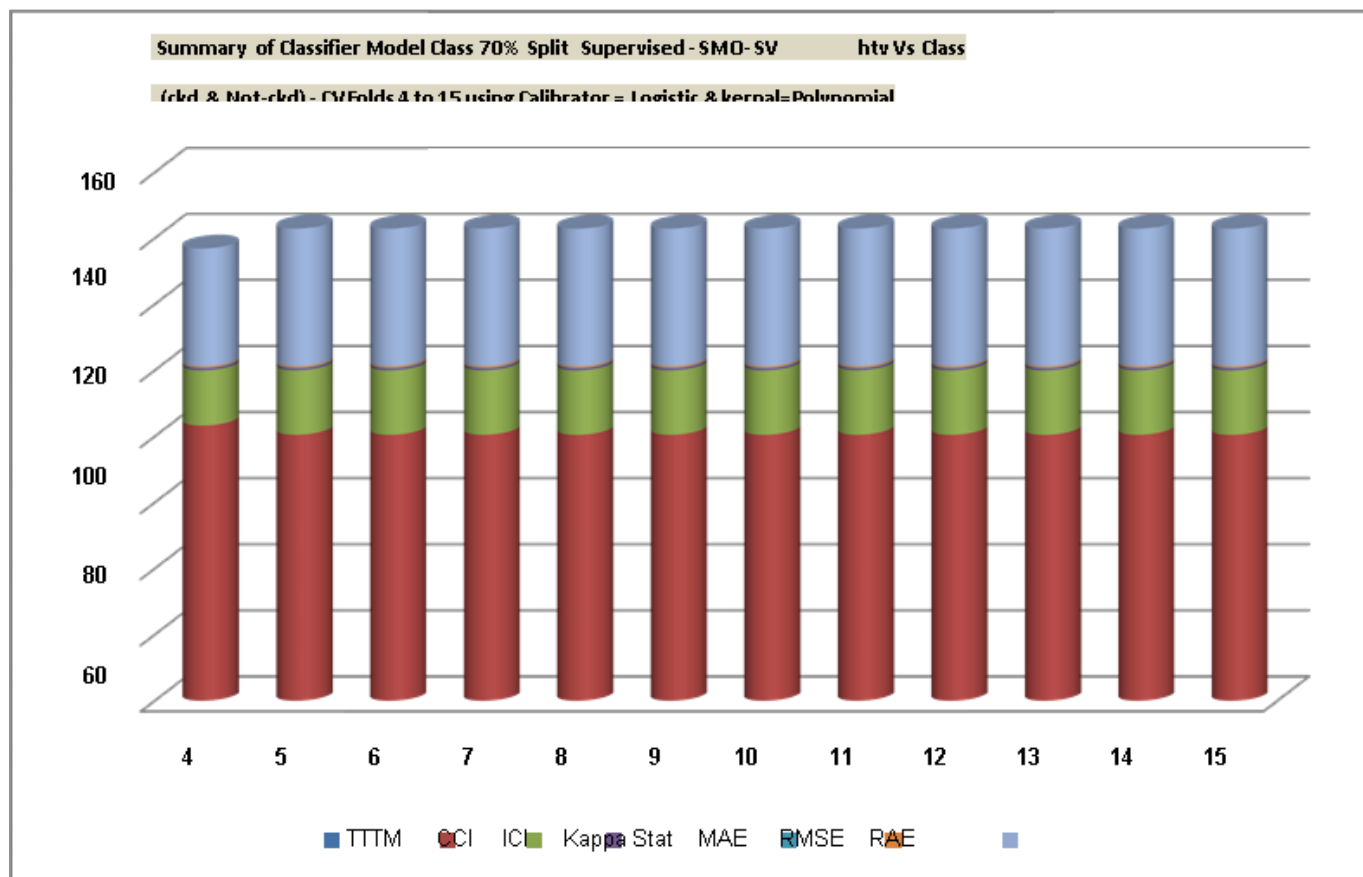
Figure: 17Summary of Classifier Model with two attributes, CVFolds 4 to 15

====== CONFUSION MATRIX ======

Table 6:Values of Confusion matrix with two attributes

Sr. No.	CVF	Predicted (a)	Predicted (b)	< - Classified as
1	4	147	103	| a = ckd
		0	150	| b = not-ckd
2	5	172	78	| a = ckd
		0	150	| b = not-ckd
3	6	172	78	| a = ckd
		0	150	| b = not-ckd
4	7	172	78	| a = ckd
		0	150	| b = not-ckd
5	8	172	78	| a = ckd
		0	150	| b = not-ckd
6	9	172	78	| a = ckd
		0	150	| b = not-ckd
7	10	172	78	| a = ckd

		0	150	| b = not-ckd
8	11	172	78	| a = ckd
		0	150	| b = not-ckd
9	12	172	78	| a = ckd
		0	150	| b = not-ckd
10	13	172	78	| a = ckd
		0	150	| b = not-ckd
11	14	172	78	| a = ckd
		0	150	| b = not-ckd
12	15	172	78	| a = ckd
		0	150	| b = not-ckd

The above result for all Cross Validation Folds from CVF = 4 to CVF=15 is the same
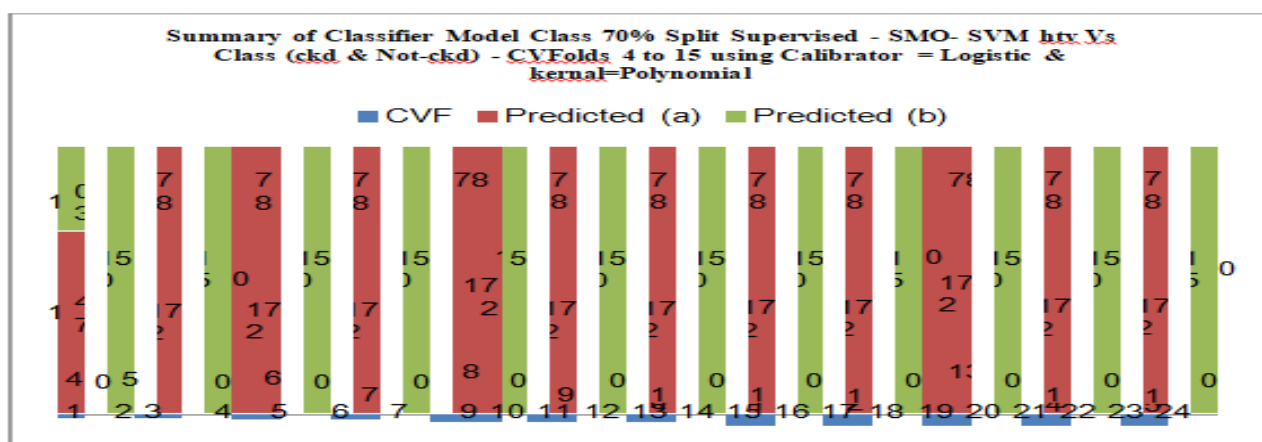
Figure: 18Summary of Classifier Model with two attributes, CVFolds 4 to 15 Step-3

Step-3 (24-Full Vs Class) – Full Attribute

Supervised- classify – SMO- SVM- Full 24 Attributes – 24 Attributes Vs Class (ckd and not-ckd) Applying Cross validation from 4 to 15 + 70% split

Calibrator: Logistic and Kernel: Polynomial
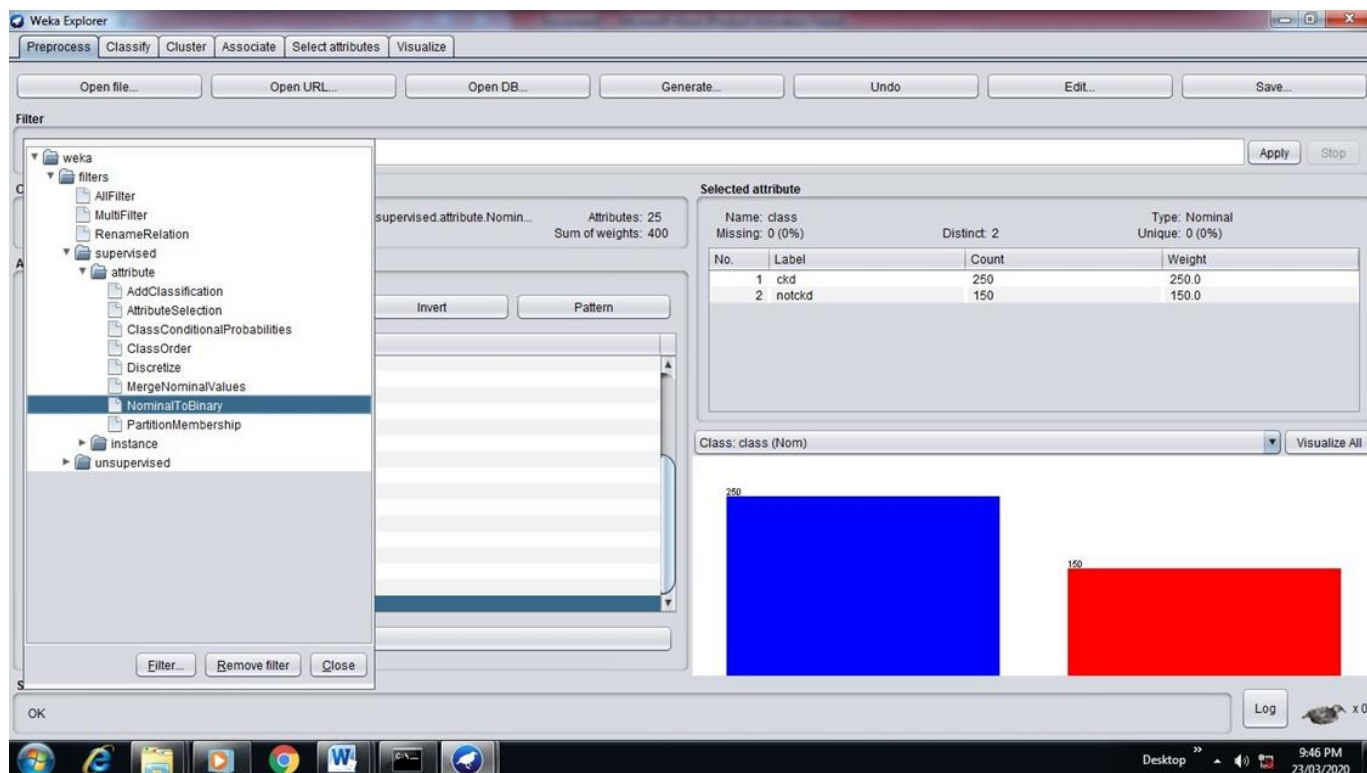
Figure: 19Preprocess of data filter attributes with Nominal to binary full attributes
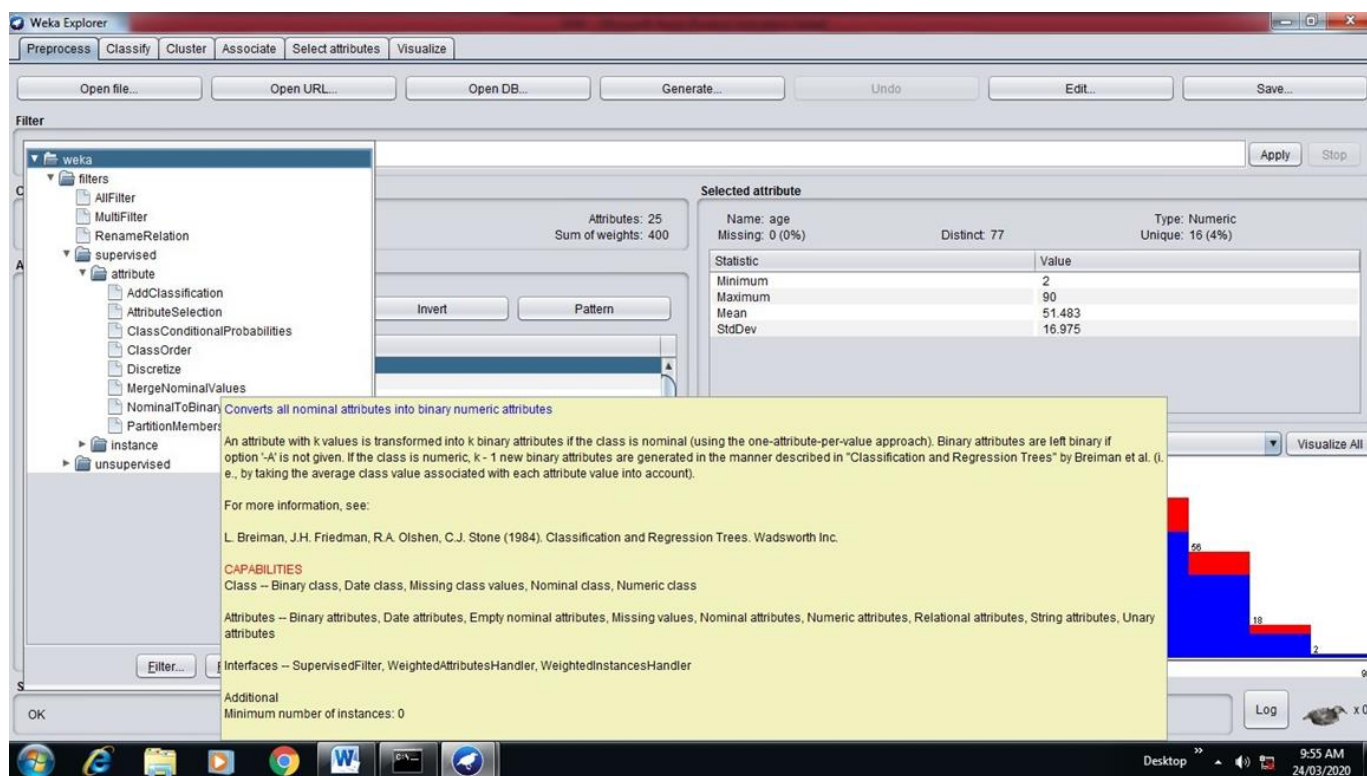
Figure: 20Convert all nominal attributes into binary numeric attributes
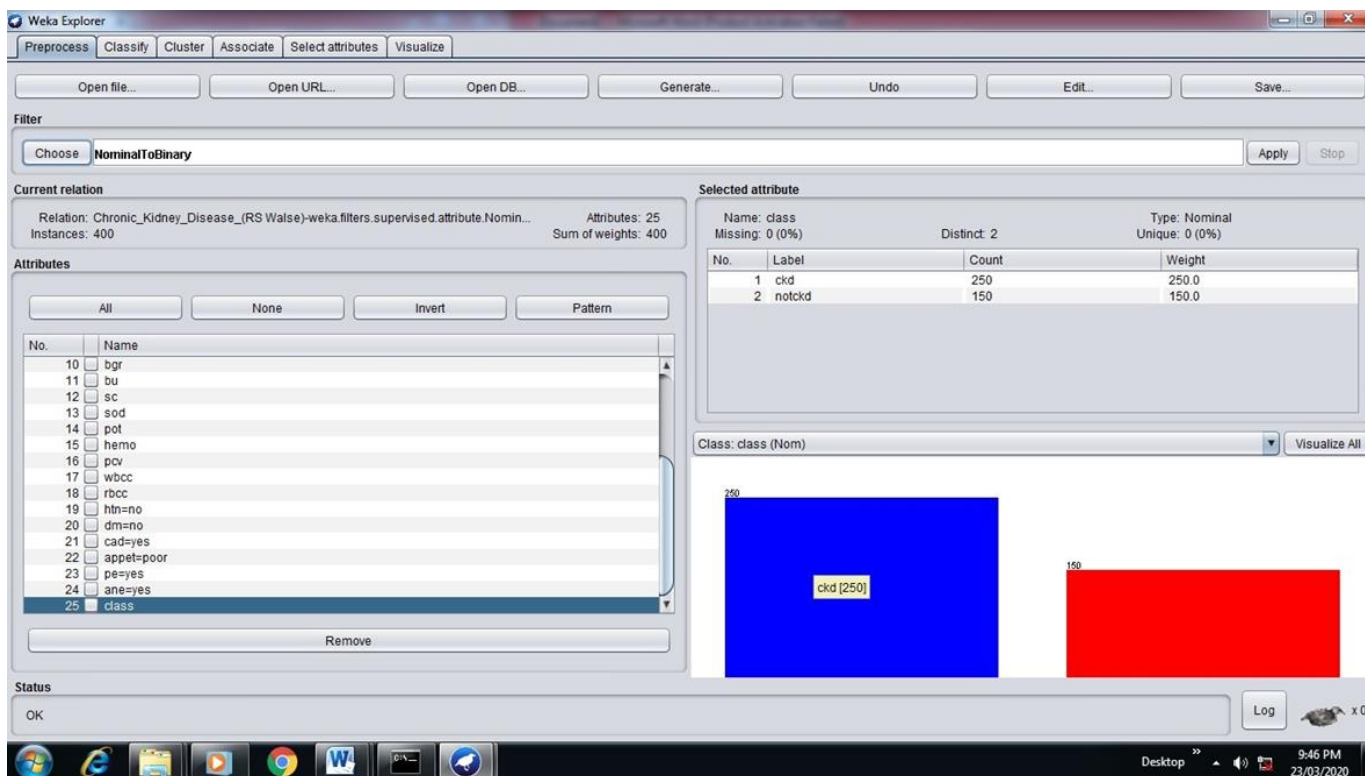
Figure: 21Convert all nominal attributes in to binary numeric attributes
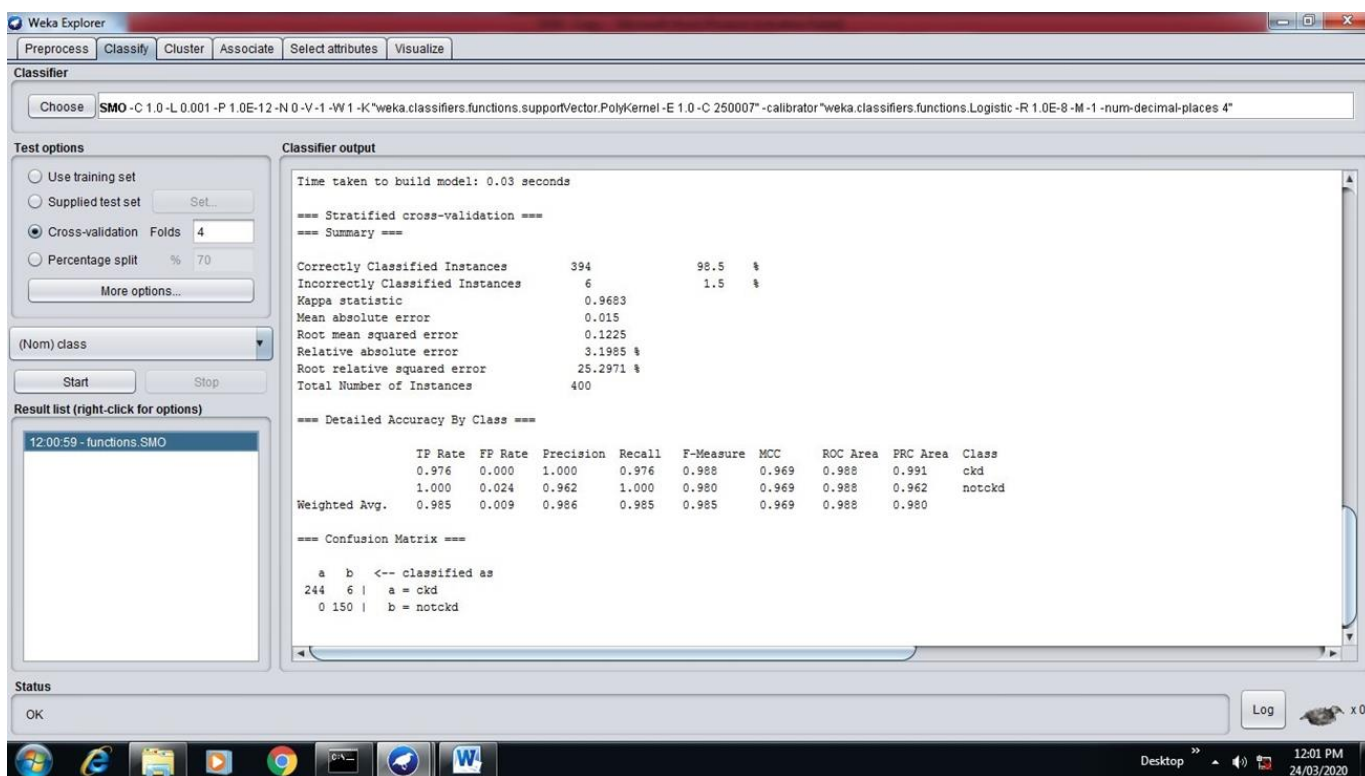
Figure: 22Result of SMO classifier with Full attribute Vs Class
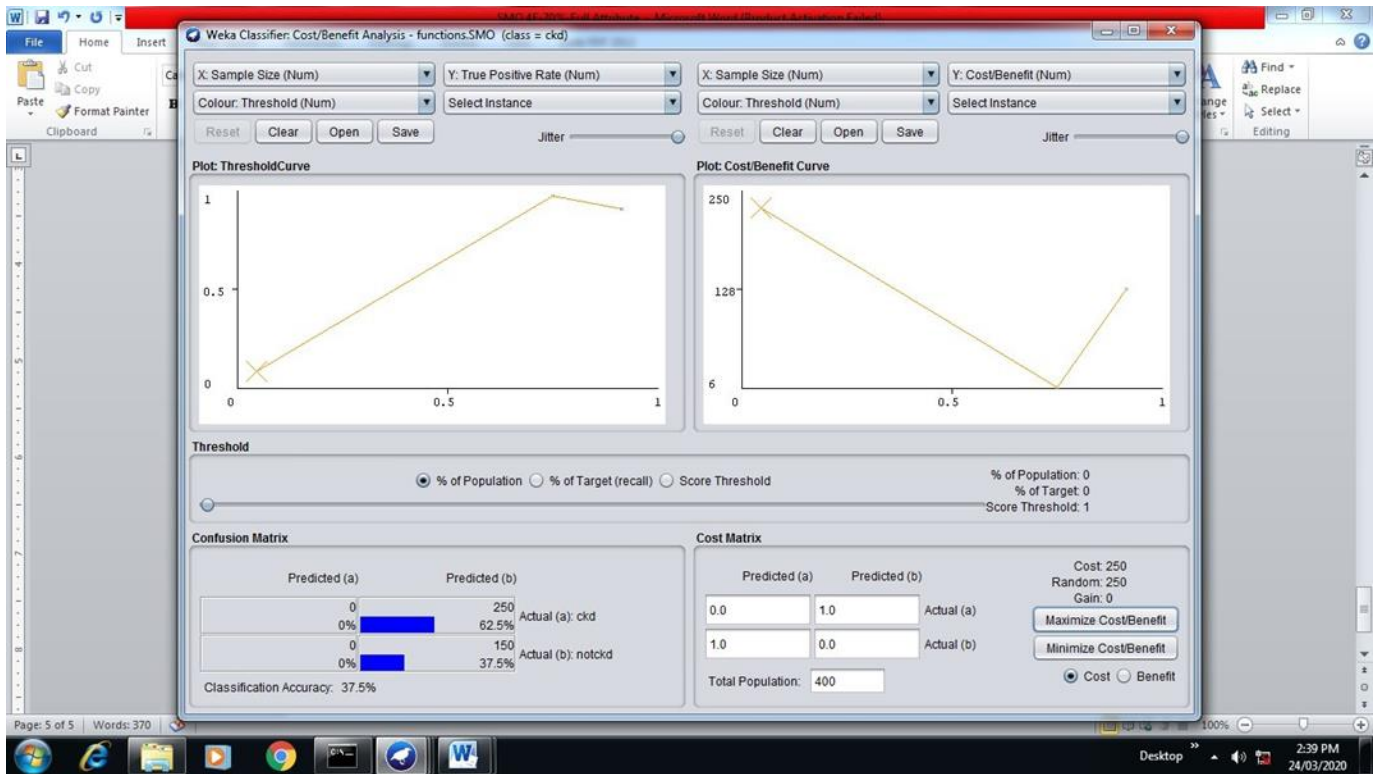
Figure: 23Weka classifier cost benefit function smo class-ckd Full attribute Vs Class
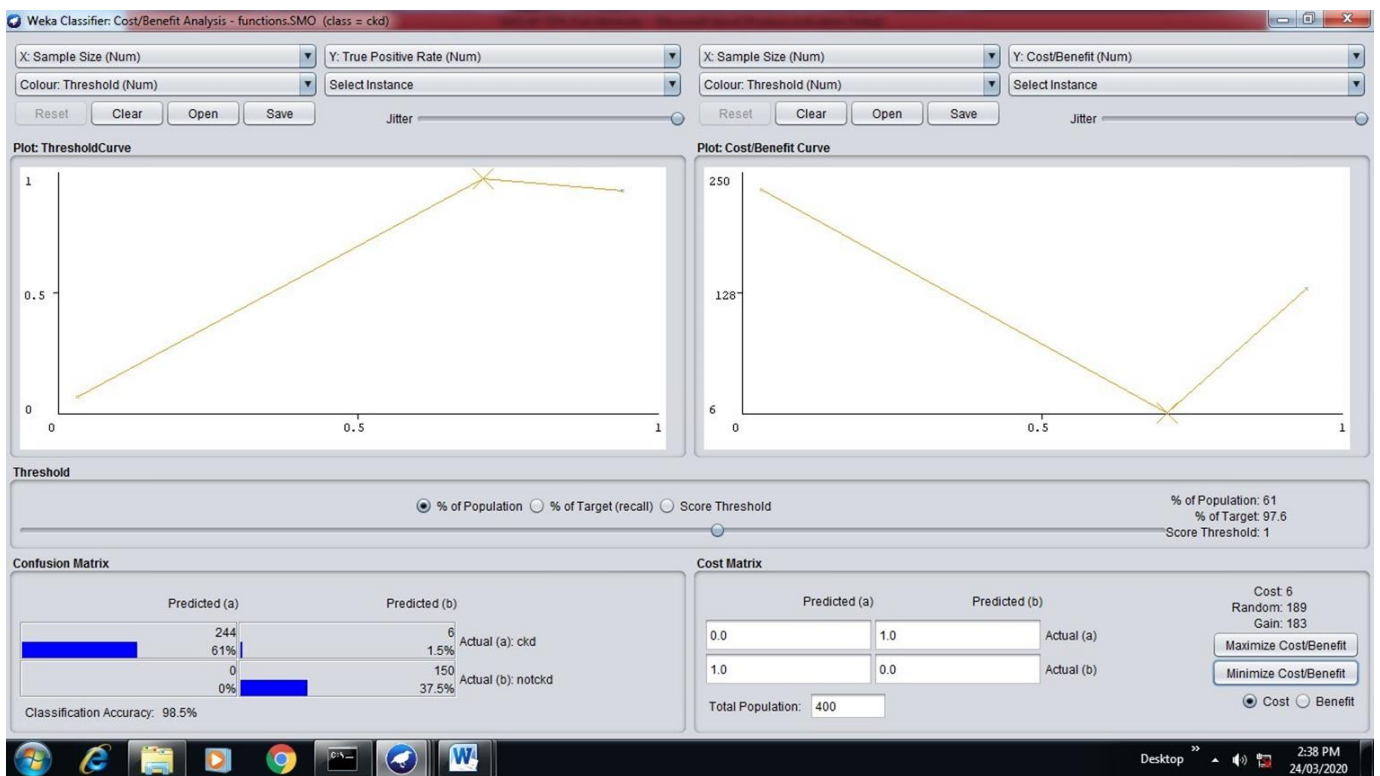
Figure: 24Weka classifier cost benefit function smo class-Not-Ckd Full attribute Vs Class

=== Classifier model (full training set) ===, SMO ,Kernel used:Linear Kernel: K(x,y) = <x,y>
Classifier for classes: ckd, notckdBinarySMO, Machine linear: showing attribute weights, not support vectors.
2* (normalized) htn=no, -1

COMPARATIVE STUDY SUPERVISED OF SMO, CALIBRATOR: LOGISTIC AND KERNEL: POLYNOMICAL USING CROSS VALIDATION FOLD 4 TO 15 WITH 70% OF SPLIT CLASSIFIER

Table 7:Detailed accuracy by Class with full attributes Vs Class (ckd-not-ckd)

Cross Validation Fold	Class	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area
4	CKD	0.976	0.000	1.000	0.976	0.988	0.969	0.988	0.991
	Not-CKD	1.000	0.024	0.962	1.000	0.980	0.969	0.988	0.962
	Weight Avg	0.985	0.009	0.986	0.985	0.985	0.969	0.998	0.980
5	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
6	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
7	CKD	0.976	0.000	1.000	0.976	0.988	0.969	0.988	0.991
	Not-CKD	1.000	0.024	0.962	1.000	0.980	0.969	0.988	0.962
	Weight Avg	0.985	0.009	0.986	0.985	0.985	0.969	0.998	0.980
8	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
9	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
10	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
11	CKD	0.976	0.000	1.000	0.976	0.988	0.969	0.988	0.991
	Not-CKD	1.000	0.024	0.962	1.000	0.980	0.969	0.988	0.962
	Weight Avg	0.985	0.009	0.986	0.985	0.985	0.969	0.998	0.980
12	CKD	0.976	0.000	1.000	0.976	0.988	0.969	0.988	0.991
	Not-CKD	1.000	0.024	0.962	1.000	0.980	0.969	0.988	0.962
	Weight Avg	0.985	0.009	0.986	0.985	0.985	0.969	0.998	0.980

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13	CKD	0.976	0.000	1.000	0.976	0.988	0.969	0.988	0.991
	Not-CKD	1.000	0.024	0.962	1.000	0.980	0.969	0.988	0.962
	Weight Avg	0.985	0.009	0.986	0.985	0.985	0.969	0.998	0.980
14	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
15	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992
	Not-CKD	1.000	0.020	0.968	1.000	0.984	0.974	0.990	0.968
	Weight Avg	0.988	0.008	0.988	0.988	0.988	0.974	0.990	0.983
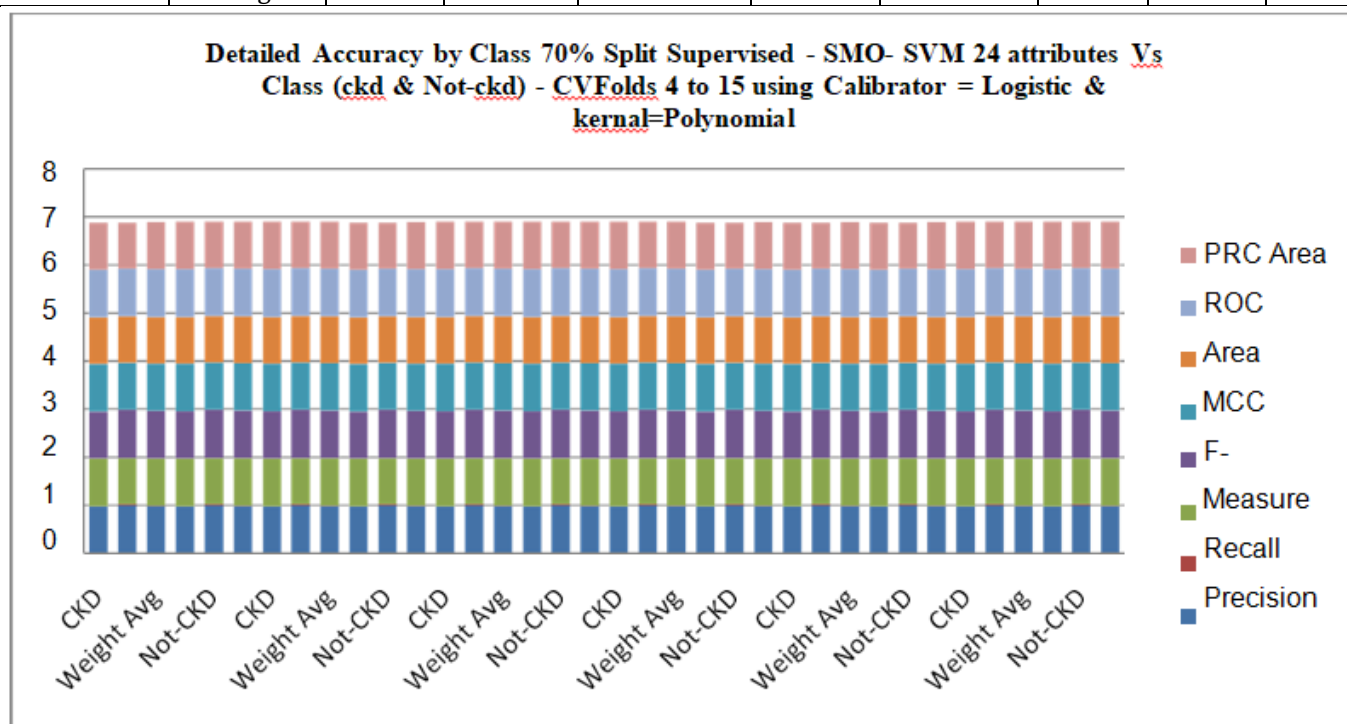
Figure: 25Detailed accuracy by class Full attribute Vs Class

Table 8:Summary of Classifier model (full training set) with full attributes
1. Test Mode: split 70% , 2. Total Number of Instances=400

Sr. No	Particulars	4	5	6	7	8	9	10	11	12	13	14	15
1	Time taken to build model	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03
2	Correctly Classified Instances	98.50	98.75	98.75	98.50	98.75	98.75	98.75	98.50	98.50	98.50	98.75	98.75
3	Incorrectly Classified Instances	1.50	1.25	1.25	1.50	1.25	1.25	1.25	1.50	1.50	1.50	1.25	1.25
4	Kappa statistic	0.9683	0.973 5	0.9735	0.968	0.9735	0.973 5	0.973 5					
5	Mean absolute error	0.015		0.0125	0.015	0.0125							
6	Root mean squared error	0.1225	0.111	0.1118	0.122	0.1118	0.11 1	0.11 1					
7	Relative absolute error	3.1985	2.665	2.6656	3.198	2.6655	2.66 5	2.66 5	3.1987	3.1987	3.1986	2.6656	2.6657
8		25.29 7	23.09	23.09 3	25.29	23.09 2	23.0 9	23.0 9	25.29 6	25.29 6	25.29 6	23.09 2	23.09 3
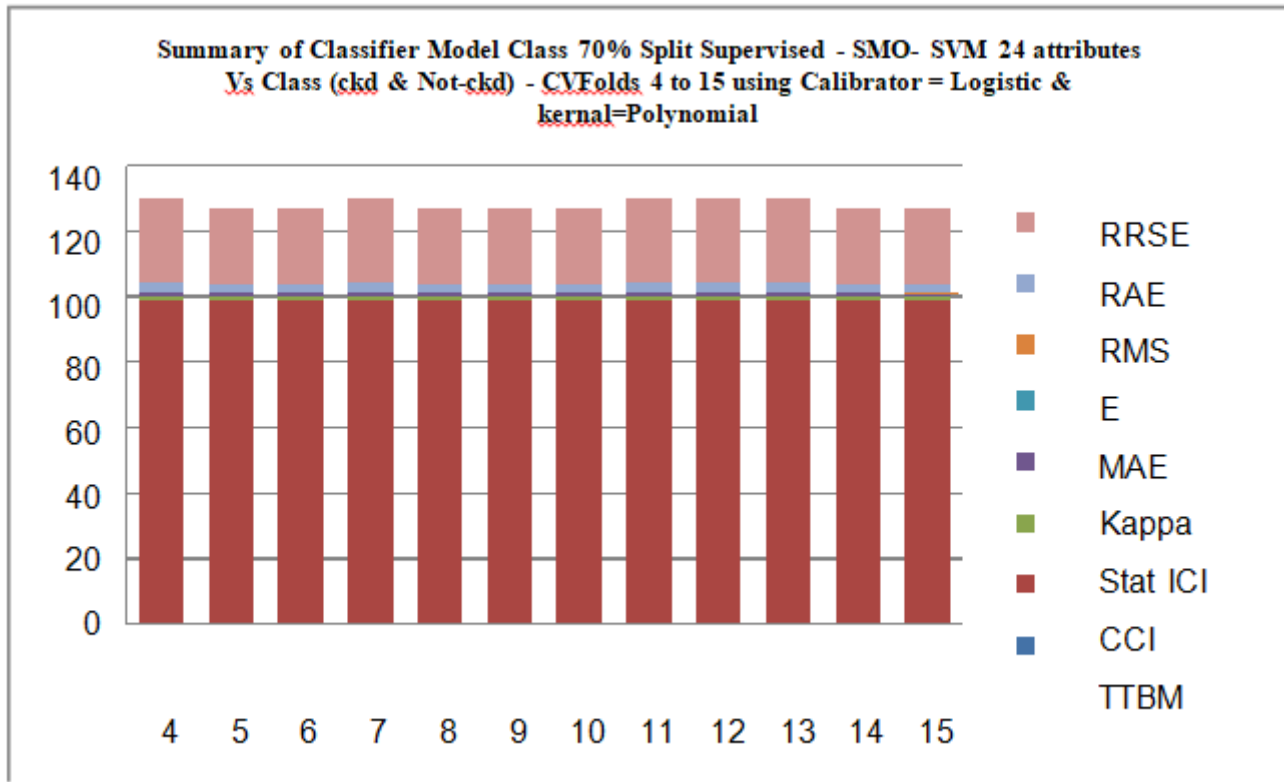
Figure: 26 Summary of Classifier Model with Full attribute Vs Class

====== CONFUSION MATRIX =======

The above result for all Cross Validation Folds from CVF = 4 to CVF=15 is the same

Table 9:Predicted values of Confusion matrix full attributes Vs Class (ckd-not-ckd)

Sr. No.	CVF	Predicted (a)	Predicted (b)	< - Classified as
1	4	244	6	| a = ckd
		0	150	| b = not-ckd
2	5	245	5	| a = ckd

		0	150	| b = not-ckd
3	6	245	5	| a = ckd
		0	150	| b = not-ckd
4	7	244	6	| a = ckd
		0	150	| b = not-ckd
5	8	245	5	| a = ckd
		0	150	| b = not-ckd
6	9	245	5	| a = ckd
		0	150	| b = not-ckd
7	10	245	5	| a = ckd
		0	150	| b = not-ckd
8	11	244	6	| a = ckd
		0	150	| b = not-ckd
9	12	244	6	| a = ckd
		0	150	| b = not-ckd
10	13	244	6	| a = ckd
		0	150	| b = not-ckd
11	14	245	5	| a = ckd
		0	150	| b = not-ckd
12	15	245	5	| a = ckd
		0	150	| b = not-ckd
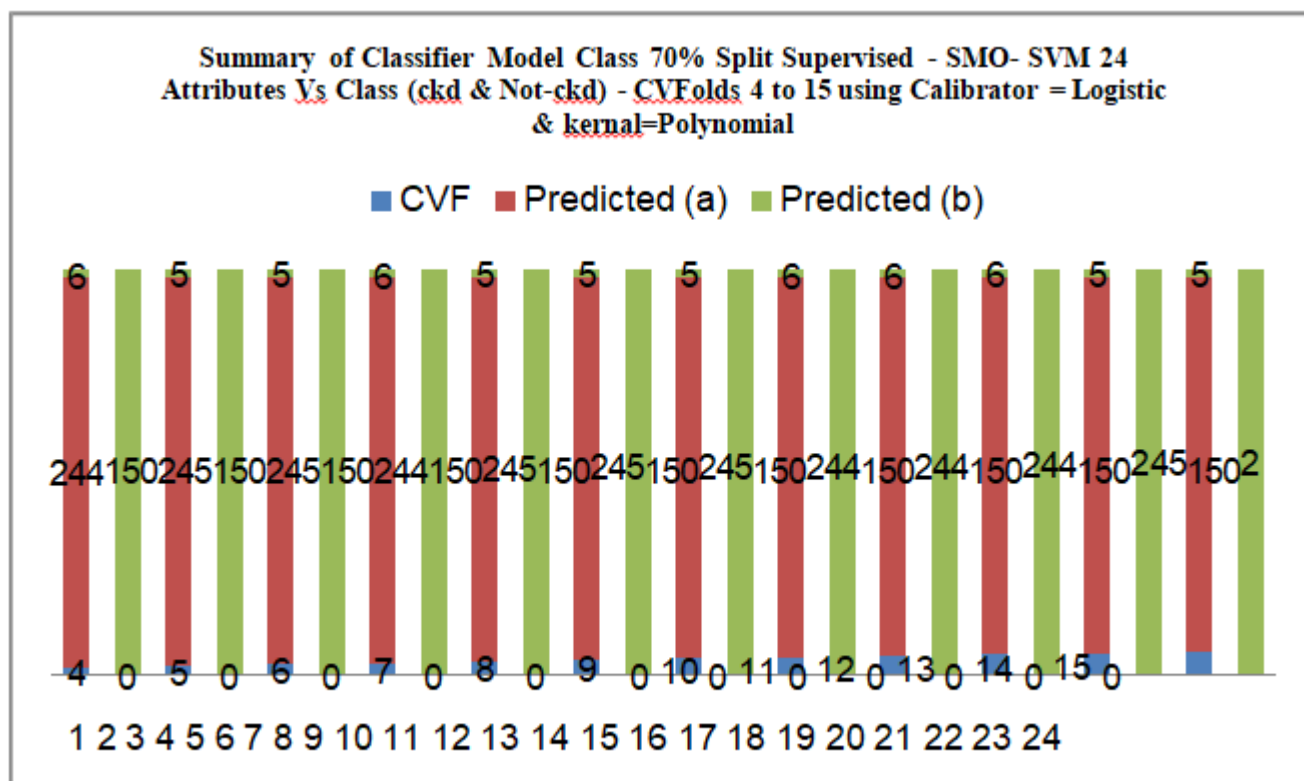
Figure: 27Summary of Classifier Model with Full attribute Vs Class

Unsupervised – Clustering – Hierarchical –Euclidean & Manhattan Distance Function using No of Clusters 2,3,4& 5 test results: Full Attributes

Step 1: Using Euclidean Distance function No of Clusters 2,3,4& 5
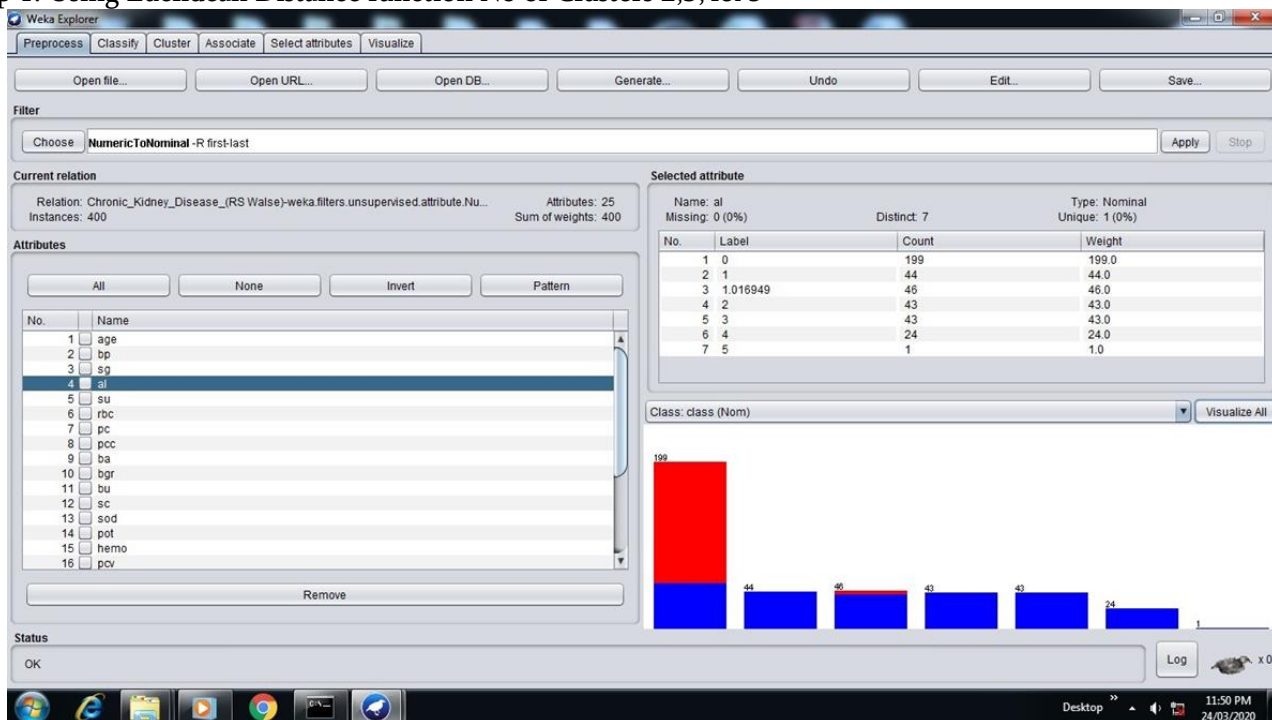
Figure: 28Preprocess Full attribute Vs Class
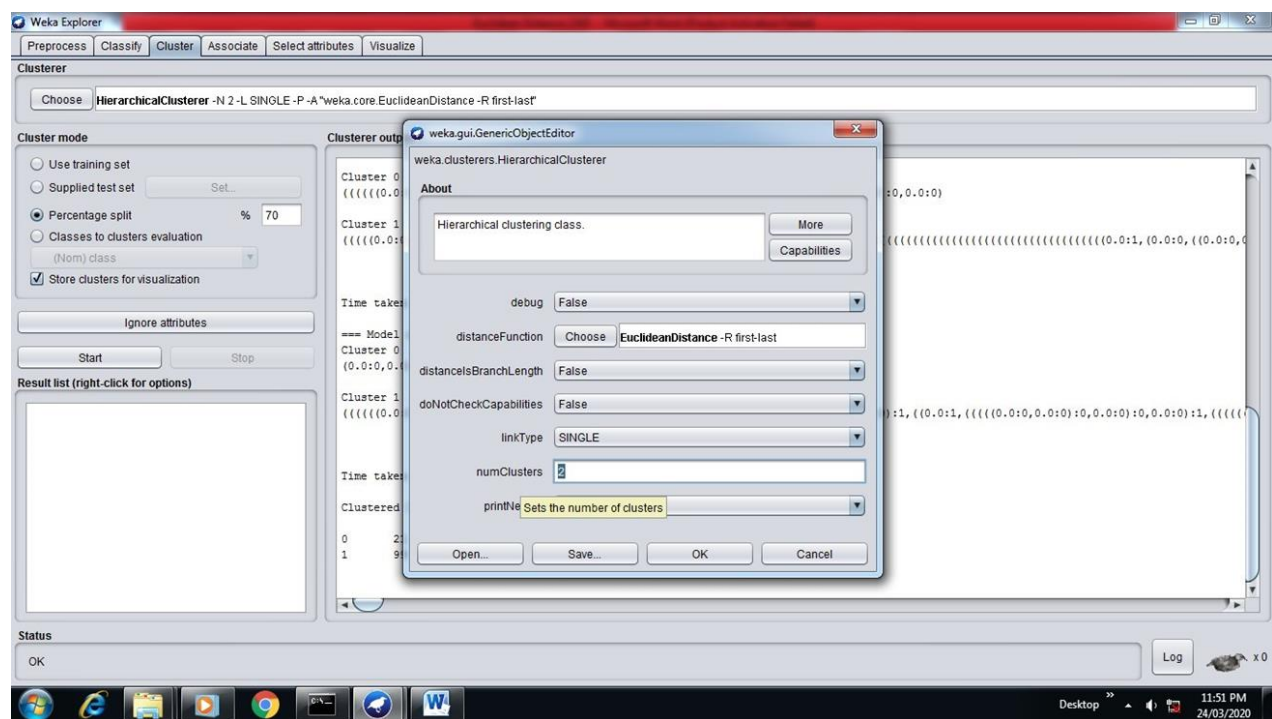
Figure: 29Hierarchical clustering class with Euclidean function of Full attribute Vs Class with no of cluster 2,3,4& 5
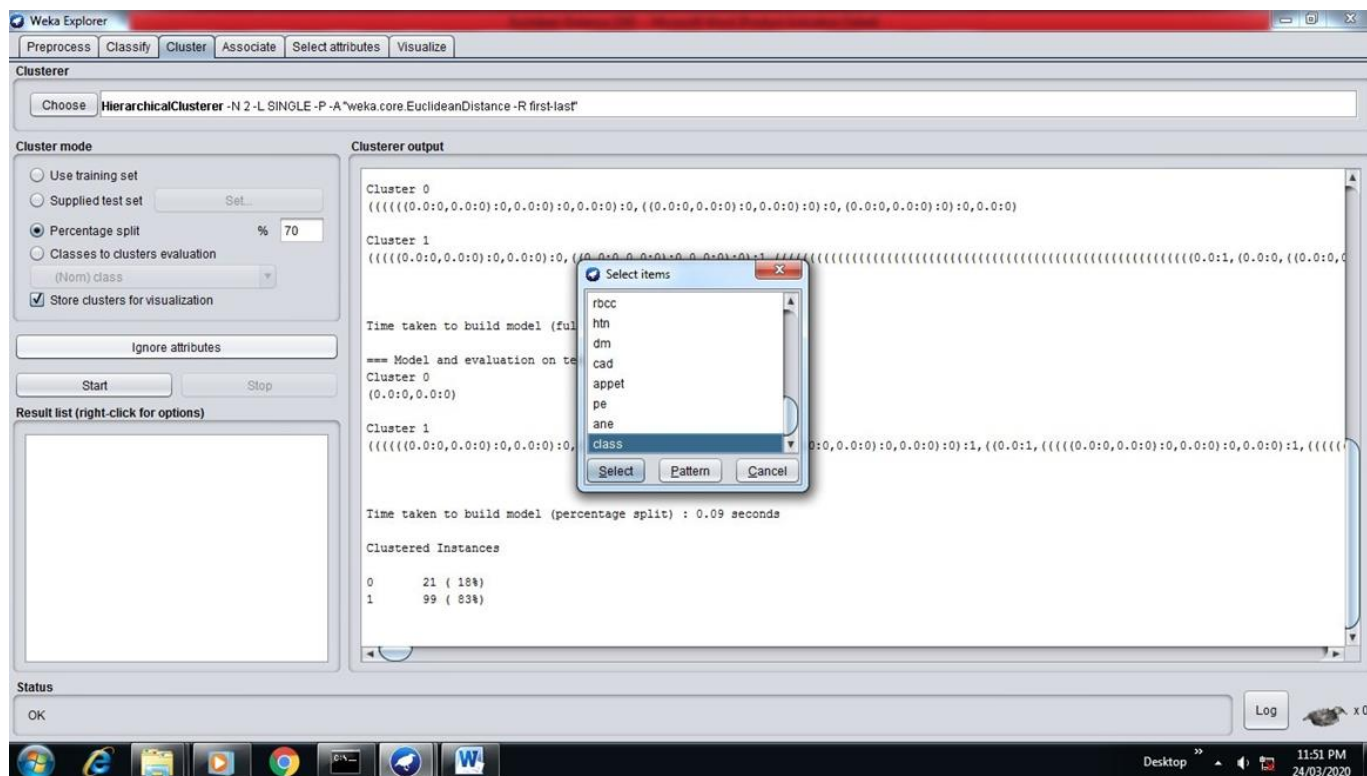
Figure: 30No of 02 cluster of hierarchical clustering class clustering output no of cluster 2,3,4& 5
STEP 1:

(Euclidean Distance) = 2 Cluster = Full Attributes

=== Run information ===

Scheme: weka.clusterers.HierarchicalClusterer -N 2 -L SINGLE -P -A "weka.core.EuclideanDistance -R first- last"
Relation: Chronic_Kidney_Disease_(RS   Walse)-weka.filters.unsupervised.attribute.NumericToNominal-Rfirst- last
Instances: 400
Attributes: 25 age
bp sg al su rbc pc pcc ba bgr bu sc sod pot
hemo pcv wbcc rbcc htn dm cad appet pe ane
Ignored:
class
Test mode: Classes to clusters evaluation on training data

=== Clustering model (full training set) === Cluster 0
Time taken to build model (full training data) : 0.73 seconds

=== Model and evaluation on training set === Clustered Instances
0   399 (100%)
1   1 (0%)

Class attribute: class Classes to Clusters:
0 1 <-- assigned to cluster

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249 1 | ckd
150 0 | notckd
Cluster 0 <-- ckd Cluster 1 <-- No class
Incorrectly clustered instances :   151.0   37.75 %
STEP 2:
(Euclidean Distance) = 3 Cluster = Full Attributes
Time taken to build model (full training data) : 0.73 seconds
=== Model and evaluation on training set === Clustered Instances
0   398 (100%)
1   1 (0%)
2   1 (0%)

Class attribute: class Classes to Clusters:

0 1 2 <-- assigned to cluster
248 1 1 | ckd
150 0 0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class Cluster 2 <-- No class

Incorrectly clustered instances :   152.0   38   %
STEP 3:

(Euclidean Distance) = 4 Cluster = Full Attributes

Time taken to build model (full training data) : 0.7 seconds

=== Model and evaluation on training set === Clustered Instances
0   397 (99%)
1   1 (0%)
2   1 (0%)
3   1 (0%)

Class attribute: class Classes to Clusters:

0 1 2 3 <-- assigned to cluster
247 1 1 1 | ckd
150   0   0   0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class

Cluster 2 <-- No class Cluster 3 <-- No class

Incorrectly clustered instances :   153.0   38.25 %
STEP 4:

480

(Euclidean Distance) = 5 Cluster = Full Attributes

Time taken to build model (full training data) : 0.69 seconds

=== Model and evaluation on training set === Clustered Instances
0   396 (99%)
1   1 (0%)
2   1 (0%)
3   1 (0%)
4   1 (0%)

Class attribute: class Classes to Clusters:

0 1 2 3 4   <-- assigned to cluster
246 1 1 1   1 | ckd
150 0 0 0   0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class Cluster 2 <-- No class Cluster 3 <-- No class Cluster 4 <-- No class

Incorrectly clustered instances :   154.0   38.5 %
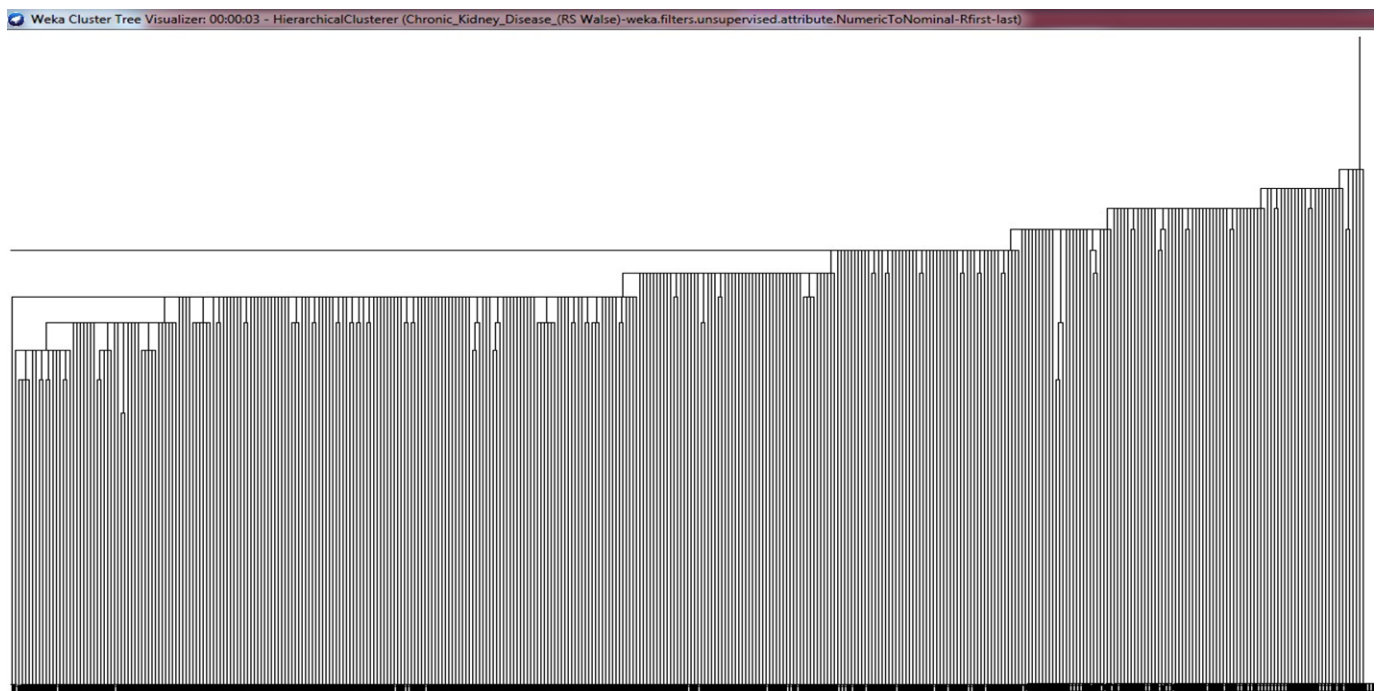
Figure: 31Hierarchical clustering with Manhattan distance Function of Dendrogam

Figure 3: Performance accuracy by Class and Confusion matrix by decision tree.
Step 2: Using Manhattan Distance function No of Clusters 2,3,4& 5
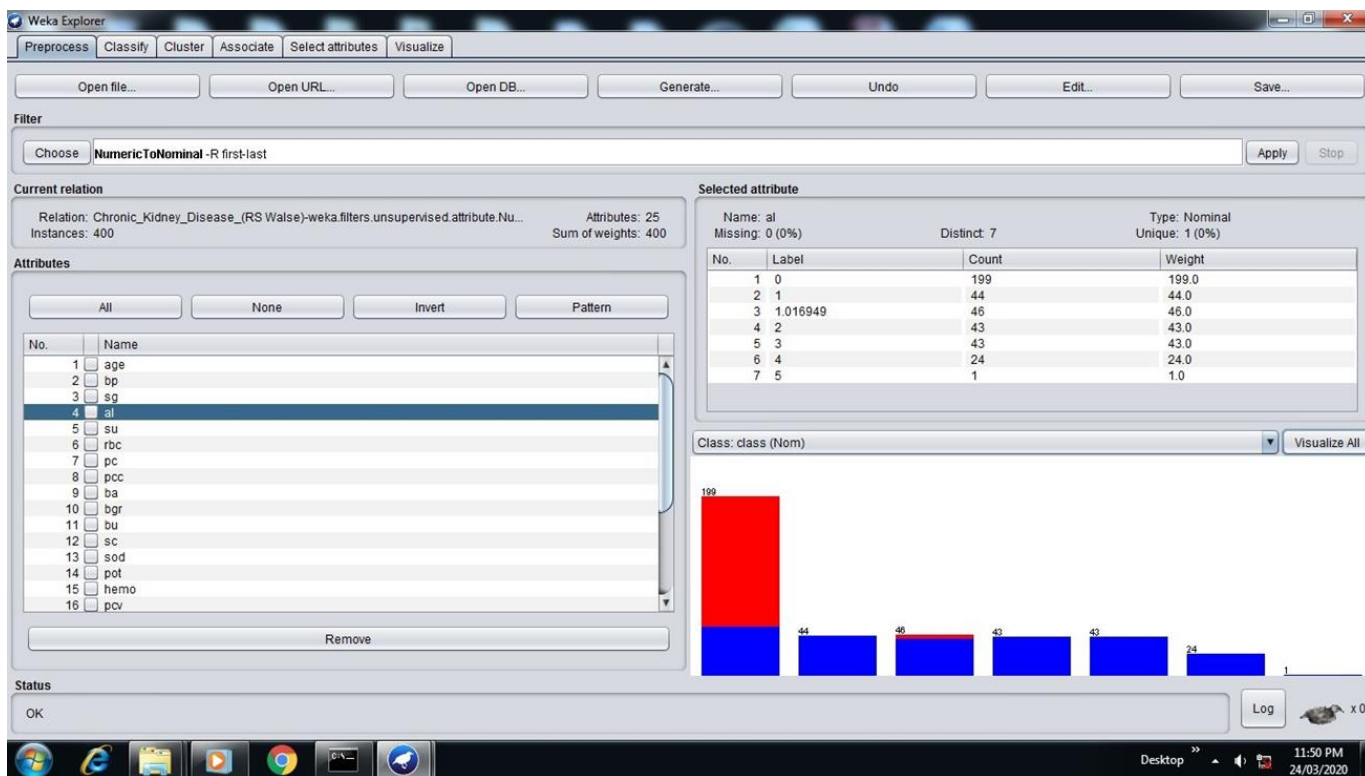
Figure: 32Preprocess data set with full attributes for Manhattan Distance function
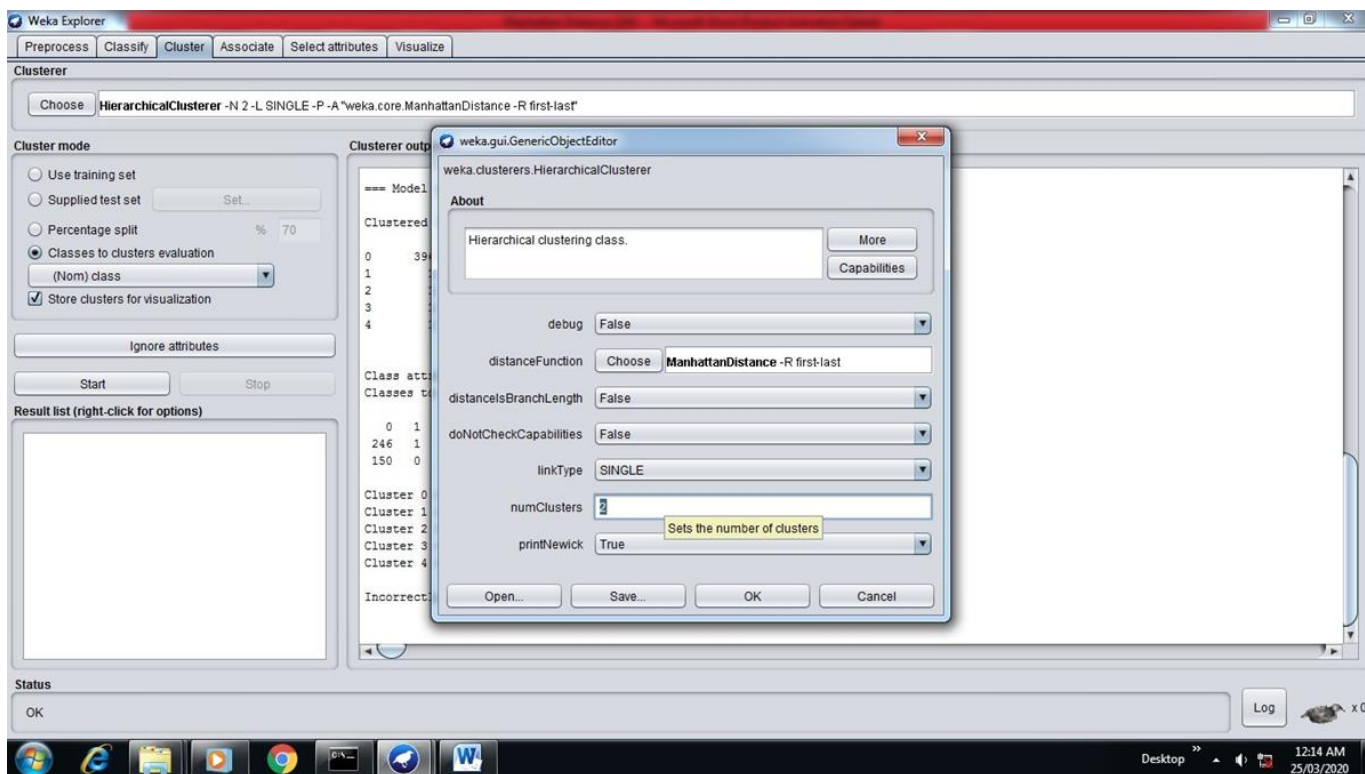
Figure: 33Hierarchical Clustering class with Manhattan Distance function for no of cluster 2,3,4& 5
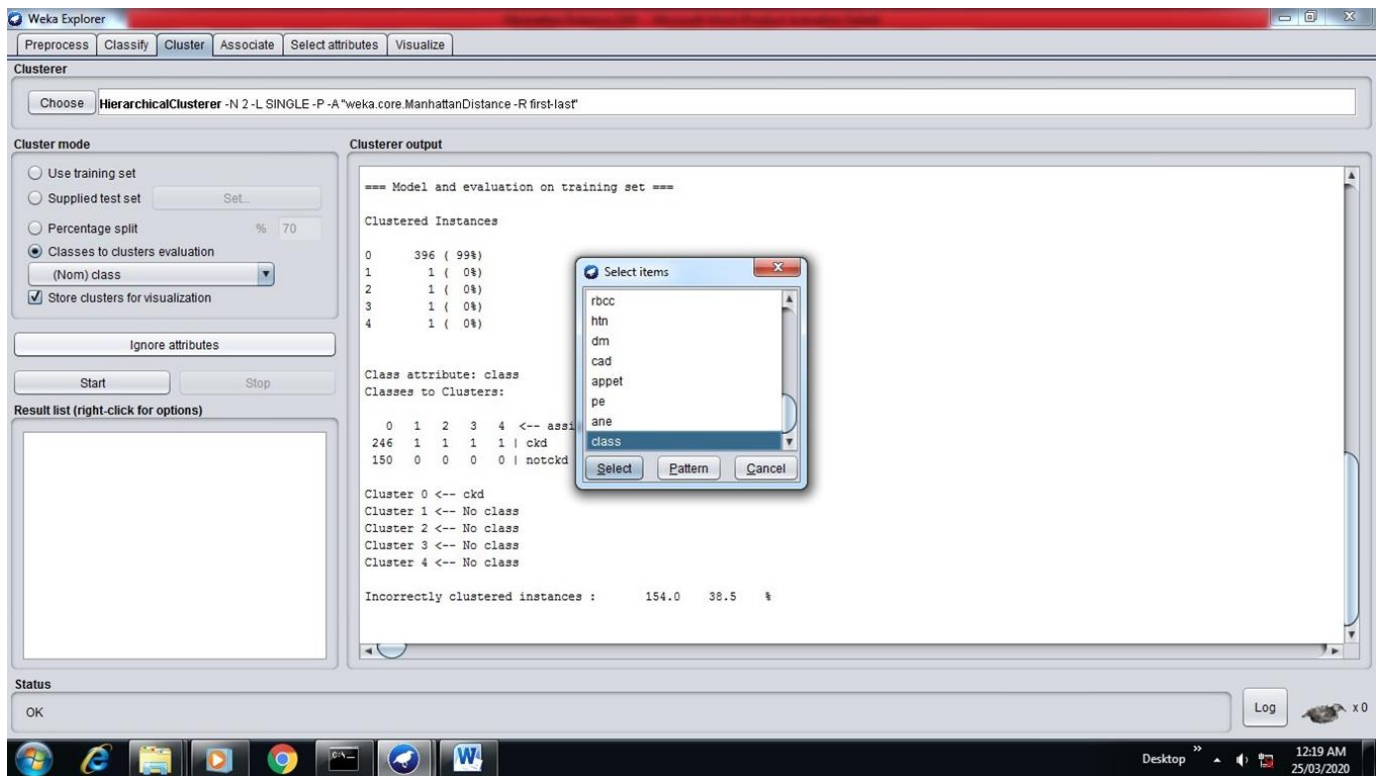
Figure: 34Result of Hierarchical Clustering class with Manhattan Distance function for no of cluster 2,3,4& 5

STEP 1:

(Manhattan Distance) = 2 Cluster = Full Attributes

=== Run information ===

Scheme: weka.clusterers.HierarchicalClusterer -N 2 -L SINGLE -P -A "weka.core.ManhattanDistance -R first- last"

Relation: Chronic_Kidney_Disease_(RS Walse)-weka.filters.unsupervised.attribute.NumericToNominal-Rfirst- last

Instances: 400

Attributes: 25

Time taken to build model (full training data) : 0.72 seconds

=== Model and evaluation on training set === Clustered Instances

0   399 (100%)

1   1 (0%)

Class attribute: class Classes to Clusters:

0 1 <-- assigned to cluster

249 1 | ckd

150 0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class

Incorrectly clustered instances :   151.0   37.75 %

STEP 2:

(Manhattan Distance) = 3 Cluster = Full Attributes

Time taken to build model (full training data) : 0.71 seconds

=== Model and evaluation on training set === Clustered Instances

0   398 (100%)

1   1 (0%)

483

2   1 (0%)

Class attribute: class Classes to Clusters:
0 1 2 <-- assigned to cluster
248 1 1 | ckd
150 0 0 | notckd
Cluster 0 <-- ckd Cluster 1 <-- No class Cluster 2 <-- No class
Incorrectly clustered instances :   152.0   38   %
STEP 3:
(Manhattan Distance) = 4 Cluster = Full Attributes
 Time taken to build model (full training data) : 0.73 seconds

=== Model and evaluation on training set === Clustered Instances
0   397 (99%)
1   1 (0%)
2   1 (0%)
3   1 (0%)

Class attribute: class Classes to Clusters:
0 1 2 3 <-- assigned to cluster
247 1 1 1 | ckd
150 0 0 0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class Cluster 2 <-- No class Cluster 3 <-- No class
STEP 4:
(Manhattan Distance) = 5 Cluster = Full Attributes

=== Model and evaluation on training set === Clustered Instances
0   396 (99%)
1   1 (0%)
2   1 (0%)
3   1 (0%)
4   1 (0%)

Class attribute: class Classes to Clusters:
0 1 2 3 4 <-- assigned to cluster 246 1 1 1 1 | ckd
150 0 0 0 0 | notckd

Cluster 0 <-- ckd Cluster 1 <-- No class Cluster 2 <-- No class Cluster 3 <-- No class Cluster 4 <-- No class
Incorrectly clustered instances :   154.0   38.5 %
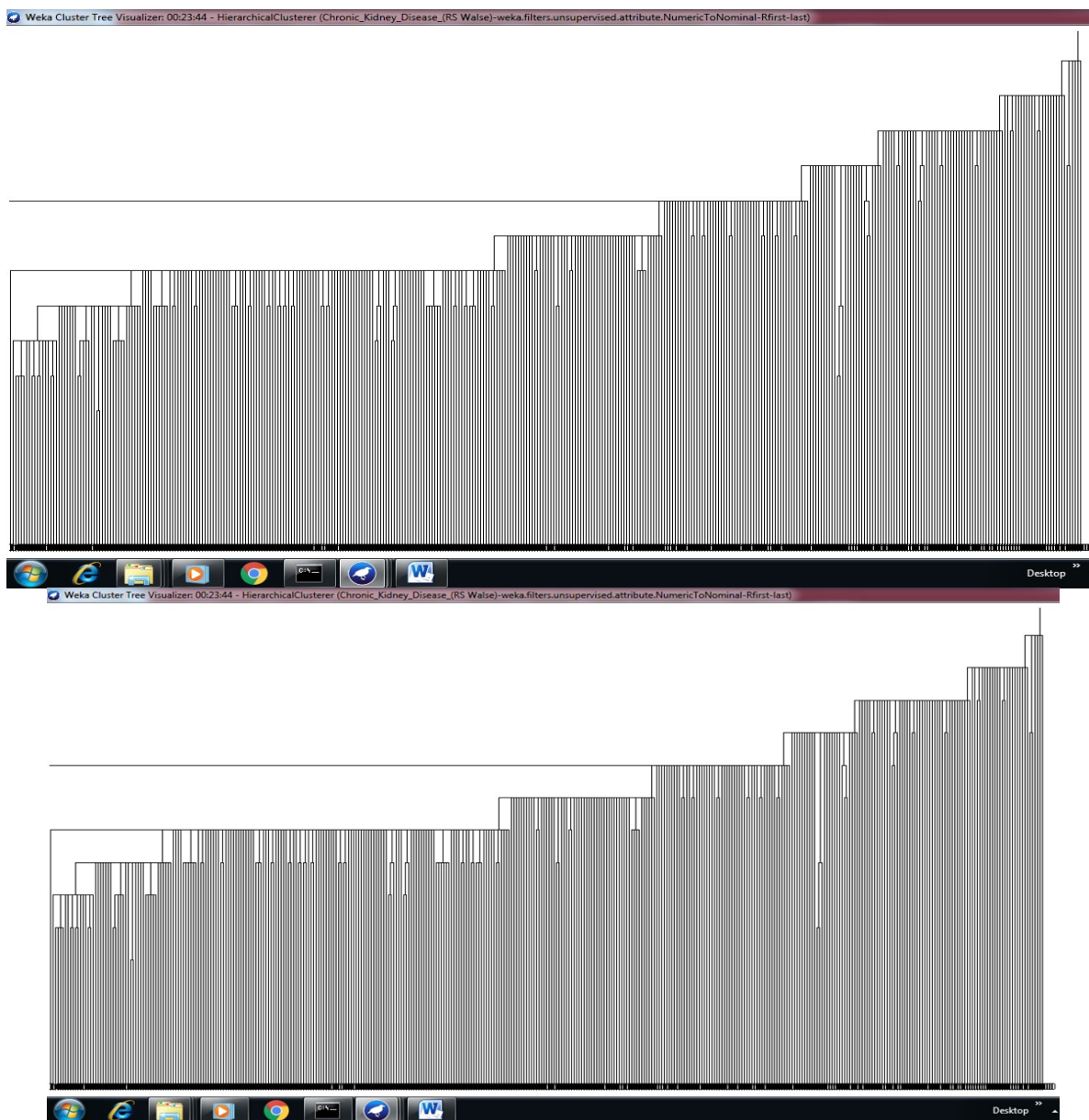
Figure: 35Result of Hierarchical Clustering class with Dendrograph Figure 35 What shows ?

IV. RESULTS AND DISCUSSION

{a}Comparative statement of Supervised SMO-SVM- Classifier with one, two & full attributes with 70% split using Calibrator: Logistic and Kernel= Polynomial function

The research, the kidney dataset processed with different attributes (25), which contains 400 rows, i.e., instances and 25 attributes, means columns. The researcher has select every attributes to displays type of attributes, the type means Nominal, how many missing values present in the data set for each attribute viz. instances, how many distinct values are present in the dataset, distinct means different values, if we select attribute is shown Nom- in front of attribute- nom means nominal type. The numeric data gives summary of the overall data in the form of descriptive statistics. Also, if data is qualitative then it treated as an attribute class and it shows in the form of label count and its weight in the form of true/false or yes/no.

Table 10: Correctness by Class values

Table 10: Correctness by Class values

	No of Attributes	Class	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area
*CVF=4 (htnVs Class)	01	CKD	0.588	0.000	1.000	0.588	0.741	0.590	0.794	0.845
		Not-CKD	1.000	0.412	0.593	1.000	0.744	0.590	0.794	0.593
		Weight Avg	0.743	0.155	0.847	0.743	0.742	0.590	0.794	0.751
**CVF appetV Class)	02	CKD	0.737	0.000	1.000	0.737	0.848	0.712	0.868	0.904
		Weight Avg	0.833	0.096	0.886	0.833	0.836	0.172	0.868	0.824
	24	CKD	0.980	0.000	1.000	0.980	0.990	0.974	0.990	0.992

* Found max and same accuracy for 5 to 15 CVF

** Found max and same accuracy for 5 to 15 CVF

*** 5,6,8,9,10,14,15 found max and same accuracy CVF

Table 10shows the correctness by Class valuesSupervised- classify – SMO- SVM- with attributes 2,3 & Full Attributes – Applying Cross validation foldfrom 4 to 15 with 70% split, and applying the Calibrator: Logistic and Kernel: Polynomial function and it shows the comparative study of the result and found the accurate prediction value, therefore research perfectly state that the increasing no of cross validation folds with respective increasing attributes the accuracy of the correctness of the class values increases shows in the form of ROC Area CVF=4 ROC Area = 0.794 using one attribute , CVF=4 ROC Area = 0.868 using two attributes and CVF=5 ROC Area=0.990. Hence we found best and Novel Predictive Module with the help of SMO- SVM- Classifier Class Module on the basis of Calibrator and Kernel function.
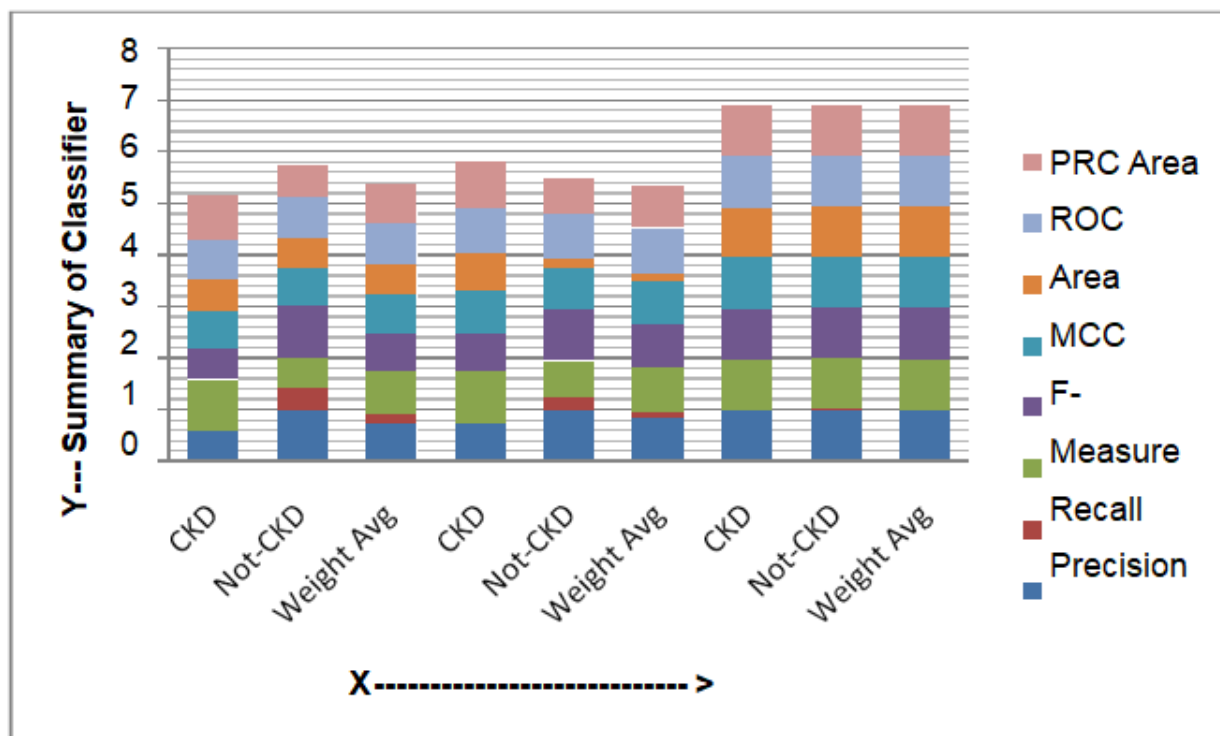
Figure: 36 Comparative study of Correctness by class values of SMO-SVM- Classifier with 1,2 and full attributes with 70% and CVF from 4 to 15.

Table 11:Summary of Classifier model (Train set data)

Sr. No.	Particulars	01 (htnVs Class) CV Folds 4 Found max and same accuracy for 5 to 15 CVF	02 (htn, appetVs Class) CV Folds 4 Found max and same accuracy for 5 to 15 CVF	24 (Full Vs Class) CV Folds 5,6,8,9,10,14,15 found max and same accuracy CVF
1	Test mode: 70% train, 30% test	70.0% train	70.0% train	70.0% train
2	Correctly Classified Instances	**74.25**	**83.33**	**98.75**
3	Incorrectly Classified Instances	25.75	16.66	1.25
4	Kappa statistic	0.517	0.6725	0.9735
5	Mean absolute error	0.2575	0.1667	0.0125
6	Root mean squared error	0.5074	0.4082	0.1118
7	Relative absolute error	54.90	35.6241	2.6656
8	Root relative squared error	104.81	84.6877	23.094
9	Total Number of Instances	400	400	400

(CVF= Cross Validation Folds)

Table 11 shows the Summary of classifier model with train set data, of SMO- classifier by applying one, two and full 25 attributes to test the result and getting some of the useful and accurate result, so as to use our research to further researcher for further prediction of data and effectively useful of the SMO – SVM classifier algorithm, further table 11 shows the how accuracy will be increased on the basis of different parameters like Cross Validation Folds just testing from 4 to 15, accuracy of the result is higher as compared to the earlier result in the form of Correctly Classifier Instances is 74.25 % , 83.33% and 98.75% respectively. Therefore also found the best Novel Summary of Classified module with highest accuracy of CCI.
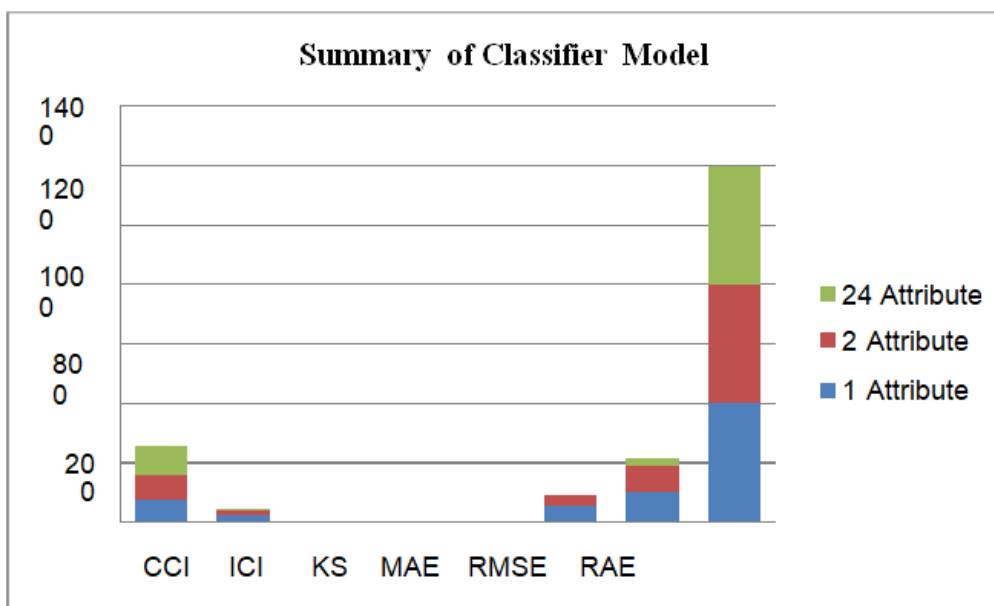
Figure: 37Comparative study of Summary of Classifier Module of SMO-SVM- Classifier with 1,2 and full attributes with 70% and CVF from 4 to 15.

Table 12:Comparative statement of Confusion Matrix SMO-SVM- Classifier with one, two & full attributes with 70% split using Calibrator: Logistic and Kernel= Polynomial function

Sr. No.	No of Attributes	CVF	Predicted (a)	Predicted (b)	< - Classified as
1	One Attribute htnvs Class	4-15	147	103	| a = ckd
			0	150	| b = not-ckd
2	Two Attributes Htn, appetVs Class	4	147	103	| a = ckd
			0	150	| b = not-ckd
		5-15	172	78	| a = ckd
			0	150	| b = not-ckd
3	Full Attributes 24 Vs Class	4,7,11,12,13	244	6	| a = ckd
			0	150	| b = not-ckd
		5,6,8,9,10,14,15	245	5	| a = ckd
			0	150	| b = not-ckd

(CVF = Cross Validation Folds)

Table 12 shows the Comparative statement of Confusion Matrix SMO-SVM- Classifier with one, two & full attributes with 70% split using Calibrator: Logistic and Kernel= Polynomial function, it plot the threshold Curve and Cost benefit curve for class ckd and Not-ckd in the form of % population of confusion matrix and cost matrix. Confusion matrix of predicted a & b also cost matrix a & b with the random and gain value. The researcher also find the research output is using full length of attributes it creates minimum Confusion matrix with accurate predicted class value with minimum no of iterations of clusters.

{b}Comparative statement of Un-Supervised Hierarchical Clustering algorithm using Euclidean and Manhattan distance function for the no of cluster 2,3,4 & 5.
Comparative statement of the Hierarchical clustering algorithm using Euclidean nad Manhattan distance function result with accuracy.

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 Euclidean Distance:
 === Run information ===

Scheme: weka.clusterers.HierarchicalClusterer -N 2 -L SINGLE -P -A "weka.core.EuclideanDistance -R first-last"
Relation:Chronic_Kidney_Disease_(RS   Walse)-weka.filters.unsupervised.attribute.NumericToNominal-Rfirst-last

 Manhattan Distance:

=== Run information ===
Scheme:weka.clusterers.HierarchicalClusterer -N 2 -L SINGLE -P -A "weka.core.ManhattanDistance -R first-last"
Relation:Chronic_Kidney_Disease_(RS   Walse)-weka.filters.unsupervised.attribute.NumericToNominal-Rfirst-last
=== Clustering model (full training set) ===

Table 13:Comparative statement of Unsupervised Hierarchical Clustering algorithm using Euclidean and Manhattan Distance Function of full attributes with 70% split. (Cluster 2,3,4& 5)

Sr. No.	No. of Cluster	Euclidean Distance				Manhattan Distance			
		Clustered Instances		Classes to Clusters		Clustered Instances		Classes to Clusters	
1	2	0	399(100)%	249 1 | ckd		0	399(100)%	249 1 | ckd	
		1	1(0%)	150 0 | notckd		1	1(0%)	150 0 | notckd	
2	3	0	398 (100%)	248 1 1 | ckd 150 0 0 | notckd		0	398 (100%)	248 1 1 | ckd 150 0 0 | notckd	
		1	1 (0%)			1	1 (0%)		
		2	1 (0%)			2	1 (0%)		
3	4	0	397 (99%)			0	397 (99%)		
		1	1 (0%)	247 1 1 1 | ckd 150 0 0 0 | notckd		1	1 (0%)	247 1 1 1 | ckd 150 0 0 0 | notckd	
		2	1 (0%)			2	1 (0%)		
		3	1 (0%)			3	1 (0%)		
4	5	0	396 (99%)			0	396 (99%)		
		1	1 (0%)	246 1 1 1 1 | ckd 150 0 0 0 0 | notckd		1	1 (0%)	246 1 1 1 1 | ckd 150 0 0 0 0 | notckd	
		2	1 (0%)			2	1 (0%)		
		3	1 (0%)			3	1 (0%)		
		4	1 (0%)			4	1 (0%)		

Table 13 describes the researcher also compare the result by using Unsupervised Hierarchical Clustering algorithm of Chronic Kidney Disease data with the support of Euclidean and Manhattan Distance clustering function with the help of 70% Split by setting the properties No of Clusters from 2,3,4, & 5 of Euclidean and Manhattan distance function. And finally research found the best and accurate prediction is the, Increasing the Number of Clusters of full attributes of Chronic Kidney Disease data accuracy of creating no of clusters as well as classes to Clusters increases. One more main comparative results also found, both the Euclidean and Manhattan distance function output result is also same for No of clusters 2,3,4& 5.

V. CONCLUSION

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The ckd data is analyzed and predicted for diagnosed patients using data mining supervised classifiers and unsupervised clustering algorithm of SMO – SVM algorithms and Hierarchical algorithms respectively. The performance of these algorithms is compare using Weka tools. The final obtained result shows that the both the Classification and Clustering algorithmNovel discovered module is the best truthful classifier with 98.75% accuracyi.e. Correctly Classified Instances as compared ofearlier results by applying one, two attributes by applying Calibrator: Logistic and Kernel: Polynomial function for CV folds is 5,6,8,9,10,14,15, the result is also same for confusion matrix also by using same CV folds. Therefore, found the best model prediction for Supervised- SMO in WEKA on the basis of three test using calibrator of logistic and kernel using polynomial function by applying Cross Validation Folds from 4 to 15 (Train on a portion of the data and test on the remainder) with 70% split, and final prediction is, increasing the no of attributes the accuracy of Correctly Classified Instances (CCI), ROC Area value and Confusion matrix value increased. Similarly research is also found to confirm predict the result of Unsupervised Hierarchical Clustering algorithm by applying full attributes also confirm prediction is increasing the number of Clusters from 2,3,4 and 5 for both Euclidean and Manhattan Function, the accuracy of result in terms of better and accurate clusters found. The adopted methodology clears the process of practical.For research work, some of the attributes were measuredRBC count, HP, Diabetes Mellitus, CAD, Appetite, Pedal Edema, Anemia, etc. Now future, this kind of research which will be helpful to the doctors or medical industry for prediction of CKD and not CKD patient based on their other health parameters, to minimize the growth rate of CKD patients and to control further damages of the kidney. Data mining plays an active role in predicting future kidney-related health problems. In this paper, thee algorithms it has been analyzed.We have tried to analyze chronic kidney disease by using SMO- SVM classifier algorithm unprocessed learning technique with Calibrator: Logistic and Kernel: Polynomial function.Indeed, the purpose of our research is to use our research to analyze kidney disease, or whether it can cause kidney disease in the future, this will allow kidney patients who are currently in a state to know what caused the kidney disease, and those who have not had a kidney disease will see if they can develop kidney disease in the future, so they will not need to perform additional tests and save money.

VI. ACKNOWLEDGEMENT

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Twitter Based Sentiment Analysis - Theoretical Aspects

Rajendra T Kaple

The model

Logistic regression is a method for analyzing a dataset in which there are one or more independent variables that determine an outcome (which is binary). In logistic regression, the dependent variable is binary i.e. it only contains data coded as 1 (TRUE, success, pregnant, etc.) or a 0 (FALSE, failure, non-pregnant, etc.). The goal of logistic regression is to find the best fitting model to describe the relationship between the dependent variable (which is binary) and a set of independent variables.

Consider a scenario where we need to classify whether an email is spam or not. So we set a threshold 0.5 any value above 0.5 will consider True and below 0.5 will be False.

Types of Logistic Regression

1. Binary Logistic Regression

The categorical response has only two 2 possible outcomes. Example: Spam or Not

2. Multinomial Logistic Regression

Three or more categories without ordering. Example: Predicting which food is preferred more (Veg and Non-Veg, Vegan)

3. Ordinal Logistic Regression

Three or more categories with ordering. Example: Movie rating from 1 to 5.

A. Logistic Function

The logistic function, also called the sigmoid function It's an S-shaped curve that can take any real-valued number and map it into a value between 0 and 1, but never exactly at those limits.

$$\phi(z) = \frac{1}{1 + e^{-z}}$$
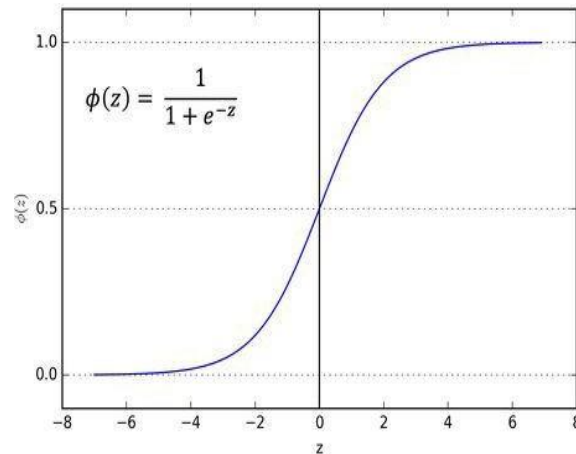
Decision Boundary:

To predict which class a data belongs, a threshold can be set. Based upon this threshold, the classes are divided

Say, if predicted_value ≥ 0.5, then classify email as spam else as not spam.

Decision boundary can be linear or nonlinear. Polynomial order can be increased to get complex

Cost Function

$$J(\theta) = -\frac{1}{m} \sum_{i=1}^{m} [y^{(i)} \log(h_\theta(x^{(i)})) + (1 - y^{(i)}) \log(1 - h_\theta(x^{(i)}))]$$

Why cost function which has been used for linear cannot be used for logistics?

Linear regression uses mean squared error as its cost function. If this is used for logistic regression, then it will be a non-convex function of parameters (theta), and as we all know Gradient descent converge into global minimum only if the function is convex.

Cost function explanation

$$J(\theta) = \frac{1}{m} \sum_{i=1}^{m} \text{Cost}(h_\theta(x^{(i)}), y^{(i)})$$

$$\text{Cost}(h_\theta(x), y) = \begin{cases} -\log(h_\theta(x)) & \text{if } y = 1 \\ -\log(1 - h_\theta(x)) & \text{if } y = 0 \end{cases}$$

Note: $y = 0$ or 1 always

We know that there are only two possible cases

- y = 1

Then our equation simplifies to

- -log(h θ (x)) - (0)log(1 - h θ (x))

  • -log(h θ (x))

○ y = 1
○ Then our equation simplifies to

- -(0)log(h θ (x)) - (1)log(1 - h θ (x))

- = -log(1- h θ (x))

Why do we choose this function when other cost functions exist?

We use this cost function because it is used to find the probability of an event = success or event = failure

Here we use binomial distribution, logistic regression does not require linear relation between dependent and independent variable. It can handle various types of relationships because it applies a non-linear log transformation to predict (odd ratio) values.

where p is the probability of presence of the characteristic of interest. The logit transformation is defined as the logged odds:

Odds=p/(1-p)

$$odds = \frac{p}{1-p} = \frac{probability\ of\ presence\ of\ characteristic}{probability\ of\ absence\ of\ characteristic}$$

and

$$logit(p) = \ln\left(\frac{p}{1-p}\right)$$

Rather than choosing parameters that minimize the sum of squared errors (like in ordinary regression) estimation in logistic regression chooses parameters that maximize the likelihood of observing the sample values.

Gradient Descent

Now we need to figure out how to minimize J(θ).

Use gradient descent as before Repeatedly update each parameter using a learning rate

Repeat {
$$\theta_j := \theta_j - \alpha \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})x_j^{(i)}$$
(simultaneously update all θ_j)
}

If you had n features, you would have an n+1 column vector for θ. This equation is the same as the linear regression rule

Multivariate Logistic Regression

Multivariate logistic regression is a classification method for multiclass(more than two possible discrete outcomes) problems. It is a model that is used to predict the probabilities of the different possible outcomes of Classes.
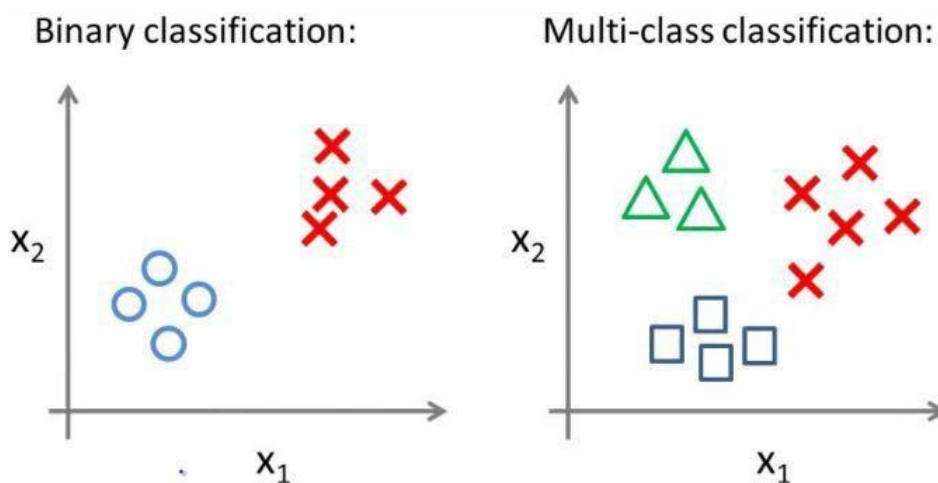
Multi class classification is implemented by training multiple logistic regression classifiers, one for each of the N classes in the training dataset.

In the above Multi Class classification example, there are 3 classes. Hence, we need to train 3 different logistic regression classifiers.

When training the classifier for Class 1, we will treat input data with class 1 labels as +ve samples (y=1) and all other classes as -ve samples (y=0).

When training the classifier for Class 2, we will treat input data with class 2 labels as +ve samples (y=1) and all other classes as -ve samples (y=0).

This will continue for all the classes.

A. Prediction phase: One vs all prediction

Once training all our classifiers, we can now use it to predict which class the test data belongs to.

For the test input, we should check the "probability" that it belongs to each class using the trained logistic regression . Your one-vs-all prediction function will pick the class for which the corresponding logistic regression outputs the highest probability and return the class label (1,2,..., or N) as the prediction for the input example.

The terms that we are going to be used frequently in this paper

- ➢ **Kernel:** The function used to map a lower dimensional data into a higher dimensional data.
- ➢ **HyperPlane:** In SVM this is basically the separation line between the data classes. Although in SVR we are going to define it as the line that will will help us predict the continuous value or target value
- ➢ **Boundary line:** In SVM there are two lines other than Hyper Plane which creates a margin . The support vectors can be on the Boundary lines or outside it. This boundary line separates the two classes. In SVR the concept is same.
- ➢ **Support vectors:** This are the data points which are closest to the boundary. The distance of the points is minimum or least.

B. Supervised Virtual Machine (SVM) :

SVM is a supervised machine learning algorithm which can be used for classification or regression problems. It uses a technique called the kernel trick to transform your data and then based on these transformations it finds an optimal boundary between the possible outputs. Simply put, it does some extremely complex data transformations, then figures out how to separate your data based on the labels or outputs you've defined.

Here we take a point from each cluster which is the farthest from mean and from the boundary using those points. Suppose you are given plot of two label classes on graph as shown in image (A). Can you decide a separating line for the classes?
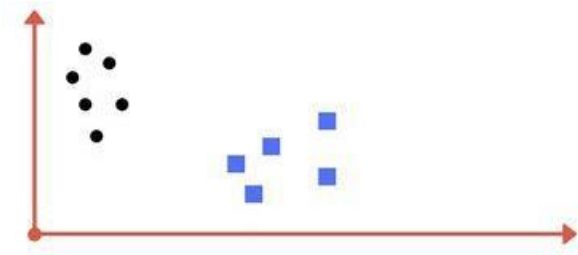
Image A: Draw a line that separates black circles and blue squares.

You might have come up with something similar to following image (image B). It fairly separates the two classes. Any point that is left of line falls into black circle class and on right falls into blue square class. Separation of classes. That's what SVM does. It finds out a line/ hyper-plane (in multidimensional space that separate outs classes). Shortly, we shall discuss why I wrote multidimensional space.
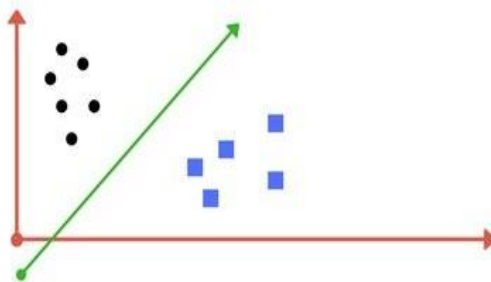
Image B: Sample cut to divide into two classes.

Now consider what if we had data as shown in image below? Clearly, there is no line that can separate the two classes in this x-y plane. So what do we do? We apply transformation and add one more dimension as we call it z-axis. Let's assume value of points on z plane, $w = x^2 + y^2$. In this case we can manipulate it as distance of point from z-origin. Now if we plot in z-axis, a clear separation is visible and a line can be drawn
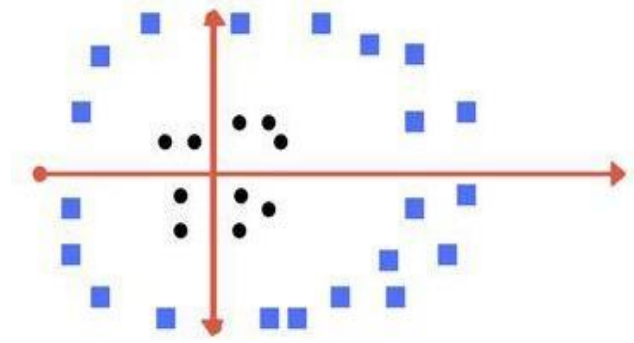
Now can you draw a separating line in this plane?
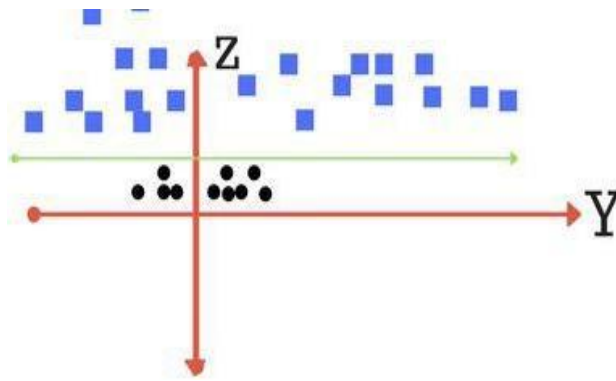
Plot of zy axis. A separation can be made here.

When we transform back this line to original plane, it maps to circular boundary as shown in image E. These transformations are called kernels.
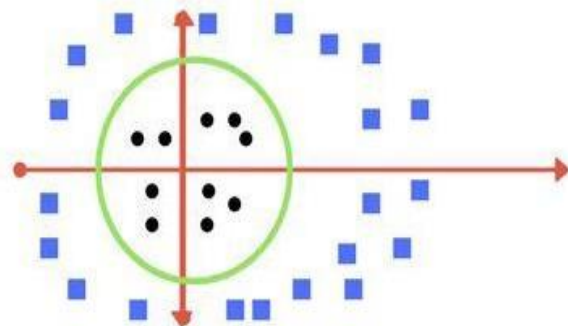
Transforming back to x-y plane, a line transforms to circle.

Here, we have three hyper-planes (A, B and C). Now, identify the right hyper-plane to classify star and circle.
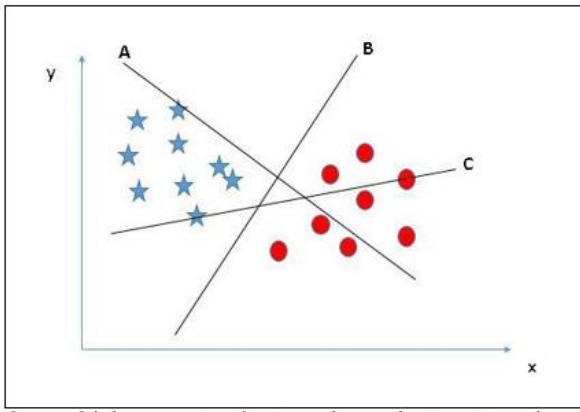
Select the hyper plane which separates the two classes better. Here, hyper-plane "B"

separates the two classes better.

● Here, we have three hyper-planes (A, B and C) and all are separating the classes well. Now, How can we identify the right hyper-plane?
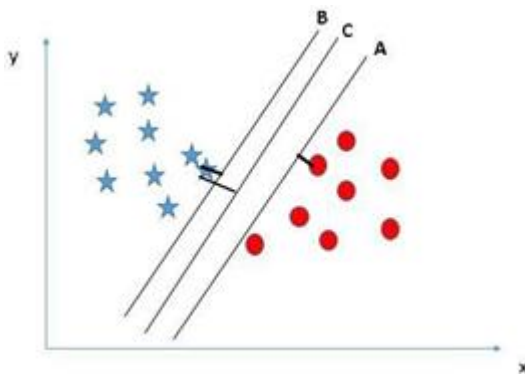
Here, maximizing the distances between nearest data point (either class) and hyper-plane will help us to decide the right hyper-plane. This distance is called as Margin. Let's look at the below snapshot:
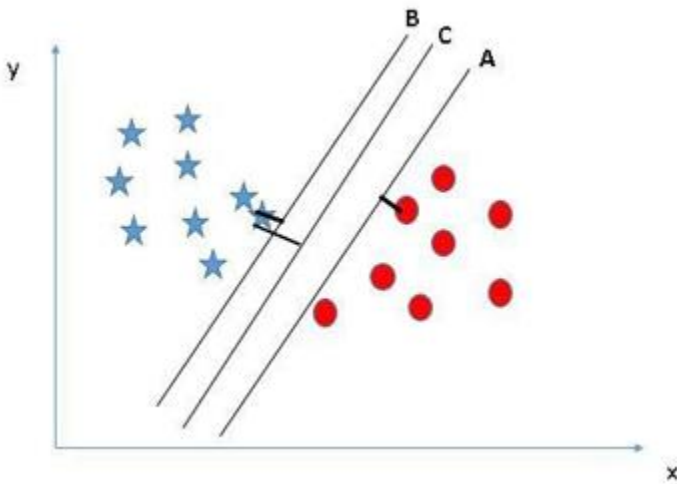
In this figure we can see that line C has high margin than A and B. So, line C is the right hyper plane in this situation. Another reason to select the hyperplane with higher margin is robustness and to avoid misclassification. SVM has feature to ignore outliers. Hence we can say that it's robust.

E. Pros and Cons associated with SVM

● Pros:

◻ It works really well with clear margin of separation

◻ It is effective in high dimensional spaces.

◻ It is effective in cases where number of dimensions is greater than the number of samples.

◻ It uses a subset of training points in the decision function (called support vectors), so it is also memory efficient.

● Cons:

◻ It doesn't perform well, when we have large data set because the required training time is higher.

◻ It also doesn't perform very well, when the data set has more noise i.e. target classes are overlapping.

◻ SVM doesn't directly provide probability estimates, these are calculated using an expensive five-fold cross-validation. It is related SVC method of Python

scikit-learn library.

F. Linear Regression :

There are two types of Linear regression :

a. Simple Linear Regression :

When we have only one feature, then it comes under univariate linear regression

b. Multi-Linear Regression :

When we have more than one feature, then it comes under simple linear regression. In linear regression, we are going to find the best fit line for our training dataset. So, what is a best-fit line? Best fit line is the one where we

get the minimum difference between predicted values and actual values, we have few mathematical formulae to find the best line and now we are going to see how to use them, but first few terminologies:

1. Hypothesis Function :

● Take the training data set

● Pass it to the machine learning algorithm

● It gives a function as output(denoted by h). This function is called Hypothesis

function.

➔ Here Θi represents the parameters.

➔ $\theta 0$ is a point where slope intercepts y-axis(or constant)

➔ $\theta 1$ is slope(or gradient)

● Now pass, test data set to the hypothesis function and it outputs the prediction.

2. Loss Function: The loss function is the sum of the squared distance between predicted value and actual value of the label for a single observation.

3. Cost: Cost function is the average of summation of the loss function. It is denoted by $J(\theta 0 , \theta 1)$.

4. Gradient Descent: It is a general algorithm that is used to minimize a function, in this case, it's Mean Squared Error Cost Function.

G. Linear regression - implementation (cost function) :

Loss Function: The loss function is the sum of the squared distance between predicted value and actual value of the label for a single observation. By squaring, the loss function amplifies the influence of bad predictions, i.e. it reacts more strongly to outliers.

The formula for loss function
Cost: Cost function is the average of summation of the loss function. It is denoted by $J(\theta 0 , \theta 1)$.

We are dividing the cost function by 2 only to reduce its value, just to make further calculation easy and small.

It determines how our hypothesis behaves for different value for parameters. The cost is higher when the model is performing poorly on the training set.

So, why do we take the square of error?

Error finds the difference between predicted and original value. We are doing this using linear regression. So, mathematically we are finding the distance between two points and we all know that distance can never be negative and hence we are squaring it.

When we plot the graph by joining the points generated by loss function we get a convex curve.
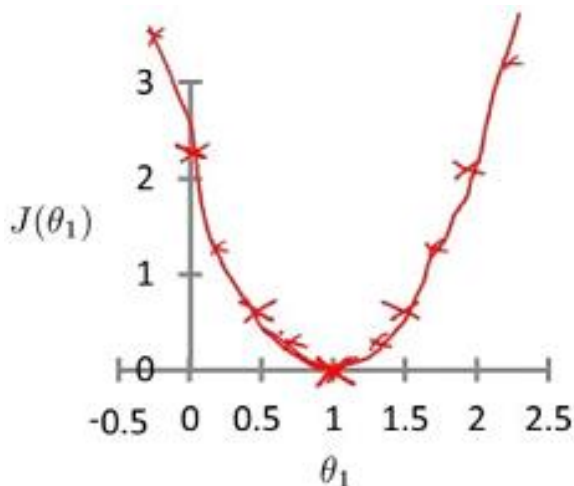
The optimization objective for the learning algorithm finds the value of θ1 which

Minimizes J(θ1)

Gradient Descent Algorithm:

$$\Theta_{n+1} = \Theta_n - \alpha \frac{\partial}{\partial \Theta_n} J(\Theta_n)$$

$\Theta \rightarrow$ Parameter Vector
$J \rightarrow$ Cost Function
$\alpha \rightarrow$ Slope Parameter

Why do we take the Derivative of Cost Function? :

There are two reasons for taking the derivative :

1. To find the direction we want to move so that we'll get a minimum of cost function :

In the plot of cost function vs theta, a positive slope means function moves upward as we move right, so we have to move towards the left to get the minimum value of cost function.
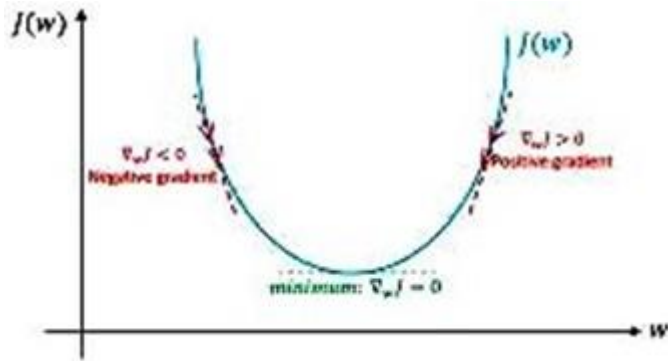
Similarly, a negative slope means function moves downwards as we move left, so move towards the right to get the minimum value of cost function.

2. How big the step should be, so that we won't miss the global minima (the point where the value of cost function is minimum) :

Here we need to take larger steps if the slope is larger i.e., we are so far from the minimum and smaller steps if the slope is smaller.

Learning Rate : (alpha)

To control the size of the steps we use learning rate. Smaller the learning rate, smaller will be the steps. Selecting the learning rate is one of the critical tasks because it affects the time for training the program. When the learning rate is large, we might miss the minimum value. If the learning rate is small, we might have to run a number of iterations, which in turn increases the training time.

So, how can we decide how many iterations to take so as to get suitable values of parameters?

Epochs :

We need to iterate the gradient descent a certain number of times to obtain the suitable values of parameters.

For this, we have to go for try and error method. So, here we need to calculate the certain large number of times.

Repeat until convergence {

$$\theta_j \leftarrow \theta_j - \alpha \frac{\partial}{\partial \theta_j} J(\theta)$$

}

The intuition of cost function and gradient descent :

Here, basically, we have to find the values of parameters where we get the minimum value of loss function. For doing so, we have to go for try and error method, i.e., we have to calculate loss function for different values of theta_0 and theta_1. And this might require thousands of attempts. We need to find a value of J(theta) after which whatever the value of theta might be, loss function won't change much.

This process of finding all the values of parameters is cost function and finding values of parameters (theta_0 and theta_1) where the value of cost function(J(theta)) is minimum is

nothing but gradient descent. But using gradient descent we can find minimum value easily without storing all the values for parameters. Using const function along with gradient descent is termed as linear regression.

H. Gradient descent algorithm :

Derivation of GD :

Here features and label as constats. Here we are taking derivation on both sides of the equation of cost function.

$$J(\theta) = \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)} \right)^2 \qquad [1.0]$$

$$\frac{d}{d\theta_0} J(\theta_0, \theta_1) = \frac{d}{d\theta_0} \left(\frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)} \right)^2 \right) \qquad [1.1]$$

$$= \frac{1}{m} \sum_{i=1}^{m} \frac{d}{d\theta_0} \left(h_\theta(x^{(i)}) - y^{(i)} \right)^2 \qquad [1.2]$$

$$= \frac{1}{m} \sum_{i=1}^{m} 2 \left(h_\theta(x^{(i)}) - y^{(i)} \right) \frac{d}{d\theta_0} \left(h_\theta(x^{(i)}) - y^{(i)} \right) \qquad [1.3]$$

$$= \frac{2}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)} \right) \qquad [1.4]$$

To move from equation [1.1] to [1.2], we need to apply two basic derivative rules:

Scalar multiple rule:
$$\frac{d}{dx}(\alpha u) = \alpha \frac{du}{dx}$$

Sum rule:
$$\frac{d}{dx}\sum u = \sum \frac{du}{dx}$$

Moving from [1.2] tog [1.3], we apply both the power rule and the chain rule:

Power Rule
$$\frac{d}{dx}u^n = n\, u^{n-1}\frac{du}{dx}$$

Finally, to go from [1.3] to [1.4], we must evaluate the partial derivative as follows. While taking the partial derivative we have to keep in mind that everything except θ0 is constant, i.e., θ1, x, and y are constants here

Chain Rule
$$\frac{d}{dx}f(g(x)) = f'(g(x))\, g'(x)$$

$$\frac{d}{d\theta_0}\left(h_\theta(x^{(i)}) - y^{(i)}\right) = \frac{d}{d\theta_0}\left(\theta_0 + \theta_1 x^{(i)} - y^{(i)}\right) = 1$$

Equation [1.4] gives us the partial derivative of the MSE cost function with respect to one of the variables, θ0. Now we must also take the partial derivative of the MSE function (cost function) with respect to θ1. The only difference is in the final step, where we take the partial derivative of the error:

Multiplying the cost function by a scalar does not affect the location of its minimum, so we can get away with this. So, here we divide the equation by 2 just to reduce it so that the calculations get simple. So as a final result we get

Cost Function – "One Half Mean Squared Error":

$$J(\theta_0, \theta_1) = \frac{1}{2m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})^2$$

Objective:

$$\min_{\theta_0, \theta_1} J(\theta_0, \theta_1)$$

Update rules:

$$\theta_0 := \theta_0 - \alpha\frac{d}{d\theta_0}J(\theta_0, \theta_1)$$
$$\theta_1 := \theta_1 - \alpha\frac{d}{d\theta_1}J(\theta_0, \theta_1)$$

Derivatives:

$$\frac{d}{d\theta_0}J(\theta_0, \theta_1) = \frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})$$

$$\frac{d}{d\theta_1}J(\theta_0, \theta_1) = \frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)}) \cdot x^{(i)}$$

In multi linear regression, we have more than one features. So just like linear regression we will have first parameter with no "X" variable and rest all will have "X" value i.e., their corresponding feature with them like

repeat until convergence: {

$$\theta_0 := \theta_0 - \alpha\frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)}) \cdot x_0^{(i)}$$

$$\theta_1 := \theta_1 - \alpha\frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)}) \cdot x_1^{(i)}$$

$$\theta_2 := \theta_2 - \alpha\frac{1}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)}) \cdot x_2^{(i)}$$

...

}

this where X_0 = 1 :

We can combine and write the equation for multi linear gradient descent as : for i in range(len(traindata)) :

for j in range(len(traindata)) :

$$\theta_j := \theta_j - \frac{\alpha}{m}\sum_{i=1}^{m}(h_\theta(x^{(i)}) - y^{(i)})x_j^{(i)}$$

Where ,

i - row(observation) j - column(feature)

Example of simple linear regression :

In linear regression, we need to generate a straight line(aka regression line) where errors are minimized.

Directory Structure of the Problems and naming conventions of the files :

Here I am taking World happiness for example

1. World Happiness Prediction Problem (folder)

a. Model Training (folder)

i. Data (folder)

1. world_happiness_training_dataset.csv (csv file)

ii. Model (folder)

1. world_happiness_training.pkl (pickle file)

iii. world_happiness_trainig.py (python file)

iv. world_happiness_trainig.ipynb (jupyter python file)

v. CSVs Files (folder)

b. Model Testing (folder)

i. Data (folder)

1. world_happiness_testing_dataset.csv (csv file)

ii. world_happiness_testing.pkl (pickle file)

iii. world_happiness_testing.py (python file)

iv. world_happiness_testing.ipynb (jupyter python file)

c. requirement.txt (text file)

Please change the above problem name with your problem name.

I. Environment Setup:

Step 0: Check the python 3 installed or not

● Type python3 -V cmd on the terminal it will show you it is installed or not

○ If not installed then install the python using the following commands

■ sudo apt-get update

■ sudo apt-get upgrade python3

■ sudo apt-get install python3

Step 1:

● Install pip first

○ sudo apt-get install python3-pip

● Then install virtualenv using pip3

○ sudo pip3 install virtualenv

● Install Jupyter

○ pip3 install jupyter

Step 2:

● Clone the problems from Github repository

○ git clone https://github.com/AkankshaKaple/ML_Problems

● Unzip the directory

● Switch to the ML_Problems directory

● Now create a virtual environment

○ python3 -m venv myenv

● Active your virtual environment:

○ source myenv/bin/activate

● Install the required libraries and packages

○ pip3 install -r requirements.txt (this file you get in the cloned repo)

● Run Jupyter Notebook in ML_Problems directory

○ jupyter notebook

● Set different kernel in Jupyter

○ python3 -m ipykernel install --user --name myenv --display-name "myenv".

Machine Learning Terms Libraries :

● Pandas : In computer programming, pandas is a software library written for the Python programming language for data manipulation and analysis and storing in a proper way. In particular, it offers data structures and operations for manipulating numerical tables and time series.

● Numpy : NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

● Pickle : Python pickle module is used for serializing and de-serializing a Python object structure. Pickling is a way to convert a python object (list, dict, etc.) into a character stream. The idea is that this character stream contains all the information necessary to

re-construct the object in another python script.

● Sklearn : Scikit-learn (formerly scikits.learn) is a free software machine learning library for the Python programming language. It features various classification, regression and clustering algorithms including support vector machines, random forests, gradient boosting, k-means and DBSCAN, and is designed to interoperate with the Python numerical and scientific libraries NumPy and SciPy. The library is built upon the SciPy (Scientific Python) that must be installed before you can use scikit-learn.

● NLTK : The Natural Language Toolkit, or more commonly NLTK, is a suite of libraries and programs for symbolic and statistical natural language processing for English written in the Python programming language.

● Seaborn : Seaborn is a library for making statistical graphics in Python. It is built on top of matplotlib and closely integrated with pandas data structures. Options for visualizing univariate or bivariate distributions and for comparing them between subsets of data.

Natural Language Processing (NLP) Terms :

● Tokenization is the process of tokenizing or splitting a string, text into a list of tokens. One can think of token as parts like a word is a token in a sentence, and a sentence is a token in a paragraph.

● Lemmatization:

Layers in Keras:

● Dense: In simple words, a dense layer is where each unit or neuron is connected to each neuron in the next layer.

● Dropout :

⮚ Dropout is a regularization technique, which aims to reduce the complexity of the model with the goal to prevent overfitting.

⮚ Using "dropout", you randomly deactivate certain units (neurons) in a layer with a certain probability p from a Bernoulli distribution (typically 50%, but this yet another hyper parameter to be tuned). So, if you set half of the activations of a layer to zero, the neural network won't be able to rely on particular activations in a given feed-forward pass during training. As a consequence, the neural network will learn different, redundant representations; the network can't rely on the particular neurons and the combination (or interaction) of these to be present. Another nice side effect is that the training will be faster.

⮚ Dropout is only applied during training, and you need to rescale the remaining neuron activations. E.g., if you set 50% of the activations in a given layer to zero, you need to scale up the remaining ones by a factor of 2. Finally, if the training has finished, you'd use the complete network for testing (or in other words, you set the dropout probability to 0).

Twitter Analysis :

● Anything to add from the document: https://www.analyticsvidhya.com/blog/2018/07/hands-on-sentiment-analysis-data set-python/

● When to use a bag of words:

If your dataset is small and context is domain-specific, Basic operational Weight (BoW) may work better than Word Embedding. Context is very domain-specific which means that you cannot find the corresponding Vector from pre-trained word embedding models (GloVe, fastText etc).

● Random State in train_test_split() :

When we use a random number generator for number/sequence generation, we give a starting number (AKA seed). When we provide the same seed, every time it'll generate the same sequence as the first one. That's why to keep the same random values every time, we give seed as random_state in train_test_split().

● Random Number:

The random numbers which we call are actually "pseudo-random numbers". These are generated by some kinds of deterministic algorithms. Basically, these pseudo-random numbers follow some kinds of sequences which has very very large period . That's why it appears random to us but in fact, are patterns in the

long run.

● What is a seed?

 The seed during such random number generation is actually the starting point in the sequence. If we use the same seed every time, it will yield the same sequence of random numbers.

 So, the same seed yields the same sequence of random numbers.

 The reason for using a seed of some value is when we want to debug the program using such deterministic behavior.

Advantages of Adam:

Adam is an optimization algorithm that can be used instead of the classical stochastic gradient descent procedure to update network weights iterative based on training data.

When introducing the algorithm, the authors list the attractive benefits of using Adam on non-convex optimization problems, as follows:

● Straight forward to implement.

● Computationally efficient.

● Little memory requirements.

● Invariant to diagonal rescale of the gradients.

● Well suited for problems that are large in terms of data and/or parameters.

● Appropriate for non-stationary objectives.

● Appropriate for problems with very noisy/or sparse gradients.

● Hyper-parameters have intuitive interpretation and typically require little tuning.

Algorithms :

● There is no transform in logistic regression and SVM.

Issues :

● Model selection prepro not working in age detection.

Covid-19 Data Analysis

Ms. Akanksha Kaple

ABSTRACT

COVID-19 outbreak was first reported in Wuhan, China and has spread to more than 50 countries. WHO declared COVID-19 as a Public Health Emergency of International Concern (PHEIC) on 30 January 2020. Naturally, a rising infectious disease involves fast spreading; endangering the health of large numbers of people, and thus requires immediate actions to prevent the disease at the community level.

Therefore, Corona Tracker was born as the online platform that provides latest and reliable news development, as well as statistics and analysis on COVID-19.

This paper is done by the research team in the Corona Tracker community and aims to predict and forecast COVID-19 cases, deaths, and recoveries through predictive modeling.

The model helps to interpret patterns of public sentiment on disseminating related health information, and assess political and economic.

Keywords: SARS-COV-2, Data Analysis, Pandemic

I. INTRODUCTION

Corona virus disease 2019(COVID-19) is an infectious disease caused by severe acute respiratory syndrome corona virus (SARS-CoV-2). It was first identified in December 2019 in Wuhan, China, and has resulted in an ongoing pandemic. The first case may be traced back to 17 November 2019. As of 8th June 2020, more than 6.98 million cases have been reported across 188 countries and territories, resulting in more than 401,000 deaths. More than 3.13 million people have recovered.

The virus is primarily spread between people during contact, most often via small droplets produced by coughing, sneezing, and talking. The droplets usually fall to the ground or onto surfaces rather than travelling through air over long distances. Less commonly, people may become infected by touching a contaminated surface and then touching their face. It is most contagious during the first three days after the onset of symptoms, although spread is possible before symptoms appear, and from people who do not show symptoms.

Data Science

Data science is an interdisciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from structured and unstructured data, apply knowledge and actionable insights from data across a broad range of application domains. Data science is related to data mining machine learning and big data.

Data science is a "concept of unify statistics, data analysis, informatics, and their related methods" in order to "understand and analyze actual phenomena" with data. It uses techniques and theories drawn from many fields within the context of mathematics, statistics, computer science, information science and domain knowledge. However, data science is different from computer science and information science.

Aim

The aim of this project to design a system called Covid-19 Data Analysis that can help us to understand the cases of covid patients and to interpret patterns of public sentiment on disseminating related health information, and assess political and economic.

II. LITERATURE REVIEW

Research papers referred

1) Covid-19 Impact on Indian Economy

Authors: Mahendra Dev (Indira Gandhi Institute of Development Research) Rajeshwari Sengupta (Indira Gandhi Institute of Development Research) https://ideas.repec.org/p/ind/igiwpp/2020-013.html

2) COVID-19 in India: Potential Impact of the Lockdown and Other Longer- Term policies.

Authors: Emily Schueller(CDDEP) Eili Klein (Department of Emergency Medicine Johns Hopkins School of Medicine; CDDEP) Gary Lin (Department of Emergency Medicine Johns Hopkins School of Medicine;CDDEP) https://cddep.org/wp-content/uploads/2020/04/India-Shutdown-Modeling -Slides- Final-2.pdf

Data Sources

For the COVID-19 data have scrapped https://api.covid19india.orgwhich is a volunteer-driven, crowd sourced database for COVID-19 state & stats & patient tracing in India.

For facts and information we have referred www.wikipedia.com and www.twitter.com.

III. SYSTEM REQUIREMENTS

2.1 Hardware requirements

- ➢ OS   :   Windows 7 or Newer
- ➢ Processor   :   Minimum 1 GHz; Recommended 2 GHz or more
- ➢ Hard Drive   :   Minimum 32 GB; Recommended 64 GB or more
- ➢ Memory (RAM)   :   Minimum 1 GB; Recommended 4GB or above
- ➢ Ethernet connection (LAN) OR a wireless adapter(Wi-Fi)

2.2 Software requirements

a. Jupyter notebook

Jupyter notebook is a web-based interactive computational environment for creating jupyter notebook documents. The "notebook" term can colloquially make reference to many different entities, mainly the Jupyter web application, Jupyter Python web server, or Jupyter document format depending on context. A Jupyter Notebook document is a JSON document, following a versioned schema, containing an ordered list of input/output cells which can contain code, text (using Markdown), mathematics, plots and rich media, usually ending with the ".ipynb" extension.

A Jupyter Notebook can be converted to a number of open standard output formats (HTML, presentation slides, LaTeX, PDF, Restructured tata, Markdown, Python) through "Download As" in the web interface, via the nbconvert library or "jupyter nbconvert" command line interface in a shell. To simplify visualization of Jupyter notebook documents on the web, the nbconvert library is provided as a service through NbViewer which can take a URL to any publicly available notebook document, convert it to HTML on the fly and display it to the user.

b. MySQL

MySQL is an open-source relational database management system (RDBMS). A relational database organizes data into one or more data tables in which data types may be related to each other: these relational help structure the data. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database.

In additional to relational database and SQL, an RDBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilities testing database integrity and creation of backups.

c. Pandas

Pandas is a software library written for the Python Programming language for data manipulation and analysis. In particular, it offers data structures and operations for manipulating numerical tables and time series.

It is free software released under the three-clause BSD license. The name is derived from the term "panel data", an econometrics term for data sets that include observations over multiple time periods for the same individuals. Its name is a play on the phrase "Python data analysis" itself.

d. NUMPY

NumPy is a general-purpose array-processing package. It provides a high performance multi dimensional array object, and tools for working with these arrays.

It is the fundamental package for scientific computing with Python. It contains various features including these important ones.

A powerful N-dimensional array object, Sophisticated (broadcasting) functions, Tools for integrating C/C++ and Fortran code Useful linear algebra, Fourier transform, and random number capabilities.

Besides its obvious scientific uses, NumPy can also be used as an efficient multi-dimensional container of generic data. Arbitrary data-types can be defined using Numpy which allows NumPy to seamlessly and speedily integrate with a wide variety of databases.

2.3 UML Diagrams

a. Data Flow Diagram

A data flow diagram (DFD) is a way of representing a flow of data through a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow; there are no decision rules and no loops. Specific operations based on the data can be represented by a flowchart. The data flow diagram is a part of the structured-analysis modeling tool. When using UML, the activity diagram typically takes over the role of the data-flow diagram. A special form of data-flow plan is a site- oriented data-flow plan.
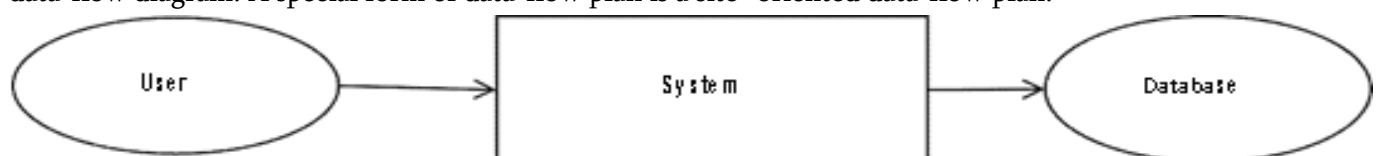
Fig. 3.5 : Level 0 Data FlowDiagram

Fig. 3.6 : Level 1 Data Flow Diagram

b. E-R Diagram

An entity-relationship (ER) model describes interrelated things in a specific domain of knowledge. A basic ER model is composed of entity types (which classify the things of interest) and specifies relationships that can exist between entities (instance of those entity types).
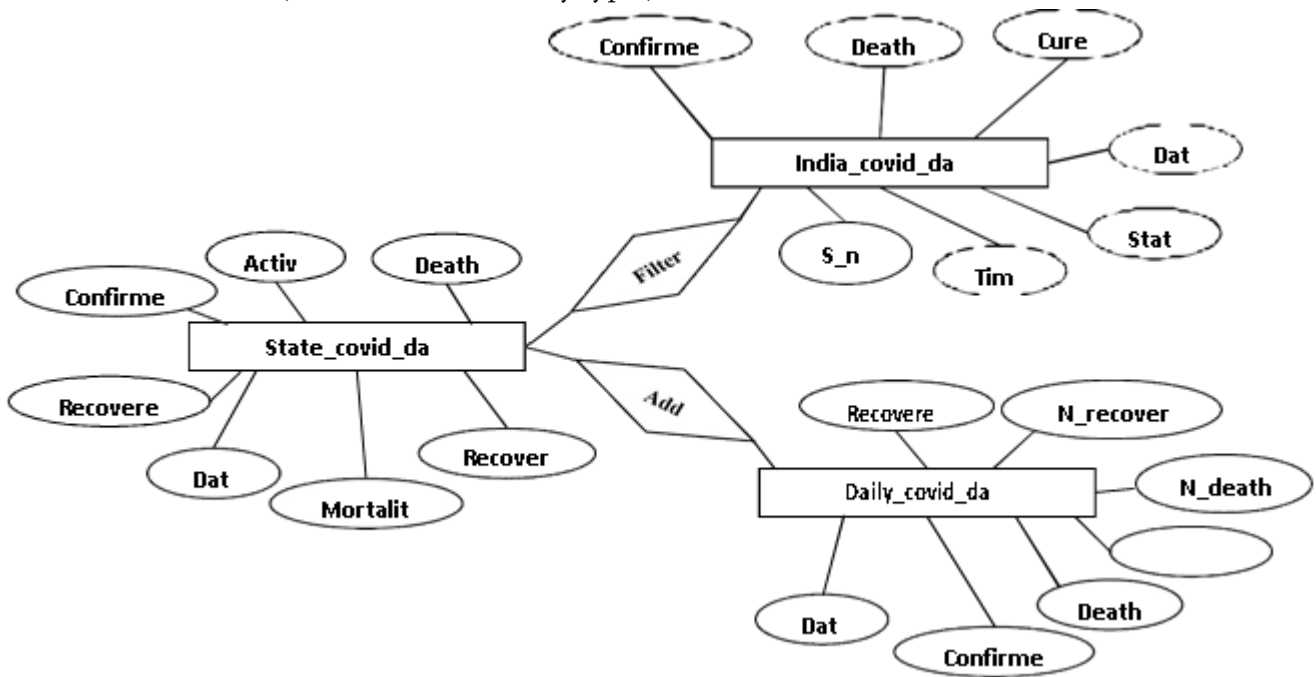
Fig. 3.7 : E-R Diagram

c. Use Case Diagram:

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved,
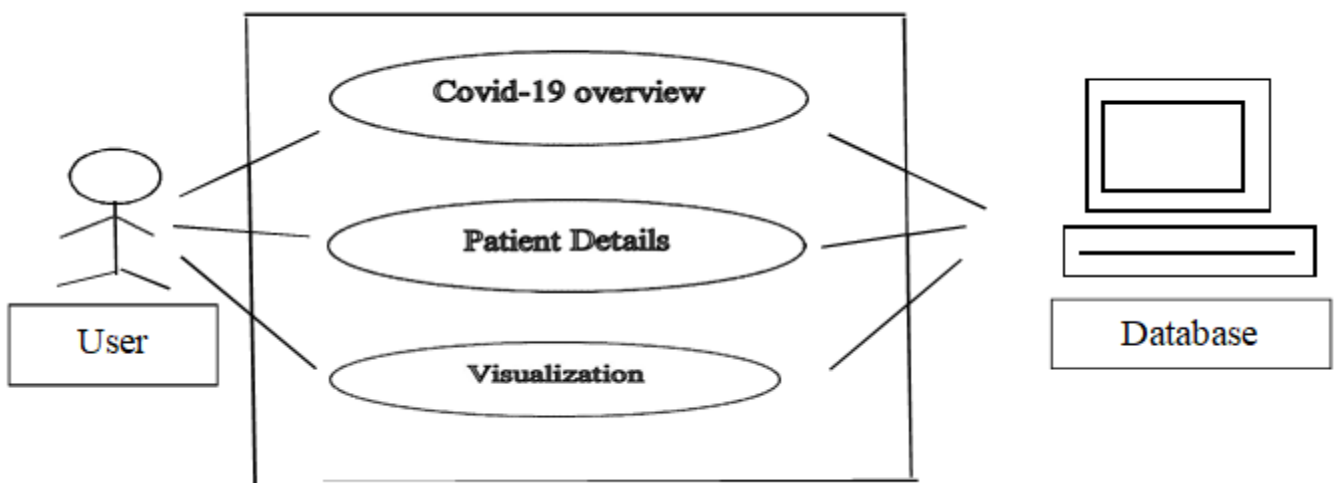
Fig 3.8 : Use Case Diagram

IV. SYSTEM IMPLEMENTATION

3.1 Data base creation

The problem of creating a covid data analysis system has two separate stages: database creation and query processing. The first stage requires the creation of database of covid patients of India. An effective storage mechanism may be implemented at this stage to improve retrieval response. In the query processing stage, gives information about the patients, number of patients with different types of cases in the existing database.

Database Creation collects the information and number of cases of patients. It stores daily cases on the basis of different cases like confirmed cases, active cases, recovered cases and deaths cases as well as store by daily cases, state wise cases and all India's cases in database. The database stored on the disk.

3.2 Query processing

- Extract the information of the patients.
- Differentiate the patients according to his type of case.
- Process on the number of cases according to type of case.

3.3 Web interface

India recorded its first COVID-19 case on 30th January 2020 in kerala. The infected person was a student who had travelled to china for academic purpose. And since then cases in India is rising exponentially.

India had recorded over 500 cases till 24th March. Therefore, government declared nation-wide lockdown from 25th march to 14th April also known as lockdown 1.0 and after this government has been extending nation-wide lockdown step by step.

Situation in India,

Confirmed Cases: 9735850

Recovered: 9215581

Active: 378909

Deceased: 141360
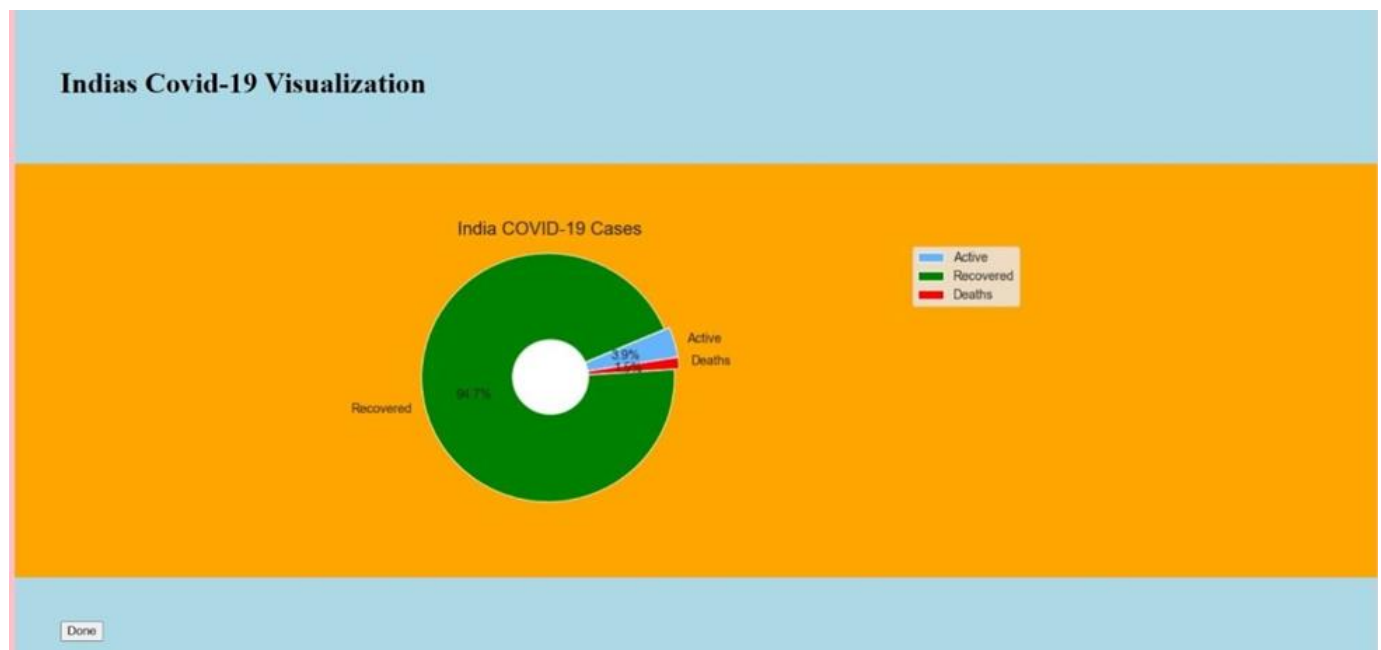
Fig 3.1 : India's Covid Ratio

India is showing good recovery rate day by day with low rate of deaths but on the other hand it is also reaching new peak of confirmed cases every day.

State wise Comparison

India consists of 28 states and 8 Union Territories with varying features such as demography, geography, location, lifestyle etc. Which can decide the spread of contagious virus? Comparing COVID-19 situation in states gives us insight of which state/area is to be focused.
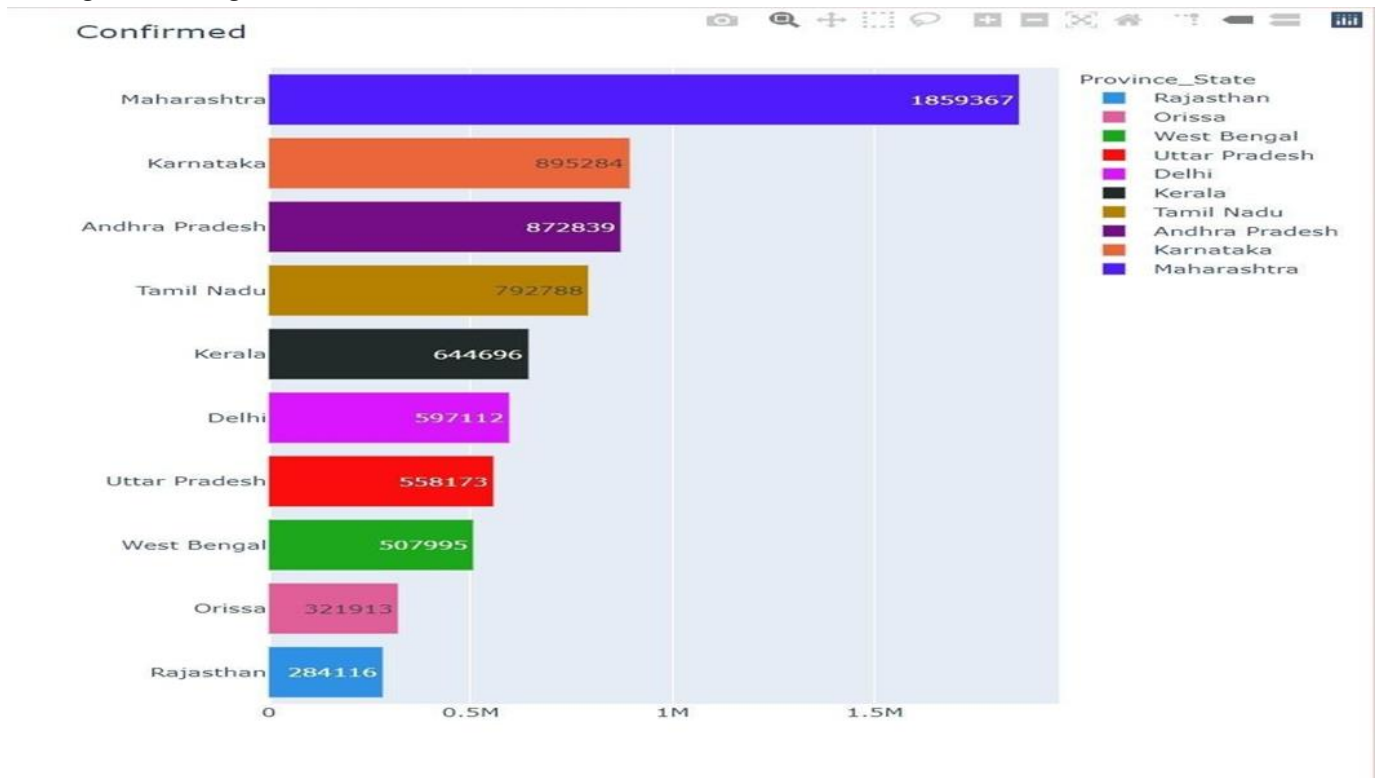
Fig 3.2 : State Wise Covid Ratio

As shown above, Maharashtra, Karnataka, Andra Pradesh, Tamil Nadu, Kerala, Delhi, Uttar Pradesh, West Bengal, Orissa, Rajasthan are top 10 states in confirmed cases in India. When the cases started to be detected in India since that time only Maharashtra has been leading this tally.

V. TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product it is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses specific testing requirements.

4.1 Types of testing

a.   Unit testing

Unit testing involves the design of test cases that validate that the   internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application . It is done after the completion of

an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

b.   Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

c.   Acceptance testing

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input: identified classes of valid input must be accepted.

Invalid Input: identified classes of invalid input must be rejected.

Functions: identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems / Procedures :

Interfacing systems or procedures must be invoked. Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

d.   Tests Results

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

e.   White Box Testing

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

f.   Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box

.you cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

4.2 Unit Testing

Unit testing is usually conducted as part of a combined code and unit test phase of the software life cycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

4.3 Integration Testing

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications,

e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

4.4 Acceptance Testing

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

VI. ADVANTAGES AND LIMITATIONS

5.1 Advantages

- To understand the ratio of cases.
- Helpful to understand the ratio of cases in terms of different parameters
- Helps to recognize COVID balance.
- User friendly application.
- Secure database.
- Easy maintenance.
- Data can be updated easily.
- Database records can be maintained computer.
- Easy data retrieval.
- System reduces manual workload.

- ➢ Less error prove and accuracy is maintained.
- ➢ Redundancy of data is avoided.
- ➢ Provides report of data.
- ➢ Fast processing and handy.

5.2 Limitations

The ratio of these data varies on daily basis, therefore we are unable to predict exact prediction about ratio.

Due to the uncertainty to predict exact ratio, we can't say when the cases will increase or decrease.

VII.CONCLUSION

Covid-19 cases are increasing daily, and it is very important to analyze these data. In this study, Covid-19 patients' data were analyzed to determine the relationship between different variables. Results show that there are dependence in age group and current status and in age group and gender only in gender, and current status variables are independent.

Our estimation show that the COVID-19 epidemic trend in India will rise from Feb 28, 2020 and will peak during May 15 to June 15.

Under such circumstances, two types of hypotheses can be considered for the adequacy of the current measures and as to whether the epidemic peak will occur during June 15-31, 2020.

Assuming that the current measures are inefficient and inadequate, the number of estimated cases will continue to increase by the end of Oct.

The current control measures are effective and sufficient and the number of cases estimated after the epidemic peak will go down.

At the time of the outbreak of COVID-19, the best and most urgent steps must be taken to overcome the corona virus epidemic. The fight against corona virus infection should be an emergency.

Future Scope

To learn more about other attributes such as patient gender, ethnicity and age and how it causes the fatality rate. A dash board of interactive charts to provide an overall summery.

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Smart Attendance System Using Face Recognition

Siddhesh R Kaple

ABSTRACT

Face recognition is a challenging problem for computer vision scientists for the last few decades. Hence it was the center of the attention for computer vision researchers. With the rapid technology advancement, face recognition system can be implemented in mobile device such as smart phones. This report will illustrate the process of face recognition in android devices starting from detecting a face until identifying the person when it sees them again. The recognition algorithm is being investigated in depth is the Haar Cascade algorithm. Furthermore the report will cover the literature review of the face recognition problems. The algorithm used in this system is Haar Cascade. The system is not only detecting the faces but also the distance of the facial characters under varying conditions. The proposed system provides the success rate at face recognition is around 93% to 95% and face identification is 99% and gives better result than the existing methods. Therefore, proposed system is more effective, always good in quality of recovering data compared to other existing attendance system. Thus the prospective of enhancing a private device, the management system is well-established on a private cloud sector by internal resources which can be recurrence easily and it makes system more comfortable.

Keywords: Student attendance, Face Recognition, Image Processing, biometric.

I. INTRODUCTION

Student attendance is an important factor for students to succeed in a course. In a certain university, student attendance in a course is also used as one of requirements for student to take the examination. A conventional approach to record student attendance is performed by asking every student to sign on an attendance list that passes through all students during the beginning of lectures. When such application is on mobile devices, the use for it can be extended dramatically. Face recognition subject emerged in the early 1970s; after the establishment of new technologies in the field of image processing and machine learning. Face recognition system is a programthat is used to identify faces automatically and verify the identity of a person from a digital image. In general, the face recognition problem is composed of two stages. First, detecting a face, i.e. finding a face in an image frame regardless of who the person is. Second, identifying whom the person is in the frame. By comparing the features of the detected face to the image faces database the system can identify the person in the image. To be able to label the person in the image, the machine should have been trained beforehand. The training steps involve detecting a face then use some image process techniques to insure the clarity of the face for the application. This paper proposed an attendance system using face recognition by employing

Android smart phone to capture student face. The image was then sent to server for attendance process. A modern approach to record attendance is by using automated attendance system. Several automated attendance system have been proposed byemploying biometric recognition face recognition to recognize students who are present and record their attendance.

Motivation

The main motivation was to explore the image processing capability on android devices. Moreover, I want to create an easy and secure way to access an android device using only the basic hardware of android mobile device i.e. the mobile device's camera Therefore, my objective was to create an android application that canlearn faces then identify them whenever the application sees those faces again. To formulate the problem: given an image with a face in it, how can we detect the face then determine the identity of the person in the image from known people to the system using android device.

Aim

The goal of this research is to build a system that can detect and recognize faces of people using image-processing techniques. Practically, this idea can be implemented in institutions for attendance. The benefits of this system are:

- Use available android phones and servers in corporation.
- Ease the attendance hassle.
- Implement the face detection and recognition algorithms to run over the mobile phones to minimize time and efforts.

Objectives

Our primary goal is to help the lecturers, improve and organize the process of track and manage student attendance and absenteeism. Additionally, we seek to:

- Provides a valuable attendance service for both teachers and students.
- Reduce manual process errors by provide automated and a reliable attendance system uses face recognition technology.
- Increase privacy and security which student cannot presenting himself or his friend while they are not.
- Produce monthly reports for lecturers.
- Flexibility, Lectures capability of editing attendance records.

II. LITERATURE REVIEW

Background History

We as humans use faces to recognize and identify our friends and family.Computers can now also identify people automatically using stored information suchas figure, iris or face to identify a particular person. Earlier many face recognitionalgorithms were used to achieve fully automated face identification process. The firstface recognition system was created in the 1960s. It was not fully automated and itrequired manual inputs of the location of the eyes, ears, nose and mouth on the imagesthen it calculates a distance to some common point the nit compares it to the storeddata. In 1971, Goldstein, Harmon and Lesk used some specific features of the human face such as hair color, nose size and lips thickness trying to automate the

recognitionprocess. The main problem back in the 1960s and 1970s was that manual inputs wererequired. The late 1980s Sirovich and Kirby used Principal component analysis (PCA)a standard liner algebra technique to reduce Face Recognition On Android6thecomplexity of the face recognition problem. In early1990sTurk and Pentland foundthat by Eigen faces techniques, the residual error could be used to detect faces inimages (Turk & Pentland, Face Recognition Using Eigenfaces, 1991).

This was animportant discovery of the history of the face recognition. It enables real-time and automated face recognition [1]. Since then automated face recognition has beenevolving and became a major interest for researcher in image possessing andcomputer scientists. Face recognition and sometime is called face identifying issimply putting a label to known faces just like human as mentioned above, we learnthe faces of our family and celebrities just by looking at their faces. Since the 1970's there was many techniques and algorithms were developed for a machine to learn torecognize known faces. Most of the recent techniques involve at least four steps:

Student Registration

- Face Detection
- Face Preprocessing
- Collecting and Learning the Faces
- Face Recognition

The images are captured using camera module and the extracted facial character will be compared with the existing image. If the face of the student is matched with the facial character stored in the database then the attendance timing for respective student gets started. The earliest pioneers of facial recognition were Woody Bledsoe, Helen Chan Wolf and Charles Bisson. In 1964 and 1965, Bledsoe, alongwith Wolf and Bisson began work using computers to recognize the human face. Due to the funding of the project originating from an unnamed intelligence agency, much of their work was never published. However it was later revealed that their initial work involved the manual marking of various "landmarks" on the face such as eye centers, mouth etc. These were then mathematically rotated by a computer to compensate for pose variation. The distances between landmarks were also automatically computed and compared between images to determine identity. These earliest steps into Facial Recognition by Bledsoe, Wolf and Bisson were severely hampered by the technology of the era, but it remains an important first step in proving that Facial Recognition was a viable biometric. Launched in 2006, the primary goal of the Face Recognition Grand Challenge (FRGC) was to promote and advance face recognition technology designed to support existing face recognition efforts in the U.S. Government [2]. The FRGC evaluated the latest face recognition algorithms available. High resolution face images, 3D face scans, and iris images were used in the tests. The results indicated that the new algorithms were 10 times more accurate than the face recognition algorithms of 2002 and 100 times more accurate than those of 1995, showing the advancements of facial recognition technology over the past decade. Back in 2010, Facebook began implementing facial recognition functionality that helped identify people whose faces may feature in the photos that Facebook users update daily. The feature was instantly controversial with the Smart attendance using face recognition news media, sparking a slew of privacy- related articles. However, Facebook users by and large did not seem to mind. Having no apparent negative impact on the website's usage or popularity, more than 350 million photos are uploaded and tagged using face recognition each day.

Related Work

There have been various techniques used to develop Attendance management system (AMS). Some of these techniques used Radio Frequency Identification (RFID), fingerprint, iris, palm, print, voice etc. For instance, a wireless attendance management system that used Iris identification was proposed by [3]. The system consisted of three modules: Iris verification and identification module, Iris management module and Wireless communication module. The implementation of the system was carried out with Daugman. Local Binary Pattern Histogram algorithm was used to design an application for both facial detection and identification of students by [9]. The algorithm identifies face by matching some parameters in which the algorithm was trained. An Embedded Computer-based Lecture Attendance Management System based on a single chip computer was used to capture the lecture attendance of different students. The identity of each student was validated through a card reader interface with a computer system. An efficient management system based biometric design was proposed by [4]. The system takes attendance electronically with the aid of a fingerprint device. The attendance stored in a database was marked after the identification of students. Sirovich and Kirby proposed a facial recognition approach that used Eigen face technique. The Eigen face recognition utilized information from the raw pixel image for training and classifying image identity. He suggested that the system can be used as the basis for the development of android applications such as android mobile security application and as an archive for the recognition of human identity. [4] proposed a RFID employee attendance system that was incorporated into a database system. The RFID attendance system was developed using components such as tags which was used as a replacement of IDcards and a reader device that could read the information related to an employee attendance. The system has the ability to store the information of all employee. Their experiment was conducted on a sample of 60 students, enrolled in a particular course. Based on experiment, the total time taken to record the attendance of a class of 60 students by manual entry took about 10 minutes while120 seconds was taken to take the attendance of 60 students using barcode and RFID technology [4].

Attendance Management System could be made smarter by using facial recognition technique based on Viola–Jones and Eigen faces algorithms developed on Android-based device. Implemented Feature-based approach also known as local face recognition system, used in pointing the key features of the face like eyes, ears, nose, mouth, edges, etc., Numerous algorithms and techniques have been developed for face recognition but the concept to be implemented here is Deep Learning. Proposed system tackles the predicament of recognition of faces in biometric systems subject to different real time scenarios such as illumination, rotation and scaling [1].

III. OVERVIEW OF FACE RECOGNITION USING OPEN CV

System Design

The proposed automated attendance management system uses a face recognition algorithm. The distance between the face parts is first calculated and then to be stored in the system. The facial characters stored are to be compared with thereal time image of the students. When the student enters the classroom the system starts identifying the faces of the students. The time for the period also gets started and the system now detects the faces and extracts the facial characters of the students. The extracted facial character will be compared with the database image. If the face ofthe student is matched with the facial character stored in the database then the attendance timing for respective student gets started.
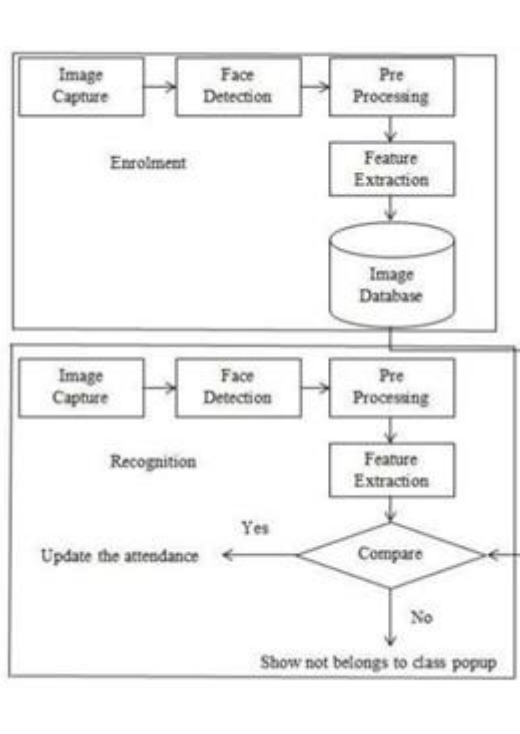
Fig. 3.1 : System Architecture

System Analysis Client

We have used Xml to create login page and Java to build login page, Add student, etc. In android we used xml for designing our layouts because xml is a lightweight language so it does not make our layout heavy.

Java is used for programming parts and it is a technology of choices for building app using managed code that can execute on mobile devices. Java files are the files where all the process occurs and allows users to interact with the system. Xml and Java are both portable standards. The result of using the combination of these two technologies is portable, reusable data and portable behavior.

The proposed system describes a simple and easy software implementation of face detection using OpenCV which helps in detecting and recognizing faces from a captured image input which is open source and can be used. Both real time face detection and face detection from specific images, i.e. Object Detection, is carried out and the proposed system stored the faces detected. The Functionality of this system is mainly categorized in following steps. To enroll and   detect faces using camera module of an android device. The code imports certain modules that enable functions such as face recognition.

Open CV Library

OpenCV (Open Source Computer Vision) is a library that was designed by Intel to process images, because it was meant for image processing it is loaded with   many of algorithms and functions to help computer scientists solve vision related problems. OpenCV offers applications that will help to train cascade classifier. In addition, OpenCV provide three face recognition algorithms built-in. Early 2010 OpenCV starts supporting android (OpenCV Dev Team, 2013).Since then the OpenCV4Android being developed to accelerate the development of OpenCV for Android. "OpenCV4Android (OpenCV DevTeam, 2013).   Since then the OpenCV4Android being developed to accelerate the development of OpenCV for Android. "OpenCV4Android is the official name of the Android port of the OpenCV library" (OpenCV Dev Team, 2013). Most OpenCV

functionality are ported to Java API, which means the API is not yet mature leading to some lack of functions that areavailable in the full version[7].
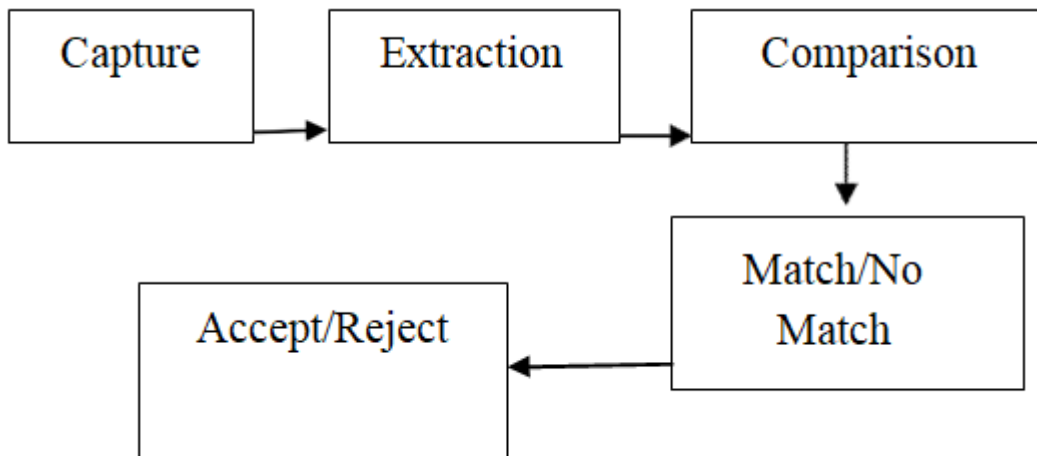
Fig. 3.2 : Stages for Authentication technique

Driver API's

APIs are intended for use by an application or computer. Into our Project user initiates to add the data of student then the application will use an API to ask the web server to store the student's data in its database. The API is the middleman between our application and the web server. And every time you use software to communicate with other software or online web servers, you're using APIs to request the information you need.

Server

What is a database server?

It is similar to data warehouse where the website store or maintain their data and information. A Database Server is a computer in a LAN that is dedicated to database storage and retrieval. The database server holds the Database Management System (DBMS) and the databases. Upon requests from the client machines, it searches the database for selected records and passes them back over the network.

A database server can be defined as a server dedicated to providing database services. Such a server runs the database software. A database server can typically be seen in a client-server environment where it provides information sought by the client systems.

Problem Definition

Face recognition is an important part for the purpose of taking Attendance. Hence there is a need for an efficient and cost effective System. The goal of this research is to build a system that can detect and recognize faces of people using image-processing techniques.

Practically, this idea can be implemented in large placesto provide security.

Feasibility Study

Here user have to analyse one important thing that this work is not only to support large volume of data but to preserve integrity, calculate the performance of time factor, graphically representation of query processing and execution i.e. the time required to get the answer of the query is also been considered to provide answer to give

the proper result. Thus the system is fully technically feasible. This provides all the facilities required that in the both front end and back end are native to it so there isno problem of compatibility. The system contains the existing resources which are efficient for developing and no extra hardware is required. Thus the system is economically feasible.

IV. SYSTEM IMPLEMENTATION AND TESTING

Software Design

It includes Android Studio, OpenCV, API/PHP Web Services, MySQL, Android Device with a camera module.
Android Studio
Android Studio is the official integrated development environment (IDE) for android application development. The Android studio contains one or more modules with resource files and source code files. These includes different types of modules :

- Android app modules
- OpenCV Library modules

By default, Android Studio display our project files in the android project view, as shown in below image. This view is formed by modules to provide quick access to our project's key source files.

These builds files are visible to the top-level under Gradle Scripts. And the app modules contains the following folders:

- Manifests :- It contains the AndroidManifest.xml files.
- Java :- It contains the source code of java files, including JUnit test code.
- Src :- It contains all non-code resources, UI string, XML layouts, and bitmapimages.
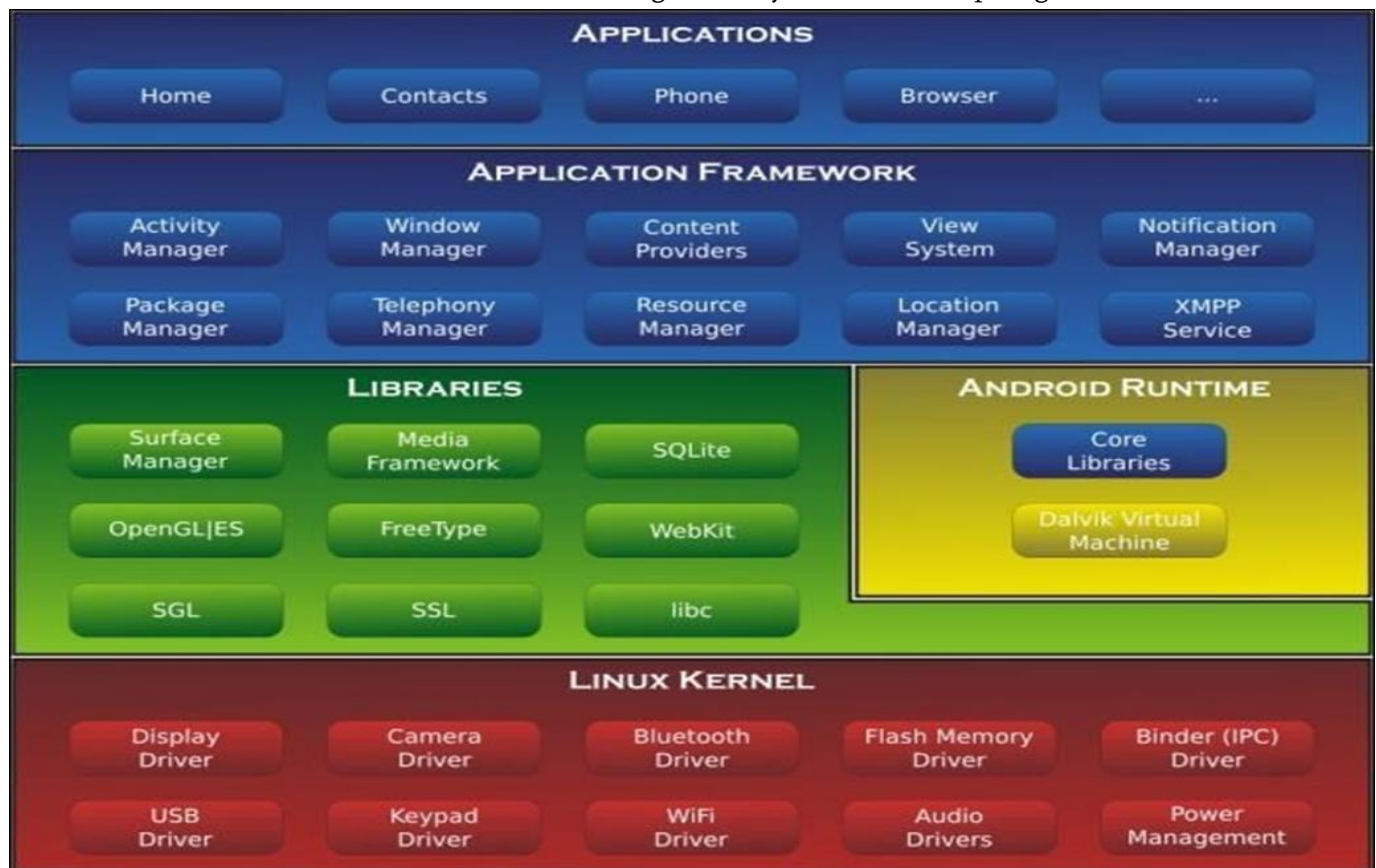
Fig. 4.1 : Android's Architecture Diagram
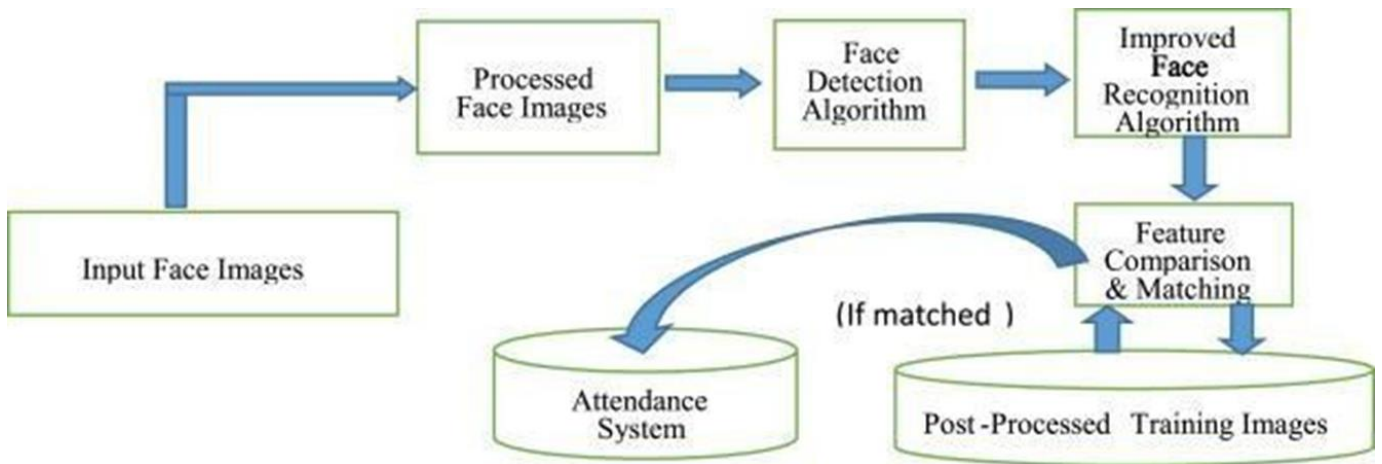
Fig. 4.2: Face Detection and recognition system overview

Source Files in Android Studio
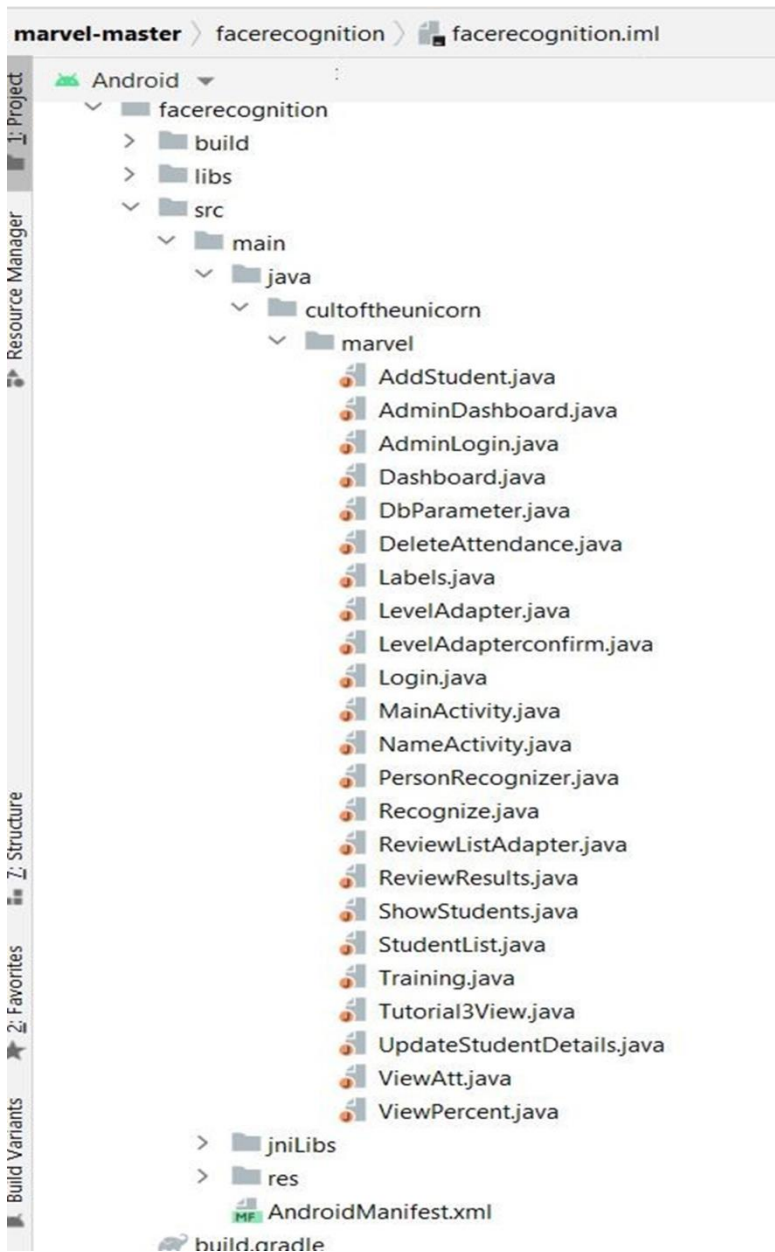
Fig. 4.3 : Android's File Structure

OpenCV

Given an image, which can come from a file or from live video, the face detector examines each image location and classifies it as "Face" or "Not Face." Classification assumes a fixed scale for the face, say 50x50 pixels. Since faces in an image might be smaller or larger than this, the classifier runs over the image several times, to search for faces across a range of scales. This may seem an enormous amount of processing, but thanks to algorithmic tricks, explained in the sidebar, classification is very fast, even when it's applied at several scales. The classifier uses data stored in   an XML file to decide how to classify each image location. The OpenCV download includes four flavors of XML data for frontal face detection and one for profile faces. It also includes three non- face XML files - one for full body (pedestrian) detection, one for upper body, and one for lower body.

Haar-Cascade

Face detection is performed by using Haar-Cascade Classifier with OpenCV. Haar Cascade algorithm need to be trained to detect human faces before it can be usedfor face detection. This is called feature extraction. The haar-cascade training data used in an xml file.
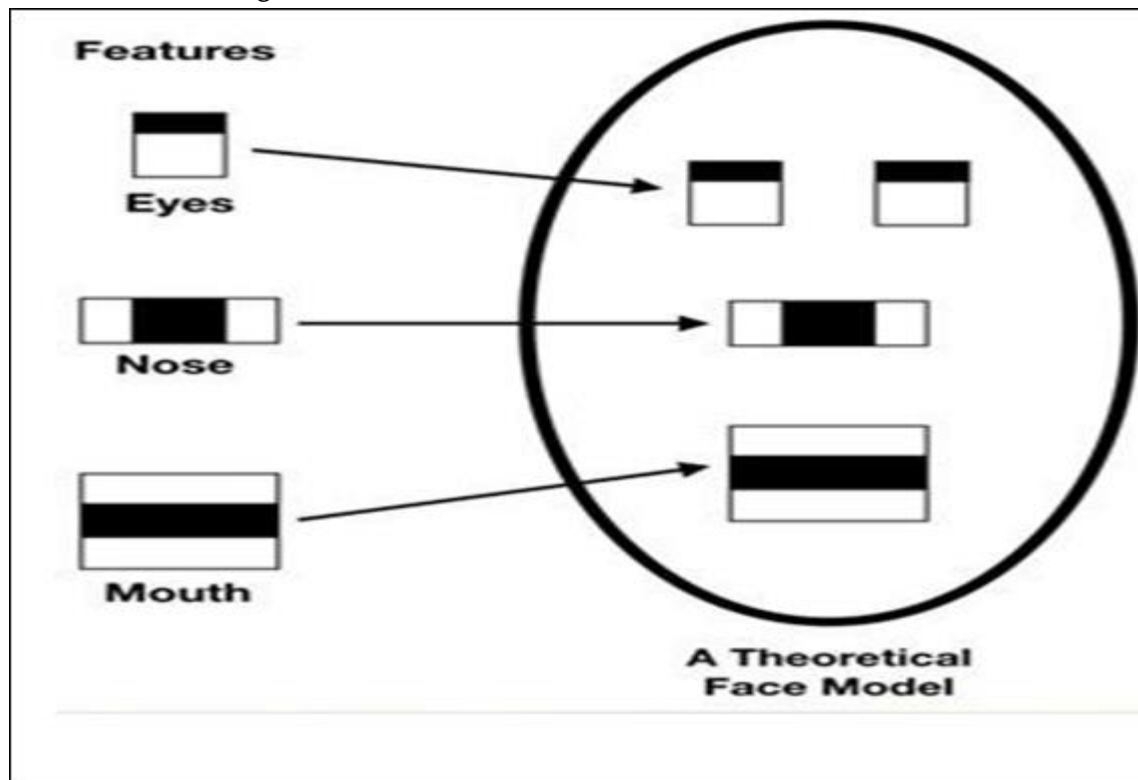
Fig. 4.4 :Haar Feature Extraction

A Haar wavelet is a mathematical function that produces square-shaped waveswith a beginning and end and used to create box shaped patterns.

Face detection on a human face is perform by matching a combination of different Haar-like- features. For example, forehead, eyebrows and eyes contrast as well as the nose with eyes as shown in above figure.

Here we are using detect Multi Scale module from OpenCV. This is required to create a rectangle around the faces in an image.

It has got three parameters to consider- scale Factor, min Neighbors, min Size.Scale Factor is used to indicate how much an image must be reduced in each image scale.

Min Neighbors specifies how many neighbors each candidate rectangle must have. Higher values usually detect less faces but detects high quality in image. Min Size specifies the minimum object size. By default it is [8]. The parameters used in this system is scale Factor and min Neighbors with the values 1.3 and 5 respectively [5] .

API

An application programming interface is a set of rules that define how computers, applications, or machines can talk to each other. You can think of it this way: the typical user interface is intended for use by a human being, while APIs are intended for use by an application or computer.

Most web APIs sit between the application and the web server. The user initiates an API call that tells the application to do something, then the applicationwill use an API to ask the web server to do something. The API is the middleman between the application and the web server, and the API call is the request. And everytime you use software to communicate with other software or online web servers, you're using APIs to request the information you need.

It's important to note that while web APIs are the most common, APIs aren't limited to the web. There are APIs for virtually every machine or system that expects to interact with other machines or systems.
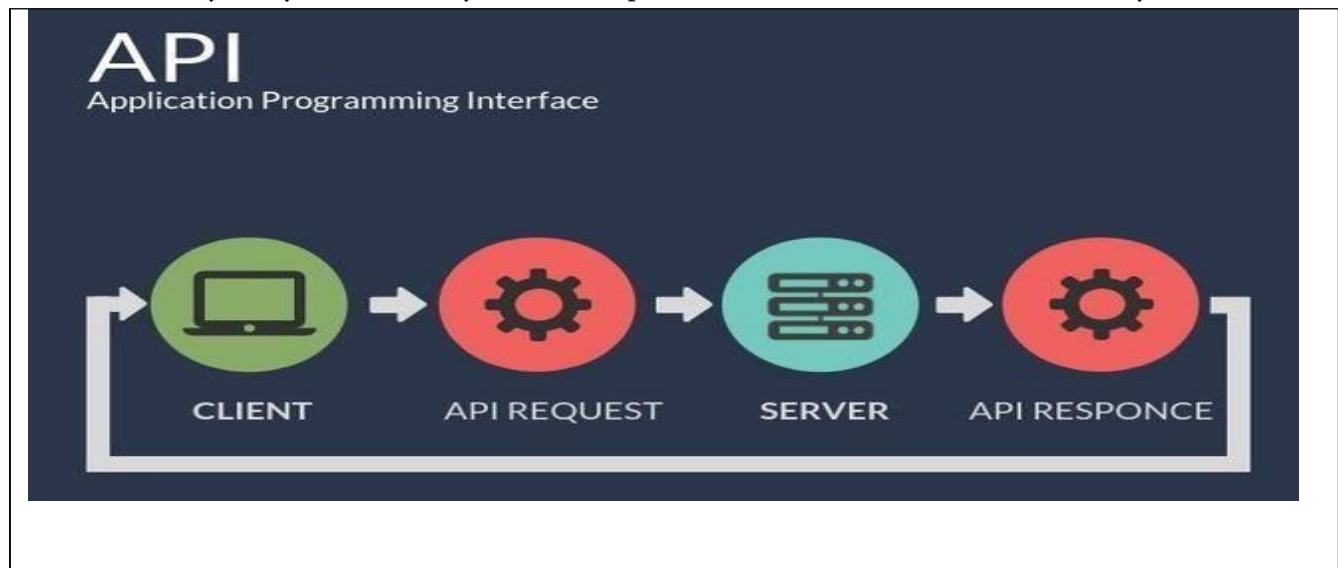
Fig. 4.5 : Implementation of API's in Smart Attendance
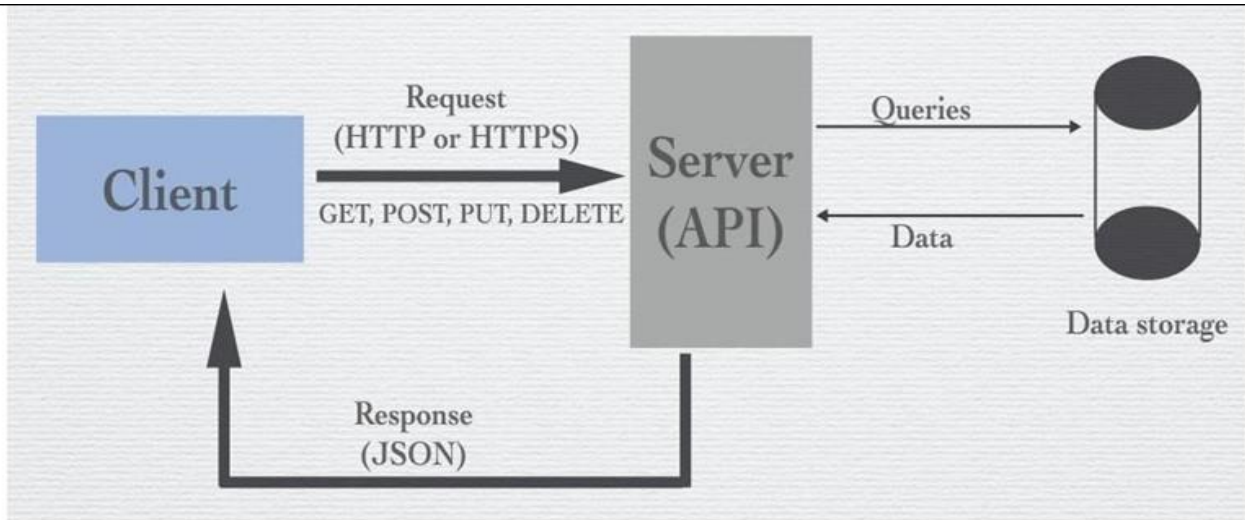
Fig. 4.6 :API Workflow

PHP

Is a server side scripting language that designed for web development, as well as used for general purpose language. The PHP code can be combined with several web frameworks and templating engines or simply it can be mixed with HTML code. The PHP code is generally processed by a PHP interpreter, which is commonly executed as native module of web server or a Common Gateway Interface (CGI) executable. After interpretation and execution of the PHP code, the results will be sent by web server to its client. Zend Engine has powered the standard PHP interpreter, which is free software liberated under the PHP license. There are many versions of the PHP, and the version, I have used for my application is the PHP. PhpMyAdmin It is an open source tool and also, it is free written in PHP, XHTML, CSS, and JavaScript planned to manage the administration of MySQL by using of a web. It is able to perform various missions like creating, modifying databases, tables, fields, executing SQL statements or managing and supervise users.

Database MySQL

Database is the collection of face images and extracted images. And also database is a collection of information that is organized so that it can easily be accessed, managed and updated.

A database provides for storing and controlling information of student such as name of student and registration number of each students.

The first step in the Attendance System is the creation of a database of faces that will be used. Different individuals are considered and a camera is used for the detection of faces and the recording of the frontal face. The number of frames to be taken for consideration can be modified for accuracy levels. These images are then stored in database along with the Registration ID. The core of the MySQL database is the MySQL Server. This server is available as a separate program and responsible for handling all the database instructions, statements, or commands. The working of MySQL database with MySQL Server are as follows:

MySQL creates a database that allows you to build many tables to store andmanipulate data and defining the relationship between each table.

Clients make requests through the GUI screen or command prompt by usingspecific SQL expressions on MySQL.

Finally, the server application will respond with the requested expressions andproduce the desired result on the client-side.

Basic Structure
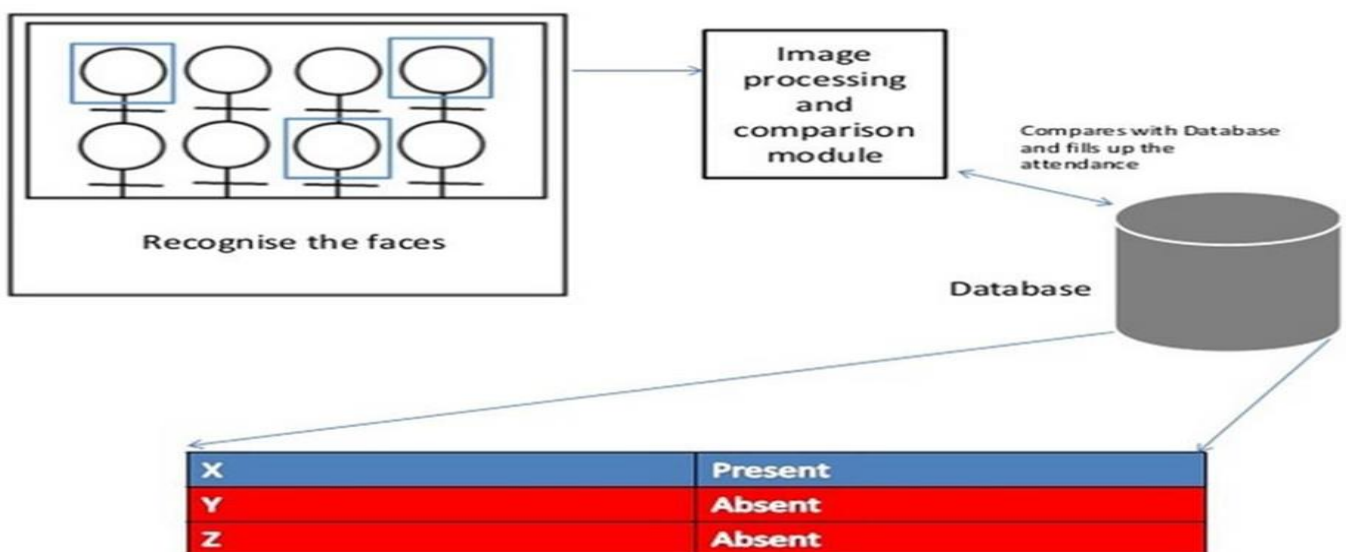
Fig. 4.6 : Basic Structure

Table 4.1 : Database Table

Uid	Uname	Branch	Year	Sem	Contact	Email-id	Attendance
123	anagha	CSE	Final	8th	9604341335	ak@gmail.com	P
124	payal	CSE	Final	7th	7972715744	ppj@gmail.com	P
125	raj	IT	First	2nd	9130162638	raj@gmail.com	A
126	sumit	CSE	Second	4th	8390586560	sumit@gmail.co m	A

System Execution Details with snapshots
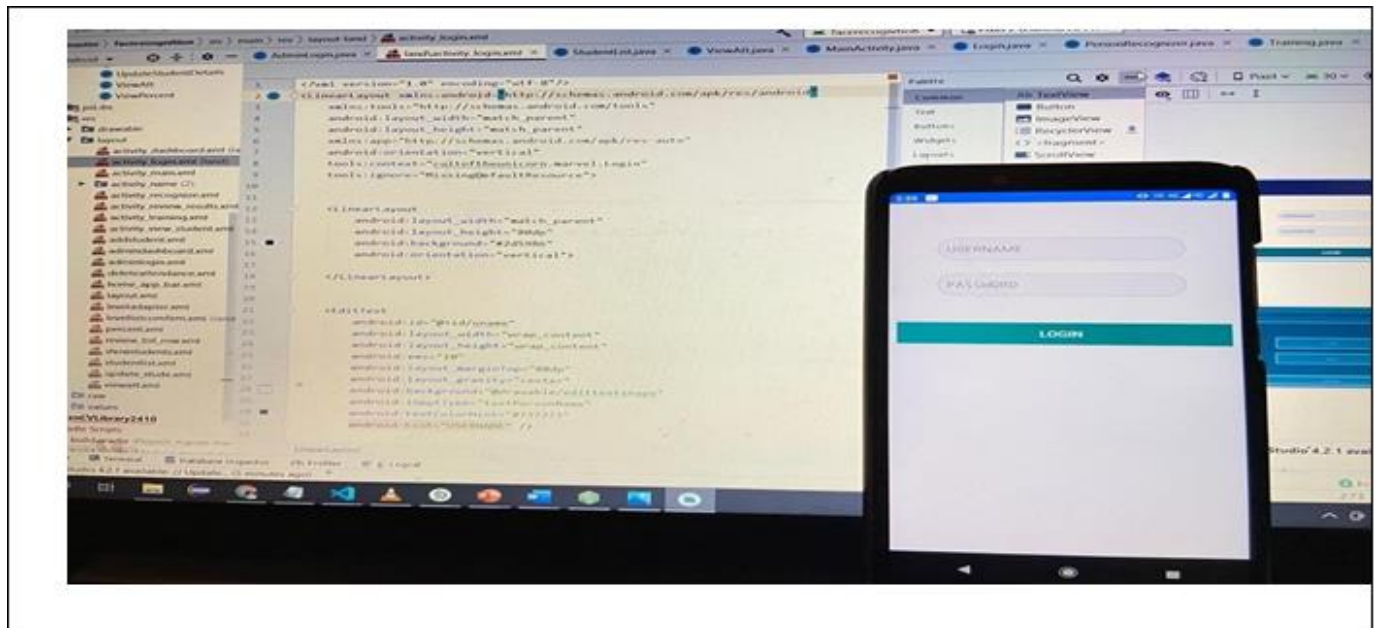
Snapshots 4.1 : Admin Login
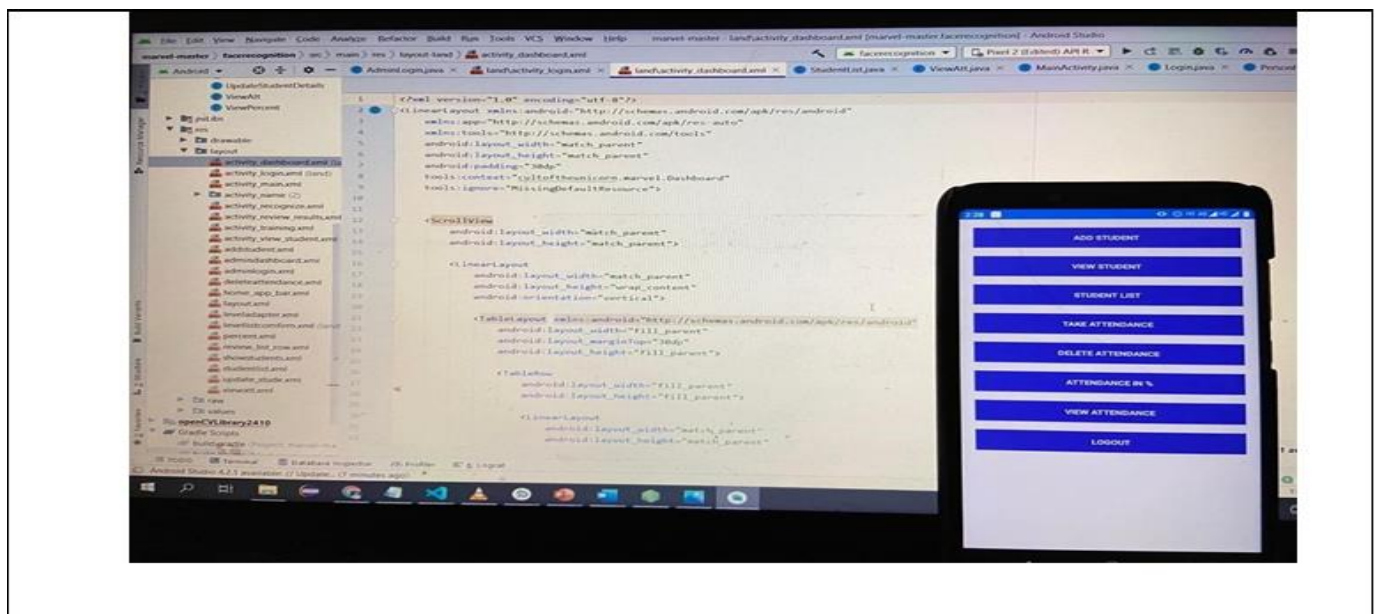
Snapshots 4.2 : Admin Dashboard
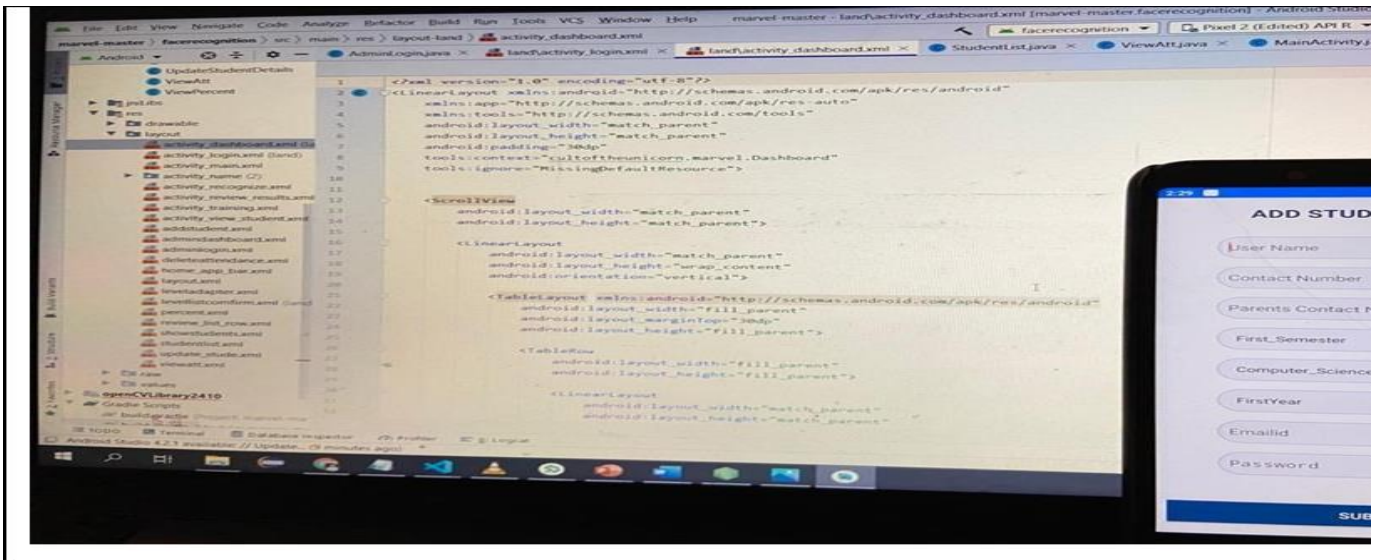
Snapshots 4.3 : Adding the Student with Information
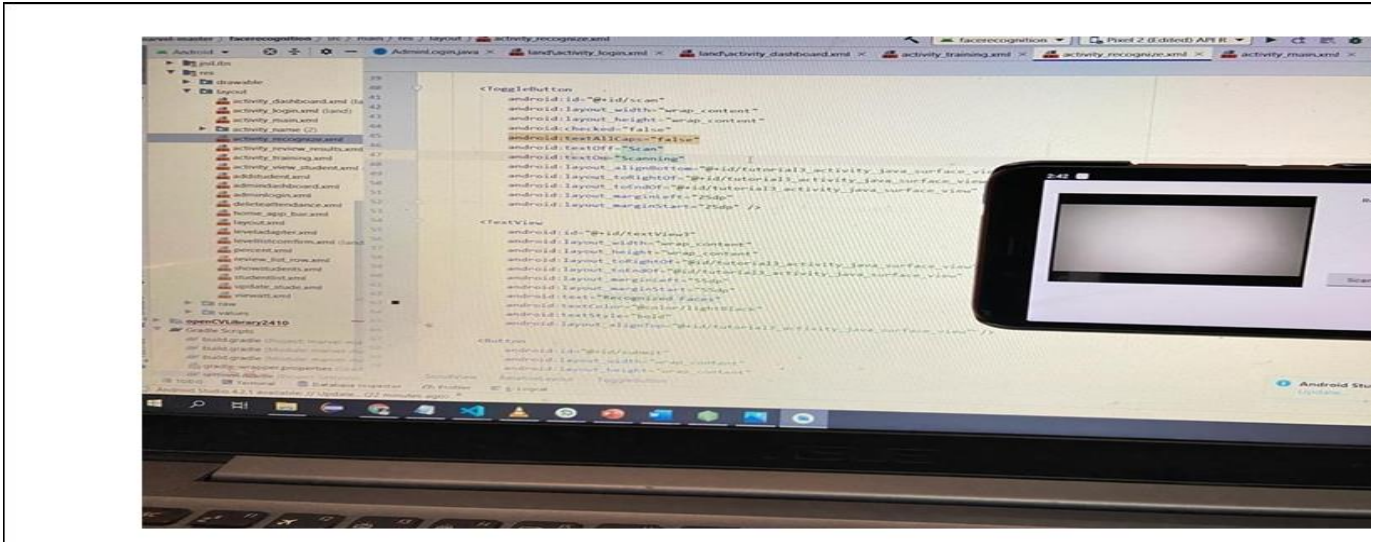
Snapshots 4.4 : Taking the Students Attendance
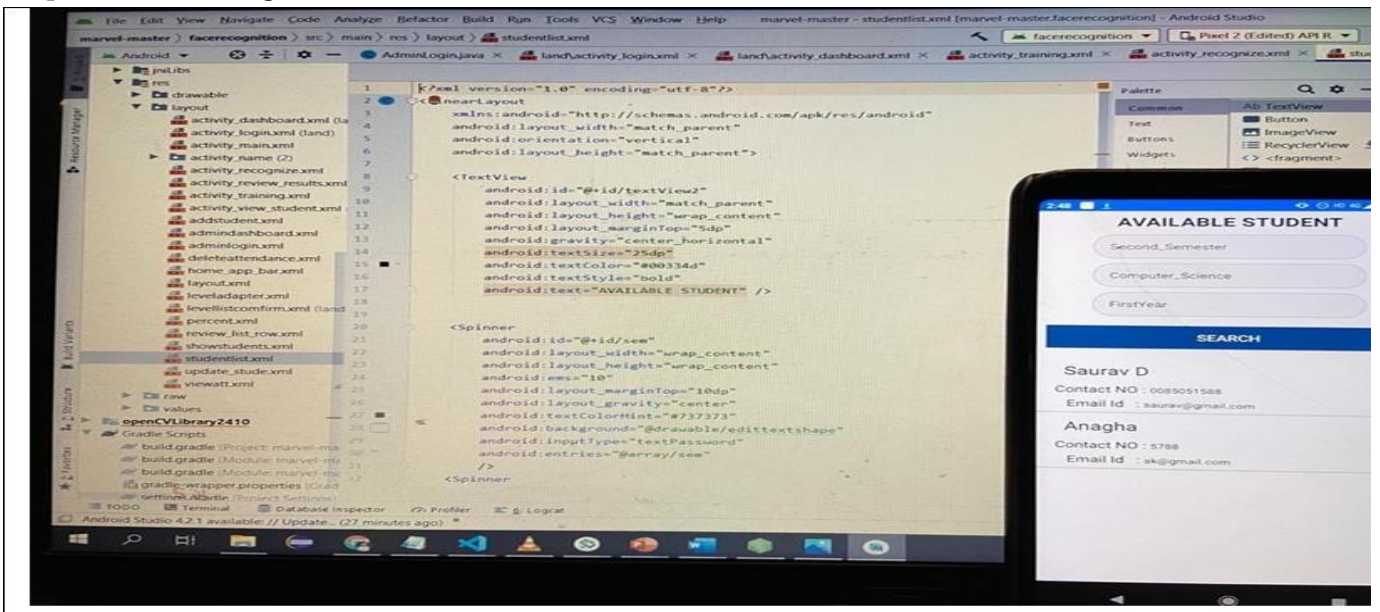
Snapshots 4.5 : Students List
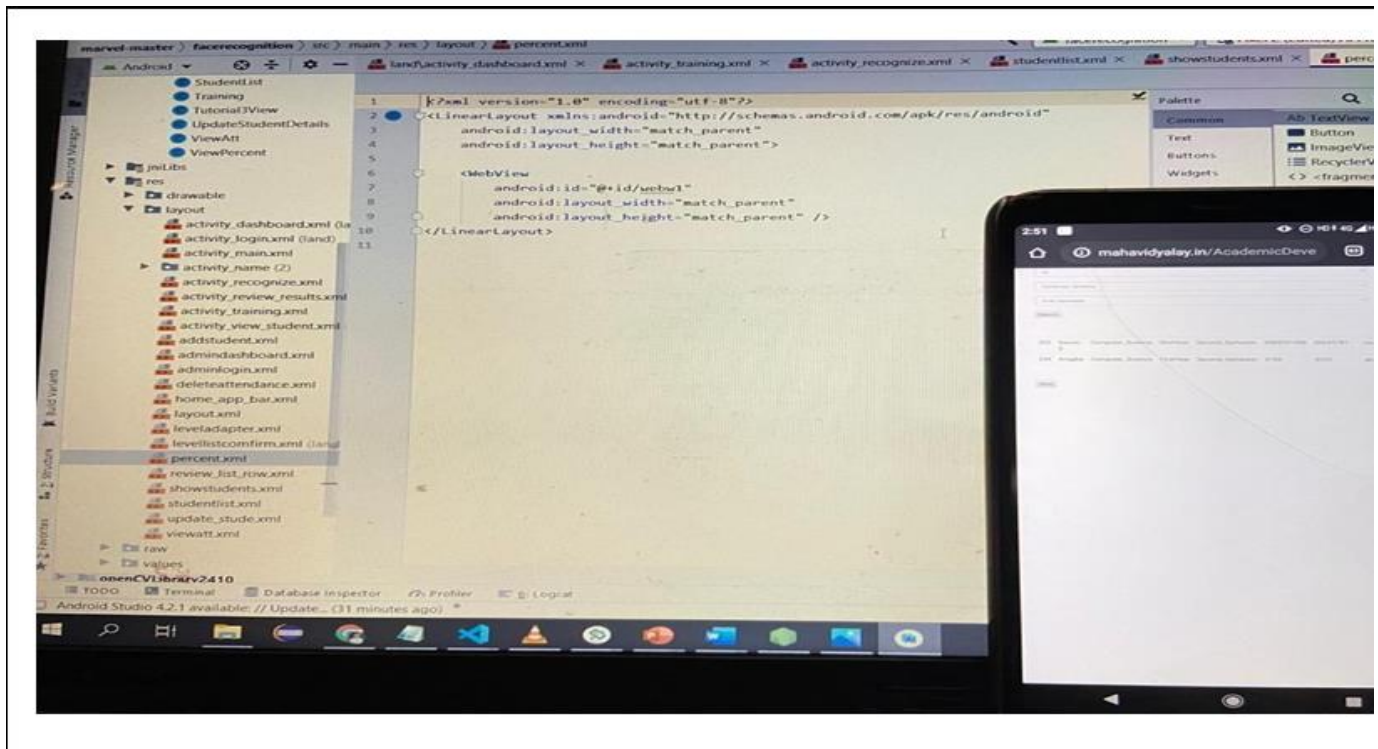
Snapshots 4.6 : Viewing Attendance

V.   ADVANTAGES AND LIMITATIONS

Advantages

- **Easy to Manage :** Since the artificial intelligence based attendance system is fully automated, managing the records and keeping a track of day to day activities will become much easier than the manual system.
- **Cost Effective :** As the whole process will be done by a computer, it means the total attendance registration and calculation will be automated and done by the system itself, therefore, saving us the money which would have been otherwise spent o the labor cost to do that.
- **Time Saving :** As you can work remotely and still see who all are coming and going. This calls for the point that, this whole system is much faster and time saving method to record attendance.

Limitations

- The quality of the reference images plays an important role in the identification process. If the resolution of the said images is not high enough, it can cause camera to be tricked into believing that the person being scanned is not the sameas in the photo.
- Depending on the quality of the input data, a system would need an appropriate amount of storage. This could be troublesome if the data collected is of high quality and requires large amount of storage space especially for events with a large expected attendance.
- Inconsistency in data entry and generate data errors.
- System is fully dependent on skilled individuals.
- Entry of false information.
- Lack of security.
- Duplication of data entry.

VI. CONCLUSION

This system aims to build an effective class attendance system using face recognition techniques. The proposed system will be able to mark the attendance via face Id. It will detect faces via webcam and then recognize the faces.

After recognition it will mark the attendance of the recognized student and update the attendance record.

VII. FUTURE SCOPE

The system we have developed as successfully able to accomplish the task of marking the attendance in the classroom automatically and output obtained in an excelsheet.

Another important aspect where we can work is towards creating the databaseof the attendance and its automatic updating. Hence maintaining attendance automatically with the help of face recognition will be very helpful and less prone to errors as compared to manual process.

This will also reduce manipulation of attendance record done by students andit will save time as well.

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Antimicrobial and Magnetic Studies Of 2-Hydroxy-5-Methyl-3-Nitro Acetophenone Thiazole Schiff Base Complexes of VO(IV), Zr(IV) and UO₂(VI)

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ABSTRACT

Coordinating metal complexes of VO(IV), Zr(IV) and UO2(VI) have been synthesized using 2-hydroxy-5-methyl-3-nitro acetophenone thiazole Schiff base ligand was derived from the condensation of 2-hydroxy-5-methyl-3-nitro acetophenone and thiazole. The Schiff bases behaved as charge bidentade ligand. The ligand was characterized by elemental analysis and spectral methods. Metal complexes characterized by elemental analysis, conductance measurements, molecular weight determinations and spectral studies. The Schiff base and their metal complexes have been evaluated for their antibacterial activities The synthesized products are coloured solids, soluble in DMF, DMSO and THF.

Keywords: Schiff base, Magnetic susceptibility, Antimicrobial

I.   INTRODUCTION

Schiff bases have often been used as chelating ligands in the field of coordination chemistry and their metal complexes are of great interest for many years. In the development of coordination chemistry and biochemistry the compounds which contain pyridine and its derivatives or Schiff bases as ligands have occupied a central role. The chemical studies of metal complexes with heterocyclic Schiff base ligands containing nitrogen, sulfur, and oxygen has attracted increasing attention. The studies of synthesis optical characterizations and Solar Energy applications of New Schiff Base materials[1]. Synthesis, characterization and antifungal activity of manganese (II) complex with Schiff Base derived from acetylacetone andl leucine[2] The newly synthesized Schiff bases, 2-acetylthiophene thiosemicarbazone and thiophene-2-aldehyde thiosemicarbazone and their metal complexes with Co(II), Cu(II), Zn(II) and Ni(II) complexes and Their Schiff bases metal complexes were tested for antibacterial activity[3] They are reported the possible use of such systems in biological applications for their antifungal properties and antioxidant activities[4].The Schiff base prepared by using variety of aldehydes and amines or any other amines possessed antitubercular, antitumer, anticancer, fungicidal medicinal and agrochemical activities. Schiff base and their metal complexes are becoming increasingly important in recent years due to their biological activity and their used as catalysts photoluminescent, electroluminescent properties Antimicrobial screening, biological great significance of Schiff base metal complexes research and play a significant role in the area of coordination chemistry. Antimicrobial evaluation of 2-amino pyridine-

derived Ligand Schiff base and its complexes with Cu (II), Hg (II), Ni (II), Mn (II) and Co (II)[5]. Due to biological potency, pharmacological properties and synthetic flexibility of thiazole Schiff bases. The aim of present investigation is to synthesize various transition metal complexes of Schiff base derived from 2-hydroxy-5-methyl-3-nitro acetophenone and 2-amino-4-phenylthiazole.

II. EXPERIMENTAL

All the chemicals were of A.R. grade and used as received. 2-hydroxy-5-methyl-3-nitro acetophenone (HMNA) and 2-amino-4-phenylthiazole was prepared by known methods[6-9]. The solvents were purified by standard methods[10].

Synthesis of 2-amino-4-phenylthiazole:

The synthesis of 2-amino-4-phenylthiazole prepared by known method[7-9]. Yield: (75%); m.p.: 148-150^{0}C
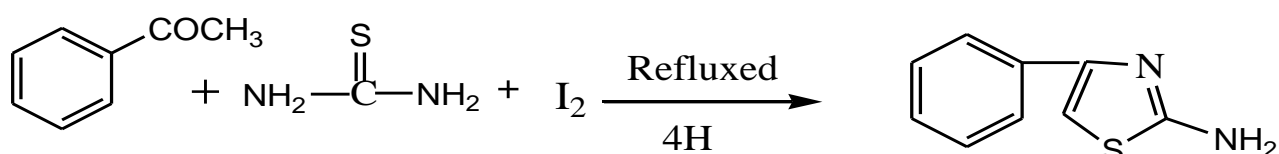
Acetophenone   2-amino-4-phenylthiazole

Synthesis of 2-hydroxy-5-methyl-3-nitroacetophenone 4-phenyl-2 imino thiazole [HMNAT]:

A solution of 4-phenyl-2 imino thiazole (0.02M) in 25ml of ethanol was added to an ethanolic solution(25ml) of 2-hydroxy-5-methyl-3-nitro acetophenone (0.02M) and the reaction mixture was refluxed on a water bath for 4-6h. After cooling a pale yellow coloured crystalline solid was separated out. It was filtered and washed with ethanol, crystallized from DMF and dried under reduced pressure at ambient temperature. The purity of ligand was checked by elemental analysis and m.p. It was also characterized by IR and ^{1}H NMR spectral studies. Yield:7o%; m.p. 310^{0}C

2-hydroxy-5-methyl-3-nitro acetophenone   2-amino-4-phenyl thiazole   HMNAT
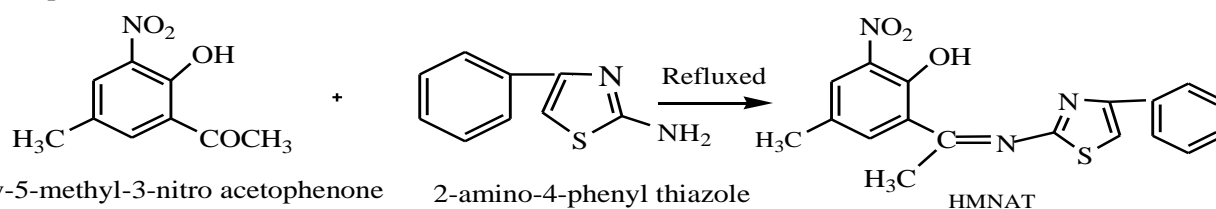
Table1. Analytical data of the Ligands.

Ligand	Molecular Formula	Formula Weight	Color and nature	Elemental Analysis		
				C% found (Cal.)	H% Found (Cal.)	S% Found (Cal.)
HMNAT	$C_{18}H_{15}N_3O_3S$	353.1	Yellow Crystalline	60.42 (61.17)	04.04 (04.24)	08.84 (09.06)

Preparation of complexes: All the metal complexes were prepared in a similar way by following method. To a hot solution of ligand HMNAT (0.02M) in 25ml of ethanol a suspension of respective metal salts was added drop

wise with constant stirring. The reaction mixture was refluxed on a water bath for 3-5 h. The precipitated complexes were filtered, washed with ethanol followed by ether and dried over fused calcium chloride. Yield : 55-60%

The complexes are soluble in DMSO and DMF but insoluble in water and common organic solvents. The metal chloride content of complexes were analyzed by standard methods[11,12] The ^{1}H NMR spectra of ligand was recorded and obtained from RSIC Chandigarh. IR spectra of the compounds were recorded on Perkin Elmer 842 spectrophotometer in the region 400-4000cm^{-1}, Carbon, Hydrogen and Nitrogen analysis were carried out at RSIC, Punjab University, Chandigarh. The molar conductance of the complexes at 10^{-3} M dilution in DMF were determined using equiptronic digital conductivity meter EQ-660 with a cell constant 1.00 cm^{-1} at room temperature. The magnetic moment measurement were made on a Gouy balance at room temperature using [HgCo(SCN)$_4$] as the calibrant. The molecular weights of the complexes were determined by Rast method.

Table 2. Analytical data and molar conductance of the compounds.

Ligand	Formula weight g mole^{-1}	Colour	Elemental Analysis Found (Calcd.)			μ_{eff} B.M	Λ_M (Ω^{-1} cm^2 mol^{-1})
			M%	C%	H%		
[VOL$_2$]	771.2	Green	6.50 (6.60)	55.55 (56.01)	3.17 (3.89)	1.5	11.8
[ZrL$_2$(OH)$_2$] 2H$_2$O	865.4	Yellow	9.88 (10.53)	49.14 (49.91)	3.34 (3.92)	Dia	17.2
[UO$_2$L$_2$]	974.3	Orange	23.53 (24.43)	43.64 (44.33)	2.93 (3.07)	Dia	13.2

III. RESULT AND DISSCUTION

The Schiff base HMNAT and its complexes have been characterized on the basis of ^{1}H NMR, IR spectral data, elemental analysis, molar conductance, magnetic succeptibility measurements and thermogravimetric analysis data . All these values and analytical data is consistent with proposed molecular formula of ligand . All the compounds are coloured solid and stable in air. They are insoluble in water but soluble in coordinating solvents like DMF and DMSO. The molar conductance values in DMF(10^{-3} M) solution at room temperature (Table2) shows all the complexes are non electrolytes. The ^{1}H NMR spectra of ligand HMNAT shows signals at δ 12.24,(1H, s phenolic OH), δ 7.60, 7.74, 7.63 and 7.72 (4H, m, phenyl) δ 6.87, 6.88, and 6.72(3H, s Phenyl), 6.78 (1H s thiophene), and 2.66(3H, s, methyl) [11,13-15].

IR spectra of ligand and metal complexes shows ν(C=N) peaks at 1626 cm^{-1} and absence of C=O peak at around 1700 – 1740 cm^{-1} indicates the Schiff base formation[16-19].

Table 3. IR spectra of ligand and metal complexes

Compound	ν(O–H) hydrogen bonded	ν(C=N) imine	ν(C–O) phenolic	ν(M–O)	ν(M–N)	ν(C–S)
HMNAT	3085	1626	1520	--	--	1128
[VOL$_2$]	--	1599	1502	514	445	1094
[ZrL$_2$(OH)$_2$] 2H$_2$O	--	1601	1488	445	412	1102
[UO$_2$L$_2$]	--	1588	1442	550	480	1084

IV. ANTIMICROBIAL ACTIVITY

Antimicrobial activity assay depends upon a comparison of the inhibition of growth of microorganism by measuring the concentration of the sample to be examined with the known concentration of standard antibiotic. For the antimicrobial analysis the agar diffusion method has been employed. In this study the ligand and their metal complexe were tested for their effect on certain human pathogenic bacteria such as Gram-positive.

The ligand HMNAT and its complexes[20-27] are found to show considerable bacteriocidal activity against *E. coli, A. aerogenes, S. aureus* and *B. subtilis* and are almost inactive against *B. megatherium, P. vulgaris* and *P. fluorescen*. The ligand inhibits the growth of *S. aureus* more than all its complexes. The results reveals that the sensitivity of ligand HMNAT and its complexes is shows in Table 4.

Table 4. Antimicrobial activity

Ligand and its complexes	*B. subtilis* (mm)	*P. vulgaris* (mm)	*S. aureus* (mm)	*E. coli* (mm)	*P. fluorescen* (mm)	*A. aerogenes* (mm)	*B. megatherium* (mm)
HMNAT	R	S$_6$	R	S$_{12}$	R	S$_9$	R
VO- HMNAT	R	R	S$_{13}$	S$_{11}$	R	S$_{11}$	S$_9$
Zr- HMNAT	S$_{11}$	S$_{10}$	S$_{14}$	R	R	S$_{11}$	R
UO$_2$-HMNAT	S$_8$	R	S$_8$	S$_{13}$	R	S$_9$	R

S-Sensitive, R-Resistant

V. CONCLUSIONS

In conclusion, we have synthesized new ligand 2-hydroxy-5-methyl-3-nitro acetophenone-2-imino thiazole and their metal complexes. The newly synthesized Metal complexes were confirmed by the spectral analysis

and further evaluated for their antimicrobial activity. It is observed structural changes in metal complexes have marked effect on the sensitivity and sensitivity varies with organisms. The antibacterial activity revealed that most of the compounds showed moderate to good activity.

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Utilization of Green Electricity for Operation of Miniature Electronic Circuits

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ABSTRACT

On small scale basis, green electricity generation from trees or plants is possible. Almost all kind of the leaf contains trillions of plant cells. Throughout the process of photosynthesis, each cell of the leaf emits plenty of electrons. By the movement of these electrons, one can produce electricity called green electricity. In our day-to-day life, electric energy is playing a major and indispensable role for human being. Most all the fields are encompassed with electricity and related appliances. Also, there are number of ways by which electricity is being generated. To prevail the demand of electrical energy is ever growing problem and is creating several threats to the environment. To deal with the situation, various types of non-conventional and renewable energy sources are being invented and developed all over the world.

In this research paper, an influence is given to utilize the generated DC voltage from living plants like xerophytes and mesophytes. This kind of energy source is non-conventional as well as renewable energy source and is very useful. It is eco-friendly technique of low voltage generation and its utilization. The undertook research work describes the design aspect of low voltage energy source wherein various plants are used as natural electrolytes along with various electrodes and cells to operate miniature electronic circuits.

Keywords: Miniature circuit, Green electricity, eco-friendly, renewable source, electrodes and cells

I. INTRODUCTION

Now a day there are number of ways by which electricity is being generated. The conventional as well as non-conventional methods are being research and developed used by different agencies, boards and institutes. Everywhere scientific teams are contributing their shares in the field of electricity generation. The researcher is trying to introduce nonconventional method of generation of electricity by using living plants like xerophytes and mesophytes. After successful generation, it may be utilized as a new kind of power source for small electronic circuits, devices & gadgets. This may treat as one of the renewable emerging source of energy. Such type of low voltage can be generated without polluting any environmental parameters.

In the presented research work, a small amount of voltage was generated and utilized for actual working of few miniature electronic circuits and gadgets. By using the electrode pairs or cells in series combinations, the net output voltage was increased whereas by using parallel combinations, the net output current was increased. Thus, various miniature electronic circuits and gadgets can be operated by the virtue of this generated output

voltage. These circuits include Digital watch, LED circuit, 12 and ½ digit Calculator, Musical sound circuit, Quartz wall clock, Timer IC 555 circuit, Tiny DC motor, Small toy, Remotes of CD player, Tiny torch and Joule Thief circuit. Most of these miniature electronic circuits require 1.5 to 4.5V DC voltage with few milliamperes (mA) of current. Also, the simultaneous operation of few of above mentioned circuits were tested using such type of generated voltage from living plants. Few photographs and video clips of actual operation of the above miniature electronic circuits and gadgets are recorded locally and stored in the research laboratory as well as college center.

II. UTILIZATION OF GENERATED VOLTAGE FOR WORKING OF DIGITAL WATCH

Digital wrist watch (Model: Mint Silicone Strap -105 DDK) with liquid crystal display (LCD) requires the typical operating voltage of 1.5 volts and current of approximately 2.5 mA. Such the low values of the voltage and currents were produced by using series combination of the Ag-Zn or Cu-Zn or any suitable type of electrodes or cells. Following figure (1) shows the actual working of a digital wrist watch using such type of generated voltage from the living plants. The digital watch and other circuit components were assembled on a regular breadboard with the help of bus and terminal streams. The watch worked for next many days and months using such kind of generated voltage. Time setting, day-date settings and all other available functions worked in the proper manner.
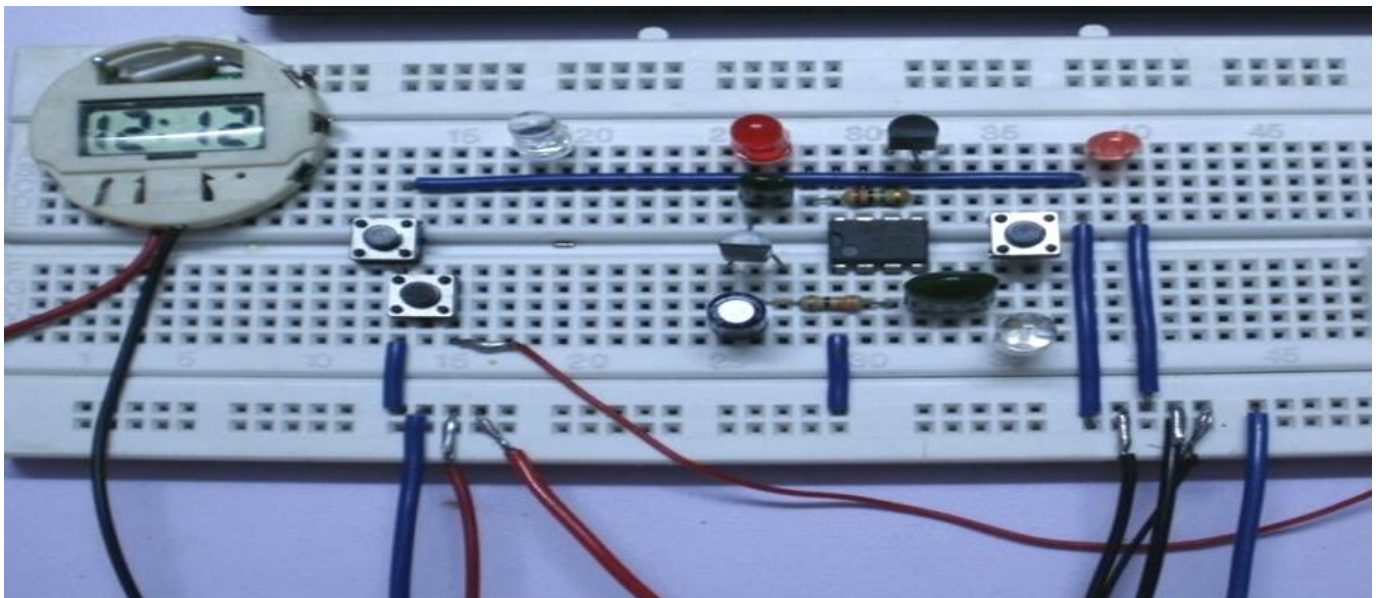
Figure (1) : Actual working of Digital Watch

III. UTILIZATION OF GENERATED VOLTAGE FOR WORKING OF LIGHT EMITTING DIODE

As per the requirement, various types of Light Emitting Diodes (LEDs) are available in the electronic market. The main types of LED are miniature, high power devices and custom designs such as alphanumeric or multi color device.   A regular low current LED of 5mm size requires the typical operating voltage of 2 volts and current of 2.5 mA (approximately 5 mW consumption). Such values of the voltage and currents were produced by using series and parallel combination of the Ag-Zn or Cu-Zn or any suitable type of the electrodes or cells. Following figure (2) shows the actual working of such a regular low current Light Emitting Diode (LED) using

generated voltage from the living plants. In the given figure, LED circuit is arranged on a regular breadboard, along with few other components. In order to focus on the emitted light from the LED, the photograph was intentionally snapped in darkness.
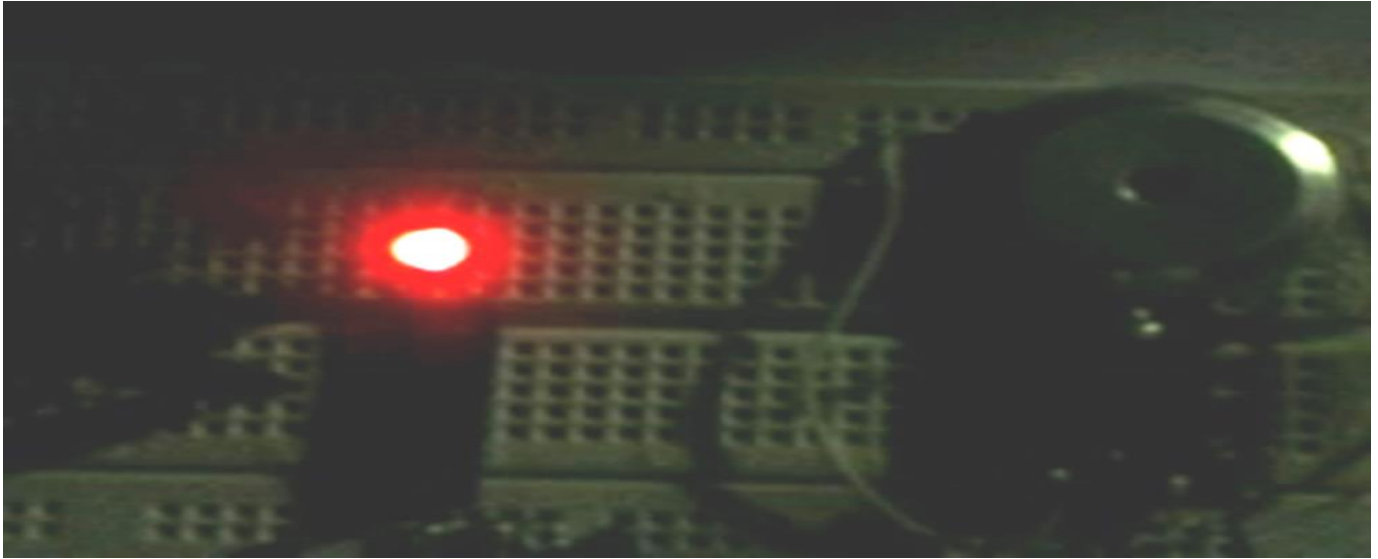
Figure (2) : Actual working of LED Circuit

IV. UTILIZATION OF GENERATED VOLTAGE FOR WORKING OF 12 AND ½ DIGIT CALCULATOR

A digital calculator with 12 and ½ digits (Model: CITIZEN – CT 512, Large Display) requires the typical operating voltage of 1.5 volts and current of 25 mA. By removing internal battery of the calculator, such values of the voltage and currents were produced by using series combination of the Ag-Zn, Au-Zn and Cu-Zn or any other suitable type of the electrodes and cells. Following figure (3) shows the actual working of such a calculator, using the generated voltage from living plants. All kind of available functions in the calculator like Auto checking, memory settings, auto power off and all other mathematical functions of the calculator worked in proper manner. A digital multimeter in the photograph of this figure shows the generated full load voltage of '2.10V', which is somewhat more than the actual voltage required for the working of calculator.
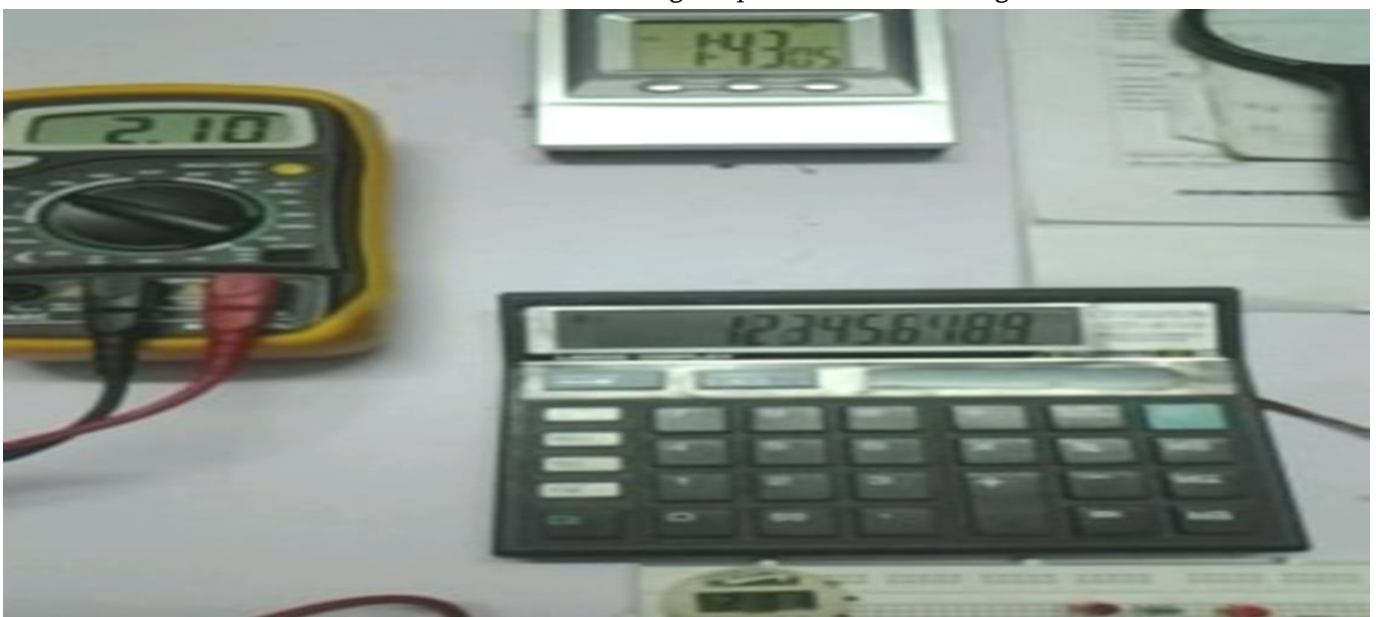
Figure (3): Actual working of 12 and ½ Digit Calculator

V.   UTILIZATION OF GENERATED VOLTAGE FOR WORKING OF MUSICAL SOUND CIRCUIT

A miniature musical sound circuit or musical greeting card circuit with build in COB (Chip On Board) and buzzer as sound output was connected as the output load. Such a circuit works on 1.5V voltage and 25mA current ratings (approximately 50 mW power consumption). The required values of voltage and currents were generated by using series and parallel combinations of the Ag-Zn, Au-Zn and Cu-Zn or any other suitable type of the electrode pairs and cells. The musical sound circuit worked properly with suitable sound output. Following figure (4) shows the actual working of such a circuit with the help of voltage generated from living plants.
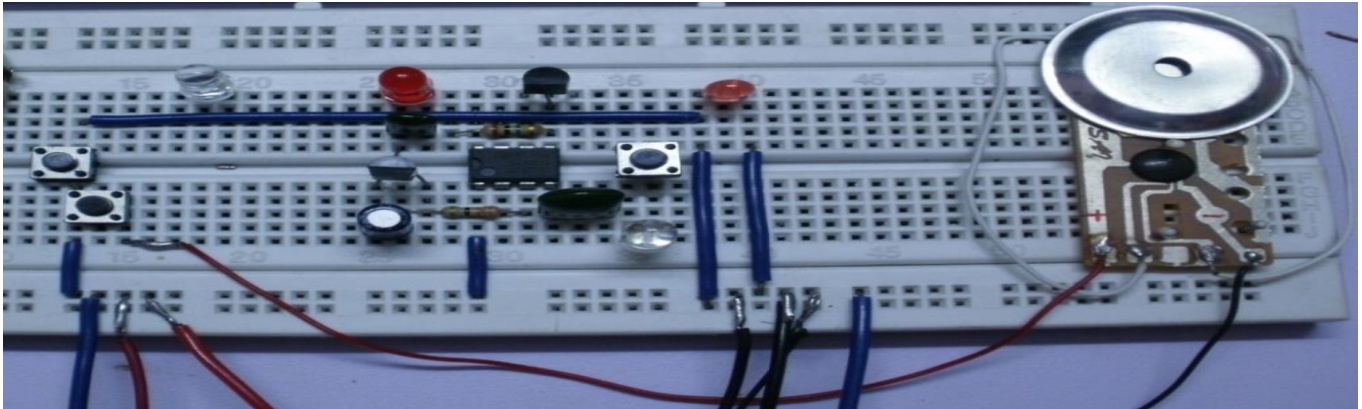
Figure (4) : Actual working of Musical sound circuit with buzzer as output load

VI.   UTILIZATION OF GENERATED VOLTAGE FOR SIMULTANEOUS WORKING OF DIGITAL WATCH, LED CIRCUIT, CALCULATOR AND MUSICAL SOUND CIRCUIT

A digital watch, a LED circuit, a digital calculator and a miniature musical sound circuit were simultaneously connected as a parallel load at the output. The simultaneous working of all these four circuits were observed and studied carefully. All the circuits worked properly as long as they were connected to the living plant setup using suitable number of electrodes and cells. Following figure (5) shows an actual photograph of simultaneous working of all these circuits, using the voltage generated from living plants. LCD display of digital watch and calculator are showing particular values of time and calculations of that instant. The voltage requirement for such a simultaneous working was up to 4.5 volts, which was developed properly.

Figure (5): Simultaneous working of Digital watch, LED circuit, Musical circuit & Calculator

VII. CONCLUSION

It was observed that such kind of source is non-conventional, renewable and eco-friendly technique of low voltage generation and its small scale utilization. The undertook research work describes the design aspect of low voltage energy source wherein various plants are used as natural electrolytes along with various electrodes and cells to operate miniature electronic circuits which includes Digital watch, LED circuit, 12 and ½ digit Calculator, Musical sound circuit, Quartz wall clock, Timer IC 555 circuit, Tiny DC motor, Small toy, Remotes of CD and DVD players, Tiny torch and Joule Thief circuit. Such types of sources are of low cost, replenishable, sustainable, pollution free and an emerging low power source of electricity.

The presented research work is in early stages, but further research may open novel ways of using such type of green energy. Thus craving of human being on conventional resources may reduce on some extent. So let's expect that our imagination may cross boundaries and we might be plugging into the surrounding trees and plants to charge our mobile phones and other gadgets using such type of green electricity.

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Generalization of Mittag-Leffler Function to Represent the Series $(1 + x)^{-1}$ and Paper $(1 - x)^{-1}$ this Series Converges for$|x| < 1$

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ABSTRACT

In this paper we use the mittag leffler function of real variable x which is special case of mittag leffler function of complex variable zAnd we can add some factor to mittag leffler function of real variable And represents the two series in $(1 + x)^{-1}$ and paper $(1 - x)^{-1}$ this series converges for $|x| < 1$,in this mittag leffler function which is generalization of mittag leffler function.i.e mittage leffler function is special case of this generalized function.

Keywords: Mittag-leffler function ,generalized mittag leffler function,mittage leffler function for real variables,

I. INTRODUCTION

Fractional derivative is as old as calculus. L'Hospital in 1695 asked what does it meanif $\frac{d^n f}{dx^n}$.if n=$\frac{1}{2}$ Since then, manyresearchers tried to put a definition of a fractional derivative. Most of them used an *integral form* for the fractional derivative.

Two of which are the most popular ones.

1) Riemann liouville definition. For $\alpha \in [n - 1, n)$ the α derivative of f is

$$D_a{}^\alpha = \frac{1}{\Gamma(n - \alpha)} \frac{d^n}{dt^n} \int_a^t \frac{f(x)}{(t - x)^{\alpha - n + 1}} \, dx$$

2) Coputo definition. For $\alpha \in [n - 1, n)$ the α derivative of f is

$$D_a{}^\alpha = \frac{1}{\Gamma(n - \alpha)} \int_a^t \frac{f^n(x)}{(t - x)^{\alpha - n + 1}} \, dx$$

II. METHODS AND MATERIAL

One parameter mittage leffler function

$$E_\alpha(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(\alpha k + 1)} \, \alpha > 0$$

Two parameter mittage leffler function

$$E_{\alpha,\beta}(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(\alpha k + \beta)} \, \alpha > 0, \beta > 0$$

It follows from definition

$$E_{1,1}(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(k+1)} = \sum_{k=0}^{\infty} \frac{z^k}{k!} = e^z$$

$$E_{1,2}(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(k+1)} = \frac{e^z - 1}{z}$$

$$E_{1,3}(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(k+1)} = \frac{e^z - 1 - z}{z^2}$$

In general

$$E_{1,m}(z) = \frac{1}{z^{m-1}} \left\{ e^z - \sum_{k=0}^{m-2} \frac{z^k}{k!} \right\}$$

$$E_{2,1}(z^2) = \sum_{k=0}^{\infty} \frac{z^{2k}}{\Gamma(2k+1)} = Cosh(z)$$

$$E_{2,2}(z^2) = \sum_{k=0}^{\infty} \frac{z^{2k+1}}{\Gamma(2k+2)} = \frac{\sinh(z)}{z}$$

The generalized

$$E_{(\alpha_1\alpha_2\ldots\alpha_m),\beta}(z_1 z_2 \ldots\ldots z_m) = \sum_{k=0}^{\infty} \sum_{l_1+l_2+\cdots\ldots l_m = k, l_1>0, l_2>0 \ldots\ldots l_m>0} \frac{(k; l_1, l_2 \ldots\ldots l_m) \prod_{i=1}^{m} z_i^{l_i}}{\Gamma(\beta + \sum_{i=1}^{m} \alpha_i l_i)}$$

Where $(k; l_1, l_2 \ldots\ldots l_m)$ are multinomial coefficient.

III. RESULTS AND DISCUSSION

In this paper generalization of mittage leffler function is derive and acommoded two imp series in this paper $(1+x)^{-1}$ and paper $(1-x)^{-1}$ this series converges for $|x| < 1$,

So main aim is to accomoded this two series in the generalied mittage leffler function

The two series is given by

$$(1+x)^{-1} = 1 - x + x^2 - x^3 + \cdots \ldots\ldots\ldots (-1)^n x^n \ldots\ldots\ldots converges\ for\ \ldots |x| < 1 \ldots$$

$$(1-x)^{-1} = 1 + x + x^2 + x^3 + \cdots \ldots\ldots + x^n \ldots\ldots\ldots\ldots converges\ for |x| < 1$$

The mittage leffler function for real variable x is

$$E_\alpha(x) = \sum_{k=0}^{\infty} \frac{x^k}{\Gamma(\alpha k + 1)}, \alpha > 0$$

The generalized mittag leffler function.

$$\delta E_\alpha(x) = \sum_{k=0}^{\infty} \frac{x^k}{\Gamma(\alpha k + 1)} \cdot (\Gamma(\alpha k + 1))^\delta$$

Where $\delta \in N_1 = \{0,1\}$

Case I.when $\delta = 0$ then original mittage leffler function of one parameter of real variable x is obtained i.e

$$0E_\alpha(z) = \sum_{k=0}^{\infty} \frac{x^k}{\Gamma(\alpha k + 1)} \cdot (\Gamma(\alpha k + 1))^0$$

$$E_\alpha(z) = \sum_{k=0}^{\infty} \frac{x^k}{\Gamma(\alpha k + 1)}$$

CaseII:-   When $\delta = 1$ then mittage leffler function of parameter family reduces to

$$1E_\alpha(z) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(\alpha k + 1)} \cdot (\Gamma(\alpha k + 1))^1$$

$$1E_\alpha(z) = \sum_{k=0}^{\infty} z^k$$

Therefore

$$1E_\alpha(z) = \sum_{k=0}^{\infty} z^k = 1 + x + x^2 + x^3 + \cdots \ldots \ldots + x^n + \cdots \ldots = (1 - x)^{-1}$$

In a similar manner,

$$1E_\alpha(-z) = \sum_{k=0}^{\infty} (-z)^k = 1 - x + x^2 - x^3 + \cdots \ldots \ldots + (-1)^n x^n + \cdots \ldots = (1 - x)^{-1}$$

IV. CONCLUSION

One can also generalize mittage leffler function.

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A Deep Learning Approach for Human Activity Recognition Using Smart Phone

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ABSTRACT

Human Activity Recognition is an emerging field of study with a lot of innovations and applications. With digitalization, mobile development and advancement in technology taking over mankind, Smartphones have become an integral part of our life. We've been so dependent on Science and its innovations, that living without mobile phones is nearly impossible. With advancement in technology, comes the responsibility of providing mankind with efficient, conventional and sustainable resources. Our project aims to implement the idea of "Technology at your fingertips".

The number of elderly people is predicted to elevate over the years, "aging in place" (living at home regardless of age factors and other aspects) is becoming an important topic inthe area of ambient assisted living (AAL). Therefore, we have proposed a human activity recognition system based on data collected from Smartphone motion sensors for daily physical activity monitoring. The proposed approach implies developing a prediction model using mainly two sensors available on a smartphone: accelerometer and gyroscope.

We have chosen to implement our solution on mobile phones because they are ubiquitous and do not require the subjects to carry additional wearable or mountable devices or sensors that might impede their activities. For our proposal, we target six basic human daily activities walking, jogging, sitting, standing, ascending, and descending stairs. We evaluate the solution against two datasets (one using only accelerometer data and the other using only gyroscope data) with great effect. We've also implemented predictive models using Deep Learning approaches LSTM (Long Short- Term Memory) and CNN (Convolution Neural Networks). The predicted results show decent especially good and accurate results obtained for walking, running, sitting, and standing. The proposed system is fully implemented on a smartphone device as an Android application, which proves to be efficient, sustainable, and accurate.

This study revolves around Deep Learning methodologies and techniques, precisely an approach based on semantic analysis mimicking the human ability to perform various activities.

I. INTRODUCTION

Smartphones have become an integral part of human life. With its advancing features and specifications, the demand for owning a smartphone has rapidly grown over the years. This piece of technology has really proved to be a boon to mankind, assisting man throughout his daily activities. According to the survey carried out by Statista, the number of smartphone users worldwide surpasses three billion. More than half of the world's populations are smartphone users and it is forecasted to further grow by several hundred million in the next few years.

Technology definitely has its own pros and cons but taking the utmost advantage of it, can be beneficial to mankind. One such field where smartphones play an important role and is a budding area of research and development, is the Human Activity Recognition (HAR).

AR (Activity Recognition) is one of the most significant innovations in the sector of Health monitoring, mobile health applications and user's activity tracking. Utilizing this important feature of smartphones and their sensors, the study of HAR is developing and evolving over time.

Activity Recognition (AR), identifies the daily activities that is performed by a user, has been intriguing and demanding within ubiquitous and mobile computing. The growth and evolution of smart mobile devices and their astounding features with sensing, processing, and network capacity have opened up a huge range of possibilities for activity recognition. Studies for HAR are extensively using Smartphones due to their unassertive, high end hardware and features, none or low costs of installation and ease of use, making it sustainable and feasible.

The HAR system is executed by taking input from smartphones, whereby exploiting data recovered from inertial sensors and observing the human movement using various approaches. Though smartphones today are loaded with a whole lot of sensors like light sensors, motion sensors, compass sensors, this study specifically aims at using two motion sensors available in every smartphone. The reason being its availability and feasibility, making it available to all and cost effective so that its usability increases.

The work described in this paper relies on Android smartphones (used to extract data in preparing the dataset), but the tri-axial accelerometer and gyroscope are basic motion sensors present in all other smartphones and mobile devices.

The aspiration of this project is to use this proposed system to track the behavior of older adults who are in need of constant monitoring, ensuring that they behave in normal parameters. Adding more features and parameters to the application can further detect more activities and give recommendations during inactivity. Hence, we have limited the the exploitation of sensor data from smartphones only, as we believed that human carried sensors and devices would discourage older adults from participating or using the application.

In this paper, we have implemented a system based on Human Activity Recognition using Deep Learning approach and deployed an Activity tracking application, with the hope that it will encourage the development and influence the direction of activity recognition research and bring into existence a feasible and sustainable application.

II. LITERATURE REVIEW

The study of Human Activity Recognition (HAR) began with implementations using the Machine Learning Approach. Over the years, there were many algorithms and methods used for solving real world problems. There is a lot of research work and executions completed using Machine Learning Algorithm. This section gives a brief overview of the transition of HAR from ML to DL, advancing over the years.

In the research conducted in [12], Machine Learning approach was used for the implementation of HAR. Algorithms like Decision Trees, Support Vector Machines, K- nearest neighbors (KNN) and Ensemble classification methods were listed in the paper that were executed using multimode motion sensos. SVM was the most precise approach tested with the highest success rate of 99.4% while the other methods also created effective models.

According to the published work in [13], SVMs have again proved to be the most accurately predicting models. With the introduction of Deep Learning, these ML approaches have lost their limelight.

In recent years, several researchers proposed DL-based solutions for the HAR problem. Though the accuracy rates were fluctuating in both ML and DL approaches, Deep Learning outperforms Machine Learning methods with its intuitive feature selection process. Various studies have also proved that Deep Learning techniques' self-learning capabilities lead to higher accuracy of results and faster processing. The first applications of Deep Learning methods have been implemented in computer vision and natural language processing [14]. The exploration in the field of DL provides scope for significant contribution to HAR and its applications.

Among the DL models, CNNs attracted the attention of several HAR researchers. [15] Use a 1-Dimensional CNN to classify activity data recorded by smartphone sensors. They compare the performance of their proposed model with some shallow ML models e.g., SVMs and DTs. The results indicate that the CNN model is more accurate. [16] use a 2- Dimensional CNN to classify six daily activities recorded from 12 volunteers. They compare their method with traditional ML methods with respect to both accuracy and computational overhead. The results indicate improvement with respect to both measures.

In [17], the authors apply different variants of RNNs (e.g., GRUs and LSTMs) to recognize daily activities and detect abnormal behavior of the elderly people suffering fromdementia. They compare the performance of these models with shallow ML models. The comparison results indicate that RNNs outperform other ML models with respect to most of the evaluated measures (e.g., accuracy, precision and recall), and among the investigated RNN models, LSTMs performed slightly better. [18] use LSTMs to classify human activity data collected by smart-home sensors. They also compare LSTMs with CNNs and traditional ML moldels in [19]. Their evaluations indicate that LSTMs and CNNs outperform other ML models, and CNNs are much faster than LSTMs in training but less accurate. As future work, they propose to combine CNNs and LSTMs to take benefit of both.[4] A study conducted by [4] published a comparative analysis of hybrid deep learning models for HAR, that has given outstanding results.

This is the new advancement to the evolution of Deep Learning.

III. METHODOLOGY

Human activity recognition plays a big role in human-to- human interaction and interpersonal relations. Because it provides information about the identity of an individual, their personality, and mental state, it's difficult to extract. The human ability to acknowledge another person's activities is one among the most subjects of study of the scientific areas of computer vision and machine learning. As a result of this research, many applications, including video surveillance systems, human- computer interaction, and robotics for human behaviour characterization, require a multiple activity recognition system.

For many years human action/activity recognition has been studied well. Most of the action recognition methods require to manually annotate the relevant portion of the action of interest within the video or the kind of input data. In recent years it's been studied that the relevant portion of action of interest are often acknowledged automatically and recognize the action. We will review the action recognition methods within the following sections of this paper.

For many years human action recognition has been studied well. Most of the action recognition methods require to manually annotate the relevant portion of the action of interest in the video. In recent years it has been studied that the relevant portion of action of interest can be found out automatically and recognizes the action. We can review the action recognition methods

HAR datasets

We have implemented the current project with two pre available datasets.
1. UCI Machine Learning Repository University of California Irvine [5]
2. WISDM WIreless Sensor Data Mining lab [10]

The main objective of choosing two datasets and implementing Deep Learning approaches separately on each one of them, was to study how the size of the dataset affects the overall performance of the Model.

It was quite evident that we got a better accuracy rate with the larger dataset as input. The results are further mentioned in the paper.

According to the research carried out in [1], their study states that the combination of accelerometer and gyroscope signals, also called multimodal recognition, increases the accuracy in HAR with respect to the use of each signal alone.

The paper consisted of the results of an analysis that was performed in order to compare the effectiveness of machine learning techniques when used separately or jointly on accelerometer and gyroscope signals.

It also states that the results show that the use of deep learning techniques in multimodal mode (i.e., using accelerometer and gyroscope signals jointly) outperforms other strategies of at least 10%. [1]

However, we have also previously researched and published a Human Activity Recognition case study with Machine Learning Models which clearly demonstrates the difference between the Approaches used. [2] Sensors based: Accelerometer

HAR research and implementation initially began with the use of accelerometers. Over the years now, the accelerometer has been an integral part of the contribution to the research of Activity Recognition. The accelerometers were used mainly because they were low- cost, low- power and compact sensors. These sensors are practically found in every smartphone today which makes it sustainable and feasible and provide motion- related information. The use of these sensors makes it effortless to recognize activities reliably and robustly.

An accelerometer is an electro mechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic which is caused by moving or vibrating the accelerometer. [3]

Sensors based: Gyroscope

Similar to the Accelerometer motion sensor, the gyroscope sensor has been widely used for Activity Recognition. A gyroscope is a device that uses Earth's gravity to help determine orientation. Gyro sensors are devices that sense angular velocity which is the change in rotational angle per unit of time. [3]
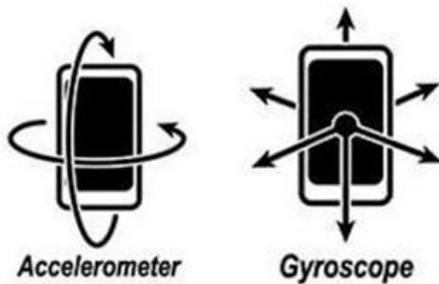
Recording Parameters	UCI Dataset	WISDM Dataset
Smartphone mounting	Waist - mounted	Pants' front pocket
Sensors	Accelerometer and Gyroscope	Accelerometer only
Number of subjects	30	36
Subject's age bracket	19 - 48	Not specified
Sampling Rate	50 Hz	20 Hz
Sample Window	128 readings with 50% overlap	200 readings with no-overlap
Different activity	Laying	Jogging
Number of instances	10299	1,098,207

Table -1: Accuracy Table

UCI Dataset

The UCI HAR dataset is an open source 6- activity dataset that contains 3D (x, y, z) raw signals extracted from the accelerometer and gyroscope motion sensors of a smartphone strapped to the waist of a subject [5]. The experiments were carried out with a group of 30 subjects within an age bracket of 19-48 years. Each person performed six basic activities of Walking, Walking Upstairs, Walking Downstairs, Sitting, Standing, and Laying. The experiment captured 3-axial linear acceleration and 3-axial angular velocity at a constant rate of 50Hz. The sensor signals were preprocessed by applying noise filters and sampled in fixed- width sliding windows of 2.56 sec with a 50% overlap (128 readings/window). The sensor acceleration signal, which has gravitational and body motion components, was separated using a Butterworth low-pass filter into body acceleration and gravity. [11]

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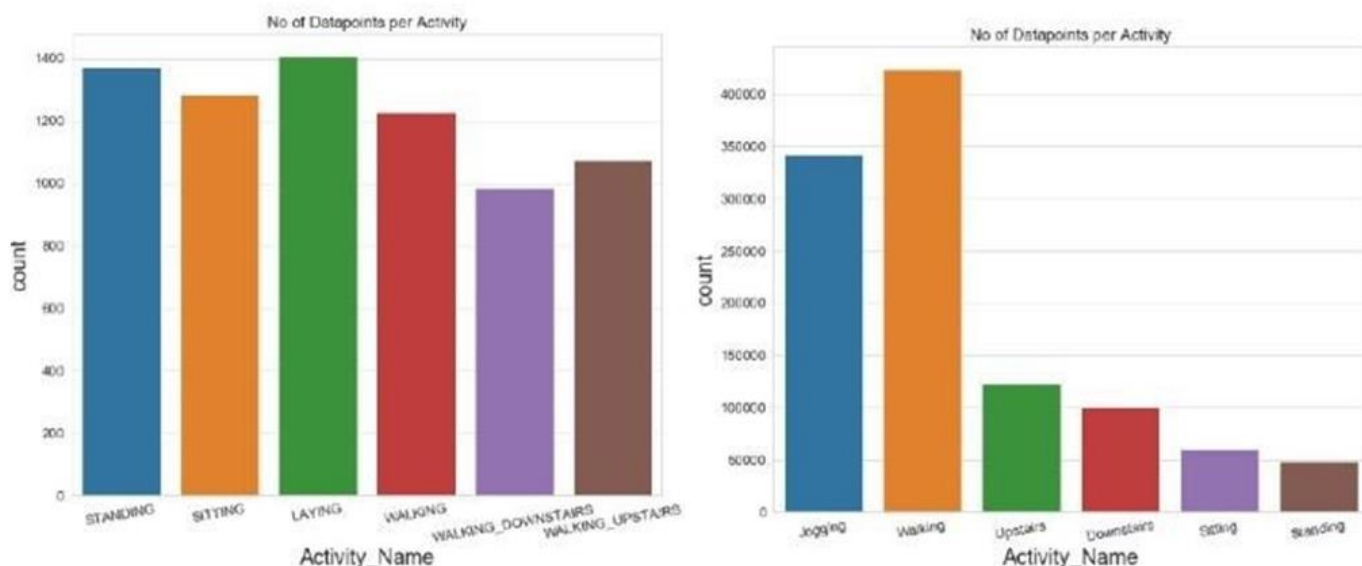
Chart -1: Datapoints plotted from the two datasets

1.3.3. WISDM Dataset

The WISDM dataset is composed of raw accelerometer data of human activities collected from 36 users. The data was recorded using a smartphone while performing six daily human activities: Walking Downstairs, Jogging, Sitting, Standing, Walking Upstairs, and Walking. The dataset has a total of 1,098,207 instances. Data transformation was made with a sampling rate of 20 Hz, which whereby 10 s worth of accelerometer samples (200 lines of the raw data) were taken to transform them into a single tuple of proposed composite features. The measured sensor data is a 3-axisaccelerometer data for each activity along with the timestamp and the user-id [10]. Before calculating any feature, the raw accelerometer data was also preprocessed to reduce noise using median filter of order 5 in each dimension separately. The total acceleration signal in time domain, 'A', captured by accelerometer is known to be the sum of gravity ('g') and body ('B') accelerations. A 3rd order Butterworth low pass filter is used with a cutoff frequency of 0.3 Hz to separate the acceleration signal into gravity and body acceleration signals. [8][9]

The published work in [8] shows the study based on the datasets used for Human Activity Recognition.

(a) UCI HAR Data Set   (b) WISDM Data Set
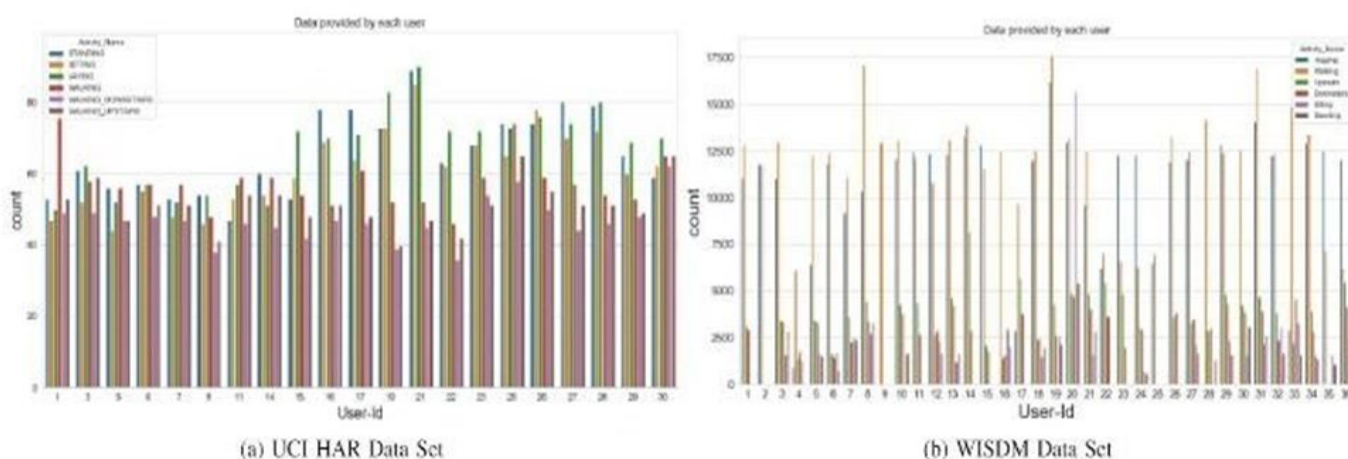
Chart -2: Data points by each user plotted from the two datasets

1. HAR using Deep Learning

Human Activity Recognition (HAR) is an emerging field of research and study, which has implementations of both Machine Learning and Deep Learning. Due to advancement in the areas of Science and Technology, the introduction of many new possibilities and studies have sprouted. Though Machine Learning and Deep Learning are both emerging fields in Data Science, Deep Learning proves to be more advanced and is still advancing over time. Machine learning (ML) has been at the core of research into human activity recognition for a very long time [5]. However, since AlexNet [6] won the ImageNet competition in 2012, deep learning has seen successful applications in a multitude of domains.

Computer vision, natural language processing, speech recognition, etc. This success led several researchers to use various deep learning approaches in solving the HAR problem [7].

The biggest advantages of Deep Learning models over ML models are their capability of learning complex features from raw data and the automatic feature extraction, improving the performance along with the accuracy rate.

Hence, we have opted to use the Deep Learning approach to eliminate the need of pre-knowledge and handcrafted feature extraction.

In this section, we have given a brief explanation of the DL models with respect to HAR, used in our experimental study.

CNN

CNNs are deep learning models widely used in computer vision. The architecture of a CNN is very similar to that of a visual cortex in the human brain. Through some filters, CNNs are able to extract features (i.e., spatial and temporal dependencies) and distinguish the objects within the input image. The filters constitute the convolution layers, which are usually followed by some fully connected layers responsible for the classification task. Other than being good at learning features, through some pooling layers, CNNs can scale to massive datasets. In fact, the purpose of pooling layers is reducing the dimensionality of input data and also extracting dominant features, which are invariant with respect to rotation and position.

LSTM

LSTMs are an extension of RNNs, which perform much better than standard RNNs when it comes to remembering dependencies for a long time. This capability is due to the structure of the repeating module in these networks. In LSTMs, the repeating module comprises four interacting layers. These layers include a layer called the cell state, together with three other layers called gates. Cell state acts as the RNN memory. Gates are ANN layers responsible for controlling the information added to/removed from the cell state. In other words, these gates allow more relevant information to flow to the cell state and prevent the flow of less relevant information. [4]
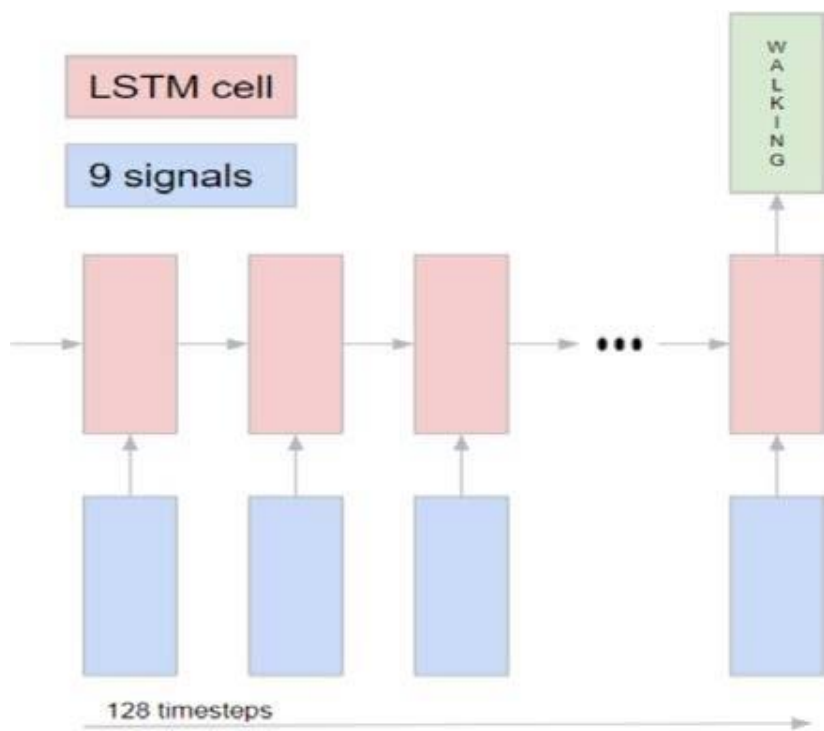
Fig -1: LSTM Model

CNN-LSTM

The figure below depicts the CNN-LSTM model, combination of the LSTM and CNN, Deep Learning models combined to make the Hybrid model.
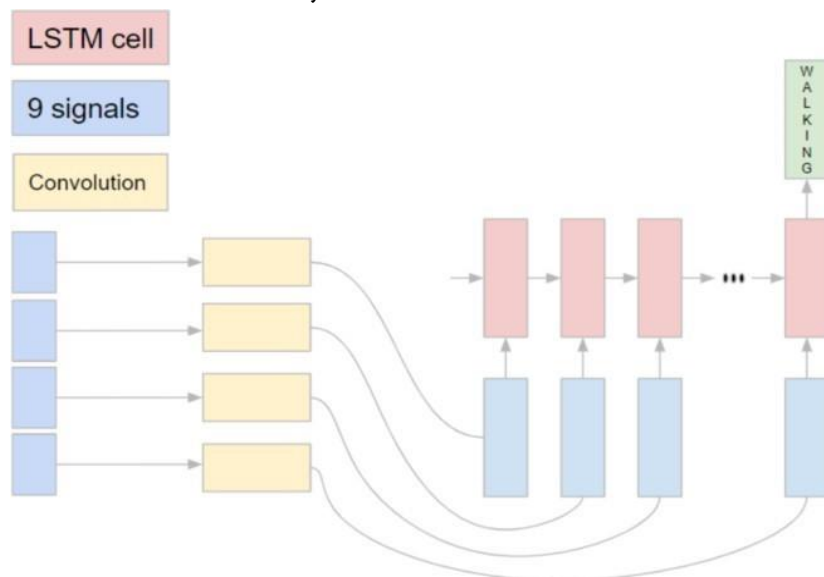
Fig -2: CNN-LSTM Model

Implementing CNN LSTM in Keras

A CNN LSTM model is expected to be trained jointly in Keras. A CNN LSTM can be defined by adding CNN layers on the front end followed by LSTM layers with a Dense layer on the output.

The architecture can be divided as two models:

1.   The CNN Model for feature extraction and

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2.   The LSTM Model for interpreting the features across time steps.

The CNN LSTM model can be defined in Keras by first defining the CNN layer or layers, wrapping them in a TimeDistributed layer and then defining the LSTM and output layers.

There are two ways to define the model that are equivalent.

1.   Defining the CNN model first, and then adding it to the LSTM model by wrapping the entire sequence of CNN layers in a TimeDistributed layer.

2.   An alternate approach is to wrap each layer in the CNN model in a TimeDistributed layer when adding it to the main model.

7.Results and Accuracy

ACCURACY OF ALL THE MODELS IMPLEMENTED			
DEEP LEARNING MODELS → DATASET ↓	LSTM	CNN	CNN-LSTM
UCI (Dataset One)	88%	93%	88%
WISDM (Dataset Two)	97%	94.70%	94.78%

Table -2: Accuracy Table

The above table (Table 2) enlists the various approaches implemented and their testing accuracy.

8. HAR Application: Real Time   Activity Detection

The need of Activity Detection in Real Time comes into picture when an efficient predictive model-based application needs to be deployed. We have successfullyimplemented and deployed an application using the LSTM model that stood out best in our research. The application is Android based and predicts activity in Real timeaccurately and efficiently.

IV. CONCLUSIONS

Taking into consideration our work of research, and the researches and studies reviewed for this paper, we come to a few conclusions:

1.   Larger datasets do affect the accuracy of the models irrespective of the approach used.

2.   The more the number of sensors, the more signals and increased data, this helps make Activity Recognition more accurate.

As an exception we do notice that our paper gets the highest accuracy from the LSTM model implemented on the WISDM dataset that comprises of data from signals of a single motion sensor.

We intentionally chose to show out this difference, since we felt the need to make technology feasible and available to all with minimum requirements. Since the main objective of this project was to design a prediction model and activity tracker for the older adults, we assumed that a normal smartphone with minimal sensors would serve the purpose. And as shown our model performs the best from the rest. This theory may not be

applicable to all sectors, but with improvement and advancement with technology comes the responsibility to cater to human needs. That's what been our focus all throughout the development of this study and deployment of the application. The paper [21] is a review of all the various tools and techniques which can be used in human activity recognition that included machine learning algorithms and neural network techniques. The survey concludes by deducing that there is no single method which is best for activity recognition of any type. There are various factors that are affecting that need to be taken into consideration while choosing the appropriate approach. Although there are numerous methods, some of the challenges still remain open and have to be resolved.

3.   The idea of Hybrid Models is an advantage to the implementation of Deep Learning Approach. Though we implemented a CNN- LSTM model and got a accuracy rate less than a simple LSTM, we would eagerly try implementations with more hybrid models.

V.   ACKNOWLEDGEMENT

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Preparation Goat Milk Whey Beverages by Using Medicinal Plant (Shatawari)

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ABSTRACT

Whey is the liquid milk has been curdled and strained its is by product of the manufacture of cheese or casein and several commercial uses. Sweet whey is manufacture during the making of rennet types of hard cheese like cheddar or Swiss cheese. Acid whey is a byproduct produced during the making of acid type of dairy products such as cottage cheese or strained yoghurt.

Keywords: Shatawari powder, whey, channa, goat milk, medicinal plants, physico-chemical properties

I. INTRODUCTION

Whey is the watery component removal after cutting of the curd in cheese manufacturing. After the drainage of curd while *shrikhand* making and when acid coagulated dairy products like *paneer* and *channa* are prepared. Day to day production of panner is increasing resulting in an increased whey production is estimated at 150000 tonnes of paneer. Whey is generally classified as sweet, sour or acidic. I[st] is depend on its titrable acidity an ph. Whey is containing almost all water soluble nutrient present in milk practically lactose, whey protein, vitamin and minerals.

Whey is used to produce whey cheese such as ricotta, whey butter, so called brunost. Dairy whey remaining from home- mode cheese making has many uses. It is flour conditioner and can be submitted for skim milk in most baked good receipes that require milk.

Whey was also used in central spain to enrich bakery products in some tradition. It was also used instead of water to produce bread dough. In areas where cheese is made excess whey by product is sometimes sprayed over hay field as a fertilizer.

II. OBJECTIVES

The present investigation was to prepare using different level of juice and medicinal plant extracts in whey beverages. To prepared by standardized method of whey beverage and Carrying out preliminary phytochemicals screening.

III. MATERIALS AND METHOD

Area of study:

The present investigation was carried out in the Department of Dairy Science Maharashtra Udaygiri Mahavidyalaya, Udgir and Shivaji Mahavidyalaya, Udgir initially to standardize the goat whey beverage and through this study was also investigated physic-chemical quality of product. Hence details the material used and the method adopted for the present investigation are presented in this chapter.

Ingredients used in standardization of goat whey beverages

Considering the initial investigation the effect of levels of medicinal extracts were studied on the physicochemical analysis of this product. The level of these variables that resulted in most of liked products on the basis of physico chemical were selected. Good quality of goat milk purchased from goat farm college of agriculture Udgir. Good quality citric acid, Suger, Orange **Shatawari powder (Janna), Drumstick powder and Ginger etc. were** purchased from the different local market like Latur and Nanded Distirct.

Process Combination

For the present investigation following parameters were used to standardize the product.

Sr. No.	Treatments	Whey (%)	Orange juice (%)	Sugar (%)	Medicinal extracts (%)
1	T_0	72	15	8	-
2	T_1	72	15	8	5
3	T_2	72	15	8	5
4	T_3	72	15	8	5
5	T_4	72	15	8	5

Details of manufacture:

```
Whey                                    ◯        A
  ⇓                                              ⇓
Clarification                    Addition of medicinal extracts@5%
  ⇓                                              ⇓
Separation                               Filtration
  ⇓                                              ⇓
Addition of sugar @ 8%                     Cooling
  ⇓                                              ⇓
Filtration                                Packaging
  ⇓                                              ⇓
Addition of orange juice @ 15%             Storage
  ⇓
  ◯        A
```
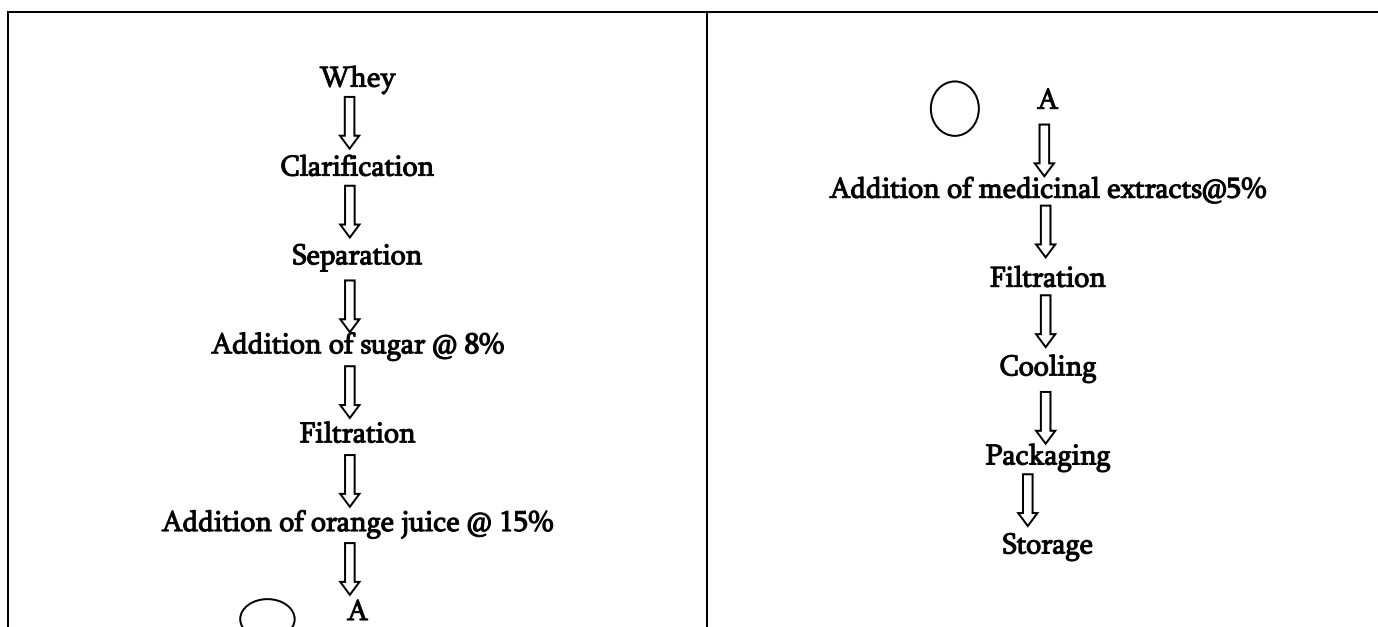
Fresh, whole, clean goat milk is purchased from goat farm, udgir. The milk is heated at 76°C for 15 minute and then coagulated with the help of citric acid @ 1%. The whey is drained by using muslin cloth. The whey is collected filtered and in which sugar is added @8%. After which shatawari powder, lemon grass, ginger,

drumstic powder is added in T_1, T2, T3, T4, treatments respectively. Then this beverage is filtered through muslin cloth. This beverage is packaged and store at refrigeration temperature.

IV. PHYSICO-CHEMICAL ANALYSIS

Total Solid (TS)

Take empty dried aluminium dish and weigh it. Transfer the 5 gm of given sample into dish. Weigh the sample and note down the reading. Place the dish on boiling water bath then remove the dish and place over hot oven maintain at 102ºC for 3 hours. After 3 hours transfer to desicator and weigh it.

$$\%TS = \frac{(W_3 - W_1)*100}{(W_2 - W_1)}$$

W1- weight of empty dish

W2- weight of dish with sample before drying

W3- weight of dish after evaporation

Determination of Total Nitrogen and Protein

Kjeladahl method for the determination of organic nitrogen is the worldwide standard for the purpose of calculating the Nitrogen and Protein content in both human food and animal feed. Kjeldahl Method has been adopted as a Standard method of Nitrogen Analysis for many non Protein Materials, Nitrogen Analysis of water, waste water, fertilizer, etc.

Kjeldahl was food scientist in Denmark food processing Industry; he worked on developing Analytical technique which would lead to better process control in the area of fermentation technology. Later he becomes the Head of the chemistry Division. His first research was in Carbohydrates Chemistry. Then his interest turned to the study of proteins in barley and their change during the various stage which led to the productions of finished beer. He found that the existing analytical procedure for the determination of Nitrogen were completely inadequate for his project. The Dumas was too slow and other method gave incomplete results.

The Method kjeldahl developed for Nitorgen Analysis consists of three phases:

Digestion step

The purpose of digestion step is to break the intricate structure and chemical bonds that hold a chemical substance down to simple chemicals and ionic structure. During the digestion step, all the amino Nitrogen is converted to Ammonium Radical.

Digestion is also termed controlled thermal oxidative degradation of sample is Concentrated sulpheric acid in the presence of potassium sulphate as catalyst. The presence of potassium sulphate raises the boiling point of the sulpheric acid mixture and shortens the digestion time . The catalyst takes the reaction to completion. The digestion time is less than a hour.

Distillation step

Distillation involves the separation and isolation of the Nitrogen from the digestion tube. This is done by rising the pH with NaOH and by doing this the ammonium radical is converted to ammonia. On heating, the ammonium is distilled out and collected in 4% boric acid as a Trapping medium.

Titration

The determination of the amount of nitrogen in the condensate flask is done by titrating with a standard solution of 0.1 N Hc1 in the prances of mixed indicator.

Calculation:

% Nitrogen = $\dfrac{14.01*(\text{ml titran-ml blank})*N*100}{\text{Sample Wight (gms)} *1000}$

Protein calculation

It is been shown that protein is 16% Nitrogen in most of the agro product. By dividing 100% by 16, we get conversion factor for nitrogen to protein of 6.25.Hence the percent protein is calculated as follows:

% protein = 6.38*N

Determination of Ash

Mount the Muffle furnace on firm base, switch on the furnace, you will see the Digital Temperature controls glows and indicates Chamber temperature. Now Display will go in normal mode & it will show process value & now the heaters will start & temperature will start rising & when the set Temperature is reached heaters will be off & temperature will be maintained within the specified limit. Now the heater to switch on automatically. Place the required material inside the chamber and close the door. Within short time the furnace attains its temperature and the heater is switched off automatically on off, so that the set temperature is maintained and do not throw or jump heavy materials in the muffle. It will damage the muffle also does not open full door directly when there is during full temp.

V. PHYTOCHEMICAL ANALYSIS

Qualitative test

1.   Test for tannins

Exactly 1ml of freshly prepared 10% of KOH was added to 1 ml of the extract. A dirty white precipitate indicates presence of tannins.

2.   Test for flavonoids

1ml of 10% NaOH was added to 3 ml of extracts. Yellow colouration indicate the presence of flavonoids in the extract.

3.   Test for glycosides

Exactly 10ml of 50% H_2SO_4 was added to 1ml of the extract in a tube. The mixture was heated in boiling water for 15 minutes about 10ml of Fehling's solution was added and the mixture was boiled. A brick-red precipitate was observed in the test mixture which indicated the precipitate indicates the presence of glycosides.

4.   Test for saponin

Presence of saponin was detected using frothing test. In this test, exactly 2 ml of extracts in a test tube was vigorously shaken for 2 minutes. Frothing observed in each extract indicate the presence of saponins.

5.   Test for steroids

Exactly 5 drops of concentrated H_2SO_4 were added to 1ml of the extracts. Red colouration indicated presence of steroids in all the extracts.

VI. RESULT AND DISCUSSION

Table 4.1: Phytochemical Constitutes Of Extracts

Test	Ethanol extracts	Distilled water
Tannin	++	+++

Flavonoids	+++	++
Glycosides	+	+
Saponin	+	++
Steroids	++	++

Note :- - = Absent/undetectable, + = Present in trace amount, ++ = Present in moderate amount, +++ = Present in large amount

From **table 5.1** it is indicated that Tannin is present in moderate amount in ethanol extracts while it was present in large amount in distilled water. Flavonoids are present in large amount in ethanol extracts but it was present in moderate amount in distilled water. Glycosides are present in trace amount in both i.e. Ethanol and distilled water. Saponin is present in trace amount in ethanol extracts but it was present in moderate amount in distilled water. Steroids are present in moderate amount in both of i.e. ethanol extacts and distilled water. Y. U. Dabaiand et al., studied on Phytochemical screening and antibacterial activity of the leaf and root extracts of *Senna italic* it was recorded that Tannin, Flavonoids, Glycosides, Steroids, Saponin are present in Ethanol extracts.

Table 4.2: phytochemical screening

Test	T_0	T_1	T_2	T_3	T_4
Tannins	-	+	+	++	+++
Flavonoids	-	+	++	+++	+
Glycosides	-	++	+	+	_
Saponin	-	+	+++	++	+
Steroids	-	+++	+	-	+

Note: - = Absent/undetectable, + = Present in trace amount, ++ = Present in moderate amount, +++ = Present in large amount

During present study it was recorded that Tannin were present trace amount in Shatawari and lemongrass (T_1 and T_2) while it as observed in moderate amount in Ginger (T_3) sample and in Drumstick powder(T_4 it was recorded in large amount. It was also recorded that flavoinoids were present in moderate amount in lemongrass (T_2) sample and large amount in T_3 sample i.e. Ginger and in shatawari and Drumstick powder (T_1 and T_4) it was recorded in trace amount. During present study it was recorded that glycosides were absent in drumstick powdered sample i.e. T_4 while it was observed in moderate in T_1 sample i.e. shatawari powder and in lemon grass and ginger it was recorded in trace amount. It was recorded that Saponin were present in large amount in shatawari and lemongrass sample (T_1 and T_2) while it was observed in moderate amount in ginger and in drumstick powder it was recorded in trace amount. It was recorded that steroids were absent in ginger sample i.e. T_3 while it was observed in large amount in shatawari extracts sample i.e. T_1 and in lemongrass and drumstick powder it Umarand et al. studied Phytochemical Analysis and Antimicrobial Effect of Lemon Grass (*Cymbopogon citratus*) and it was recorded that Tannin, Flavonoids, Glycosides, Steroids, Saponin are present in Ethanol extracts.was recorded in trace amount.

Different table 4.3: Physico-chemical analysis (mean±sd) of beverages

Test	T_0(mean±SD)	T_1(mean±SD)	T_2(mean±SD)	T_3(mean±SD)	T_4(mean±SD
TS (g/100gm)	19.31±0.24	23.31±0.17	18.12±0.13	18.33±0.07	23.12±0.09
Ash(g/100gm)	0.95±0.01	0.97±0.01	0.87±0.01	0.86±0.02	1.29±0.01

Protein(g/100gm)	1.57±0.01	1.74±0.08	1.95±0.08	1.36±0.02	1.56±0.13
pH	4.11±0.01	4.18±0.05	4.17±0.012	4.13±0.013	4.17±0.01
Acidity(%LA)	0.622±0.029	0.625±0.012	0.700±0.01	0.683±0.02	0.629±0.01
Physico-Chemical Analysis					
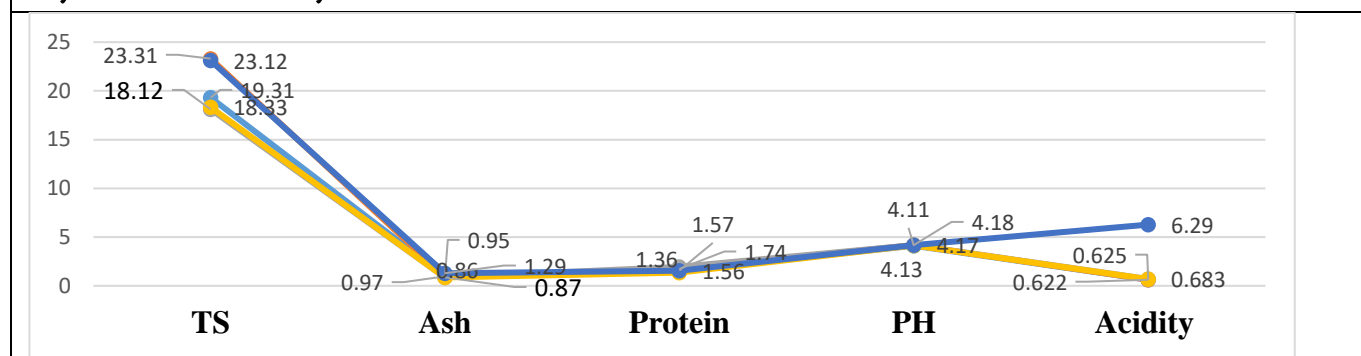
From table 5.3, TS was recorded higher i.e.23±0.17 in T_1 sample and lowest were observed in T_2 sample i.e. 18.12±0.12. Flavia C.A.Buriti and et al. studied on the texture and sensory features of dairy beverages prepared by goat milk and it was recorded 15.0 in T sample i.e. Guava pulp. Ash was recorded higher i.e. 1.29±0.01 in T_4 sample while the lowest readings were observed in T_3 sample i.e. 0.86±0.02. Protein was recorded higher i.e. 1.95±0.08 in T_2 sample while the lowest were observed in T_3 sample 1.36±0.02. pH was recoded higher i.e. 4.18±0.05 in T_1 sample while the lowest were observed in T_0 sample i.e. 4.11±0.01. Acidity was recorded higher 0.700±0.01 in T_2 sample while the lowest reading 0.622±0.029 in T_0 sample. Flavia C.A. Buriti and et al. studied on the texture and sensory features of dairy beverages prepeared by goat milk.

VII.CONCLUSION

Beverages on whey continue to receive a considerable amount of attention now a days. These indicate the growing awareness among consumers and manufactures alike for the enormous potential these offered for diversifying product profile. Technological packages are available for wide range of whey based such products and with better understanding regarding the functionality of different ingredients it would be possible to develop functional whey products for specific target group.

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Information Communication Technology in Library and Information Science Education : An Overview

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ABSTRACT

Information Communication Technology ICT plays an important role in society when we take into account the social, culture and economic role of computers and the Internet. Considering that all youngsters move through compulsory education, school is the appropriate place to develop crucial ICT competencies. The present paper focus on the What is ICT, concept of information technology, ICT in libraries, ICT and library professionals, objectives of ICT, advantages of ICT, ICT disadvantages/ limitations, components of ICT, library and information science education (India). Information and Communication Technologies (ICTs) have become central to education and training in Library and Information Science/Service (LIS) because of the great influence of these technologies on the professional world.

I. INTRODUCTION

The recent development in science and technology has led to a new startling condition concerning information created in the world. In the present ICT era, it becomes necessary for the librarians to use the computers and other devices in the day-to-day work. In this context, the librarians shall possess, in addition to the academic and professional qualifications, certain ICT skills, such as dexterity in operating systems, use of application software packages, knowledge of databases and programming, acquaintance in webpage design, library automation software, technical skills, and managerial skills. In recent years, Information and Communication Technologies have been regarded to have a pervasive influence on the economy as well as other parts of society. The Information and Communication Technology is widely considered as the most important revolution humankind has experienced since the industrial revolution and the development of movable type printing techniques. A country's development depends on the extent of use, speed of access, and skill application of ICT systems. The utilization of Information and Communication Technology has become an indicator of the level of the nation's wealth. Countries, which do prepare for ICT but not use it, are likely to lose their global competitiveness.

II. ICT IN LIBRARIES

ICT has changed the traditional methods of library activities and services providing new dimensions for teaching, learning and research in higher educational institutions. With the help of ICTtools, it is possible to store, retrieve, disseminate and organize information by creating websites and databases. Information is now published both electronically and by print making it accessible to users according to their demands. It is important to assess the ICT applications in library and information centers in the context of changing user needs. This section includes studies related to the application of ICT in libraries both in India and abroad.

The first and foremost ICT component, which can be adopted in the libraries, is the computer for library automation and to have an in-house database of library holdings in electronic form. As many primary journals and being published in CD form, it becomes necessary to equip the libraries to optimize the use of information. E-mail, online retrieval networking, multimedia and internet are the other important technologies, which can be used for faster access to information.

III. ICT AND LIBRARY PROFESSIONALS

In a changing environment when most of the library services are ICT based, it is important for library professionals to be well informed and updated regarding developments in ICT. This section deals with different studies regarding the use of ICT based applications by library professionals, their attitudes towards ICT, skills in handling new technologies, need for training in the new technologies etc.

IV. OBJECTIVES OF ICT

1. To provide greater information and easier access
2. To allow access to computers and the internet for everybody, so that a divide does not build
3. up between those who do not possess computers
4. To assist people to develop their ICT skills for accessing information.
5. To give access to digital learning materials, which are set to increase in both quality and quantity.
6. To provide staff expertise to seek out information or learning materials-staff become skilled gatekeepers not just of printed sources but of the digitized ones too.

V. ADVANTAGES OF ICT

Before embarking on an elaborate discussion of the issues involved in library training by deploying ICT, it is essential to understand the advantages of ICT in a Library situation. These advantages include:

1. Opportunities methodologies and to deploy more interesting material that creates an interest in the librarians;
2. Enables better management of library a librarian thereby improving the productivity of the tutor as well as the taught;
3. Enables the librarian to concentrate on other tasks such as research and consultancy;
4. Enables optimum utilization and sharing of resources among institutions thereby reducing the costs of implementing ICT solutions.

VI. ICT DISADVANTAGES / LIMITATIONS

Impact of ICT made various problems in online publishing. In case of e-journals and online databases, the library looses its access after stopping the subscription. The publishers do not give access to the issues which were subscribed. Besides these ICT has following general disadvantages:-

- Expensive
- Need Expertise
- Socio technical issues
- Information insecurity
- More technology dependence
- Less use of human brain

VII. LIBRARY AND INFORMATION SCIENCE EDUCATION (INDIA)

Library and Information Science is now a discipline that has made immense developments in modern times, but library profession has not yet attained equal status as that of other professions. According to Singh (2000), the growth of library profession is influenced by the growth of library and information science education, for it is the education and training that gives direction to the profession. In India a formal course in library science was first started by W. A. Borden in Baroda (1911) and later by A.D Dickinson in Punjab University (1915). The certificate course started by Madras Library Association in 1929 was taken over by Madras University in 1931 under Dr. S.R Ranganathan and was subsequently converted into a postgraduate course of one - year duration in 1937. Other Universities which started Library science courses in are early periods Andhra University the (1935) : Banaras Hindu University (1941) ; University of Delhi (1947) ; Aligarh Muslim University (1952) etc.

In India about 118 universities and institutions impart Library and Information Science (LIS) education While Bachelor of Library and Information Science (BLIS) is offered by 105 universities , Master of Library and Information Science (MLIS) courses is provided by 78 universities and 21 universities offer two - year integrated courses Seventeen universities provide M.Phil in Library and Information Science , 53 universities provide Ph.D in Library and Information Science and 2 universities provide D.LittDegree (Jain, Kaur, &Babbar, 2007) . Out of 17 institutions offering aM.Phil degree, 14 are regular universities and three are under distance education. Dr. B.R. Ambedkar Open University , Hyderabad (then known as Andhra Pradesh Open University) , is the first Open University in India offering Library and Information Science programs correspondence at Bachelor's Degree and Masters . through Degree from 1985 and 1998 respectively , followed by the University of Madras . Indira Gandhi National Open University in 1989) started BLISC and later MLISC and PhD program. IGNOU has played a major role in popularizing distance education in India

by providing educational opportunities at distance in many disciplines , including Library and Information science . IGNOU has a number of study centers spread across the country. The academic program of the University have multi - media support with facilities for audio, video , radio , television , interactive radio and video counseling , as well as tele - conferencing . IGNOU is the nodal agency for running a 24 - hour educational TV channel. GyanDarshan, in collaboration with other institutions of higher learning .GyanVani is emerging as a huge cooperative network of FM radio stations, exclusively devoted to education (IGNOU , 2010) . Other open universities in India offering library science courses are Annamalai University, Algappa

University, S.V. University Tirupati, University of Madras, Madurai - KamarajUniversity , Madurai etc. Today there are more than 20 Library and Information Science schools in India offering LIS courses through distance mode (Naushad Ali &Bakshi, 2006).

In all levels of higher education, ICT is creating a significant change in the traditional concepts of teaching and learning . This shift from the traditional environment has forced LIS education andare training to attempt to improve the quality of programs and hence, LIS curricula need to consolidate ICT concepts , knowledge , skills and proficiency into core competencies , and LIS schools need to provide adequate content and practice that will enable the professionals to use ICTs effectively . The trends noted in the context of Indian LIS program relocation of the academic administration of LIS schools (Information Science at the University of Madras and NISCAIR in New Delhi) , and expansion of LIS departments (Ramesha& Ramesh Babu, 2007) . Information technology oriented M.Tech course is being offered by International School of Information Management (ISIM). University of Mysore, two - year graduate training program by IIT Madras, PGDLAN (IGNOU, University of Hyderabad), etc. In addition, DRTC and NISCAIR have been providing advanced courses in Library science, viz. , Master of Science in Library and Information Science (MS - LIS) , and Associate ship in Information Science (AIS) respectively , which is equivalent to Master's degree in Library & Information Science . The different LIS courses available in India, including regular and distance education, are as follows:

- Certificate course in Library and Information Science (C.Lib.Sc)
- Diploma in Library and Information Science
- B.Lib.Sc. / BLIS (Bachelor Degree in Library and Information Science)
- M.Lib.Sc. / MLIS (Master Degree in Library and Information Science)
- MS - LIS (Master of Science in Library and)MS - LIS (Master of Science in Library and Information Science)
- AIS (Associateship in Information Science)
- PGDLAN (Post Graduate Diploma in Library Automation and Networking)
- M. Phil (Master of Philosophy) in Library and Information Science
- PhD (Doctor of Philosophy) in Library and Information Science
- D.Litt in Library and Information Science

Another major trend is the Digital learning environment or e - learning, facilitated by the application of ICT, which has revolutionized continuing education for learners of all ages. Initiatives across the world include ALA online continuing education of American Library Association and ACRL, Association of College and Research Libraries, Special Library Association - learning Series and in India, Flexi learn of IGNOU, etc. are few examples of providing open learning space for LIS professionals. MIT, Massachusetts Institute of Technology (USA) and NPTEL, National Program on Technology Enhanced Learning (India) provide free e - learning modules on different subjects.

VIII.   CONCLUSION

Information and communication technology (ICT) influences the role of LIS professionals and the offer number of opportunities for professionals and personal development . Professionals with appropriate ICT skills are crucial for transforming traditional library to the electronic library Information and Communications Technology (ICT) or Information Technology (IT) usually a more general term that stresses the role of unified communications and the integration of telecommunications , computers , middleware as well as

necessary software , storage- and audio - visual systems , which enable users to create , access , store , transmit , and manipulate information . The library professionals must possess sufficient knowledge of new ICT skills such as library automation, e resources management, content management, organization of information on Internet and Intranet. Developing and maintaining digital libraries / institutional repositories, web based library services etc.

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Library Collection Development in Digital

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ABSTRACT

The time is changing and therefore requirements and environment of library staff, working condition, and user's demand are also changing. The impact of the internet and digital products on libraries has been widely discussed. Amazing growth of e-resources changed library operation dynamically. In today's period life is so fast and everybody wants to go fast. This paper contains the library collection and e-resource development in digital library and how they provide the services to the user's the paper further it discusses the e-resource types and its use for user and it also describes the advantages of digital facilities.

I. INTRODUCTION

We all know how the information explosion and the information revolution have occurred in the last three decades. But the advents of information and communication Technologies, the internet and particularly the World Wide Web have revolutionized literally everything under the sun. (shrivastava)

Electronic Resources is one of the emerging environment in libraries Information communication in the competitive service. E-Resources usually consist of e - books , e - journals , articles , newspaper , thesis , dissertation , databases and CD - ROM , which are likely to be the alternative to the print media . Emerald , Ensco , scopusare some of the examples of online databases . All updated information is published in these e - sources . The familiarity and use of electronic information resources in the libraries for rapid of development is necessary and important. (Dhanavandan, 2012)

Library collection development is the process of meeting the information needs of the people (a service population) in a timely and economical manner using information resources locally held , as well as from other organizations .

Collections are developed by librarians and library staff by buying or otherwise acquiring materials over a period, based on assessment of the information needs of the library's users. In addition to ongoing materials acquisition, library collection development includes : (Evans , 2007)

- the creation of policies to guide material selection
- replacement of worn lost materials
- removal (weeding) of materials no longer needed in the collection
- planning for new collections or collection area
- cooperative decision - making with other libraries or within library consortia

II. MEANING AND DEFINATION OF DIGITAL LIBRARY

The term digital library has been applied to a wide variety of offerings from collections of electronic journals to software agents that support inquiry based education to collections of email to electronic versions of a public library, to personal information collections, and even to the entire internet.

Definition

"An informal definition of a digital is a managed collection of information, with associated services where the information is stored in digital formats and accessible over a network. A crucial part of this definition is that the information is managed. A stream of data sent to earth from a satellite is not a library. The same data, when organized systematically, becomes a digital library collection. Most people would not consider a database containing financial records of one company to be a digital library, but would accept a collection of such information from many companies as part of library. Digital libraries contain diverse information for use by many different users. Digital libraries range in size from tiny to huge. They can use any type of computing equipment and any suitable software. The unifying theme is that information is organized on computers and available over a network, with procedures to select the material in the collections, to organize it , to make it available to users , and to archive it ." (Arms)

E-resources

An electronic resource is defined as a resource which requires computer access or any electronic product that delivers a collection of data , be it fent referring to full text bases , electronic journals, image collections other multimedia products and numerical , graphical of time based as a commercially available that

- **Multi – access**: Networked products can provide multiple points of access of multiple point in time (24 hours a day 7 days a week) and to multiple simultaneous users
- **Speed :** An electronic resource is it quicker to browse or search , to extract information from , and to integrate that information into other material and to CROSS - search or reference between different publications
- **Functionality:** E - resource will allow the user to approach the publication to analyze its contain new ways by click of the mouse on search mode.
- **Content :** The c resources can contain amount of information , but more importantly the material can consist of mixed media i.e. Images video , audio animation which could not be replaced in print Apart from the above some other advantages of sources may include international reach , unlimited capabilities , reduced cost , convenience search and linking . (Bajpai , Mal . A Bajpal.2009)

Types of Electronic Resources

Below are some brief descriptions of the types of electronic resources which are available through the University of Chicago Library.

- **Research Guides by Subject Indexes :**
- **Electronic Books and Texts \ Electronics Journals :**
- **Library catalogs :**
- **Reference Sources :**
- **Statistical Sources**
- **Sounds Recordings :**
- **Image databases (Art, Maps, and Medical etc.):**

III. CONSORTIA SUBSCRIPTION TO E RESOURCE

It is known that libraries and information carton not able to procure organize and disseminate vast amount of information due to lack of adequate fund and budget. Nowadays, consortia subscription to resources through consortia of libraries is a viable solution to increase the access to a lower cost. Library consortia refer to cooperation.co-ordination and collaboration among the libraries institution for the purpose of resource sharing the libraries all over the word are forming cost of all types and all levels with an objective to take advantage of global network to promote better faster and most cost effective ways of providing resources to the information seekers. The collective strength of consortia members facilitates to get the benefit of wider access to electronic resources Affordable constant at the best terms and conditions (Devi & Devi)

IV. ADVANTAGES

The advantages digital libraries as a means of easily and rapidly accessing books, archives and images of various types are now widely recognized by commercial interests and public bodies alike

- **No physical boundary.** The use of a digital library needs not to go to the library physically; people from all over the world can gain access to the same information, as long as internet connection is available.
- **Round the clock availability.** A major advantage of digital libraries is that people can gain access 24/7 to the information
- **Multiple accesses.** The same resources can be used simultaneously by number of institutions and patrons This may not be the case for copyrighted material library may have a license for " lending out only one copy at a time this is achieved with a system of digital rights management where a resource can become inaccessible after expiration of the lending period or after the lender chooses to make it inaccessible (equivalent to returning the resource)
- **Information retrieval.** The user is able to use any search term (word , phrase , title , name and subject) to search the entire collection Digital libraries can provide very user - friendly interfaces , giving clickable access to its resources
- **Preservation and conservation** , Digitization is not long - term preservation solution for physical collections , but does succeed in providing access copies for materials that would otherwise fall to degradation from repeated use Digitized collections and born - digital object pose many preservation and conservation concerns that analog materials do not Please see the following problems " section of this page for examples
- **Space.** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information; simply because digital information requires very little physical space contain them and media storage technologies are more affordable than ever before.
- **Added value.** Certain characteristics of objects, primarily the quality of image may be improved. Digitization can enhance legibility and remove visible flaws such as stains and discoloration. (Wikipedia)

V. DISADVANTAGES

The computer viruses, lack of standardization for digitized information quick degrading properties of digital material different display standard of digital product and its associated problem, health hazard nature of the radiation from monitor etc. Makes digital libraries at times handicap. (LISWiki.2011)

- **Copyright:** Digitization violates the copyright law as the thought content one author can be freely transfer by other without his acknowledgement. So one difficulty to overcome for digital libraries is the way to distribute information. How does a digital library distribute information at will while protecting the copyright of the author?
- **Speed of access:** As more and more computer are connected to the internet its speed of access reasonably decreasing. If new technology will not evolve to solve the problem then in near future internet will be full of error messages.
- **Initial cost is high:** The infrastructure cost of digital library i.e. the cost of hardware, software: leasing communication circuit is generally very high .
- **Band width :** Digital library will need high band for transfer of multimedia resources but the band width is decreasing day by day due to its over utilization .
- **Efficiency:** With the much larger volume of digital information, finding the right material for a specific task becomes increasingly difficult.
- **Environment:** Digital libraries cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen.
- **Preservation:** Due to technological development, a digital library can rapidly become out - of - date and its data may become inaccessible.

VI. CONCLUSION

In modern times the internal and particularly the world we have revolutionized literally everything under the sun and in this modern world the information gets so easily through the internet. The user can access the information through internet Digital library plays an important role in information world. E resources can help to store the information and serve the service to the users E - resource provides various services to the users. E - Resource provides various service to the users through which the library collection and its development is improved

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Generalized Fractional Fourier-Wavelet Transform and its Applications

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ABSTRACT

The Fractional Fourier transform is a time frequency distribution and an extension of the classical Fourier transform. There are several known applications of the Fractional Fourier transform in areas of signal processing especially in signal restoration and noise removal. The Wavelet transform is useful for image processing to accurately analyze the abrupt changes in the image that is localize means in time and frequency. The aim of this paper is to present generalization of fractional Fourier-Wavelet transform.

Keyword: Fractional Fourier Transform, Wavelet Transform, Fractional Fourier-Wavelet Transform, Testing Function Space, Signal Processing

I. INTRODUCTION

In very simple terms, the fractional Fourier transform (FRFT) is a generalization of the ordinary Fourier transform [1]. Specifically, the FRFT implements the so-called order parameter α which act on the ordinary Fourier transform operator. In other words, the $\propto$-th order fractional Fourier transform represents the $\propto$-th power of the ordinary Fourier transform operator. When $\propto = \pi/2$, we obtain the Fourier transform, while for $\alpha = 0$ 0, we obtain the signal itself. Any intermediate value of a $\propto$ $(0 < \propto < \pi/2)$ produces a signal representation that can be considered as a rotated time–frequency representation of the signal [2][3].

The fractional Fourier transforms was introduced by Namias as a Fourier transform of fractional order. The most important aspect of fractional Fourier transform is its applicability in time varying signals for which the Fourier transforms fails to work. Fractional Fourier transform was first introduced as a way to solve certain classes of ordinary and partial differential equation arising in quantum mechanics. Fractional Fourier transform has established itself as a powerful tool for the analysis of time varying signals, especially in optics. Fractional Fourier transform has found applications in areas of signal processing such as repeated filtering, fractional convolution, beam forming, optimal filter, convolution, filtering and wavelet transform, time frequency representation [4][5].

The wavelet transform theory is based on analysis of signal using varying scales in the time domain and frequency. Formalization was carried out in the 1980s, based on the generalization of familiar concepts. The

wavelet term was introduced by French geophysicist Jean Morlet. The seismic data analyzed by Morlet exhibit frequency component that changed rapidly over time, for which the Fourier Transform (FT) is not appropriate as an analysis tool. Thus, with the help of theoretical physicist Croatian Alex Grossmann, Morlet introduced a new transform which allows the location of high-frequency events with a better temporal resolution [6].

The wavelet transform (WT) has been shown to be an appropriate tool for time-frequency analysis. Wavelet transform has been applied in many fields of signal processing, including speech, image, communications, radar. The wavelet transform has been shown to be a successful tool for dealing with transient signals, data compression, bandwidth reduction, and time-dependent frequency analysis of short transient signals, [4] optical correlators, [5], [6] sound analysis, [7] representation of the human retina, and representation of fractal aggregates[8].Mathematically, the wavelet operation is equivalent to performing a Fourier transform of the input function, multiplying it by a differently scaled Fourier transforms of the wavelet mother function, and eventually performing an inverse Fourier transform[9].

II. THE CONVENTIONAL FRACTIONAL FOURIER-WAVELET TRANSFORM

The conventional Fractional Fourier-Wavelet transform is defined as

$$FrFT\{f(x,t)\} = F_\alpha(p,b) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(x,t) K_\alpha(x,p,t,a,b) dx dt$$

where $K_\alpha(x,p,t,a,b) = \sqrt{\frac{1-i\cot\alpha}{2\pi}} e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha - 2xp]} \frac{1}{\sqrt{|a|}} e^{i\pi\left(\frac{t-b}{a}\right)^2}$ -----2.1

where $0 < \alpha < \frac{\pi}{2}$.

$K_\alpha(x,p,t,a,b)$ belongs to the testing function space and $f(x,t)$ lies in its dual space.

III. THE TESTING FUNCTION SPACE $E(R^n)$

An infinitely differentiable complex valued smooth function $\emptyset(x,t)$ on R^n belongs to $E(R^n)$, if for each compact set I $\subset S_{c,d}$,

$$S_{c,d} = \{x,t: x,t \in R^n, |x| \le c, |t| \le d, c > 0, d > 0\}$$
$$\gamma_{E,l,n}(\emptyset) = \sup_{\substack{x \in I \\ t \in I}} |D_x^l D_t^n \emptyset(x,t)| < \infty$$ -----3.1

Thus, $E(R^n)$ will denotes the space of all $\emptyset \in E(R^n)$ with support contained in $S_{c,d}$. Moreover, we say that f is a fractional Fourier-Wavelet Transformable if it is a member of E^*, the dual space of E.

IV. DISTRIBUTIONAL FRACTIONAL FOURIER-WAVELET TRANSFORM

The distributional Fractional Fourier –Wavelet transform of $f(x,t) \in E(R^n)$ defined by
$$FrFWT\{f(x,t)\} = F_\alpha(p,b) = \langle f(x,t), K_\alpha(x,p,t,a,b) \rangle$$

where $K_\alpha(x,p,t,a,b) = \sqrt{\frac{1-i\cot\alpha}{2\pi}} e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha - 2xp]} \times \frac{1}{\sqrt{|a|}} e^{i\pi\left(\frac{t-b}{a}\right)^2}$

$$K_\alpha(x,p,t,a,b) = A_\alpha \, e^{iB_\alpha[(x^2+p^2)\cos\alpha - 2xp]} \times C_\alpha \, e^{i\pi\left(\frac{t-b}{a}\right)^2}$$ -----4.1

$A_\alpha = \sqrt{\frac{1-i\cot\alpha}{2\pi}}$, $B_\alpha = \frac{1}{2\sin\alpha}$, $C_\alpha = \frac{1}{\sqrt{|a|}}$

V. ANALYTICITY THEOREM

Statement: Let $f(x,t) \in E^*(R^n)$ and let its fractional Fourier-Wavelet transform be defined as

$$FrFWT\{f(x,p,t,a,b)\} = F_\alpha(p,b) = \langle f(x,t), K_\alpha(x,p,t,a,b) \rangle$$

Then $F_\alpha(p,b)$ is analytic on C^n if the $supp f \subset S_{c,d}$ such that

$$S_{c,d} = \{x,t : x,t \in R^n, |x| \le c, |t| \le d, c > 0, d > 0\}$$

Moreover $FrFWT_\alpha(p,a,b)$ is differentiable and $D_x^l D_t^n(F_\alpha(p,b)) = \langle f(x,t), D_x^l D_t^n K_\alpha(x,p,t,a,b) \rangle$

where $K_\alpha(x,p,t,a,b) = \sqrt{\frac{1-i\cot\alpha}{2\pi}} e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha - 2xp]} \times \frac{1}{\sqrt{|a|}} e^{i\pi\left(\frac{t-b}{a}\right)}$

Proof: Let $p = (p_1, p_2, p_3, - - - p_i, - - - p_n) \in C^n$ and $b = (b_1, b_2, b_3, - - - b_i, - - - b_n) \in C^n$ be arbitrary but fixed point and 'a' is fixed point.

We first prove that,

$$\frac{\partial}{\partial p_i}\{F_\alpha(p,b)\} = \langle f(x,t), \frac{\partial}{\partial p_i} K_\alpha(x,p,t,a,b) \rangle$$

For fixed, $p_i \ne 0$ choose two concentric circles C' and C'' with centre at p_i with radii r and r_1 respectively such that $0 < r < r_1 < |p_i|$,

Let Δp_i be a complete increment satisfying $0 < |\Delta p_i| < r$

Consider

$$\frac{F_\alpha(p_i + \Delta p_i, b) - F_\alpha(p_i, b)}{\Delta p_i} - \langle f(x,t), \frac{\partial}{\partial p_i} K_\alpha(x,p,t,a,b) \rangle = \langle f(x,t), \psi_{\Delta p_i}(x,t) \rangle$$

$$-----5.1$$

$$\langle f(x,t), \psi_{\Delta p_i}(x,t) \rangle$$
$$= \frac{1}{\Delta p_i}\{\langle f(x,t), K_\alpha(x, p_i + \Delta p_i, t, a, b) \rangle - \langle f(x,t), K_\alpha(x, p_i, t, a, b) \rangle\}$$
$$- \langle f(x,t), \frac{\partial}{\partial p_i} K_\alpha(x,p,t,a,b) \rangle$$

$$\langle f(x,t), \psi_{\Delta p_i}(x,t) \rangle$$
$$= \langle f(x,t), \frac{1}{\Delta p_i}\{K_\alpha(x, p_i + \Delta p_i, t, a, b) - K_\alpha(x, p_i, t, a, b)\}$$
$$- \frac{\partial}{\partial p_i} K_\alpha(x,p,t,a,b) \rangle \langle f(x,t), \psi_{\Delta p_i}(x,t) \rangle$$

where $\psi_{\Delta p_i}(x,t) = \frac{1}{\Delta p_i}\{K_\alpha(x, p_i + \Delta p_i, t, a, b) - K_\alpha(x, p_i, t, a, b)\} - \frac{\partial}{\partial p_i} K_\alpha(x,p,t,a,b)$

for any fixed $x, t \in R^n$ and fixed integer $l = (l_1, l_2, l_3 - - - l_n)$

$$D_x^l\{K_\alpha(x,p,t,a,b)\} = D_x^l\left\{\sqrt{\frac{1-i\cot\alpha}{2\pi}} e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha - 2xp]} \times \frac{1}{\sqrt{|a|}} e^{i\pi\left(\frac{t-b}{a}\right)^2}\right\}$$

$$= D_x^l\left\{\sqrt{\frac{1-i\cot\alpha}{2\pi}} e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha - 2xp]} \times B(t)\right\}$$

where $B(t) = \frac{1}{\sqrt{|a|}} e^{i\pi\left(\frac{t-b}{a}\right)^2}$

$$D_x^l\{K_\alpha(x,p,t,a,b)\} = A_\alpha\left[\sum_{k=0}^{\lfloor l/2 \rfloor} \frac{l!}{k!\,(l-2k)!} (2iB_\alpha)^{l-k} \left(\frac{\cos\alpha}{2}\right)^k (x\cos\alpha - p)^{l-2k}\right]$$

$$e^{iB_\alpha[(x^2+p^2)\cos\alpha-2xp]}B(t)$$

where $A_\alpha = \sqrt{\dfrac{1-i\cot\alpha}{2\pi}}$, $B_\alpha = \dfrac{1}{2\sin\alpha}$

$$D_x^l\{K_\alpha(x,p,t,a,b)\} = \left[\sum_{k=0}^{\lfloor l/2\rfloor} \frac{l!}{k!\,(l-2k)!}(2iB_\alpha)^{l-k}\left(\frac{\cos\alpha}{2}\right)^k (x\cos\alpha - p)^{l-2k}\right]$$

$$\sqrt{\frac{1-i\cot\alpha}{2\pi}}\, e^{\frac{i}{2\sin\alpha}[(x^2+p^2)\cos\alpha-2xp]}\frac{1}{\sqrt{|a|}}\, e^{i\pi\left(\frac{t-b}{a}\right)^2}$$

$$= \left[\sum_{k=0}^{\lfloor l/2\rfloor} \frac{l!}{k!\,(l-2k)!}(2iB_\alpha)^{l-k}\left(\frac{\cos\alpha}{2}\right)^k (x\cos\alpha - p)^{l-2k}\right]K_\alpha(x,p,t,a,b)$$

$$------5.2$$

Since for any fixed $x \in R^n$ and fixed l and $0 < \alpha \leq \pi/2$
$D_x^l\{K_\alpha(x,p,t,a,b)\}$ is analytic inside and on C',
We have by Cauchy integral formula,

$$D_x^l\psi_{\Delta p_i}(x,t) = \frac{1}{2\pi i}D_x^l\int_{C'} K_\alpha(x,\tilde{p},t,a,,b)\left[\frac{1}{\Delta p_i}\left(\frac{1}{z-p_i-\Delta p_i}-\frac{1}{z-p_i}\right)-\left(\frac{1}{z-p_i}\right)^2\right]dz$$

where $\tilde{p} = (p_1,p_2,p_3,---p_{i+1},z,p_{i+1},---p_n)$

$$D_x^l\psi_{\Delta p_i}(x,t) = \frac{1}{2\pi i}D_x^l\int_{C'} K_\alpha(x,\tilde{p},t,a,b)\left[\left(\frac{1}{(z-p_i-\Delta p_i)(z-p_i)}\right)-\left(\frac{1}{z-p_i}\right)^2\right]dz$$

$$D_x^l\psi_{\Delta p_i}(x,t) = \frac{\Delta p_i}{2\pi i}D_x^l\int_{C'}\left[\left(\frac{D_x^l K_\alpha(x,\tilde{p},t,a,b)}{(z-p_i-\Delta p_i)(z-p_i)^2}\right)\right]dz$$

$$D_x^l\psi_{\Delta p_i}(x,t) = \frac{\Delta p_i}{2\pi i}D_x^l\int_{C'}\left[\left(\frac{Q(x,\tilde{p},t,a,b)}{(z-p_i-\Delta p_i)(z-p_i)^2}\right)\right]dz$$

$$----5.3$$

But for all $z \in C'$ and x is restricted to a compact subset of $R^n, 0 < \alpha \leq \pi$,
$Q(x,\tilde{p},t,a,b) = D_x^l K_\alpha(x,\tilde{p},t,a,b)$ as in 5.3 bounded by a constant L.
Moreover, $|z-p_i-\Delta p_i| > r_1 - r > 0$ and $|z-p_i| = r_1$ therefore we have

$$\left|D_x^l\psi_{\Delta p_i}(x,t)\right| = \left|\frac{\Delta p_i}{2\pi i}D_x^l\int_{C'}\left[\left(\frac{Q(x,\tilde{p},t,a,b)}{(z-p_i-\Delta p_i)(z-p_i)^2}\right)\right]dz\right|$$

$$\leq \frac{|\Delta p_i|}{2\pi}\int_{c'}\frac{L}{(r_1-r)r_1{}^2}|dz|$$

$$\leq \frac{|\Delta p_i|}{2\pi}\frac{L}{(r_1-r)r_1{}^2}2\pi r_1$$

$$\left|D_x^l\psi_{\Delta p_i}(x,t)\right| \leq \frac{|\Delta p_i|L}{(r_1-r)r_1}$$

Similarly　　　$\left|D_t^n\psi_{\Delta b_i}(x,t)\right| \leq \dfrac{|\Delta b_i|M}{(r_1-r)r_1}$

where $P(x, p, t, a, \tilde{b}) = D_t^n K_\alpha(x, p, t, a, \tilde{b})$ is bounded by a Constant M.

Thus as $|\Delta p_i| \to 0$ and $|\Delta b_i| \to 0$. $\left|D_x^l \psi_{\Delta p_i}(x, t)\right|$ and $\left|D_t^n \psi_{\Delta b_i}(x, t)\right|$ tends to zero uniformly on the compact subset of R^n, therefore it follows that $\psi_{\Delta p_i}(x, t)$ and $\psi_{\Delta b_i}(x, t)$ converges in $E(R^n)$ to zero. Since $f(x, t) \in E^*$, we conclude that equation (A) also tends zero. Therefore $F_\alpha(p, b)$ is Differentiable with respect to p_i and b_i.But this is true for all $i = 1, 2, 3, ---n$, hence $F_\alpha(p, b)$ is analytic on C^n and $D_x^l D_t^n (F_\alpha(p, b)) = \langle f(x, t), D_x^l D_t^n K_\alpha(x, p, t, a, b)) \rangle$.

VI. CONCLUSION

In this paper Fractional Fourier –Wavelet Transform is introduced, Analyticity theorem for Fractional Fourier-Wavelet transform is proved.

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Water Remediation Using Graphene-Based Materials

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ABSTRACT

Graphene-based adsorbents with three-dimensional (3D) porous structure inherit the perfect carbon crystal structure of two-dimensional (2D) grapheme sheets and reveals many advantages such as high porosity, large surface area and extremely low density. Such exceptional properties enable diverse organic contaminants to easily enter and diffuse into 3D networks, and make these materials perfect adsorbents demonstrating outstanding adsorption and recyclability. The synthesis and use of graphene-based materials for water remediation by adsorptive removal of organic pollutants is an emerging field of research. Functionalization of graphene-based adsorbents have received widespread attention and are largely explored for water purification to get the benefit of their improved properties resulting from synergistic effects. This review deals with the recent trends and progress in the rapid developing field of wastewater purification using graphene-based adsorbents for the removal of toxic organic pollutants. This review highlights the targets achieved, the comparison of structural performance, challenges, limitations and future research directions.

Key words: Graphene, Adsorption, Organic pollutants, Wastewater

I. INTRODUCTION

Most of the water resources like lakes, rivers, groundwater, and even sea water are made impure by toxic organic contaminants such as organic solvents, spilled oil, dyes, pharmaceutical and personal care products and agrochemicals. Clean water is vital need to maintain human health as well as environmental sustainability but owing to the overuse of agrochemicals, industrialization growing at alarming rate and its byproducts have polluted water making it unfit for human consumption. It is to be noted that water pollution by toxic organic contaminants is complex in reality as one has to deal with the co-occurrence of diverse type of pollutants [1]. Water treatment is further hindered by imperfect water quality assessments and poor data compilation based on water purification techniques employed for removal of multipollutants in used water. Therefore, tactics to tackle these multipollutants is crucial challenge in water purification and thus there is need to develop efficient water purification technologies to remove these multipollutants from wastewater [1, 2]. Conventional water remediation techniques include physical, chemical and biological processes at preliminary, primary, secondary, and tertiary levels which are essential to purify wastewater containing several types of multipollutants [3]. Physical processes are such as filtration, adsorption, distillation, skimming and sedimentation; chemical

processes are oxidation, chlorination, precipitation, neutralization, hydrolysis, electrochemical, ultraviolet irradiation and ozonation and biological processes include either of the aerobic or anaerobic treatment conversions. In many of the existing water purification techniques there are several drawbacks such as high consumption of energy, huge operation cost, poor removal efficiency, production of toxic side products and secondary pollutants [3, 4]. Many of the carbon-based materials like charcoal, porous carbon, graphene, carbon nanotubes are widely used for the adsorptive removal of organic pollutants from wastewater [5, 6]. They have received great attention owing to their high surface area, low cost, remarkable affinity towards organic contaminants and ease of modification [7]. Among the existing carbon-based materials, graphene-based adsorbents have received notable attention in adsorptive removal of organic contaminants owing to their unique characteristics such as large surface area and diverse active sites for adsorption [8]. The adsorption performance of graphene-based adsorbents for the removal of organic pollutants is based on the interaction mechanisms between the pollutants and graphene-based materials and therefore understanding this correlation is crucial for the further development in the design of graphene-based functional materials to enhance their practical applications.

Graphene is made up from the 2D layer of sp^2 hybridized carbon atoms which are packed to form honeycomb type lattice [9]. 2D graphene is unique in terms of its dimensions because it can be enfolded to form 0D fullerene, rolled to form 1D-carbon nanotubes and further it can be stacked to form 3D graphite [10]. Graphene exhibits a very large theoretical surface area of 2630 m^2/g [11]. However, graphene has a property to generate restacking and irreversibly agglomerate because of van der Waals forces and strong π-π bonds that results into the lowering of its surface area than the theoretical value to a great extent and limits its practical use [12]. In order to effectively exploit the outstanding properties of graphene has become a major challenge and opportunity for researchers all over the world. To circumvent the above mentioned phenomenon, the promising strategy is employed, wherein 2D graphene sheets are converted into the assembly of 3D macroscopic structures. This conversion no way changes the fundamental exceptional properties of graphene sheets but further improves combined useful properties like high porosity, low density and notable mechanical and electronic properties [13, 14].

Graphene oxide (GO), one of the derivatives of graphene, has been largely used for the adsorption of several organic pollutants [15, 16]. But reduced graphene sheets and GO are different than that of pristine graphene in particular aspects. Pristine graphene has no oxygen in it whereas reduced graphene sheets and GO contain C:O ratio of 8:246 and 2:4, respectively. The Young modulus for pristine graphehe is 1000 GPa, whereas in GO it is largely compromised to 200 GPa and in the reduced GO (RGO) it is somewhat improved to 250 GPa. As compared to graphene, the production cost of RGO and GO is very low [17], which is one of the reasons for the wide use of GO. The oxygen functionality on GO renders a negative charge on its surface which aids to adsorb cationic organic dyes, electrostatically [18]. Thus the presence of oxygen in GO enables it for the adsorption purposes. Moreover, aromaticity of the GO also helps to interact, via the π-π interaction, with that of the aromatic groups on the organic pollutants. Owing to the presence of reactive species, functionalization of the GO is approachable [19]. Various reactive organic functionalities present on the GO are carboxylic acid, hydroxyl group and epoxy ring. The carboxylic acid functionality shows enhanced reactivity as it occupies the peripheral sites on the GO sheets. In order to get the functionalized GO the carboxylic group is activated by using thionyl chloride followed by the attack of nucleophile to generate the covalent bond linkage [20]. Functionalized GO can be obtained by using another reactive moiety, the hydroxyl group, which work as a nucleophile and smoothly attacks ketone to join the required ketone bearing functionality on the GO [21].

Lastly, the epoxy group on the GO can be smoothly opened by the attack of nucleophile to attain the functionalized GO [22]. Besides this, GO can also be functionalized using inorganic particles like metals, non-metals and their oxide nanoparticles [23].

II. REMOVAL OF ORGANIC POLLUTANTS

Albeit, there are several reviews available on graphene and its derivatives for water purification [24-27], this review focuses on the recent progress and strategies employed for the removal of organic dyes, pharmaceuticals, endocrine disrupting chemicals, brominated flame retardants (BFRs) and other organic compounds.

1.1. Organic dyes

Wastewater treatment and its reuse is a challenging approach for environmental sustainability. The large quantity of water utilized in the textile industry is just one side of this serious issue. Before the wastewater contaminates the other water sources, it must be treated properly for the efficient removal of dyes. Use of graphene and its derivatives is one of the best alternatives for the effective removal of dyes. This subsection highlights the representative examples for the graphene-based adsorptive removal of organic dyes. Organic dyes are colored macromolecules that are classified on the basis of molecular structure, solubility, charge or the chromophores residing in their structure [28, 29]. Several dyes such as direct, reactive, acid and base dyes are water-soluble dyes whereas disperse, azo, vat and sulphur dyes are water-insoluble dyes [30]. The aromatic rings present in their structures facilitates the interaction between the delocalized electrons on benzene ring and the delocalized π electrons present on the basal plane of the sheets via π- π and cationic- π interactions along with that of the hydrogen bonding and electronic interaction originating from the sp^3 domains of the graphene sheets. It is to be noted that functionalized graphene exhibits improved dye removal performance than the pristine graphene because of the charge groups present on the organic dyes. For example, GO with the negative charge on its surface exhibits improved performance for the adsorption of cationic dyes than that of anionic dyes while the latter are efficiently removed with the graphene modified using cationic functional groups like amine, chitosan and polyethyleneimine [31].

Organic dyes can be successfully removed from wastewater using the approaches that relies on the interaction between organic dyes and functionalized graphene. For instance, graphene sheets coated with polydopamine are fabricated for the effective removal of methylene blue, methyl violet and 4-nitrophenol via π-π and electrostatic interactions between organic dyes and polydopamine as the latter carries nitrogen and oxygen functional groups [32]. Sulphonated graphene nanosheets with –SO_3H, –OH and –COOH functional groups adsorb methylene blue mainly because of the electrostatic interaction apart from the slight contribution via π-π interaction [33]. A similar approach was demonstrated by GO/chitosan aerogel with dual functionality that exhibited electrostatic as well as π-π interactions between the cationic dyes and oxygen bearing groups on GO. The same functionalized GO shows adsorptive removal of anionic dyes because of the amino groups present on the chitosan chains [34]. Moreover, it was found that GO exhibits improved adsorption efficiency for methyl green with increase in temperature [35]. The highest adsorptive efficiency calculated by Langmuir was 5.496 mmol/g at pH 5.

Liu et al. prepared GO sponge by centrifugal vacuum evaporation method and this GO sponge exhibited higher adsorptive removal efficiency of 99.1% and 98.8% and that too in just 2 min for methylene blue and methyl violet, respectively [36]. Figure 1a shows a synthetic scheme for 3D GO sponge preparation. In the first step,

modified Hummers method was used to prepare the GO sheets. GO sponge was fabricated using a centrifugal vacuum system. Figure 1b confirms that the prepared GO sponge reveals high flexibility. It was found that the extruded GO sponge quickly recovered its original shape. Figure 1c and d represents SEM images for the GO sponge at low and high magnification. Figure 1c presents finely-assembled interconnected layers of GO sheets that construct a 3D network, while Figure 1d represents a fairly smooth organization of 3D linked graphene sheets that possesses an outstanding structural as well as mechanical stability to impart awesome adsorption capacity.
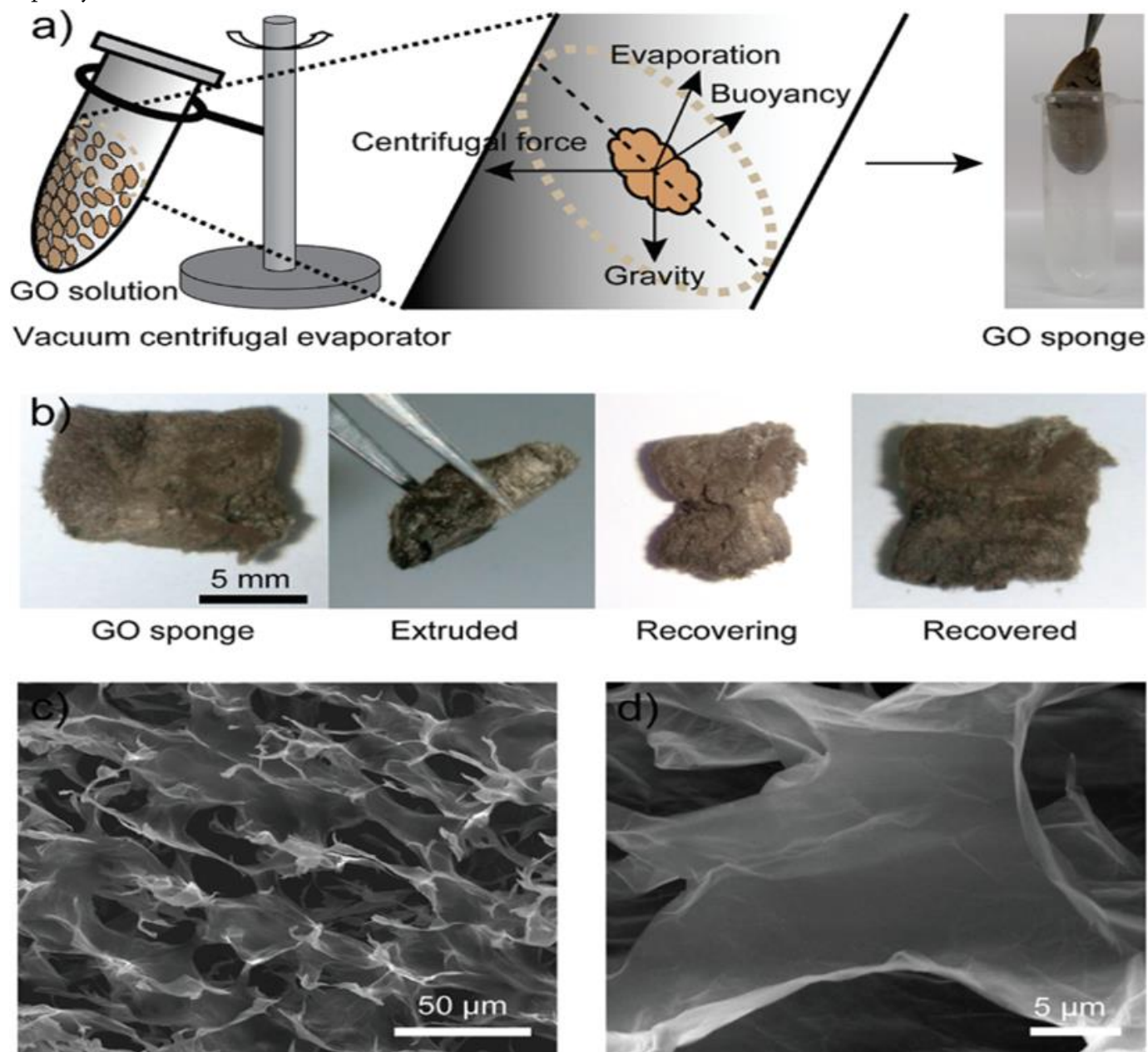
Figure 1. (a) Synthetic scheme of a 3D GO sponge. (b) Flexibility test of a GO sponge. (c) Low-magnification of SEM image for the GO sponge surface and (d) high-magnification of SEM image for the inner part of the 3D GO sponge [36]. Copyright © 2012, American Chemical Society.

Digital images of methylene blue adsorption on GO and SEM (Scanning Electron Microscope) images of the methylene blue adsorbed GO sponge are shown in Figure 2. The 3D GO sponge exhibits adsorption capacity as great as 397 and 467 mg/g for methylene blue and methyl violet, respectively. Here the adsorption of these dyes

on GO can be credited to endothermic chemical reaction that included π-π stacking and anion-cation interaction. The graphene-based adsorption for the removal of basic red 12 and methyl orange was reported using GO with the adsorptive efficiency of 63.69 mg/g and 16.83 mg/g, respectively, at pH 3 of the media [37]. The adsorption of dyes on GO was noticed to be endothermic in nature. Moreover, the degree of oxidation of GO also exhibits some effects on the dye removal process. Yan et al. reported that with the enhancement of the oxidation degrees of GO, its adsorptive removal efficiency for methylene blue also increases [38]. This is probably due to generation of higher number of active adsorption sites as well as increased exfoliation degree of the carbon planes. Le et al. showed that even the graphene based cathode exhibits improved performance for the adsorptive removal of dyes [39]. RGO over the carbon felt surface was successfully used as a cathode for the effective removal of acid orange 7. It was found that 94.3% of the dye was mineralized within 5 min. The cathode was completely stable even after 10 cycles with its mineralization ratio above 64%. Another report shows that GO/polyethylenimine (PEI) hydrogels exhibits improved performance for the adsorptive removal of methylene blue and Rhodamine B from water [40]. Here the advantage of using PEI hydrogels is that they can be easily separated from water after dye removal. It was reported that GO can be used as flocculants for the removal of several organic pollutants such as cationic yellow 7 GL dye, hematite, humic acid and kaolin [41].
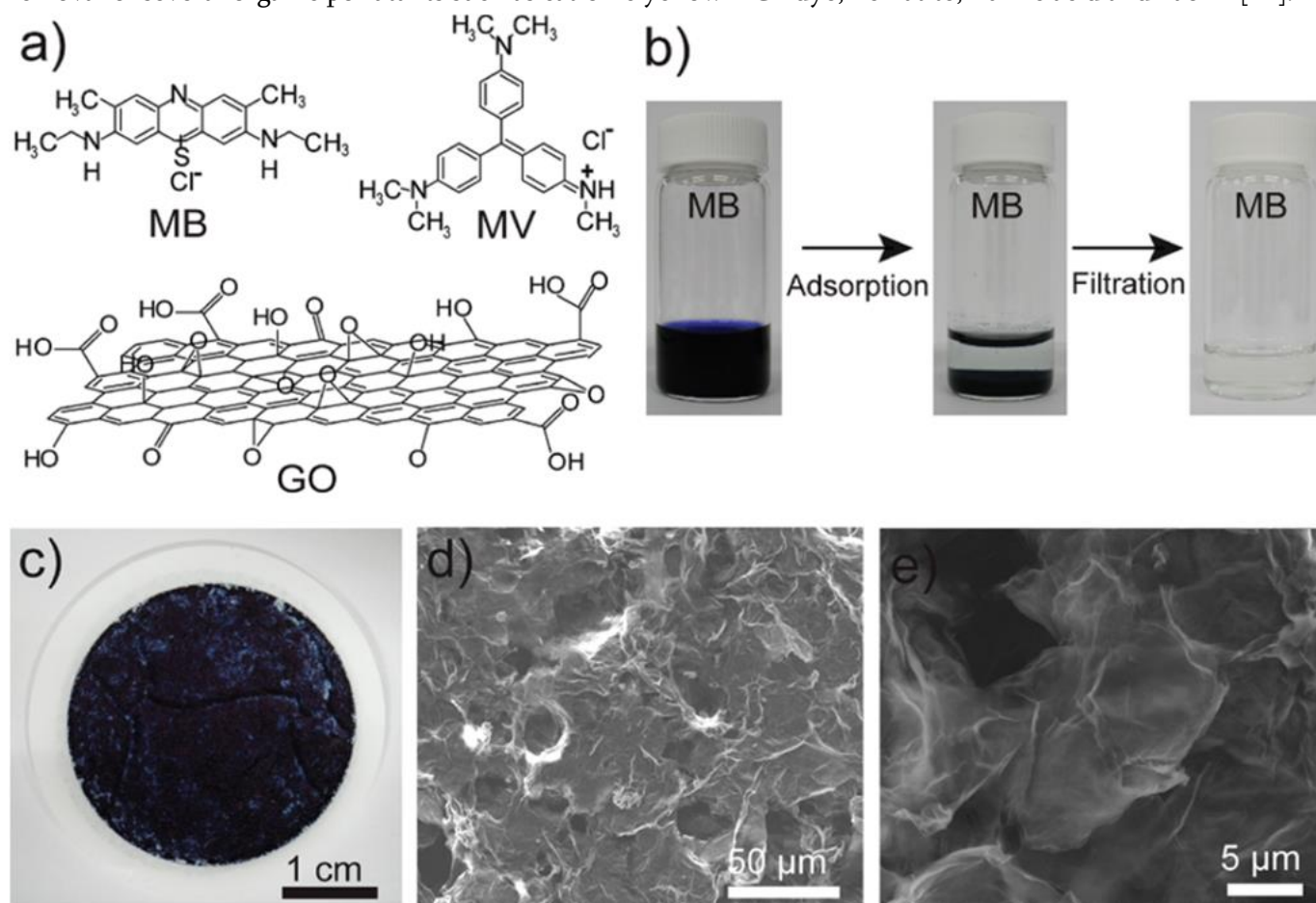
Figure 2. (a) Chemical structures of MB, MV, and GO. (b) Digital images of the original MB dye solution (left), the pale color solution with precipitated MB adsorbed GO sponges (middle), and the colorless water after filtering the MB adsorbed GO sponge (right). (c) Digital image of the filtered dye adsorbed GO sponges. SEM images of the MB adsorbed GO sponges with (d) low-magnification and (e) high-magnification [36]. Copyright © 2012, American Chemical Society.

Recently, GO and RGO were studied for the adsorptive removal of methylene blue via batch experiment method that involves various experimental factors such as pH (2-10), adsorbent dosage (0.5-2 g/L), contact time (0-1440 min), and initial methylene blue concentration (25-400 mg/L) [42]. Methylene blue removal was optimized for the GO and RGO adsorbents and it was found that increase in the initial concentration of methylene blue had positive effect on the adsorptive removal of methylene blue and similar effect was noticed for the amount of adsorbent employed and initial pH. The outstanding dye removal estimated was 99.11% after 240 min at optimal conditions. It was found that GO could be employed effectively for the adsorptive removal of methylene blue from wastewater. The adsorption data was obtained from the Langmuir isotherm (R^2: 0.999) and pseudo-second-order kinetic models (R^2: 0.999). The Langmuir isotherm was used with the consideration that the uniform surface of the GO adsorbent forms only a monolayer of the adsorbate. It is to be noted that along with physical adsorption, chemical adsorption also occurs here because the adsorption energy calculated by D-R (Dubinin-Radushkevich) model was found to be 9.38 kJ/mol.

Recently, it was found that adsorptive removal capacity for methylene blue was improved when agricultural waste was loaded with GO [43]. When corn straw core was loaded with 5 wt% GO, it exhibited the maximum adsorption capacity of 414.03 mg/g at 298 K, pH = 12 and methylene blue concentration of 1000 mg/L. It is to be noted that the adsorptive removal rate for methylene blue over corn straw core loaded with 5 wt% GO has improved by 21.62% compared to that of pure corn straw core (64.58%) and it has excellent recyclability (5 cycles) maintaining removal efficiency >90%. The adsorptive removal of organic pollutants get affected adversely by surface modification of graphene [44]. The difference in performances of graphene for the absorptive removal of Eriochrome Black T (EBT) was noted before and after acid modification with the maximum adsorption capacity of 102.04 mg/g before and 70.42 mg/g after acid modification. It was observed that EBT removal efficiency of acid modified graphene (80%) was lower than that of the pristine graphene (95%), at adsorbent dosage of 10 mg, pH 2, initial dye concentration of 10 mg/L and contact time of 3 h.

A GO based hydrogel, Fe_3O_4/RGO/PAM hydrogel, made from Fe_3O_4 nanoparticles, reduced graphene oxide (RGO) and polyacrylamide (PAM) could degrade 90% Rhodamine B (20 mg/L) within 1 h, under visible light irradiation, and it maintained same efficiency even after 10 cycles [45]. This GO based hydrogel could actually degrade sewage of fine chemical wastewater and it was found that chemical oxygen demand (COD) of wastewater decreased from 10400 to 2840 mg/L after visible irradiation of 1 h. Further, it can be concluded that this hydrogel provides new pathway because it has the capacity to remove organic pollutants and heavy metal ions, synchronously, from industrial wastewater, as evident from the 90% degradation of Rhodamine B (20 mg/L) under visible light irradiation for 20 min and 34.8%-66.3% removal rate for various metal ions after two days continuous adsorption. In another example it was found that when GO was incorporated into the other adsorbent such as sodium alginate (SA) to form SA/GO hydrogel beads, it improves the adsorptive removal efficiency of the latter for organic dyes like methylene blue, Rhodamine B, Vat Green 1 and methyl orange [46]. Such incorporation obviously decreases the pore size and swelling ratio of the hydrogel beads. The adsorption isotherm and kinetic studies of the SA/GO beads show that dye adsorption phenomenon consists of a series of diffusion and adsorption steps. The process starts with the diffusion of organic dyes through the GO macropores with subsequent saturation on the GO surface followed by intraparticle diffusion. The diffusion rate of the organic dyes reduces because of the pore shrinkage. The adsorption of dyes on GO surface involves π-π stacking and anion-cation interaction and is considered as endothermic chemical reaction. The adsorptive removal capacity can be further improved using magnetic graphene oxide (MGO). For instance orange G and methylene blue are successfully removed by using MGO because of the electrostatic interaction between the

organic dyes and negatively charged MGO surface as well as π-π interactions between π conjugation domain of MGO nanosheets and delocalised π electrons on the aromatic rings of the dyes [47].

1.2. Pharmaceuticals and endocrine disrupting chemicals

GO exhibits outstanding adsorptive removal of pharmaceuticals. For instance, GO shows adsorptive removal of 3709 and 500 mg/g for sulfamethoxazole and diclofenac, respectively in batch experiments [48]. The main binding mechanisms for the adsorption of sulfamethoxazole and diclofenac were hydrophobic and π-π electron donor-acceptor interactions. Both sulfamethoxazole and diclofenac were adsorbed over GO from the solution up to 12% and 35%, respectively within 6 h contact time and an increase in GO dosage resulted in the increment in the adsorption of diclofenac. This is because increase of GO dosage offers a larger adsorbable surface to the relatively more hydrophobic diclofenac, whereas sulfamethoxazole was inappropriate for hydrophobic adsorption owing to its hydrophilic nature. It is to be noted that the sonication of GO remarkably increased the adsorptive removal of drugs and removal of sulfamethoxazole and diclofenac increased with increasing intensity of sonication reaching maximum to 30% and 75%, respectively owing to the dispersion of exfoliated GO particles and the reduction in the density of oxygen-containing functional groups on GO surface. The oxygen-containing functional groups on GO surface produces electrical repulsion and inhibits the π-π electron donor-acceptor interactions with anionic compounds, limiting their adsorption. This modification causing reduction in the density of oxygen-containing functional groups and promoting dispersion of GO particles resulted in alleviation of electric repulsion and enlargement of adsorptive surface area and thus exhibited enhancement in the adsorption of these compounds on GO surface.

In another instance, 3D porous graphene hydrogel adsorbent demonstrated an outstanding adsorptive removal capacity of 235.6 mg/g for the antibiotic ciprofloxacin via combination of three adsorption interaction mechanisms viz. hydrogen bonding, π-π electron donor-acceptor interaction and hydrophobic interaction [49]. The size of graphene hydrogels also influences the adsorption process besides pH and NaCl ionic strength. It was investigated that reducing the size of graphene hydrogels considerably speed up the adsorption process and improves the adsorptive removal of organic pollutants from water. When three solvents namely water, methanol and ethanol were studied for knowing the ciprofloxacin removal mechanism over graphene hydrogel granules, it was found that the adsorptive removal followed the order water>methanol>ethanol. Hydrogen bonding by water molecules with that of ciprofloxacin might have contributed for the enhanced adsorptive removal, as compared with the remaining two solvents. Thus water with 99 wt% within graphene hydrogels demonstrated the major role in improving the adsorptive removal performance of ciprofloxacin. As graphene hydrogel revealed an outstanding adaptation to environmental factors, it stands as the promising adsorbent for the adsorptive removal of antibiotic pollutants from wastewater.

Another instance shows that SA/GO hydrogel beads can be used for the adsorptive elimination of endocrine disrupting chemicals like bisphenol A, a poisonous chemical, which may interfere the gene transformation and reproduction of human and animals [46]. SA/GO 1.0 wt% hydrogel beads demonstrates the outstanding adsorption capacity of 342.69 mg/g for bisphenol A, as computed from the Langmuir isotherm model. It can be observed that SA/GO hydrogel beads have a very promising adsorptive removal efficiency, wherein higher amount of bisphenol A molecules could be removed by the hydrogel beads in 6 h of contact time. On the other hand, the pristine SA exhibits a weaker adsorption capacity of 50 mg/g. Presence of GO enhanced the interactions between bisphenol A and hydrogel beads via hydrogen bonding, n-π stacking and π-π stacking. It was found that the adsorption of bisphenol A was enhanced with an increase in pH. At low pH, the successive

protons (H$^+$) were integrated to the carboxyl groups (COO$^-$) in the GO, obstructing the hydrogen bonding and n-π stacking between bisphenol A and hydrogel beads. When the pH was enhanced, there was the negatively charge on GO surface and higher number of carboxyl groups participated in the interactions resulting in the greater adsorption of bisphenol A. Thus, introducing GO in the hydrogel system give rise to higher number of carboxylic groups, the superior performance in the adsorption capacity can be noticed with SA/GO hydrogel beads.

In another instance, GO was used for the adsorptive elimination of other endocrine disrupting chemical, 17β-Estradiol, from aqueous solution through strong adsorptive interactions with adsorption capacity of 149.4 mg/g at 298 K and pH = 7 [50]. Go exhibited outstanding adsorption capacity even after several desorption/adsorption cycles. The adsorption mechanism was considered to be via hydrogen bonding and π-π interactions between GO and 17β-Estradiol. 17β-Estradiol is π electron rich owing to the numerous fused aromatic rings that can smoothly interact with the π electrons of GO. Besides, hydrogen bonding and π-π interactions between oxygen-based functionalities on GO and OH of 17β-Estradiol affect the adsorption process. The influence of background electrolyte cations such as KCl, NaCl, CaCl$_2$ and MgCl$_2$ was investigated for the 17β-Estradiol adsorption on GO and it was noticed that 17β-Estradiol revealed improved adsorptive removal capacity with the presence of monovalent cations K$^+$ and Na$^+$ than that of divalent cations Ca^{2+} and Mg^{2+}. This phenomenon is probably because of the squeezing out effect in the presence of cations. However, the background electrolyte anions such as Cl$^-$, NO$_3^-$, SO$_4^{2-}$ and PO$_4^{3-}$ exhibited no remarkably different effect for the adsorption of 17β-Estradiol on GO. But the presence of humic acid had an adverse effect on the adsorption of 17β-Estradiol adsorption on GO at pH = 7.

1.3. Removal of brominated flame retardants

GO can even be used for the adsorptive removal of brominated flame retardants. For instance, the sorption features of tetrabromobisphenol over GO were studied by carrying out batch experiments [51]. The highest adsorptive removal reported for tetrabromobisphenol over GO was 115.77 mg/g. Thermodynamic studies shows that sorption of tetrabromobisphenol over GO was a spontaneous as well as exothermic process. Sorption of tetrabromobisphenol over GO was studied to examine the influences of temperature, pH, concentration, coexisting anions and humic acid. The adsorption of tetrabromobisphenol over GO was comparatively more at pH < 6.0 owing to hydrophobic and π-π interaction, whereas it declined at pH >7.0 due to the weak π-π interactions manifested at higher pH. Besides, at higher pH, the functional groups of GO got deprotonated resulting in the creation of negative charge at the surface and thus the electrostatic repulsions lowered the adsorption capacity of GO for the negatively charged tetrabromobisphenol from its aqueous solution. The adsorption of tetrabromobisphenol over GO also gets affected by the anions such as NO$_3^-$, HCO$_3^-$, SO$_4^{2-}$ and HPO$_4^{2-}$. The presence of HCO$_3^-$ and HPO$_4^{2-}$ can significantly lower the sorption of tetrabromobisphenol over GO, while NO$_3^-$ and SO$_4^{2-}$ have a minor influence on the sorption of tetrabromobisphenol. The influence of anions on the adsorption capacity of GO for tetrabromobisphenol is in the order NO$_3^-$ < SO$_4^{2-}$ < HPO$_4^{2-}$ < HCO$_3^-$. The effect of humic acid on the adsorptive removal of tetrabromobisphenol over GO was also investigated and it was found that with increasing concentration of humic acid, the sorption of tetrabromobisphenol over GO got declined, probably because of the competition between humic acid and tetrabromobisphenol for the available sorption sites. Humic acid gets bonded on GO surface by the strong interaction of π conjugated structure of GO. Further, the oxygen bearing functional groups on GO gets bonded with amino and numerous

hydroxyl groups of humic acid via strong hydrogen bonding interaction, thus overall making humic acid as very strong competitor to lower the sorption of tetrabromobisphenol over GO.

1.4. Removal of other organic compounds

Graphene nanosheets (GNS) and GO were found to be even effective in the sorption of polycyclic aromatic hydrocarbons like pyrene, naphthalene and phenanthrene [52]. The experimental sorption capacity for naphthalene over graphene and GO nanosheets was reported to be 70.69 and 1.347 mg/g which was nearly equivalent to that calculated by using the pseudo-second-order model. Albeit, the isotherm models such as Dubinin-Ashtakhov, Langmuir and Freundlich could not appropriately clarify the adsorption of the polycyclic aromatic hydrocarbons over graphene and GO, particularly at lower concentrations, the Langmuir model clearly explained the adsorption of naphthalene and phenanthrene over GO. The sorption capacity of graphene nanosheets is greater for the polycyclic aromatic hydrocarbons compared to that of GO even if their surface areas are nearly equivalent. The SEM and TEM (Transmission Electron Microscope) images for phenanthrene adsorption over GNS and GO is shown in Figure 3. The π-π interaction is one of the mechanism responsible for the sorption of aromatic organic pollutants over graphene and its derivatives. The greater affinities of the polycyclic aromatic hydrocarbons to graphene nanosheets are owing to the π-π interactions to the flat surface besides the sieving effect of the potent groove regions generated by wrinkles on graphene surfaces. On the other hand, the sorption sites on GO altered to the carboxyl groups attached to the edges of GO since the groove regions died out and the surfaces of the polar nanosheets restricted the π-π interactions. The molecular sizes, hydrophobic properties of the polycyclic aromatic hydrocarbons and surface morphology of graphene and its derivatives also greatly affects their sorption capacity. For example, the sorption affinity of graphene was greater for smaller molecules compared to larger molecules. This implies that small molecules smoothly access many groove regions possessing greater surface energy sites. Moreover, sieving effect should also be regarded because molecules of different sizes could reach [53].
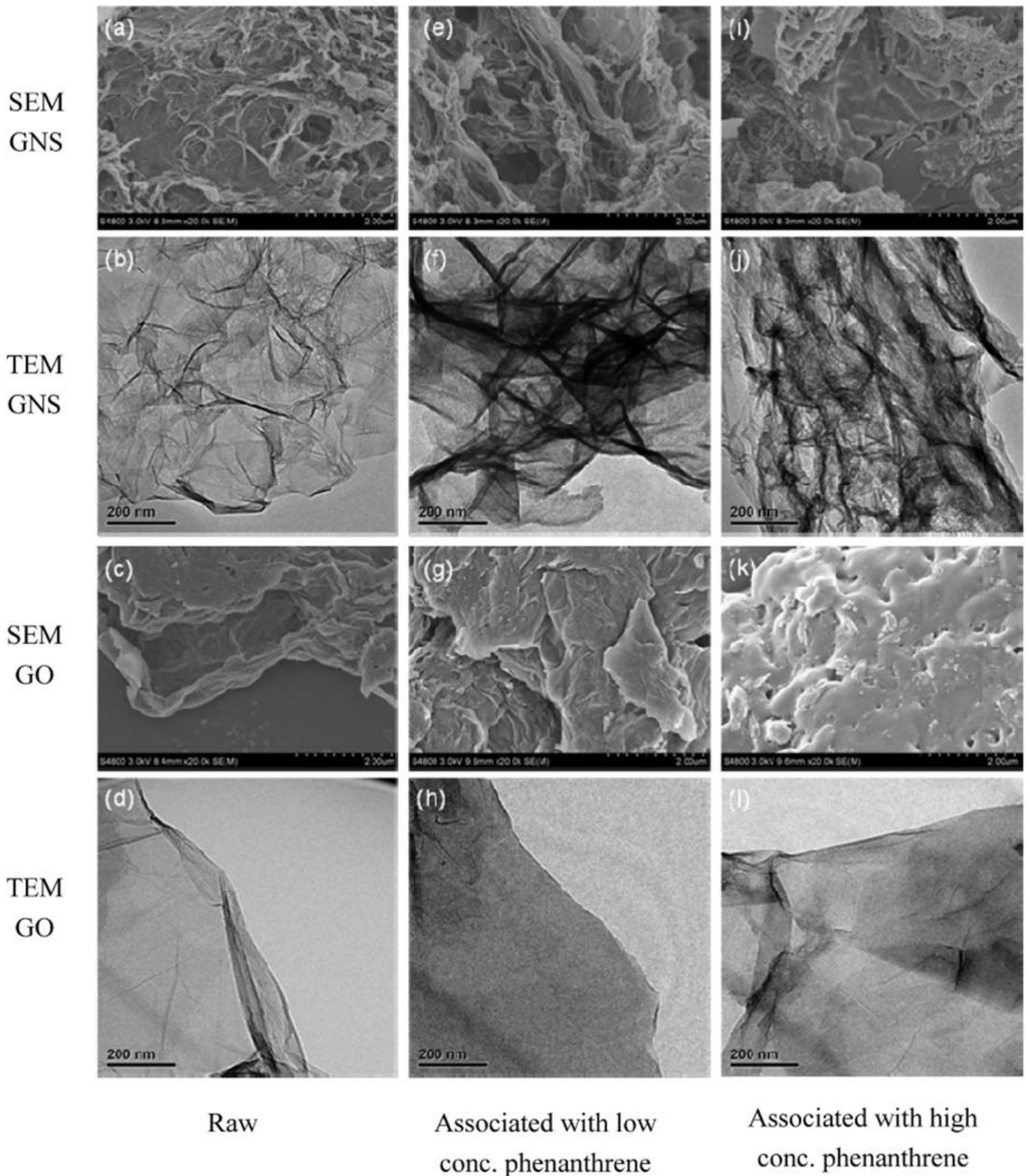
Figure 3. The SEM and TEM images of graphene (GNS) and graphene oxide (GO) before (the first column) and after association with phenanthrene at a low concentration (the second column) and at a high concentration (the third column) [52]. Copyright © 2014 American Chemical Society.

In another instance, graphene was found to be useful for the adsorptive removal of bisphenol A from aqueous solution [54]. The highest adsorption capacity demonstrated by graphene for bisphenol A was 182 mg/g at 302.15 K as computed from a Langmuir isotherm and it was among the maximum values of bisphenol A adsorption relative to the other carbonaceous adsorbents as per the reports of the literature. The probable reasons for the adsorption of bisphenol A on graphene were the π-π interactions and hydrogen bonding and that were even confirmed from the FTIR spectra of graphene. The π-π interactions occur between graphene and benzene ring in bisphenol A that favours the adsorption of bisphenol A, whereas the hydrogen bonding results from the interactions between bisphenol A and hydroxyl groups in graphene. Besides, the exceptional sp^2-hybridized single-atom-layer structure of graphene is accountable for its outstanding adsorption capacity. Thus graphene stands as a promising adsorbent for the adsorptive removal of bisphenol A from wastewater. The thermodynamic investigations suggests that the adsorption of bisphenol A is a spontaneous as well as exothermic process. Moreover, adding NaCl in the solution might favour the adsorption process, while high temperature and the basic pH range are regarded unfavourable.

Graphene and GO can even be used for the adsorptive removal of naphthalene, 2-naphthol, 1,2,4-trichlorobenzene and 2,4,6-trichlorophenol from aqueous solution [55]. Graphene demonstrates similar adsorptive removal efficiency for these four aromatic compounds at pH 5.0, although their chemical properties are different. However, at alkaline pH graphene exhibits greater adsorptive removal for 2-naphthol. It is because of the greater π-electron density on anionic 2-naphthol relative to that of neutral 2-naphthol, that favours π-π interaction with graphene. In case of GO, its adsorptive removal capacity for the four aromatic compounds is of the order naphthalene < 1,2,4-trichlorobenzene < 2,4,6-trichlorophenol < 2-naphthol. 2-naphthol, 1,2,4-trichlorobenzene and 2,4,6-trichlorophenol are adsorbed on graphene predominantly through π-π interaction, whereas 2-naphthol and 2,4,6-trichlorophenol are adsorbed on GO via hydrogen bonding between oxygen-containing functional groups on GO and hydroxyl groups on these two aromatic compounds.

Recently, graphene-based sponges were doped with atomic boron and nitrogen to use them for the electrochemical degradation of persistent organic contaminant, iopromide in one-pass, low-conductivity supporting electrolyte and by flow-through mode [56]. Nitrogen and Boron doping of graphene-based sponges improved their electrocatalytic activity. Graphene-based sponges were generated via low-priced, bottom-up method that permits effective introduction of dopants as well as the functionalization of the RGO coating and thus adaption of the material for the elimination of particular contaminants. The N-doped cathode and B-doped anode exhibited outstanding contaminant removal of >90% at the geometric anodic current density of 173 A/m^2. During the electrochemical degradation of iopromide, there was the direct electron transfer since the OH· radicals were formed via H_2O_2 decompositon (H_2O_2 produced at cathode) and O_3 was formed at the anode. The product formed from iopromide exhibits that the cleavage of all three C-I bonds on aromatic rings occurring at anode is favoured over the breaking of the alkyl side groups, which reveals the role of π-π interactions with graphene surface. Owing to the presence of sodium chloride, the productivity of chlorine was <0.04% and no chlorate and perchlorate were formed, which exhibits very poor electrocatalytic activity of the graphene-based sponge anode for chloride.

In another instance, the magnetic superhydrophobic polyurethane (PU) sponge loaded with Fe_3O_4@oleic acid@graphene oxide (Fe_3O_4@OA@GO) was used for the effective removal of oil from water [57]. Every year a lot of oil is released to water from industries. Therefore, there is need to develop superhydrophobic oil adsorbing material that can be potentially reused. To meet this demand, GO was coated with functionalized oleic acid, Fe_3O_4 nanoparticles and that was loaded on the three-dimensional microstructure of commercial

polyurethane sponge (Fe₃O₄@OA@GO-PU) via simple and low-priced dip coating method. To ensure the synthesis of modified polyurethane (M-PU) sponge characterization analysis was used. The M-PU sponge was eco-friendly and exhibited the superhydrophobicity that repelled water with contact angle of 158° and demonstrated selective adsorption for various oils and organic solvents from water with outstanding adsorption efficiency. Even the water quantity collected after distillation was <1%. It is to be noted that the M-PU sponge exhibited improved performance under the exposure of magnetic field with various intensities because of the increased surface area of the M-PU sponge. Moreover, the magnetic property of M-PU sponge contributed to recyclability of the material as it exhibited outstanding oil spill clean-up performance for 15 cycles without any notable decline in its adsorption efficiency. Further, uniqueness of M-PU sponge superhydrophobicity was the selective adsorption of contaminants from water at static and dynamic states. It is noteworthy that the M-PU sponge can be employed for practical application of separation of oil from oil-polluted water since, the M-PU sponge exhibits non-stop adsorption of oil from water when coupled with a peristaltic pump.

III. CONCLUSIONS

In this review article, the recent progress and strategies employed for the removal of organic dyes, pharmaceuticals, endocrine disrupting chemicals, brominated flame retardants (BFRs) and other organic compounds using graphene-based adsorbents have been summarized. To ensure the healthy sustainability of life, the problem of environmental pollution should be resolved smartly. Water purification technologies based on nanotechnology have received acceptance by industrial sectors as well as researchers. The art of converting carbon-based nanomaterials to efficient materials, especially for water purification applications, is nowadays a prime field of research. Carbon-based materials are widely used for removing the toxic contaminants owing to their porosity, easy availability and facile synthesis. Graphene and GO materials are optimal for the water treatment by adsorption owing to the desired tunability of these materials. Functionalization of graphene-based adsorbents through covalent and non-covalent interactions is one of the gainful steps to achieve the desired target.

To promote practical applications and future research more skilful efforts should be exerted. The basic problem after the adsorptive removal of target pollutant/s is the complete separation of graphene-based adsorbent from aqueous solution. The separation of these materials is essential as they have been already studied to have very toxic effects after inhalation, ingestion or even skin exposure [58]. It is not sensible to add another toxic substance while eliminating the other toxic contaminants. To meet these demands, appropriate and properly-managed design is needed to employ graphene and graphene-based adsorbents. Moreover, effective methods should be developed to recollect these adsorbents. It was found that ultracentrifugation separation is effective technique to separate graphene form water. But the major problem of this technique is consumption of high energy. An alternative option to this may be membrane filtration technique, but it has other problem like blockage of membrane pores that restricts its applications. Currently, the magnetic separation method is regarded as effective alternative for the separation of graphene and graphene-based adsorbents form water. The next challenge is the recreation of the graphene-based adsorbents. Occasionally, the adsorbed pollutants strongly stick to the surface and they cannot be separated, which remarkably affects their efficiency. Another challenge is associated with the engineering of these graphene-based adsorbents for suitable commercialization, because these adsorbents are tested in the laboratory setups. It may happen that these adsorbents after encapsulation may reduce their large surface area as they change into the graphitic form. In the current

scenario, the fresh 3D designs of graphene-based adsorbents are receiving attentions, wherein graphene sheets are ordered to get a 3D architecture of graphene that helps to prevent graphene agglomeration. Such architecture favours the adsorption as it provides better porosity and large surface area. The techniques to develop the design of graphene-based adsorbents are routes to the large-scale practical applications and commercialization.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Analytical Structure of Mellin-Wavelet Transform

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ABSTRACT

Wavelets are mathematical tool which can be used to extract information from many different kinds of data including audio signals and images. The Wavelet transform decomposed the signal with finite energy in the spatial domain into a set of functions. The Wavelet transform has been shown to be a successful tool for dealing with transient signals, data compression, sound analysis, representation of the human retina. Mellin transform, a kind of nonlinear transformation, is widely used for its scale invariance property. The main objective of this paper is the generalization of analytical structure of Mellin-Wavelet transform.

Keywords:- Mellin transform, Wavelet transform, Testing function space, Mellin-Wavelet transform, signal processing.

I. INTRODUCTION

The word "Wavelet" has been introduced by Morlet and Grossmann [1] in the early 1980s. A Wavelet is a wave-like oscillation that is localized in time. The main objective of Wavelet Transform is to define the powerful wavelet basis functions and find efficient methods for their computation. The wavelets, which are based on scale invariance and self-similarity-fractal patterns, are therefore the most suitable technique employed to study the biomedical and other texture images. Being a versatile tool especially for the analysis of quasi-chaotic signals, noisy images, wavelets have got applications in all branches of medicine, biology, computer tomology, analysis of ECG, brain wave studies. In biological systems, introducing stochastic 'noise' has been found helpful in improving the signal strength of the internal feedback loops for balance and other vestibular communication. It has been found helpful to diabetic and stroke patients with balance control.

The Mellin transform is an integral transform named after the finnish mathematician Hjalmar Mellin (1854-1933). Mellin transform is basic tool for analyzing the behaviour of many in mathematics and mathematical physics. Mellin transform is implemented as a fast Mellin transform [2]. Mellin transform is widely used for its scale invariance property [3-5]. Mellin transform has many applications such as navigation, radar system, in finding the stress distribution in an infinite wedge, also in digital audio effects [6]. Karen Kohl and Flavia Stan introduced an algorithmic approach to the Mellin transform method by applying Wegschaider's algorithm in

his research work [7]. Mellin transform offers human a new way to figure problem out [8-11]. It was R. H. Mellin initially gave a systematic formulation of transform and its inverse. In this paper we introduced generalized Mellin-Wavelet transform and proved analyticity theorem for Mellin-Wavelet transform.

II. THE CONTINUOUS WAVELET TRANSFORM

The Continuous Wavelet transform of a decomposition function $f(x)$ with respect to a basic wavelet $\Psi(x)$ given by the convolution of a function with a scaled and translated version of $\Psi(x)$ is defined as

$$W_\Psi(a, b)[f] = \frac{1}{|a|^{1/2}} \int f(x) \Psi^* \left(\frac{x-b}{a} \right) dx = \langle f(x), \frac{1}{\sqrt{|a|}} \Psi \left(\frac{x-b}{a} \right) \rangle \qquad \text{(I)}$$

where $\langle \cdot, \cdot \rangle$ is the inner product.

The function f and Ψ are square integrable function and Ψ satisfies the admissibility condition

$$C_\Psi = \int \frac{|\hat{\Psi}(w)|^2}{|w|} \ dw \ < \infty$$

Subscript '*' denotes the complex conjugation, 'a' is the scale parameter $a > 0$; 'b' is the translation parameter. The term $\frac{1}{\sqrt{a}}$ is the energy conservative term that keeps the energy of the scaled mother wavelet equal to energy of the original wavelet [12].

The classical wavelet transform of a function f with respect to a given admissible mother wavelet is $\Psi(x) = exp(i\pi x^2)$ defined as wavelet domain coefficient at scalar parameter $a = tan\alpha^{\frac{1}{2}}$.

$$W_\Psi(a, b)[f] = \frac{1}{\sqrt{|a|}} \int_{-\infty}^{\infty} f(x) \ e^{i\pi \left(\frac{x-b}{a} \right)^2} dx = \frac{1}{|a|^{\frac{1}{2}}} \int_{-\infty}^{\infty} f(x) \ e^{i\pi \frac{(x-b)^2}{tan a}} dx$$

where Ψ satisfies the admissibility condition

$$C_\Psi = \int \frac{|\hat{\Psi}(w)|^2}{|w|} \ dw \ < \infty$$

where C_Ψ is the admissibility constant.

III. MELLIN –WAVELET TRANSFORM

The Conventional Mellin –Wavelet transform is defined as

$$MW_\Psi \{f(t, x)\} = MW_\Psi(p, a, b) = \int_0^\infty \int_{-\infty}^\infty f(t, x) \, K(t, x, p, a, b) \, dt \, dx$$

where $K(t, x, p, a, b) = \frac{1}{|a|^{\frac{1}{2}}} t^{p-1} e^{i\pi \left(\frac{x-b}{a} \right)^2}$

IV. TESTING FUNCTION SPACE $\mathbf{MW_{a,b,\Psi,p}}$

An infinitely differentiable complex valued smooth function $\phi(t, x, p, a, b)$ define over $-\infty < x < \infty, 0 < t < \infty$ with the parameter p, a, b is said to belong to $MW_{a,b,\Psi,p}$ for each $m, n \in \mathbb{R}^2$

$$\gamma_{l,k,p}\phi(t, x) = \underset{I}{\text{Sup}} \left| \xi_{m,n}(t) t^{q+1} D_t^q D_x^k \phi(t, x) \right|$$
$$< \infty$$

where $q, k = 0,1,2,3, \dots \dots$

$$\xi_{m,n} = \begin{cases} t^{-m} & ,0 < t \le 1 \\ t^{-n} & ,1 < t < \infty \end{cases}$$

Now we prove the kernel of Mellin Wavelet transform belongs to the $W_{a,b,\alpha,p}$.

V. DISTRIBUTIONAL GENERALIZED MELLIN-WAVELET TRANSFORM

For $f(t,x) \in MW_{a,b,\Psi,p}^*$

where $\mathrm{MW}_{a,b,\Psi,p}^*$ is the dual space of $MW_{a,b,\Psi,p}$ and $m < Re\ p < n, b \in R, a \neq 0$;

the distributional Mellin-Wavelet transform is defined as

$$MW_\Psi\{f(t,x)\} = MW_\Psi(p,a,\ b) = \langle f(t,x),\ K(t,x,p,a,b)\rangle \qquad (1)$$

where $K(t,x,p,a,b) = \dfrac{1}{|a|^{\frac{1}{2}}}\ t^{p-1}\ e^{i\pi\left(\frac{x-b}{a}\right)^2}$ $\qquad (2)$

R. H. S. of equation(1) has a sense as an application of $f(t,x) \in MW_{a,b,\Psi,p}^*$ to $K(t,x,p,a,b) \in \mathrm{MW}_{a,b,\Psi,p}$.

VI. ANALYTICITY THEOREM

Statement If $F(p,b) = \langle f(t,x), K(t,x,p,a,b)\rangle$ that is

$F(p,a) = \langle f(t,x), \dfrac{1}{|a|^{\frac{1}{2}}}\ t^{p-1}\ e^{i\pi\left(\frac{x-b}{a}\right)^2}\rangle$ Then $F(p,b)$ is analytic for some fixed $p > 0, b > 0, a > 0$. and

$\dfrac{\partial}{\partial p}\dfrac{\partial}{\partial b}F(p,b) = \langle f(t,x), \dfrac{\partial}{\partial p}\dfrac{\partial}{\partial b}K(t,x,p,a,b)\rangle$ where $K(t,x,p,a,b) = \dfrac{1}{|a|^{\frac{1}{2}}}\ t^{p-1}\ e^{i\pi\left(\frac{x-b}{a}\right)^2}$

Proof Let p and b be an arbitrary but fixed. Choose the real positive number a_1, b_1, and r such that $\sigma_1 < a_1 < p - r < p + r < b_1 < \sigma_2$.

Let Δp be a complex increment such that $0 < \Delta p < r$.

For $\Delta p \neq o$, we write

$$\frac{F(p+\Delta p,b)-F(a,b)}{\Delta p} - \langle f(t,x), \frac{\partial}{\partial p}\frac{1}{|a|^{\frac{1}{2}}}\ t^{p-1}\ e^{i\pi\left(\frac{x-b}{a}\right)^2}\rangle = \langle f(t,x), \frac{1}{|a|^{\frac{1}{2}}}\frac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{\Delta p}\left[t^{(p+\Delta p)-1} - t^{p-1}\right] -$$

$$\frac{\partial}{\partial p}\frac{t^{p-1}}{|a|^{\frac{1}{2}}}e^{i\pi\left(\frac{x-b}{a}\right)^2}\rangle = \langle f(t,x), \Psi_{\Delta p}(t,x)\rangle$$

Where $\Psi_{\Delta p}(t,x) = \dfrac{1}{|a|^{\frac{1}{2}}}\dfrac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{\Delta p}\left[t^{(p+\Delta p)-1} - t^{p-1}\right] - \dfrac{\partial}{\partial p}\dfrac{t^{p-1}}{|a|^{\frac{1}{2}}}e^{i\pi\left(\frac{x-b}{a}\right)^2}$

To prove:

$\Psi_{\Delta p}(t,x) \in MW_{a,b,\Psi,p}$, we shall show that as $|\Delta p| \to 0$, $\Psi_{\Delta p}(t,x)$ converges in $MW_{a,b,\Psi,p}$ to zero.

To proceed, let C denotes the circle with centre at p and radius r_1,

Where $0 < r < r_1 < min(p - a_1,\ b_1 - p)$. We may interchange differentiation on p with differentiation on t.

$(-D_t)^q \Psi_{\Delta p}(t,x)$

$$= (-D_t)^q \left\{ \frac{1}{|a|^{\frac{1}{2}}}\frac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{\Delta p}\left[t^{(p+\Delta p)-1} - t^{p-1}\right] - \frac{\partial}{\partial p}\frac{t^{p-1}}{|a|^{\frac{1}{2}}}e^{i\pi\left(\frac{x-b}{a}\right)^2} - \frac{\partial}{\partial t}\frac{1}{|a|^{\frac{1}{2}}}\ t^{p-1}e^{i\pi\left(\frac{x-b}{a}\right)^2}\right\}$$

$$= \frac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{|a|^{\frac{1}{2}}\Delta p}\left\{P(p + \Delta p)\ t^{p+\Delta p-q-1} - P(p)t^{p-q-1}\right\}$$

Where $P(p + \Delta p)$ is polynomial in $p + \Delta p$ and $P(p)$ is polynomial in p.

Now applying Cauchy's integral formula.

$(-D_t)^q \Psi_{\Delta p}(t,x)$

$$= \frac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{|a|^{\frac{1}{2}}\Delta p}\left\{\frac{1}{2\pi i}\int_c \frac{P(z)t^{z-q-1}}{(z-p-\Delta p)}\ dz - \frac{1}{2\pi i}\int_c \frac{P(z)t^{z-q-1}}{(z-p)}\ dz - \frac{1}{2\pi i}\int_c \frac{P(z)t^{z-q-1}}{(z-p)^2}\ dz\right\}$$

$$= \frac{e^{i\pi\left(\frac{x-b}{a}\right)^2}}{2\pi i |a|^{\frac{1}{2}}} \int_c \left[\frac{1}{(z-p-\Delta p)(z-p)} - \frac{1}{(z-p)^2} \right] P(z) t^{z-q-1} dz$$

$$= \frac{e^{i\pi\left(\frac{x-b}{a}\right)^2} \Delta p}{2\pi i |a|^{\frac{1}{2}}} \int_c \frac{1}{(z-p-\Delta p)(z-p)^2} \, P(z) t^{z-q-1} dz$$

$$D_t^q D_x^l \Psi_{\Delta p, \Delta v}(t, x)$$

$$= \frac{e^{i\pi\left(\frac{x-b}{a}\right)^2} (i\pi)^l \Delta p V(v)}{2\pi i |a|^{\frac{1}{2}}} \int_c \frac{P(z) t^{z-q-1} \, dz}{(z-p-\Delta p)(z-p)^2}$$

Now for all $z \in C, -\infty < x < \infty, 0 < t < \infty$

$$\underset{I}{\mathrm{Sup}} \left| \xi_{m,n}(t) t^{q+1} \, D_t^q D_x^l \Psi_{\Delta p}(t, x) \right| \leq K$$

where K is a constant independent of z and t.

Moreover $|z - p - \Delta p| > r_1 > r > 0 \quad$ and $|z - p| = r_1$

$$C_1 = \max\{|P(z) t^z| : z \in C\}$$

Consequently

$$\underset{I}{\mathrm{Sup}} \left| \xi_{m,n}(t) t^{q+1} (i\pi)^l e^{i\pi\left(\frac{x-b}{a}\right)^2} \Delta p V(v) \int_c \frac{P(z) \, t^{z-q-1} \, dz}{(z-p-\Delta p)(z-p)^2} \right|$$

$$\leq \underset{I}{\mathrm{Sup}} \left| \xi_{m,n}(t) t^{q+1-q-1} (i\pi)^l e^{i\pi\left(\frac{x-b}{a}\right)^2} V(v) \right| |\Delta p| \int_c \frac{|P(z) t^z|}{|z-p-\Delta p| |z-p|^2} |dz|$$

$$\leq K \frac{|\Delta p|}{2\pi} \int_c \frac{C_1}{(r_1 - r) r_1{}^2} |dz|$$

$$\leq \frac{|\Delta p|}{2\pi} \frac{C_2}{(r_1 - r) r_1{}^2} \int_c |dz|$$

$$\leq \frac{|\Delta p|}{2\pi} \frac{C_2}{(r_1 - r) r_1{}^2} 2\pi r_1 \qquad\qquad \text{where } c_2 = kc_1$$

$$\leq \frac{|\Delta p| \, C_2}{(r_1 - r) r_1}$$

The right hand side is independent of t and converges to zero as $|\Delta p| \to 0$

This shows that $\Psi_{\Delta p, \Delta v}(t, x)$ converges to zero in $\mathrm{MW}_{a,b,\Psi,p}$ as $|\Delta p| \to 0$

VII. CONCLUSION

In the present work distributional generalization of Mellin-Wavelet transform is presented. Analyticity theorem for Mellin-Wavelet transform is proved.

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Bagged Decision Tree Algorithm Using Bloom Filters to Reduce the Cloud Storage Capacity

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ABSTRACT

One of the biggest achievements of IT developers around the world is cloud computing. It enables users to access extensible, distributed, virtualized, hardware or software infrastructure across the network. Cloud computing is fraught with security concerns. This research primarily focuses on building an optimal storage approach by reducing redundant data stored in geographically distant cloud data storage servers. According to the current technique, the system reduces security risks in hybrid clouds by protecting data and restricting data access based on space and time. There is an efficient method of storing secret keys in distributed hash tables and destroying them once they have been used to boost data security as a result. In order to achieve data deduplication, in addition to a distributed hash table, Attribute Based Encryption (ABE) is also used. Simulation is done in CloudSim using seven different parameters, namely accuracy, key computation time, kappa statistics, mean absolute error, root mean square error, encryption and decryption time.

Keywords: Cloud Computing, Security, Decision Tree, Bloom Filters, C4.5, Data Deduplication, Decryption Time, Decryption Time, Attribute Based Encryption.

I. INTRODUCTION

Cloud computing is an emerging service-oriented computing platform. It contains various types of services, like Infrastructure as a service (IAAS), platform as a service (PAAS), Data as a service (DAAS) and software as a service (SAAS). It also contains storage for one type of DAAS. The security of the stored data in the cloud is complex due to its global nature. Data deduplication is a specific data compression technique that removes multiple copies of repeated data from storage. Generally, deduplication is categorized into two different types: file-based deduplication and block-based deduplication. Cloud computing majorly focuses on file-based deduplication. As a result of its security features, deduplication protects your data from both insiders and external threats. In existing deduplication, schemas only verify the physical level match with the appropriate server data. But the cloud may contain the same data on different servers. Key sharing for secure content in the cloud generally creates uncommon keys for unique data. When there are a large number of users or documents available, it can complicate storage [1, 2].

Machine Learning (ML) is the process of training a machine to acquire new skills or adapt its present skill set to new settings. ML requires a lot of computational power to train models at times, and not everyone has access to a lot of storage machines. Cloud computing [3] simply refers to computing resources that are accessible over the internet or other comparable networking The merger of machine learning and cloud computing is known as an 'intelligent cloud.' The intelligent cloud gains the ability to carry large amounts of data saved on the cloud in order to do forecasting and analyze scenarios. Integrating ML abilities into enterprise applications has its own limitations. The special skills are required to create, train, and deploy ML nodes and computational special-purpose networks.

Machine learning is currently the focus of research along with cloud security and data deduplication for the security of data in hybrid clouds. Data deduplication precludes data from insider and outsider attacks for security purposes. The machine learning approach 'Enhanced C4.5' is used to classify users to provide different access and roles. Using the same key for all data will reduce the security of the file. Individual key storage for individual files will create a storage complexity. When keys are used after encryption or decryption, the complexity of storing them is increased to an unacceptably high degree. By providing data protection and controlling data access based on space and time, the existing solution reduces security concerns in hybrid cloud computing.

These five sections make up the body of the paper. Section I provides a clear introduction to the convergence of machine learning and cloud computing. Section II depicts a literature survey. In Section III, the complete procedure for the method used (Bagged Decision Tree) in this work. The fourth section explains the outcomes. Section V brings the paper to a close.

II. LITERATURE SURVEY

This section discusses previous studies related to efficient cryptographic algorithms to increase data security by storing secret keys in distributed hash tables.

Li et al. [4] presented Dekey, an efficient and reliable convergent key management solution for safe deduplication. To ensure the semantic security of convergent keys and the secrecy of outsourced data, Dekey leverages deduplication across convergent keys and distributes convergent key shares among many key servers. Implementation of Dekey with Ramp's secret sharing system. Encoding/decoding overhead is minimal in comparison to ordinary upload/download activities.

Li et al. [5] developed distributed deduplication systems to increase data dependability while maintaining the secrecy of users' outsourced data in the absence of an encryption mechanism. To facilitate file-level and fine-grained block-level data deduplication, four architectures were proposed. The tag's uniformity and integrity were ensured. The Ramp secret sharing mechanism was used to create deduplication systems, which revealed that by comparing ordinary upload/download activities to usual network transmission overhead, it incurs negligible encoding/decoding overhead.

"Approved data deduplication" was developed by Li et al. [6] to preserve data security by factoring differences in user privileges into the duplicate check. New deduplication structures supporting approved duplicate checks in hybrid cloud architecture have been developed; file duplicate-check tokens are issued by the private cloud server with the help of a private key. The methods are safe against both insider and outer attacks defined in the suggested security model, according to security analysis. A prototype was suggested, approved duplicate check

technique as a proof of concept and ran testbed experiments on it. We demonstrated that, when compared to convergent encryption and network transfer, our permitted duplicate check technique had a low overhead.

To increase the efficiency of data management, Miao et al. [7] proposed a payment-based incentive mechanism for deduplication systems that is safe. No malicious cloud service provider, according to the security and incentive study, could fool a client with reduced deduplication pricing. In other words, active clients always pay less per bit than inactive clients. The technique could incentivize clients to engage in deduplication.

On the basis of the threshold blind signature, Miao and coworkers [8] created a new multi-server assisted deduplication solution that can effectively resist collusion assaults between the cloud server and several key servers.

Jiang et al. [9] proposed a probabilistic TIMER technique for efficiently detecting malicious cloud server behavior. For example, it relies on cryptographic assumptions and network latency to avoid server collusion. This creates significant incentives for economically reasonable cloud servers to store customer data in their stores.

A secure outsourced ID3 decision tree technique for two hostile model parties was suggested by Li et al. [10]. Cloud servers' data mining techniques and the privacy of users' data will both be protected by the proposed algorithm. Only the result trees are available to the parties; they are not aware of the data mining scheme. Cloud servers can not access any private information about the parties, either. As a result of the protocol, malevolent cloud servers are protected.

Vardharajan et al. [11] focus on the security services that a cloud provider can provide to its customers (tenants) as part of its infrastructure to prevent these risks. There's also an explanation of a customizable security as-a-service model for cloud providers to offer their tenants and the customers of their customers. During the study, the security architecture was implemented, and the security mechanisms and performance evaluation findings were analyzed in great depth.

According to Cao et al. [12], the rule of C4.5 is improved by using the L'Hospital Rule, which simplifies calculation processes and enhances decision-making algorithms. A similar concept is used to calculate the rate of knowledge gain, which greatly improves the method. And the application at the end of the study demonstrates that the modified algorithm is efficient, making it more suitable for the application of vast amounts of data, and its efficiency has been considerably enhanced in accordance with the real application.

Wai et al. [13] proposed the upgraded C4.5 decision tree and Naive Bayesian (NB) classifiers for web page classification. When the class labels are the same in the original C4.5 classification process, the usual entropy measure is inadequate to measure the suitability of nodes. This system can efficiently enable the classification of web pages into each category by utilizing semantic technologies. This system's effectiveness is demonstrated by employing HTML pages from the computer science domain.

Data deduplication is extensively employed in cloud storage systems to remove redundant storage overhead. Jiang et al. [14] suggested two approaches: static and dynamic schemes, the latter of which allows tree reconfiguration by raising the cost of computation. The central concept is to employ an interactive protocol based on static or dynamic decision trees. The benefit is that, by communicating with clients, the server reduces the time complexity of the deduplication equality test from linear time to efficient logarithmic time across all data items in the database. It turns out that our schemes are Path-PRV-CDA2-secure as well as significantly faster than the R-MLE2 scheme for data equality tests when the number of data items is considerable.

To retain the service, Abujassar et al. [15] introduced the novel Cloud Computing Alarm (CCA) mechanism, which allows the manager node to assign jobs to the best and freest available node. The Cloud Computing Alarm (CCA) approach is used to convey all information about the service node, including which one is ready to accept tasks from users. This strategy, according to simulation results, improves QoS, which will increase the number of people who utilize this service. The CCA improved services without affecting network speed by performing each task in less time, according to the data.

For the quantitative assessment and analysis of secSLA-based security levels supplied by CSPs in relation to Cloud Customer security requirements, Luna et al. [16] proposed two evaluation approaches, namely QPT and QHP. These techniques help to improve the security requirements specifications by allowing customers to define and communicate their individual security demands. QPT and QHP are validated using two scenarios and a prototype, based on real-world CSP secSLA data from the Cloud Security Alliance's Security, Trust, and Assurance Registry, in addition to providing recommendations on their standalone and collective use.

There are some promising results in the implementation of cosine similarity in a flat database by Hernandez et al. [17]. As a result of this, a movie that is highly related to another will be recommended. Once these results have been verified, they might be utilized to construct an automated recommendation system that uses customer ratings to provide recommendations for items and services from a company with such a system.

Fog and cloud computing collaboration were used by Alsaffar et al. [18] to build an architecture for IoT service delegation and resource allocation. There are three conditions (service size, completion time, and VM capacity) that determine the algorithm decision rules for managing and delegating user requests in order to balance the burden. Other algorithms are being considered for resource allocation in fog and cloud computing to achieve service level agreements and quality of service, and for optimizing large data distribution. As shown by the simulation results, the suggested technique can efficiently balance workload, improve resource allocation, optimize massive data distribution, and outperform other existing methods.

On the basis of ownership challenge and proxy re-encryption, Yan et al. [19] offer a strategy to deduplicate encrypted data stored in cloud storage. Encrypted cloud storage is widely used to protect the privacy of data holders. In contrast to this, encrypted data presents new obstacles to cloud data deduplication, which is necessary for huge data storage and processing in the cloud. Access control and data deduplication are integrated. Extensive study and computer simulations are used to determine the performance levels. For example, for huge data deduplication in cloud storage, the results reveal that the scheme has greater efficiency and efficacy.

Wang et al. [20] developed and applied a novel weighted local cosine similarity (WLCS) to visual tracking. To begin, the local cosine similarity assesses the similarities between the target template and the candidates and provides some theoretical insights into them. Second, an objective function is established to simulate the discriminative ability of local components, and the objective function is solved using a quadratic programming method to yield the discriminative weights. Finally, within the particle filter architecture, an effective and efficient tracker based on the WLCS approach is built, as well as a simple updating method. Experiment findings on numerous difficult image sequences show that the proposed tracker outperforms other competing approaches.

Because data sharing is unavoidable with deduplication, control over access permissions in encrypted deduplication storage is more crucial than in standard encrypted storage. As a result, data deduplication should be paired with data access control mechanisms for maximum flexibility. Youn et al. [21] proposed a deduplication approach based on CP-ABE to address this issue. The proposed technique provides client-side

deduplication while also offering confidentiality via client-side encryption to avoid users' sensitive data from being exposed on untrusted cloud servers. It also offers a sufficient trade-off between storage space efficiency and security in a cloud environment, making it ideal for the hybrid cloud model, which takes into account both data security and storage efficiency in a business context.

III. PROPOSED BAGGED DECISION TREE ALGORITHM

The suggested bagged DT algorithm is discussed in this section. To effectively process the concept of deduplication in the proposed system, distributed hash tables were introduced to load and store each distributed server's data and their secret keys to encrypt it. A dictionary-like interface is provided by a distributed hash table, but the nodes are scattered over the network. The node assigned to store a specific key is determined by hashing that key. Hence, the effect on the hash-table buckets is now independent of the nodes in a cloud network. According to Figures 1 and 2, the suggested study work and cloud server have a flow chart, respectively.
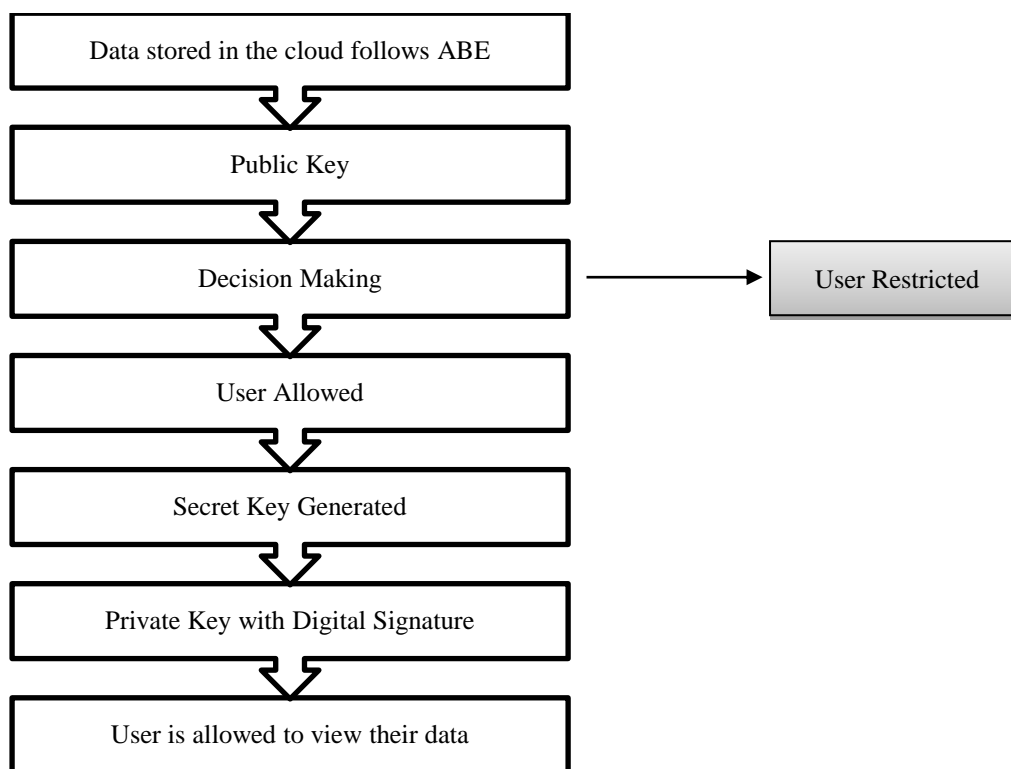
Figure 1. Flowchart of the Proposed Work
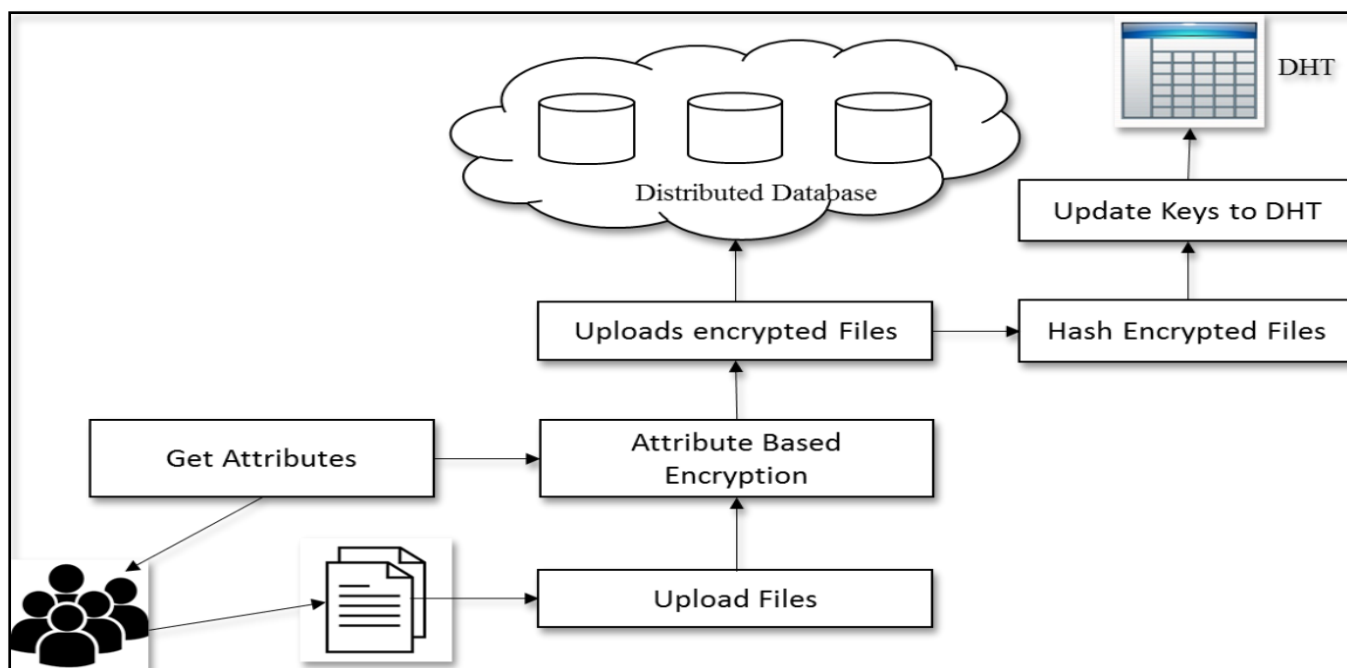
Figure 2. Uploading the File to Cloud Server

A. Data Deduplication

Data deduplication is a computational technique that removes redundant data from a dataset. The method is used to increase storage efficiency and reduce the amount of bytes transported via data networks. It is also referred to as single-instance storage. Extra copies of the same data are eliminated in data deduplication, leaving only one copy to be stored. To confirm that the single instance is truly a single file, data is inspected to find duplicate byte patterns. The duplicates are then replaced with a reference to the stored chunk.

Instead of storing many copies of the data, the de-duplication technique retains only one physical copy. De-duplication can be done at either the file or block level. The file level deduplication technique in this scenario eliminates numerous copies of the file as well as duplicate data blocks that arise in non-identical files. It is also important to note that data deduplication has a huge impact on the protection of sensitive user data, which is secured from both internal and external threats. To achieve this file deduplication, along with the Distributed hash table, Attribute Based Encryption (ABE) is implemented. Figure 3 depicts how data deduplication is divided into five components.
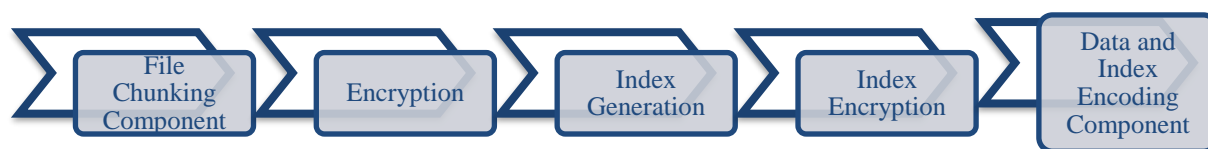
Figure 3. Components of Data Deduplication Framework

B. User Classification

When migrating to the cloud, users are a precious asset and a major issue. The active field of research and development in cloud computing is data privacy and security. User privacy is becoming increasingly important

for many enterprises as they migrate to the cloud. Users might be of numerous sorts, and the level of protection necessary for any data varies as well. In order to classify users based on access and roles, C4.5 machine learning is employed.

The C4.5 algorithm [22] is a user interface module used to identify cloud users prior to handling the access control mechanism for data transfer in cloud networks. It is utilized as a Decision Tree Classifier, which may generate a decision based on a sample of data. A classifier is a part of the code in data mining that takes data for classification and tries to forecast which class the new data belongs to. C4.5 is the successor to the Iterative Dichotomiser (ID3) and eliminates the requirement by dynamically creating a discrete attribute based on numerical factors that separates the continuous attribute value into discrete intervals. C4.5 turns the trained trees (the ID3 algorithm's output) into sets of if-then rules. In order to decide the order in which each rule should be implemented, the precision of each rule is considered next. A rule's precondition can be pruned by removing it if its accuracy improves without it.

C. Bagging

In statistical classification and regression, tagging is a group learning method that increases the stability and accuracy of machine-learning algorithms utilized. It is also known as the bootstrap aggregation. A random data sample is selected in a training set with a replacement to allow individual data points to be selected more than once.

Bagging algorithm creates an ensemble of classifiers or predictors, each of which offers an equally-weighted prediction in the learning scheme. Bagging works as follows when given a set of p tuples, P. For iteration i (i = 1, 2,.., n), the original P tuples are replaced with those from the training set, Pi. Bagging is short term for bootstrap aggregation. An example of a bootstrap sample is each of the training data sets. Pi may contain some original P tuples that were not included in P, while others may appear more than once due to sampling with replacement. For every training set, Pi, a classifier model, Ci, is learned. Classifiers return their class predictions to categorize an unclassified tuple (X), which counts as a single vote. When the votes are counted, C allocates X the class that has received the most support. Taking the average of each prediction for a given test tuple can be used to bag continuous variables. The approach is compiled in the bagged classifier with a much higher accuracy than the initial P classifiers. It is not significantly worse and the impacts of noisy data are more robust. The higher precision is due to the reduction in variance of the various classifiers in the composite model. A bagged predictor is always superior to a single P-driven predictor in terms of prediction, according to theorems on the subject.

Input:
D, a set of d training tuples;
k, the number of models in the ensemble;
A learning scheme (e.g., decision tree algorithm, backpropagation, etc.)
Output: A composite model, M∗.
Method:
(1) *for* i = 1 to k do // create k models:
(2) create bootstrap sample, Di, by sampling D with replacement;
(3) use Di to derive a model, Mi;
(4) end *for*
To use the composite model on a tuple, X:

(1) *if* classification then

(2) let each of the k models classify X and *return* the majority vote;

(3) *if* prediction then

(4) let each of the k models predict a value for X and *return* the average predicted value;

Key sharing for secure content in the cloud generally creates unique keys for unique data. It may create storage complexity at the time of a huge number of users or document availability. To overcome this issue, we created a new shared key model for each unique reference and the shared key can be destroyed. This key will be generated by using the document or file's unique value and server availability value. With the use of an authentication code, it is possible to verify that the sender of an email actually has access to a shared secret key and that no one else could have sent or edited it.

Reducing the storage complexity in terms of destroying the encryption key as well as removing duplicated or replica content by using Blooming Filters, which will efficiently retrieve data stored on a number of geographically separated storage systems. In order to allow membership queries, they are compact data structures for probabilistic representations of a set. When generating a standard Bloom Filter, an array of m bits is used, and it uses k separate hash functions. There are a number of advantages to using Bloom Filters, including cheap storage requirements, rapid membership verification, and no false negatives. False positives are conceivable, but depending on the application needs, their probability can be regulated and greatly reduced.

C. Attribute Based Encryption (ABE)

In order to implement the concept of cryptographic access control, ABE, a cryptographic primitive, was used. Attribute-based encryption often entails neither encrypting the attributes nor encrypting the entire data. Encryption in ABE is simple, secure, and economical compared to other encryption methods presented. Because the encrypted data comprises the attributes in place of the data, the ABE [23] is secure. In the event of a malicious attack, the data is never released. Attribute-based encryption has the drawback of being expensive to decrypt data. The application is protected via attribute-based encryption. When compared to other encryption algorithms, the ABE performs well [24].

Attribute Based Encryption Algorithm

Input: Input Data (M), User Attribute (I_n)

Output: Encrypted Data (Enc)

Method:

n represents number of attributes for particular user

Key Generation:

Step 1: *For* i=1 to n

Step 2: *For* j= 1 to I_1.Size

Step 3: $L_x=L_x+I_1(j)$

Step 4: End *For*

Step 5: End *For*

Step 6: *For* x=1 to L_x.Size

Step 7: k(x)= L   (x)

Step 8: k(x)=k(x)+(L_x(x)&oxff)+0x100

Step 9: End *For*

Encryption Algorithm

Step 1 : Let M be the data to be encrypted
Step 2 : Let Enc be the encrypted Data
Step 3 : Private key P_k ← generate key
Step 4 : Public Key B_K ← generate random prime number
Step 5 : Master Key m_{k1}, m_{k2} ← generate random even number less than public key
Step 6 : Secret Key S_K ← power(P_k, m_{k2})
Step 7 : while D != null do
Step 8 : con ← D
Step 9 : for k=1 to con.size()
Step 10 : CT_1=con(char(k))+ S_K
Step 11 : CT_2= m_{k1}*B_K
Step 12 : $Cipher_{CT}$=CT_1*CT_2
Step 13 :   End For
Step 14 :   Enc ←Enc.append($cipher_{CT}$)
Step 15 :   End While

IV. SIMULATION RESULTS

In this section, the results of the experiments are presented graphically, along with a discussion of the findings. The section also discusses the simulation tool and the performance parameters applied. Analysis of the performance of several measures was used to put into practice the proposed framework. The CloudSim simulator with NetBeans was used in this study. As a result of this, CloudSim is able to model and simulate cloud computing data centers and virtualized hosts, as well as allocation policies and network topologies. The NetBeans IDE is an IDE which facilitates the development of desktop, mobile, and online apps. It is free and open source. The IDE runs on Windows, Linux, Mac OS X, and other UNIX systems.

A. Accuracy

Accuracy refers to how close a measured value is to a standard or known value. It is the degree to which a measured or calculated quantity conformity to an actual or true value.

Where TP = True Positive

       TN = True Negative

       FP = False Positive

       FN = False Negative

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN}$$

Table 1. Accuracy Value Table

Existing (C4.5)	Proposed (Bagged DT)
96.5517	97.7273

Table 1 shows that the suggested Bagged Decision Tree Algorithm outperforms the existing C4.5 algorithm. Figure 3 demonstrated the accuracy of the existing and proposed bagged DT algorithm. The existing technique

uses C4.5 only, whereas the proposed scheme uses the concept of bagging. This reduces variance and, as a result, overfitting is reduced. That's why there is a slight increase in accuracy in the proposed scheme than in the existing scheme.
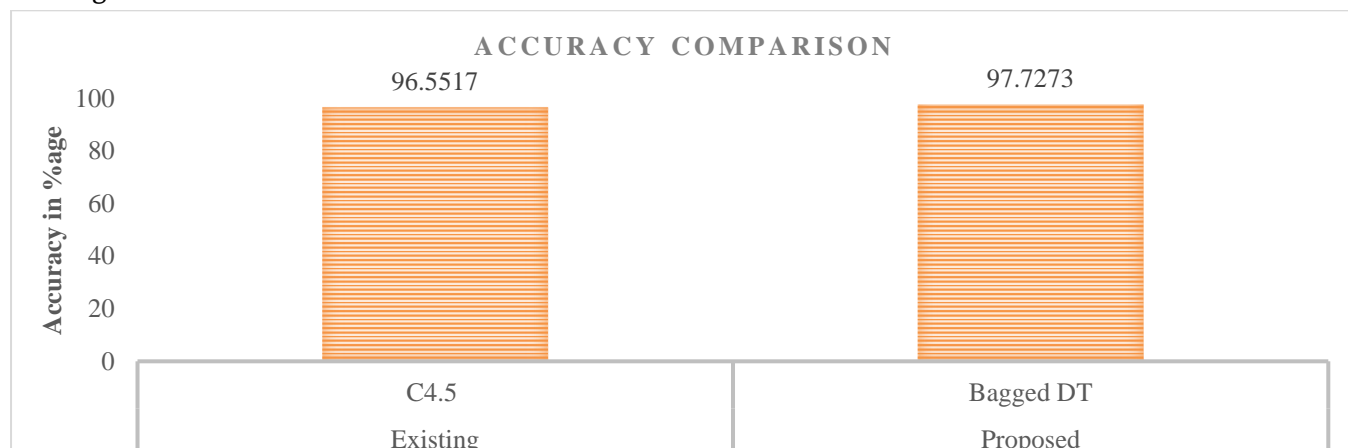
Figure 3. Accuracy

B. Kappa Statistics

Jacob Cohen created the term kappa statistics.Kappa is an inter-rater reliability statistical measure for category variables. When two raters use the same criterion based on a tool to determine whether or not a condition occurs, Kappa is used.

$$K = \frac{p0 - pe}{1 - pe}$$

where p_o = relative observed agreement among raters

p_e = hypothetical probability of chance agreement.

Table 2. Kappa Statistics Value Table

Existing (C4.5)	Proposed (Bagged DT)
0.9308	0.9545
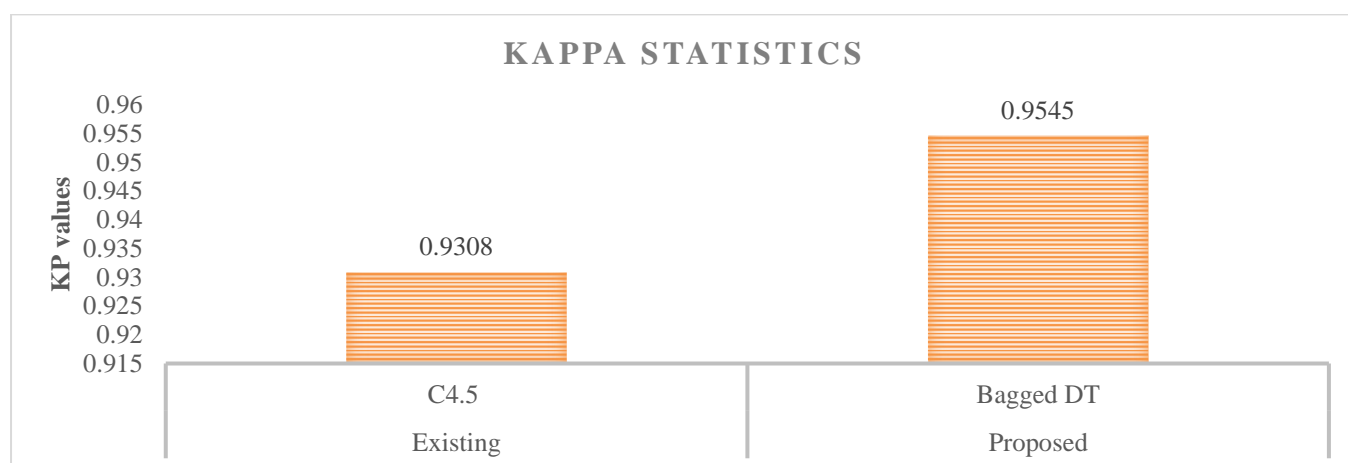
Figure 4. Kappa Statistics

Table 2 represents the kappa statistics values of existing and proposed algorithms. The figure 4 shows the comparison between the values generated after applying kappa statistics. It is clearly shown in figure 4 that the bagged DT algorithm outperforms existing C4.5 algorithm because

C. MAE and RMSE

In order to measure the accuracy of continuous variables, two often used metrics are the mean absolute error (MAE) and the root mean squared error (RMSE). With equal weigh for each difference, MAE calculates the average absolute difference between forecast and actual observation across the test sample.

$$MAE = 1/n \sum_{i=1}^{n} |xi - x'i|$$

RMSE is a quadratic scoring rule that additionally gauges the error's average magnitude. In other words, it is equal to the root of the average squared difference between forecast and observation. The values for MAE and RMSE are shown in table 3 using the following formulas.

$$RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (xi - x'i)^2}$$

Table 3. Error Rate Value Table

	Existing (C4.5)	Proposed (Bagged DT)
MAE	0.0568	0.0332
RMSE	0.1724	0.1334
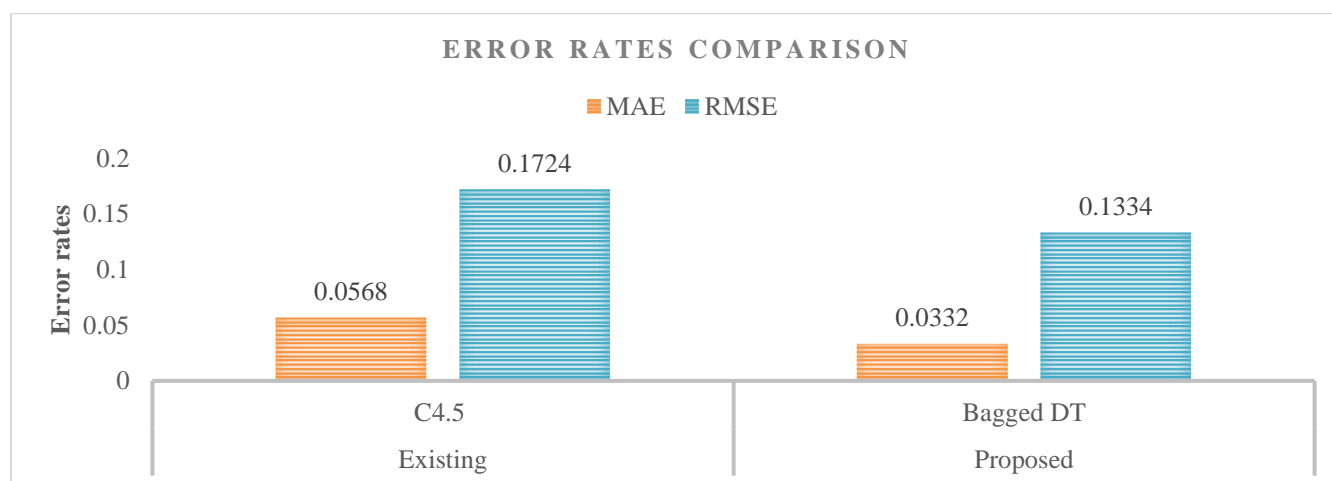
Figure 5. Error Rate

Its performance is displayed in Figure 5 when compared with that of the existing C4.5 method. Both MAE and RMSE are measures of the average model prediction error expressed in units of the variable of interest. In this case, smaller numbers are preferred.

D. Key Computation Time

Key computation time is the amount of time required to halt a computational operation. It is sometimes referred to as running time. Table 4 displays the key time of calculation of the planned and current file size scheme in KB.

Table 4. Values of Key Computation Time

File Size in KB	Existing (C4.5)	Proposed (Bagged DT)
10	0.12	0.08
20	0.16	0.10
30	0.19	0.14
40	0.21	0.17

50	0.25	0.20
60	0.30	0.24
70	0.35	0.31
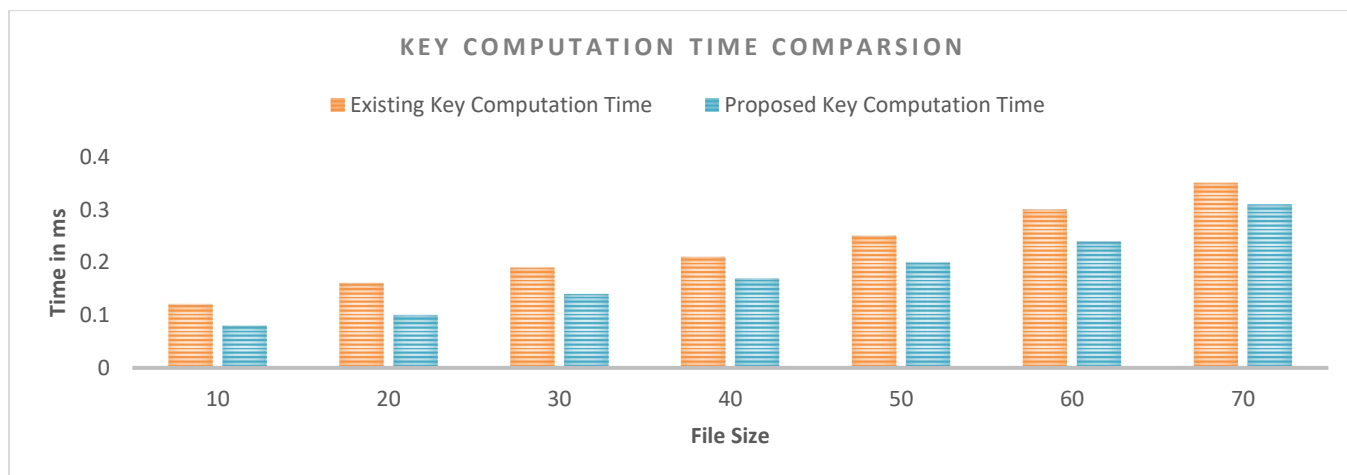
Figure 6. Key Computation Time

Figure 6 represents a key computation time curve, whereas table 4 displays important computation time values for the proposed and current C4.5 algorithms. As the file size grows, so does the time required to compute the key. When compared to the present technique, the suggested technique has a shorter key computation time. For example, when the file size is increased to 70MB, computation time improves by roughly 15%.

E. Encryption Time

The time it takes to encode a cipher text from a plaintext is considered as time an encryption algorithm takes. Table 5 indicates the time of encryption for both the current and the proposed schemes in accordance with the file size in KB.

Table 5. Encryption Time

File Size in KB	Existing (C4.5)	Proposed (Bagged DT)
10	14.6	9.32
20	23.5	14.4
30	30.1	21.3
40	38.6	27.6
50	45.6	39.14
60	78.9	62.96
70	85.7	75.45
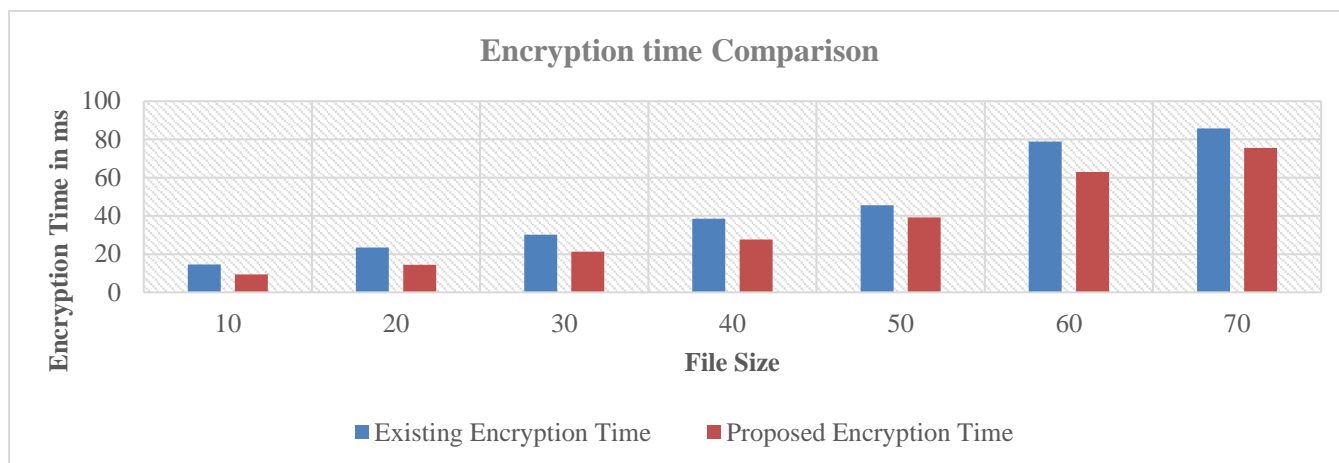
Figure 7. Encryption Time

The graph above depicts the time required to encrypt data based on different file sizes. The time it takes to encrypt a file grows in proportion to its size. When compared to the existing ABE method, the suggested ABE with hash function encryption time is shorter, indicating that the proposed technique performs better in terms of encryption parameters. The graph illustrates that when the file size is increased to 70 MB, the encryption time improves by around 10%.

F. Decryption Time

This is the time taken by a decryption algorithm to work in order to generate plain text from ciphertext. Table 6 presents the decryption time of both the proposed and existing schemes corresponding to the file size in KB.

Table 6. Decryption Time

File Size in KB	Existing (C4.5)	Proposed (Bagged DT)
10	9.26	7.1
20	16.4	12.2
30	22.9	17.3
40	28.1	24.6
50	35.3	30.8
60	49.8	44.9
70	60.4	52.9
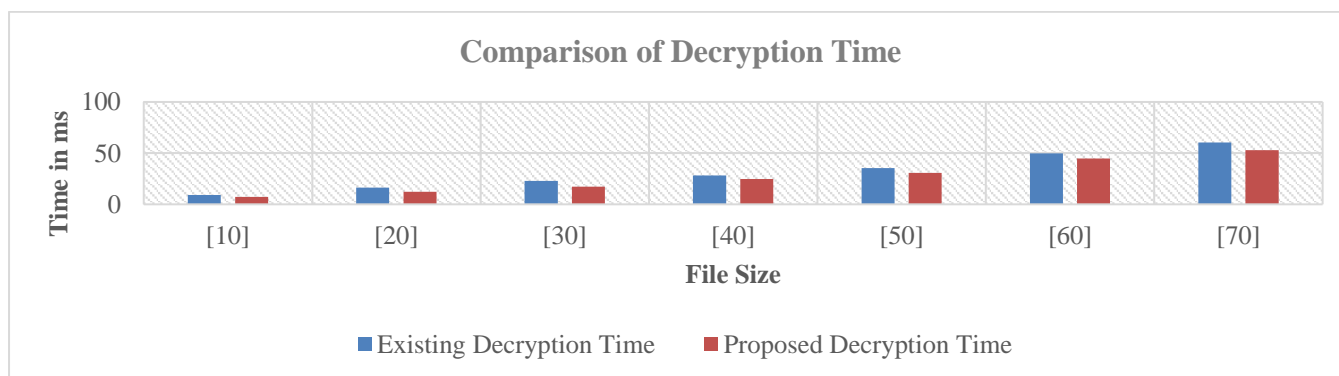
Figure 8. Decryption Time

According to different file sizes, Figure 8 shows how long it takes to decrypt the data comparisons. The time of decryption is growing as the size of the file grows. Compared to the current ABE algorithm, the proposed ABE

using hash-function has shown that the proposed technique is more efficient in terms of decryption parameters. The chart reveals that the decryption time indicated, when the file size grew to 70MB, is around 10%.

V. SUMMARY

In this study, a novel machine-learning application has been built to give security to hybrid cloud networks when storing data and retrieving or accessing data from cloud databases. In order to reduce redundant data storage and retrieval, the Bagged DT deduplication technique has been devised. In addition, the current C4.5 algorithm is used to classify cloud users based on their authenticity. It was necessary to further develop and test the proposed machine learning application in order to establish the level of security of hybrid cloud networks when storing, retrieving, and accessing data from a cloud database. This suggested technique has the greatest potential to mitigate security risks in hybrid clouds. The ABE encryption algorithm is used in conjunction with the bagged decision tree technique. Simulation results of the Bagged DT algorithm are discussed in comparison with the existing C4.5 decision tree algorithm. In addition, the recommended technique has demonstrated less key computation time, encryption and decryption time, a high accuracy rate, and low RMSE and MAE values. More research in this area can be done by employing a strong cryptographic algorithm for secure storage.

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Synthesis of PANI/ZnO Composite and Study of DC Conductivity

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ABSTRACT

In the present study, novel electrically conducting material polyaniline(PANI) and PANI/ZnO composite is synthesized by chemical oxidation method using ammonium persulfate as oxidizing agent. The Zinc Oxide (ZnO) nanopowder is synthesized by in-situ method by using Iron Nitrate and ammonium bicarbonate solution. Various PANI/ZnO composites are prepared by varying the amount of ZnO (5, 10, 15, 20 and 25 wt% of aniline monomer). In the study DC conductivity was measured and the results showed that the D.C. electrical conductivity increases with increasing concentration of ZnO. The X-ray diffraction technique is used to determine the amorphous nature of the sample.

Keywords: Conducting polymer, Polyaniline, ZnO, DC electrical conductivity

I. INTRODUCTION

Conducting polymers have been extensively studied for its wide range of technological applications [1-3]. Amongst the variety of conducting polymers, polyaniline (PANI) is one of the most prominent polymer due to its unique electrical properties, good environmental stability and easy synthesis. It is widely used in many applications such as electromagnetic interference shielding, rechargeable batteries, chemical sensors, corrosion protection coatings, and microwave absorbing materials [4-8]. Conducting polymers provide tremendous scope for tuning of their electrical conductivity from semiconducting to metallic region by way of doping [9]. In order to modify the transport, optical and mechanical properties of materials for certain applications, dopants are added into the host materials. Moreover nanocomposite material composed of conducting polymers and oxides have open more field of application such as drug delivery, conductive paints, rechargeable batteries, toners in photocopying, smart windows, etc [10, 11]. Attempts have been made to improve the mechanical strength of conducting polymer by combining it with the inorganic materials to form a composite. Among various inorganic materials ZnO is one of the attractive and extensively used material. The present study deals with the synthesis & characterization of PANI/ZnO composites and evaluation of dc conductivity for different wt. % of ZnO in PANI composites with an intension to know the formation of composite material and effect of doping ZnO in PANI material. Conductivity is a measure of electrical conduction and thus a measure of the ability of a material to pass a current. The characterization of the composites samples prepared has been done with the X-ray diffraction analysis techniques.

II. METHODS AND MATERIAL

PANI/ZnO composites were synthesized using chemicals such as, Aniline hydrochloride [C6H7N.HCL], Ammonium peroxydisulphate [(NH4)2S2O8] and double distilled water for synthesis of PANI. While, Zinc sulfate [ZnSO4] and ammonium bicarbonate [NH4HCO3] for synthesis of ZnO powder. All chemicals used were of AR grade of high purity (LOBA Chemicals) in this work. The double distilled water and Acetone (AR grade 99.9% purity) was used as a solvent and washing reagent in the chemical reaction respectively

A. Preparation of polyaniline (PANI)

Aniline hydrochloride (purum, 2.59 g, 20 mmol) was dissolved in distilled water in a volumetric flask to 50 mL of solution. Ammonium peroxydisulfate (purum, 5.71 g, 25 mmol) was dissolved in water also to make 50 mL solution. Thus using above solutions 0.2 M aniline hydrochloride is oxidised with 0.25 M ammonium peroxydisulfate in aqueous medium. Both solutions were kept for 1 h at room temperature, then mixed in a beaker, briefly stirred, and left to rest in order to polymerize. Next day the PANI precipitate was collected on a filter, washed with 100 mL portions of 0.2 M HCl and similarly with acetone and then dried in air.

B. Preparation of ZnO powder

The ZnO nanopowder was synthesized by in-situ method. Initially 100 ml of (0.1M) Iron Nitrate solution and 126 ml of (2.5 M) ammonium bicarbonate solution was prepared in aqueous medium. The prepared solution of zinc sulfate was then added to the solution of ammonium bicarbonate with constant stirring keeping the reaction mixture at 450C. After some time slurry of basic zinc carbonate (BZC) in the form of white precipitate was obtained. The obtained ppt is then filtered, washed and dried. Finally zinc oxide nanoparticle is prepared by heating the dried precipitate at 5000 C for 1 hr. Thus fine powder of zinc oxide is obtained.

PANI and PANI/ZnO composite samples were synthesized by chemical oxidation method. Same procedure was used to synthesize the composite with an additional step of adding the ZnO into the prepared aniline hydrochloride solution. Different composites were obtained by varying the amount of ZnO (5, 10, 15, 20 and 25 wt% of aniline monomer) and named as PB1, PB2, PB3, PB4 and PB5 respectively.

III. RESULTS AND DISCUSSION

A. XRD Analysis

The XRD patterns of pure ZnO is shown in figure 1(a), while that of PANI/ZnO composites are shown in figure 1(b),1(c),1(d),1(e) and 1(f) respectively. The main peaks for pure ZnO were observed at different values of 2θ at 32.69°, 34.35°, 36.18, 47.46˚, 58.42˚, 63.78˚, 67.98˚ and 69.09° corresponding to crystal planes (100), (002), (101), (102), (110), (103), (112) and (201) respectively. The pattern thus matches to the standard XRD pattern of pure ZnO which is confirmed from the JCPDS card no 36-1451. The peaks are similar to those observed by other researchers [12]
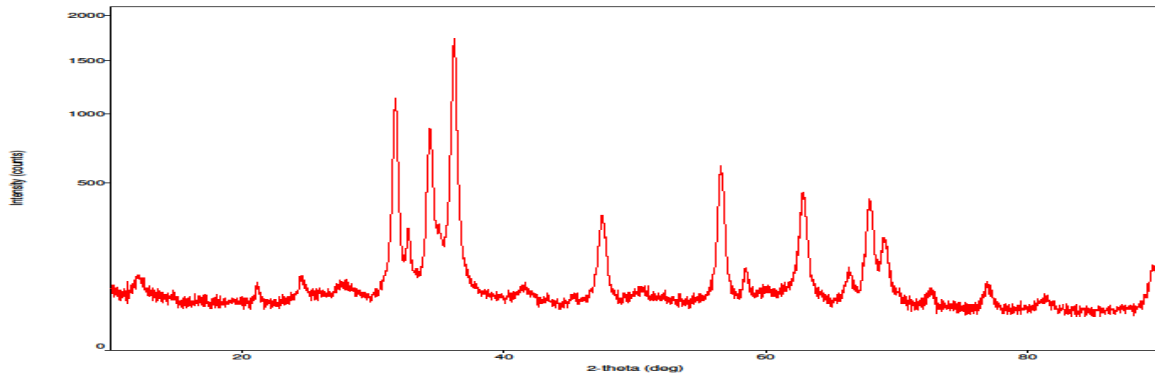
Fig.1(a) XRD spectra of ZnO sample
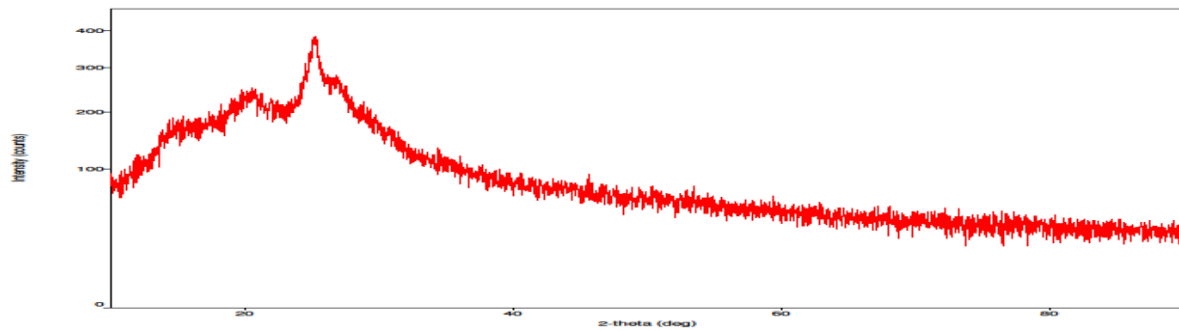
Fig.1(b) XRD spectra of PB1
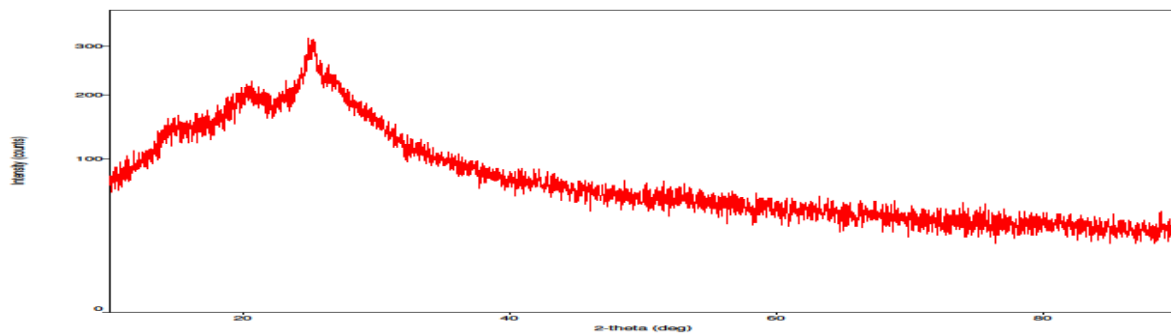
Fig.1(c) XRD spectra of PB2
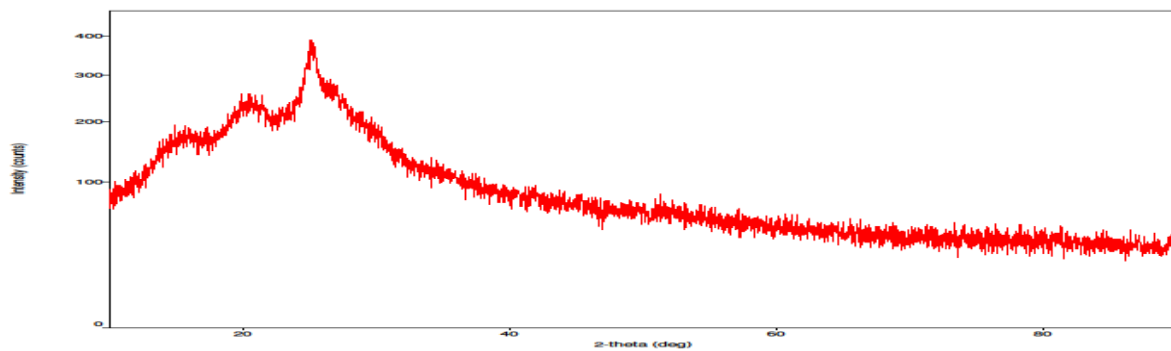
Fig.1(d) XRD spectra of PB3
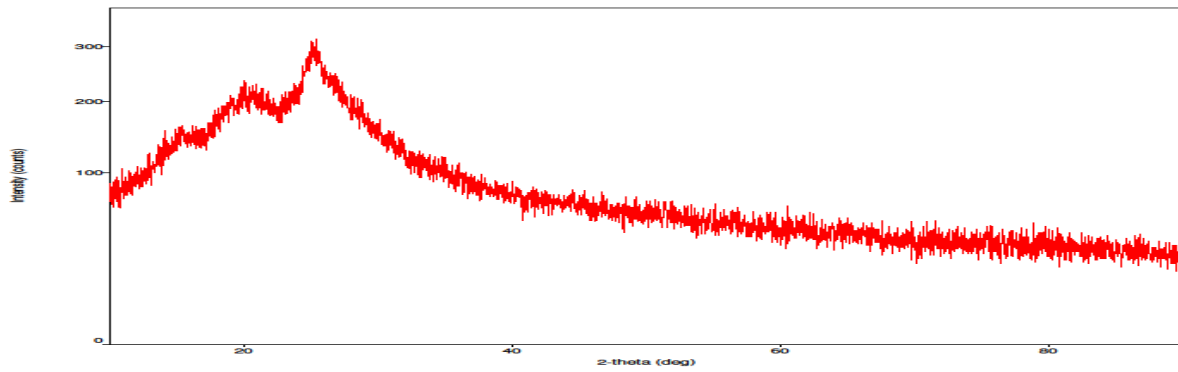
Fig. 1(e) XRD spectra of PB4
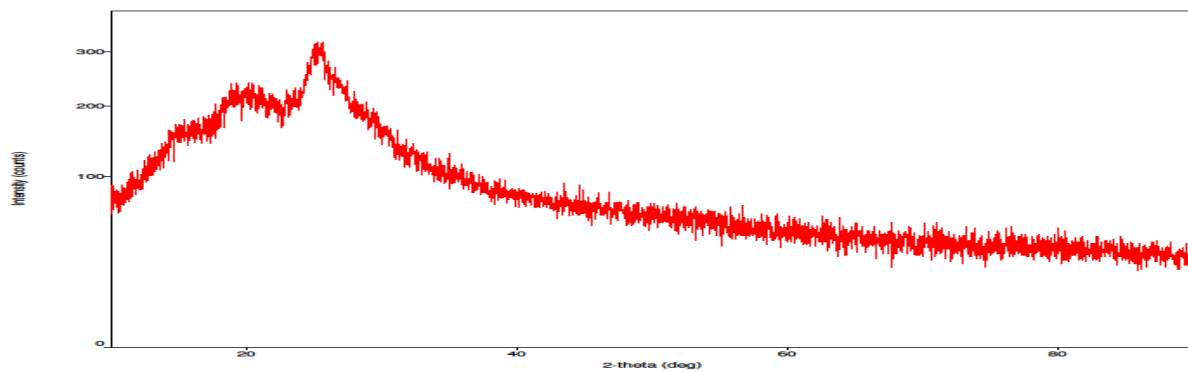
Fig.1(f) XRD spectra of PB5

The peak at 2θ=25˚, is present in all five prepared composites, indicates that the PANI retains its identity in composite phase also. Formation of composites was confirmed with lower crystallinity.

B. DC conductivity

Conducting polymers are unique, their conductivity depends strongly on their redox state. In its oxidized state CPs can exceed the upper limit of the semiconducting range, while the polymer in its reduced state it conducts poorly [13]. Doping is a process of oxidizing (p-doping) or reducing (n-doping) a neutral polymer and providing a counter anion or cation (i.e., dopant), respectively. The process of doping introduces charge carriers in the form of polarons or bipolarons into the polymer.

Conductivity mechanism:

A mechanism often used to explain the dc conductivity of conducting polymers is Mott's polaron hopping model [14]. This mechanism describes a phonon-assisted quantum-mechanical transport process in which a balance is obtained between the thermodynamic constraint on a charge carrier moving to a nearby localized state of different energy, and the quantum mechanical restraint on a carrier moving to a localized state of similar energy, but spatially separated. This description is equally applicable to charge carriers such as electrons, holes, polarons or bipolarons provided that the appropriate wave function is incorporated. The temperature dependence of the dc conductivity according to Austin et al[15] and Mott[16] is given by:

$$\sigma = n\, e\, \mu$$
$$= \left(\frac{\nu_0\, Ne^2\, R}{kT}\right) C(1\text{-}C)\exp(\text{-}2\,\alpha R)\exp\frac{-W}{kT} \qquad (1.1)$$

Where N is the number of metal ions sites per unit volume and C is the ratio of concentration of ion in low valance state to total concentration of metal ion; the term $\exp(-\alpha R)$ represents electron overlap integral between sites. R is the hopping distance and W is activation energy. Assuming that a strong electron lattice interaction exists, the activation energy W is the result of polaron formation with binding energy W_p and any energy difference WD which might exist between the initial and final sites due to variation of the local arrangements of ions. Austin et al[5] has shown that

$$W = W_H (1/2)W_D$$

for $T > \theta_D/2$ $= W_D$ $for\ T < {\theta_D}/{4}$ (1.2)

Where, W_H is the polaron hopping energy, W_D is the disorder energy arising from the energy difference between two neighbouring hopping sites and θ_D is Debye temperature. The polaron hopping energy W_H is given by,

$$W_H = {W_p}/{2}$$ (1.3)

Where W_p is polaron binding energy. The polaron hopping energy W_H calculated from the theory of Austin et al [5] is given by,

$$W_H = \left({e^2}/{4\,\varepsilon_p}\right)\left(\frac{1}{r_p} - \frac{1}{R}\right)$$ (1.4) Where $\frac{1}{\varepsilon_p} = \frac{1}{\varepsilon_\infty} - \frac{1}{\varepsilon_s}$

ε_s and ε_s are the static and high frequency dielectric constants of the material respectively, ε_p is the effective dielectric constant [17], r_p is the polaron radius estimated from the site spacing R (for crystal like solids). The most general expression to calculate the polaron binding energy given by Holstein [18] is:

$$W_p = \left({1}/{2N}\right)\Sigma_q |v_q|^2 \omega_q$$ (1.5)

Where $|v_q|^2$ is the electron-phonon coupling constant, ω_q is the frequency of optical phonons of wave number q and N is the site density. Another method has been given by Mott [19] which gives a direct estimate (for polar lattices[19], if the distance R through which the electron must be transferred is not large compared to r_p) of the polaron binding energy:

$$W_p = \left(\frac{1}{2}\right)\left({e^2}/{\varepsilon_p r_p}\right)$$ (1.6)

In generalized polaron model, the activation energy is

$$W = W_H - J$$ (1.7)

Where, J is polaron band width which is related to the electron wave function overlap on adjacent sites.

Temperature dependence of conductivity:

The conductivity of conducting polymers shows temperature dependence. They have room temperature conductivity as high as those of traditional metals. However, typical organic conducting polymers and their composites exhibits non-metallic sign (conductivity increases with temperature) [20-22], which is a challenge for conventional ideas of metallic transport.

Mott's law of variable range hopping (VRH) is usually used to interpret the temperature dependence of conductivity of the electrically conducting polymers. The model was derived for amorphous semiconductors in which charge carriers such as electrons, holes and ions move between localized states having energies compatible to the Fermi energy [23]. The localized energy states correspond to structural disorder arising from imperfect crystallinity, lower degree of conjugation, and the presence of impurities. As temperature decreases, thermal energy kT decreases, and there are fewer neighbouring states with accessible energies, so the mean range of hopping of charge carriers increases. This leads to the following expression for the conductivity:

$$\sigma = \sigma_0 \exp\left\{-\left(T_0/T\right)^{1/(n+1)}\right\} \qquad (1.8)$$

Where σ_0 is the pre-exponential factor, T_0 is the characteristic temperature of thermally assisted hopping and n (= 1, 2, or 3) is the dimensionality of the process. The electron normally jump to a site for which the activation energy W is as low as possible, and is given as:

$$W = {}^3/_{4\pi R^3 N (E_F)} \qquad (1.9)$$

Where $N (E_F)$ is the density of states at the Fermi energy. The probability of a hop per unit time can be given as:

$$P = \nu_0 \exp\left[-2\,\alpha\,\overline{R}\, - \frac{W}{kT}\right] \qquad (1.10)$$

Where, ν_0 is a jump rate factor and k is Boltzman's constant. Here α is defined so that $\exp(-\alpha r)$ is the rate at which the atomic wave function on a single potential well falls off with distance r. The conductivity will be obtained by:

$$\sigma = e^2\, N\, (E_F)\overline{R}^2\, P$$

$$= K_0 T^{-1/2} \exp\left[-\left(\frac{T_o}{T}\right)^{1/4}\right] \qquad (1.11)$$

Where e is electronic charge

DC conductivity analysis:

The dc electrical conductivity of the samples for different molar concentration of ZnO is measured in the temperature range 303 – 353K by measuring the resistance of the samples. It was found that the value of the conductivity depends upon the composition of the sample as well as its temperature as shown in Fig.2 (a) and Fig.2 (b)
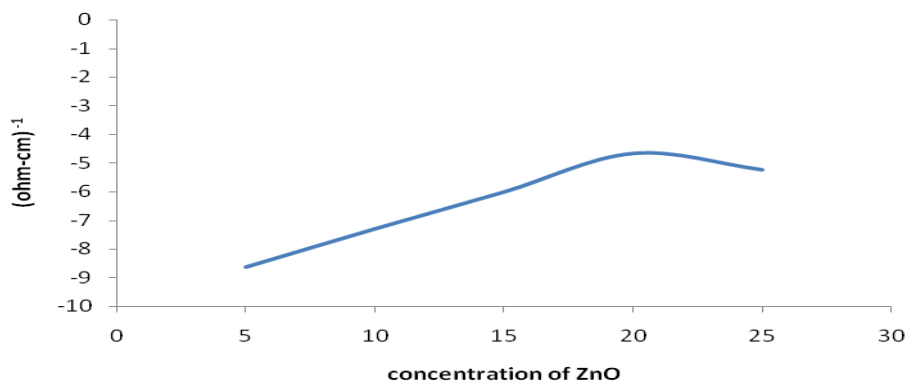
Fig. 2(a): Variation of dc conductivity with concentration of ZnO

The increase in conductivity of composite films with molar concentration of ZnO can be explained on the basis of formation of conducting Pani/ZnO network in the structure of composite films. While the decrease in the conductivity can be due to over oxidative reaction and formation of poor conducting Pani/ZnO with low bulk density.
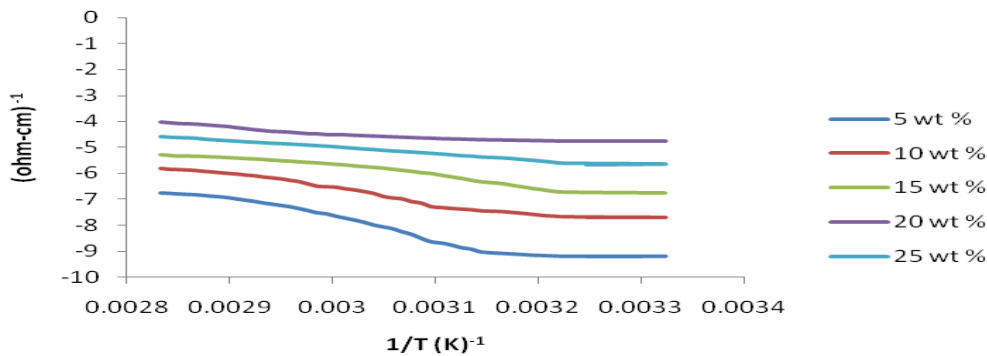
Fig 2(b):Variation of log σ with inverse temperature PANI- ZnO composite polymer

The increase in conductivity is due to increase in number of charge carriers with increase of ZnO content. This might be due to delocalization effect associated with doping in the composite structure [24-27]. The temperature dependence of conductivity fits the Arrhenius equation for the given temperature range and is given by, $\sigma = \sigma_0 \exp\left[\frac{-E_a}{kT}\right]$

Where 'Ea' is the activation energy and σ_0 is the pre-exponential factor.

The DC electrical conductivity of PAni/ZnO nanocomposite is significantly higher in (20 wt % ZnO) and lower in (5 wt % ZnO) nanocomposite.

IV. CONCLUSION

From the study of XRD pattern of PANI and ZnO with PANI/ZnO composite, it is confirmed that ZnO has retained its structure and the ZnO particles are uniformly distributed within polymer chain. While the DC conductivity studies shows that the conductivity of the PANI/ZnO composite increases with an increase in concentration of ZnO, the doping of Zno in PANI produces polarons and/or bipolarons into the composite material which in turn enhances the conductivity. While the increase in conductivity with increase in temperature is attributed to polymer chain mobility and activation of dopant.

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Studies of Some Substituted Dihydropyrimidinones in DMF-Water Solvent by Viscometrically at Different Temperature

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ABSTRACT

Measurements of density & Viscosity has been carried out for some substituted dihydropyrimidinones at different temperature in DMF-Water medium. Viscosities & densities of present system has been measured at 300K,305K, 310K, 315K. Using above data various parameters such as Relative Viscosity, Falkenhagen Coefficient A, Jones Doles Coefficient B, & Thermodynamic Parameters have been computed. The results are interpreted on the basis of solute -solvent & solute-solute interaction.

Keywords: Falkenhagen Coefficient A, Jones Doles Coefficient B, & Thermodynamic Parameters.

I. INTRODUCTION

The Studies on Viscometric Measurements has been regarded as a sensitive tool for understanding various interactions occurs in the solution of liquid mixtures & their dependence on composition & temperature are of importance in many fields of applied research. Viscosity & Its derived parameters provide the valuable information regarding molecules. Viscosity is one of the important property of liquid. The measurement of viscosity like other transport properties of electrolytes. Provide useful information about Solute-Solute & Solute-Solvent interaction The present study deals with the study of molecular intraction in terms of viscosity & Some Substituted dihydropyrimidinone of an Solvent-Water mixtures in different Concentration. Viscosity measurement like other transport properties of electrolyte, provides useful information about Solute-Solute & Solute-Solvent interactions. These interaction have been studied in aqueous & non aqueous Solutions by manyworkers[1-3].

Viscometry[4-5] is an important tool in order to elucidate the solute as a structure maker or a structure breaker. Viscosity provides an insight into the stage of association of the solute & extent of its interaction with solvent. The nature & degree of molecular interaction in different solution depends upon several factors i.e. the nature of the solvent, the structure of the Solute & also the extent of Solvation taking place in the solution . Viscosity is one of the Physical Properties of the liquid & gas as it implies resistance to flow as fluid exhibit a Characteristics property of flowing under applied force, even the force of their own weight, physical properties of liquid & binary mixture have been the subject of interest in research laboratories[6-8].

In recent years, such the considerable efforts have been given for the elevation of ideal & excess thermodynamic quantities of binary & ternary liquid mixture[9-10]. The Study of Molecular interaction in the liquid mixtures is of Considerable in the elucidation of the structural properties of the molecules. The nature & degree of molecular interactions in different solutions depend upon the nature of the medium, the structure of the solute molecule & also the extent of solvation taking place in solution. The present study of some substituted dihydropyrimidinone is selected. In Acoustic Parameters provide a better insight into molecular environment to liquid mixture. It seemed important to study molecular interaction, which motivated the authors to carry out the present investigation in the binary liquid mixtures of dihydropyrimidinone with DMF-Water Solvent at different temperatures.

II. MATERIALS & METHODS

Solvent DMF used in the present work was of AR grade, Purified & dried by the usual procedure. Densities, Viscosity, Relative Viscosity & Specific Viscosity were measured at different temperatures over a wide range of composition. Densities were determined by using bicapillary pycnometer. The Viscometer Calibrated with double distilled water[11-12]. All the measurements were carried out at different temperatures. Ligand solutions of different concentration were prepared in 20% DMF-Water of Dihydropyrimidinoes, for each measurement sufficient time was allowed to attain thermal equilibrium in thermostat.

Table 1 : System-TFP in 20% DMF-Water Medium

Table 1.1

At 300 K					
Conc. Mol dm^{-1}	Density x10^3 Kg m^{-3}	Time flow in sec.	Viscosity x10^{-3} Nsm^{-2}	Relative Viscosity	Sp. Viscosity
0.02	0.99481	66.1	0.50509	0.93516	-0.85278
0.04	0.99502	66.6	0.50832	0.94111	-0.57794
0.06	0.99522	66.8	0.50998	0.94418	-0.46196
0.08	0.99547	66.9	0.51093	0.94520	-0.38550
0.1	0.99574	66.9	0.51196	0.94850	-0.34919

Table 1.2 :

At 305 K					
Conc. Mol dm^{-1}	Density x10^3 Kg m^{-3}	Time flow in sec.	Viscosity x10^{-3} Nsm^{-2}	Relative Viscosity	Sp. Viscosity
0.02	0.99411	64.2	0.49910	0.96026	-0.68905
0.04	0.99414	64.4	0.49913	0.96035	-0.48979
0.06	0.99418	64.6	0.49915	0.96152	-0.39678
0.08	0.99420	64.8	0.4942	0.96256	-0.39426
0.1	0.99422	64.9	0.49950	0.96956	-0.39223

Table 1.3 :

At 310 K					
Conc. Mol dm^{-1}	Density x10^3 Kg m^{-3}	Time flow in sec.	Viscosity x10^{-3} Nsm^{-2}	Relative Viscosity	Sp. Viscosity
0.02	0.99254	60.7	0.46822	0.93791	-0.85308
0.04	0.99287	60.8	0.46915	0.93978	-0.59730
0.06	0.99310	60.9	0.47161	0.94572	-0.58730
0.08	0.99333	61.1	0.47329	0.94809	-0.46.772
0.1	0.99355	61.2	0.47596	0.95143	-0.38683

Table 1.4 :

At 315 K					
Conc. Mol dm^{-1}	Density x10^3 Kg m^{-3}	Time flow in sec.	Viscosity x10^{-3} Nsm^{-2}	Relative Viscosity	Sp. Viscosity
0.02	0.99051	58.8	0.44872	0.95468	-0.67920
0.04	0.99089	59.2	0.54654	0.95648	-0.51587
0.06	0.99109	59.4	0.54056	0.95574	-0.51589
0.08	0.99124	59.6	0.54212	0.95209	-0.51590
0.1	0.99152	59.7	0.54345	0.95342	-0.51592

Table 2 : Values of Falkenhagen Coefficient A, Jones – Dole Coefficient B, at different temperatures in DMF-Water Medium

Temp T (K)		300K	305K	310K	315K
20 %Acetone-Water medium	A	-1.189	-0.979	-1.206	-1.039
	B	2.835	2.309	2.876	2.458

III. RESULT AND DISCUSSION

The densities & viscosities of trifluoperazine hydrochloride (TFP), 20% DMF-Water medium at 300K, 305K, 310K, & 315K have been measured in the concentration range 0.02 to 0.1mol/dm^3. The viscosity A & B Coefficient have been Computed by the least squares method from the plot of (nr-1/$\sqrt{c}$) Vs $\sqrt{c}$.

A Is measure of ion-ion interactions & B is measure of Solute-Solvent interaction has been calculated & listed in table. In the present study viscosity of liquid solutions increses with increase in concentration of antipsychotic drugs salts solution in 20% DMF-Water mixture & decreases with increase in temperature. The increasing values of density & viscosity shows that there is a moderate attraction with Solute & Solvent molecules. The decrease values with increase of temperature shows a decrease in intermolecular forces due to increase thermal energy of the system. The increases in viscosity with increases in concentration may be attributed to the increases in solute may be attributed to the increase in solute solvent interaction. Observation of above data shows that the viscosity A – Coefficients are found to be negative. The viscosity A Coefficient represent the ion interactions & negative Values have shown some physical significance. However negative a values have also been reported to be in other solvents in some studies[13-16]. The large & Small values of " A"

Shows the stronger & weaker solute – solute interactions respectively. When solute is introduced into solvent of organic water mixture it will interfere with the ordered structure of water in the solute co-sphere. As only one solute is present so such variation in the values can be explained.

It is evident from table 2 that the "B" Coefficient is an adjustable parameter, which may be either positive or negative & it is a measure of the effective hydrodynamic volume of solute which accounts for the solute solvent interactions. Viscosity B Coefficients have been established to arise from ion – solvent interactions & are responsible for introducing order or disorder in the structure of the solvent. Solute with negative B Coefficient is Characterized as structure breakers indicating weak solute – solvent interactions. The Values of viscosity A & B Coefficient responsible for solute – solute & Solute Solvent interactions.

IV. CONCLUSION

In the present study viscosity of liquid solutions increases with increase in Concentration of dihydropyrimidinone solution in 20% DMF – Water mixture & decreases with increases in temperature. It also observed that the value of viscosity A & B Coefficient responsible for solute & solute – solvent interactions.

V. ACKNOWLEDGMENT:

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Description of Some Plant Galls Found in Nanded District of Maharashtra State

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ABSTRACT

This contribution includes the description of plant galls found in different parts of Nanded district of Maharashtra, India. these plant galls were collected from different parts of Nanded District viz. Bhokar, Khandar, Vishnupuri, Naigaon

KEY WORDS: Plant Galls, Nanded District, Maharashtra.

I. INTRODUCTION

Plant galls or tumors are abnormal growths are found on different plant parts. Almost   all plant parts i.e. leaf, shoots, stems, roots and inflorescences develop plant galls. Plant galls develop as a interaction between organisms and plant. The organisms who cause plant galls are popularly known as Zoocecidia or Cecidozoa. The example of Zoocecidia are Protozoas, Nematodes, Mites and Insects. Plant galls are also caused by Phytocecidia like bacteria and fungi. Over 106 plant galls have been reported from Maharashtra which includes 37 plant galls from Marathwada region (Sharma R.M.2003 and 2009) . More than 25 plant galls previously reported from Nanded district so far.

Galls on Family Amaranthaceae

Eight galls known from this family at present include five stem galls, and one gall each on root, leaf and flower. Stem galls are caused by 4 weevils (Coleoptera) and one mite where as remaining three galls are accounted by one nematode, (root), one midge gall (flower) and one aleurodidae. Two new cacidomyiidae galls caused by contarinia asperae sp. now. And Lasioptera asperae Sp. Nov. are reported herewith.

Leaf gall of Achyranthes aspera (L) Contarinia asperae male female sp. nov. (Cecidomyliidae: Diptera)

Achyranthes aspeara (L) is a wild herb and is of medicinal importance. It is used as diuretic and laxative medicine. A new leaf gall is reported as under.

Description of gall : Leaf gall usually hypophyllous, globose or subglobose, ovioid or fusiform, solid, solitary, glabrous, indehiscent, large and irregular; persistent or subseculent swelling at the base of the midrib or of the main lateral veins, pale green on yellow when young, turns reddish brown towards maturity. Larval cavity single axial, long, monothalamous enclosing single a single maggot. Ostiole hypophyllous, generally single gall per leaf but many a times 2-3 galls found on single leaf. Size 7-10 mm long and 3-4 mm thick.

Ecological notes: Gall formations were noticed during August-September months in both 2019, 2020. Emergence of adult noticed during October- November. Galls yellow of pale green initially becomes reddish brown on maturity. Usually gall cavity with single Maggots but sometimes may contain 2-3 maggots. Pupation in the gall.

This new midge gall reported for first time from Maharashtra and is collected from forest of Sitakhandi, Bhokar, kandhar (Dist. Nanded). Two midge fly species viz. male female sp. nov. And *Lasioptera asperae* male female sp. nov. Were bred from these leaf galls. Lasioptera species is believed to be gall former whereas Contarinia sp. is believed as an inquiline.

Distribution: Mani (1973) reported gall no. 523 and gall no. 815 as caused by Lasioptera and unknown Itonididae respectively on Achyranthes aspera Linn. From Coromamdal coast, but he could not rear adults from these galls and also did not describe the species.

Later Sharma R. M. (1976) bred adults from both stem and leaf galls on this host weed species as caused by lasioptera achyranthesae from University area, Aurangabad during 1976, 77, 78. This is new record of two galls midge flies bred from leaf gall on this host plant from study area.

Stem gall of *Achyranthes aspera* (L) (*Lasioptera asperae* male female sp.nov.) (Cecidomyliidae: Diptera) *Achyranthes aspera* Linn. is a wild herb and found all over the Maharashtra.

Description: gall solitary , globose or sub globose, elongated or elongated cylindrical, shiny, irregular, solid, hard, woody, costate, tomentose, indehiscent persistent ; young galls dark green, old galls turns yellowish-brown on maturity. Gall cavity long, unilocular and spacious and enclose generally a single larva. Pupation inside the gall, lot of excretory material found inside the gall. Size variable 1-2 cm long 15-20 mm thick, usually 3-4 galls may arise on a single twig.

Anatomical study: The central modularly part is dissolved due to the gall formation and the gall cavity shows a gradual proliferation towards the interior of the pith. However the epidermis, cortex, endodermis and part of the vascular bundle remain unaffected. On careful examination of the cortex it is revealed that the parenchymatous region of the cortex it is revealed that the parenchymatous region of the cortex is also on the verge of initiation of gall formation.

Ecological notes: Gall formation noticed during September-October months in the study duration. The young galls similar to that of the nodes and cannot be easily identified initially. Young galls are dark green and old galls turns brownish on maturity. Pupation takes place inside the gall.

Distribution: Mani (1973) collected stem galls on this host weed from Coromandal coast probably caused by Lagioptera (?) but could not rear and did not describe cecidozoa,but Sharma (1976, 77, 78) reported stem and leaf galls on this host weed from Aurangabad (M.S.) caused by *Lasioptra achyrantesae.*

A new gall reported for the first time from Sitakhandi forest Dist. Nanded. Maharashtra State, India. Causative midge flies i.e. *Lasioptera asperae* sp. nov. is a new cecidozoa for the science.

Galls on Family Boraginaceae

Seven galls reported from this family include three leaf, three flower and one root galls. These galls are caused by mites (3 galls), midges (2 galls) and two beetles. The galls have partly Ethiopian and some have Malayan affinities.

New galls on three new hosts are described herewith.

Petiole gall of *Cordia Obliqua* Frost. (Unknown beetle: Coleoptera) *Cordia Obliqua* Frost, a common forest tree from this part of Maharashtra is of medicinal importance. Leaf extract of this tree is used for treating cough and chest related problems. Gall caused by an unknown beetle is reported herewith.

Description of gall: Petiole gall caused by unknown beetle is found extensively on this host tree. The gall is ovoid or fusiform, solid, woody, single, spacious larval cavity contains a single grub, gall size variable, 16-20 mm long and 5 mm thick; initially gall is green, however turns yellowish towards maturity.

Anatomical study: In the presence of petiole gall, the bark is seen intact. The pith and medullar parenchyma including phloem is affected and central portion of the pith cells is completely dissolved to form larval cavity. Moreover it is indicated that soft parenchymatus cells are greatly affected and lignified vascular tissue are found intact.

Ecological notes: The gall formation was noticed during August-September months during study period of 2019, 2020. Initially the gall looks like an ordinary petiole and appears green in colure but later it becomes larger, swollen and turns pale yellowish on maturity. Pupation occurs in the soil. Emergence was noticed during November-December.

Distribution: Present gall is the first record of caused by a beetle from this region of India. It is reported from forests of Bhokar, Barul, and from S.R.T.M.Univerrcity area (Dist. Nanded).

Earlier a mite gall caused by *Eriophyes cordiae* Nelepa on cordia myxa Linn was reported from different parts of India. The present beetle gall on this new host tree i.e. *Cordia oblique* Frost is reported for first time from this part of India, and is new to the science.

Stem gall on *Cordia oblique* Frost.

A new stem gall on this host tree i.e. *Cordia oblique* caused by an unknown beetle is reported herewith. This host tree is medicinally important one. Leaf extract of this tree is used for treating cough and chest problems.

Description of gall: Localized of extensive swelling on the old as well as terminal branches, hard, solid, woody, subglobose, fusiform, moniliform; initially dark green but later on turn yellow or straw colored towards maturity; larval cavity single, irregular, spacious, encloses many grubs. Galls of variable size, ranging from 50-60 mm long and 10-15 mm thick.

Ecological notes: These galls were collected and studied during 2018, 2019, 2020. The gall formation was noticed from late October each year. Initially the galls are green but later on turn straw colored towards maturity, single, spacious, larval cavity with many grubs. Pupation outside the gall, emergence during November/ early December each year.

Distribution: Earlier a mite gall caused by *Eriophis cordia* Nelepa galling *C. myxa* Linn. Was reported from different parts of India.

Present stem gall caused by an unknown beetle is the first report of gall on this new host plant from Maharashtra & India. Grubs present inside these galls confirm about beetle as the causative organism.

Pouch gall on leaves of *Cordia dichotama* Frost (Unknown Eriophyes sp: Acarina :)

Cordia dichotama frost is common forest tree that is found in the forest of Kandhar (Dist. Nanded). The host tree has medicinally. Leaf paste is used as a dressing for pustular eruption on the face. Bark is mild tonic and astringent. Fruits are used for treating cough and uterus, chest problems.

A new mite gall on the leaves of this hosts tree is reported herewith.

Description of gall: Epiphyllous, yellowish or pale green, fizz gall, often leading to formation of pustule like pouch galls, with a large hypophyllous ostiole, cavity lined by white or brown long hairs, hairs unbranched twisted, gall 3-4 mm diameter.

Ecological notes: The gall formation was noticed during November-December months during 2019, 2020. Galls initially simple outgrowth but later develop into a pouch gall. Young galls dark green or yellowish while pale green towards maturity.

Distribution: Earlier Acarina gall, caused by *Eriophyes cordiae* Nelpa was reported galling leaves of Cordia myxa Linn from different parts of India.

A mite gall is reported on a new host plant species i.e. *eordia dichotame* Frost from forests of Barul, Kalamber, Kandhar (Dist. Nanded) (M.S.), India.

Galls on Burseraceae Of the four galls known at present galling the members this family, two Eriophyds, one psyllid and one cecidomyiidae galls are reported from India. Three leaf and one inflorescence galls are reported so far. One known psyllid gall and one known midge gall are reported from this study area.

Leaf gall of Garuga pinnata Roxb. (phacopterian lentiginosomus Buckton, Homoptera) *Garuga pinnata* Roxb is a common forest tree that occur in tropical forest of Kinwat, Bhokar, Kandhar, Sitakhandi (Dist. Nanded). The leaves and branches are used as a fodder for Elephant and cattle etc.

Description of gall: Leaf gall, simple, epiphyllous, free, or clustered and bunched; ovoid, subcylinderical, or subglobose, unicellular gall, strongly constricted basally in to a short neck like stalk inserted in cup like tumescence of covering outgrowth from leaf blade, on midrib or large side veins, usually close to leaf base. The young galls are conspiously yellow and smooth, become yellowish green during growth and turn tinted reddish towards , maturity; galls with reticulate surface and with many radiating veins. A single leaf may usually have 2-3 galls but some times over dozen galls may be found bunched together. Gall cavity spacious, with a 1 or 2 nymphs and adult of psyllid. On maturity, galls dehiscence irregularly above and allow the escape of adult bug, which has been emerged much earlier but remains imprisoned inside the gall. Gall 20 mm long and 10 mm in diameter.

Ecological notes: The gall formation was observed during June – July months of 2019, 2020. Generally on both young and older leaves. Matured galls are tinted red in color. Spacious gall cavity contains 1 or 2 nymphs and also adult psyllid.

Distribution: Earlier this known gall was reported from different parts of India. This is the first report of this Psyllid gall from forests of Kandhar and Bhokar forest (Dist. Nanded) of Maharashtra, India.

Leaf gall of *Garuga pinnata* Roxb. *Lasioptera garugai* Deshpande et. el. And *Garugadiplosis brevipalpi* Deshpande et. el.

This is the first record of cecidomyiid gall on Garuga pinnata Roxb reported from forests of Kandhar and Gangakhed.

Description of gall: Leaf gall, epi-hypophyllous, more pronounced on lower side of the blade, sessile, simple, ovoid, of globose, smooth, persistent gall, occurs on midrib, vein or veinlets, initially green but turns reddish brown on maturity. Gall cavity unilocular enclosing one or two maggots inside. Fully formed gall measured 7-8 mm in diameter, 3-7 galls may arise on single leaf. Exist holes circular, mostly on under surface.

Ecological notes: The gall formation was noticed during July-August months of 2019, 2020. Emergence usually during September. Few galls remains persistent even after defoliation.

Distribution: This leaf gall, a first cecidomyiid gall on this host plant, was reported from forests of Bhokar, Sitakhandi & Kinwat by Deshpande et. el. In 2003. Two gall midge flies were reared from this leaf gall. Viz. *Lasioptera garugai* and *Garugadiplosis brevipalpi*. The first one is believed to be a gall former while the latter as an inquilines. The present gall is now reported from the forest of Kandhar (Dist. Nanded) Maharashtra, India. Two gall midge flies viz. *Lasioptera garugai* and *Gargodiplosis brevipalpi* were reared from this leaf gall.

II. RESULT AND DISCUSSION

As data collected by author on plant galls shows that there are numerous types of plant galls found in Nanded district. These plant galls are from Different families of Angiosperms. Yet lot of scope for study of plant galls from study area.

III. CONCLUSION

From above result and discussion it is clear that Nanded district has rich biodiversity of plant galls . The places viz. Vishnupuri, Bhokar, Khandar, Naigaon, Ardharur has numerous types of plant galls. These plant galls may be pest of various cops.

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Barriers in Information Literacy Program at Our College

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ABSTRACT

Today's information literacy is very important aspect for the development of higher education, college and users. In this paper is an attempt to bring out the barriers in Information Literacy Program. Stressing the need for Information Literacy Program the barriers such as problems related to management of the educational institutions, financial problem, inhibition of the teachers, psychological problems of the users such as students, full-time research workers, teachers and employees have been enumerated. The problem related to the status of the Librarian has been touched as also his inhibition. Attempts have been made to touch on important issue related to the problem and development of the library. This paper is an attempt to give a brief overview of the various problems encountered in the implementation of information literacy program in our college.

Keyword: Information skills, Information Literacy, Financial Problem, Psychology Problems, Management Problems, Government Responsibilities.

I. INTRODUCTION

Today is the age of information technology. In the of information technology, a great deal of information is being created. A large amount of information is being created as well as a large number of information tools. So that it has become increasingly clear that students cannot learn everything they need to know in their field of study in a few years of college. Information literacy equips them with the critical skills necessary to become independent lifelong learners. Current modern era is a competitive era. To survive, one has to be aware of all the happenings in the world. Therefore, everyone tries to gain the information from various available sources for variety of reasons. The researchers, teachers, students collect the information for study purpose, managers collects it for manage their field work and other work. It means that information is key to success for everyone. The countries which are considered as Advanced Countries are rich in information. Because of their information richness, they have become advanced countries. Every human being and also nation knows the importance of the information. In this age of information every nation strives to be supreme. Unless and until the nation is not powerful in terms of information, it cannot achieve this target. On this backdrop, government motivates their scientist to engage in the research. Therefore the research output, especially of scientific literature has been increasing exponentially since the second half of the last century. Library in true sense is the power house of the information. This tremendous growth of literature in the various documentary forms is

to be managed in the library. It is the responsibility of library professionals to manage, organize and disseminate this information to the needy persons at right time without wasting their valuable time. Information is a valuable commodity. In the present information age, it has a monetory importance. Information Literacy is the solution for this critical problem of access, evaluate and use information from a variety of sources.

In the current information age, the speed at which we work makes us increasingly dependent on high quality information. However, information is becoming more voluminous, fragmented into different formats and media, and duplicated in multiple physical locations. People need to be literate in order to make effective use of these myriad resources. The term information literacy, sometimes referred to as information competency, is generally defined as the ability to access, evaluate, organize, and use information from a variety of sources. Being information literate requires knowing how to clearly define a subject or area of investigation; select the appropriate terminology that expresses the concept or subject under investigation; formulate a search strategy that takes into consideration different sources of information and the variable ways that information is organized analyze the data collected for value, relevancy, quality, and suitability; and subsequently turn information into knowledge (ALA 1989). This involves a deeper understanding of how and where to find information, the ability to judge whether that information is meaningful, and ultimately, how best that information can be incorporated to address the problem or issue at hand.

Information Literacy is the ability to access, evaluate and use information from a variety of sources. As students prepare for 21st century traditional instruction in reading, writing and mathematics need to be coupled with practice in communication, critical thinking and problem solving skills, Information Literacy is the ability to recognize why information is needed and have and have the ability to locate, evaluate and use effectively the needed information.

Information literacy has become a crucial issue today for development and progress .Even at the individual level to become an independent lifelong learner it is essential to achieve a high level of information literacy. Information Literacy programs are under way across the globe.

In the twenty first century, information literacy has become a crucial issue for the political, economic, social and cultural development in all countries. Information literacy is global phenomenon today. It is information gap that divides the nations and the citizens of a nation into rich and poor. It is information literacy that inclosing this gap.

II. OUR COLLEGE

Our JIJAMATA ARTS COLLEGE, Darwha Dist -Yavatmal is a Rural and Arts College; most of the students are studying in Marathi medium. So they don't have much knowledge of technology. Information literacy is the vital process in the modern changing word which is mostly used for higher education. We are implementing this program so that even our students can get important information in today's age. For such students, there is a lot of difficult in implementing information literacy program. The barriers encountered in the information program are briefly stated. For the last two – three years our libraries have been implementing information literacy program through induction program. This program accommodates maximum number of college students and we give them a lot of information about college and library every year through this program.

III. OUR LIBRARY ACTIVITIES

1. **College Prospect:** The prospect prepared annually in our college contains information regarding library rules, facilities, software and various other facilities.
2. **Best Reader award:** The Best Reader Award is given to three students every year by the library.
3. **Library Friend Award:** The Library Friend Award is given annually to the students who contribute to the various activities carried out by the library every year.
4. **Book Exhibition:** Every year an exhibition of books is organized through our library.
5. **User Education Program:** We are implementing user education program in the library so that the students get complete information about the library.
6. **Class room teaching by librarian**
7. **Library visit**
8. **Parents visit to library**
9. **Quiz competition**
10. **Practice Competitive Exam**

What is Information Literacy?

The term information literacy was introduced in 1974 by Zurkowski who was the president of the US Information Industry Association to refer to people who knew how to apply information resources to their work. Even after three decades of its first use information literacy as a concepts is still evolving. Various attempts have been made by experts to explain this concept of information literacy. Often information literacy, library literacy, media literacy, computer literacy, network literacy and digital literacy are erroneously used as synonymous terms. Library literacy relates to the competency in the use of library resources and services. Media literacy refers to the ability to evaluate the information received from different mass media of information .Computer literacy denotes the skills in manipulating the computer hardware and software. Network literacy refers to the ability to navigate the Internet and digital literacy refers to the ability to explore the digital information. Whereas information literacy is a wider concept that encompasses all of the above mentioned literacy's and goes much beyond. It is about using information effectively and intelligently. Often some librarians find it difficult to differentiate between library instruction and information literacy. Library instruction is about teaching the use of library. Information literacy, on the other hand, focuses on users empowerment to do independent and self-directed search.

1) According to the American Library Association. Presidential Committee on Information Literacy Final Report.(ALA, 1989) "Information Literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information."

Why Information Literacy Program is necessary?

Today's world is the world of Information. Information has an important place in human life as well as for decision making for the planner and plays an important role for acquiring knowledge. Information is also important for using new technology etc. Because of information explosion, it creates lots of information and locates in various tools or things which became as the sources of its. Information also publishes in various volumes and edition. Due to unawareness of readers, scope of information in library and differences in information sources, students, readers and researchers don't' understand where they should search information.

They don't get proper information at right time. Students, Readers or Researchers who come in library want information immediately; therefore they should know about all information sources. User doesn't know how to get the information. Information Literacy is the only one solution over it. To implant 'The Information Literacy program is responsibility of a College Librarian for getting proper information at proper time to the Users. Therefore librarian should be able to handle it and there is a necessity of research on Information Literacy.

Users need information basically according to their needs. Information Literacy is aimed to promote the skills of users to locate, collect and evaluate the information. The information may be in printed or electronic form, it is useful to them, but they don't know how to access it. Therefore, Information Literacy programming has become essential. But some barriers come into implementing Information Literacy Program.

Therefore, this topic has become important to the library professionals and hence the researcher has selected this topic for studies.

IV. BARRIERS OF INFORMATION LITERACY PROGRAM

Different problem can arise when introducing Information Literacy Program. We have tried to include the important barriers in the implementation of information literacy program in our college. These barriers are enumerated as follows:

A) Organization/Institution related Problems

The librarian in charge of the library is responsible for organizing the library and providing library services to students and faculty members, researchers or library users, and is responsible for its services and IL program. He is the information specialist and manager for library operations and functions.

Responsibility implies delegation of proper authority to transact the assigned business effectively. The business of the college library is to organize the library resources and services. But practically Librarian has no freedom to take his own decision. For ex. for the governance of the college library many colleges have got a library committee constituted or formed under the college regulations by an executive order for the Principal. It acts as a link between the top management of the college and the Librarian and mostly have recommendatory role. Its recommendations are not final unless duly approved by an appropriate authority. As a matter of Principal, the Principal and the Librarian should be its Chairman and Secretary respectively. The college Librarian occupies key position in its library committee. His active participation in his deliberations will be in the interest of the library and its users because he is accountable for library, organizations, services, execution and follow up action on the decisions taken by the authorities on the recommendation of the library committee.

Unfortunately, the position of the Librarian in library management at many places is like a square peg in a round hole. He is neither delegated with any authority in the college management nor granted even the membership of the library committee. If he is simply expected to bear the responsibilities without any authority commensurate to his position, then he should not be accountable for the decision made by the library committee and other authorities. Hence cooperation of the authorities of the organizations has to be secured through persuasion.

B) Financial Problems:

Every college has to face with various financial issues while implementing any plan. No grant is given by the government for this purpose. The college has to spend for such various activities. In the same way our college may also face financial problems while implementing important initiatives like information literacy program. It may be derived from the parent organization or UGC or any such funding sources, but it needs proper planning,

prior assessment of the current and anticipated demands and thoughtful utilization which can be made by a trained and competent librarian only. But it is a matter or experience that the college librarian is quite often neglected in deciding the library finance. The decisions are generally taken at higher level as to what amount should be made available to the library without caring for the stepping prices and periodical subscriptions, requirement of the library users and the library's requirements. But librarian is the only competent persons who is well familiar with the strength and weakness of the library collections requirements of the library users, nature and value of publications, new services to be introduced and the areas of the library which need strengthening. He should plan his requirements well in advance and put up his demands before the appropriate authorities. He should also plan as to how he would utilize the funds made available for the library by the UGC and other sources. Thus his job is very challenging, because he attempts to draw maximum funds in the best possible manner to the utmost satisfaction of the library users as well as authorities. Hence financial problems should not be obstacles in way of librarians.

C) Inhibition of the Teachers:

While the information Literacy program is being implemented in colleges, it does not seem to be of much use to college professor. Although information tools are being made available to students and professor through this information letters program, there is not much enthusiasm among the teachers. In such a situation, one has to consider their mentality while implementing such a program.

Many times the feelings of teachers towards the librarian may not always be very encouraging. Faculty members and Researchers in many cases may not agree that a non-teaching staff of the library have anything to teach the teacher. Now days in every modern library, a well qualified librarian is appointed whose qualifications are not less than the faculty members. In college librarians have been granted faculty status. Many teachers do not think of approaching the librarian in case of any requirements for his study and research purposes. This type of psychological inhibition should be removed from their mind by way of some orientation program specially arranged for the teacher community. The problem of inhibition of the teachers arises because of failure of teacher training instruction to include in their basic training program. An adequate understanding of the function of the college library as a learning laboratory and the role of librarian as a fellow teacher is necessary.

D) Student's Psychological Problems:

The User Components of libraries are as follow:

1) Students:

Students may be school level, under graduate or post graduate levels…

2) Researchers:

a) Full Time Scholars mostly receive research grants primarily from various national, international organizations.

b) Part-time: Part-time researchers are mostly working on honorary basis.

c) They are mostly working in the under graduate colleges as whole time teachers.

1) Teachers:

a) Full time Asst.Prof. Assot. Professors, Professors, Readers, Lecturers and

b) Part-Time and Honorary teachers.

2) Employees:

They are not frequent library users. The above said categories of users and their requirements are different in nature. Librarian and staff have to face their varieties of requirements and also to make psychological study of

each category. For example, Student community is rather shy in nature and they generally do not express their demands before the Librarian. Librarian has to take initiative in this regards by way of personal contact and identify their exact requirements. Secondly, student's community is the prime user in the libraries, The library system of most of the undergraduate colleges is so bad that it fails to attract students to its fold. No uses orientation program is carried on. Naturally their information collecting, handling and usage capacity is very inadequate.

E) Researchers:

Researchers of different disciplines are studying books related to various researches in our college. So they also have different demands. Our library strives to meet the demands of maximum research trough inter library loan. A library use pattern of the researchers varies in many ways. There are senior research fellow who are aware of some core document of their subjects and also aware of the library norms, rules and regulations for utilizing library facilities. But in most case it is found that the researchers are not well acquainted with the ordinary document like national indexing and abstracting service, report of conference etc.

F) Teachers:

Changes in teaching pattern, competition for higher posts, impact of information explosion, lead a section of teachers to increasing use of the libraries. But in many cases faculty members and researchers may not agree that the library's non-teaching staff has anything to teach teachers. Researchers may also share the same view.

G) Problems Related to Librarian Status:

Intertie has to deal with the problem of rest in order to present any new program. The librarian may not be able to overcome the psychological barrier in introducing such a programmer out of his own accord. Co-operation of the authorities of the organization or institution and the faculties has to be secured through precaution in this respect. But to bitter experience some of the researchers and faculties may not find interest in this regards. Their feelings towards the librarians may not always be very encouraging.

H) Inhibition of the Librarian:

Today Libraries are facing some major barriers in implementing the information literacy program, notable among them are absence of properly designed curriculum on information literacy. Since our library is a small library, there are not skillful staff libraries available. Therefore, the librarian alone has a huge responsibility over time. At such times the librarian has to face different problem.

To remove the inhibition of the librarian and the library staff and to create an atmosphere conductive to proper library functioning, library association with the assistance of the Government and the authorities concerned may undertake certain programmers, to promote Information Literacy Programmed.

V. GOVERNMENT RESPONSIBILITIES

1. Govt. of the India and the state Government should take initiative to make compulsory provision in the budget of college for the library and post of Librarian while granting recognition to them.
2. Government has failed to include in the advance course of study either at state or National level, the specific learning experience requiring library support and specific reference to the necessity of intergrading instruction in the use of library within the frame work of teaching learning programmed.

VI. CONCLUSION

No matter how many problems arise while implementing information literacy program, it is very important to implement information literacy program for the benefit of the users. It is necessary to adoption an information literacy program in order to explode deeply and use information resources. Skillful staff should be provided to the library through the govt. for maximum development of the library. A specific set of rules should be prepared in the context of the information literacy program through the university Library.

Management of educational institutions must recognize the importance of libraries and librarians, providing maximum possible financial support to the libraries and giving decision making authority to the librarians.

Teachers need come forward by shedding their concept that the librarian cannot teach them the use of library. Teacher should help the librarian to implement the Information Literacy programmers.

The librarians should dispel any doubts regarding the implementation of Information Literacy programmes and should work like a salesman in this respect.

The student community, research workers and the faculty members should neither feel shy of nor should they feel that the librarian is not competent in guiding them for the use of library resources.

The Universities and the Government should insist upon the Information Literacy programmes in schools and colleges since they usually provide the financial support for building up the libraries.

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Dielectric and Structural Relaxation Studies Of 1,3-Butanediol-1,4-Dioxane Mixtures Using Time Domain Reflectometry Technique

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ABSTRACT

The complex permittivity spectrum of 1,3-Butanediol in 1,4-Dioxane have been measured in the frequency range of $0.01 \le v/GHz \le 50$, over the entire concentration range using time domain reflectometry technique at 25°C. The dielectric parameters such as static dielectric constant (ε_s) and relaxation time (τ in ps) are obtained from the complex permittivity spectra using nonlinear least square fit method. The 1,3-Butanediol-1,4 Dioxane mixture shows the Cole-Davidson type relaxation process. The molecularinteractions among1,3-Butanediol-1,4 Dioxane mixture have been studied using excess dielectric constant, excess inverse relaxation time and Bruggeman factor.

Keywords: Complex Permittivity Spectra, Dielectric relaxation, Time domain reflectometry Excess inverse relaxation, Bruggeman factor.

I. INTRODUCTION

Dielectric relaxation spectroscopy of associating liquids offers valuable insights in the study of physicochemical properties. The time domain reflectometry (TDR) is a very useful technique to study the dielectric relaxation parameters of liquids. This technique covers a broadband of frequencies in a single measurement [1]. The measurement of dielectric relaxation is a good tool to study molecular interactions in hydrogen bonded liquids such as diols.In our laboratory the considerable dielectric work has been done on diol–dioxane mixtures using time domain reflectometry [2]. These molecules have an intrinsic electric dipole moment. Diols are the organic compounds which are most important in the field of organic chemistry and biochemistry. Due to the presence of two –OH groups in a diol molecule, the solution chemistry of these compounds can be strongly influenced by the intermolecular and intramolecular hydrogen bond formation. It also plays an important role in the physical properties of the molecules.Butanediols are four carbon diols that have many industrial and biological applications[3-5].

1,3-butanediol (1,3-BD) is the higher diol in diol family having structural formula $OHCH_2CH_2CHOHCH_3$. This colorless liquid is derived from butane alcohol in which hydroxyl groups are attached to first and third carbon atoms of the chain. 1,3-BD is commonly used as a solvent for food flavoring agents and is a co-monomer used in certain polyurethane and polyester resins. 1,3 BD is a highly effective humectants in pet foods, tobacco and

cosmeticformulations. Many workers [6-7] have reported dielectric relaxation studies of binary mixtures to understand hydrogen bonding and intramolecular interaction in the mixtures. Kadam *et al.* have studied dielectric properties of 1,3 butanediol-water mixture in frequency range of 10 MHz to 30 GHz using a time domain reflectometry (TDR) technique at 25^{0}C temperature [8]. Shinde*etal.* have reported dielectric spectra of 1,3-propanediol-dioxane mixture in the frequency range 10 MHz to 30 GHz at 25^{0}C using the method of time domain reflectometry [9].

In present paper, we have reported the dielectric relaxation study of 1,3-BD–1,4-Dioxane1,4-Dx mixtures over a wide concentration and frequency range using time domain reflectometry technique. The static dielectric constant, relaxation time, excess properties, Kirkwood correlation factor and the number of hydrogen bonds for 1,3-BD–1,4-Dx mixture have been determined.

II. EXPERIMENTAL PROCEDURE

1,3 BDand 1,4-dioxane (1,4-Dx) are purchased from Merck-Chemicalsand used without purification.Complex permittivity spectra for 1,3-butanediol and 1,4-dioxane (1,4-Dx) binary mixture at temperature 25^{0}C was recorded over the frequency range $0.01 \leq v/GHz \leq 50$ using Time Domain Reflectometry. Tektronix Digital serial analyzer (DSA 8300) sampling main frame oscilloscope having dual channel sampling module80E10B has been used. A sampling module provides 12 ps incident and 15 ps reflected rise time pulse produced by tunnel diode was fedthrough a coaxial line system having 50 Ω impedance. The inner andouter diameters of used coaxial cable were 0.28 mm and 1.19 mm respectively.Sampling oscilloscope records the changes in step pulseafter reflection from the end of line. The reflected pulse without sampleR1(t) and with sample Rx(t) were recorded in the time window of 5 nsand digitized in 2000 points. The subtraction [q(t) = R1(t) – RX(t)]and addition [p(t)=R1(t) + RX(t)] of these pulses are done and stored in oscilloscope memory. Fourier transformation has been used for the conversion of time domain data to frequency domain data in the frequency range $0.01 \leq v/GHz \leq 50$. Calibration of TDR was done accordingto guidelines of manufacturers and using solvents with known dielectric constant [2, 10-11].

III. RESULT AND DISCUSSION

The Cole–Cole (ε'vs. ε') plot for different concentrations of 1,3-BD–1,4-Dx mixture is shown in **Figure 1**. To calculate static dielectric constant (ε_0), relaxation time (τ) and distribution parameters (α and β) the complex permittivity $\varepsilon^*(\omega)$data were fitted by the non-linear least squares fit method to the Harviliak–Negamiexpression [12] $\varepsilon_*(\omega) = \varepsilon_\infty + \frac{\varepsilon_s - \varepsilon_\infty}{[1+(j\omega\tau)^{1-\alpha}]^\beta}$ (1)

where ε_s, ε_∞, τ,$\alpha$and β are the fitting parameters. The Harviliak–Negami function includes the Cole–Cole ($\beta = 1$), Davidson–Cole ($\alpha = 0$) and Debye ($\alpha = 0$, $\beta = 1$) relaxation spectral functions in the limiting form. In general, the dielectric loss spectrum of polyalcohol is an asymmetric shape, and it is described by Cole-Davidson equation. Here these fitting parameters, α is kept to 0 and β is varies in between1 to 0. βindicates the asymmetrical broadness of the loss peak.

It can be seen from **Figure 1**that the dielectric relaxation in these mixtures can berepresented by Cole–Davidson relaxation. The change in β values may reflect a variationin the relaxing species or a perturbation of the molecular structure of the system. Thedecreases of β suggest that the structure of the mixtures deviates significantly from thatof pure diol.
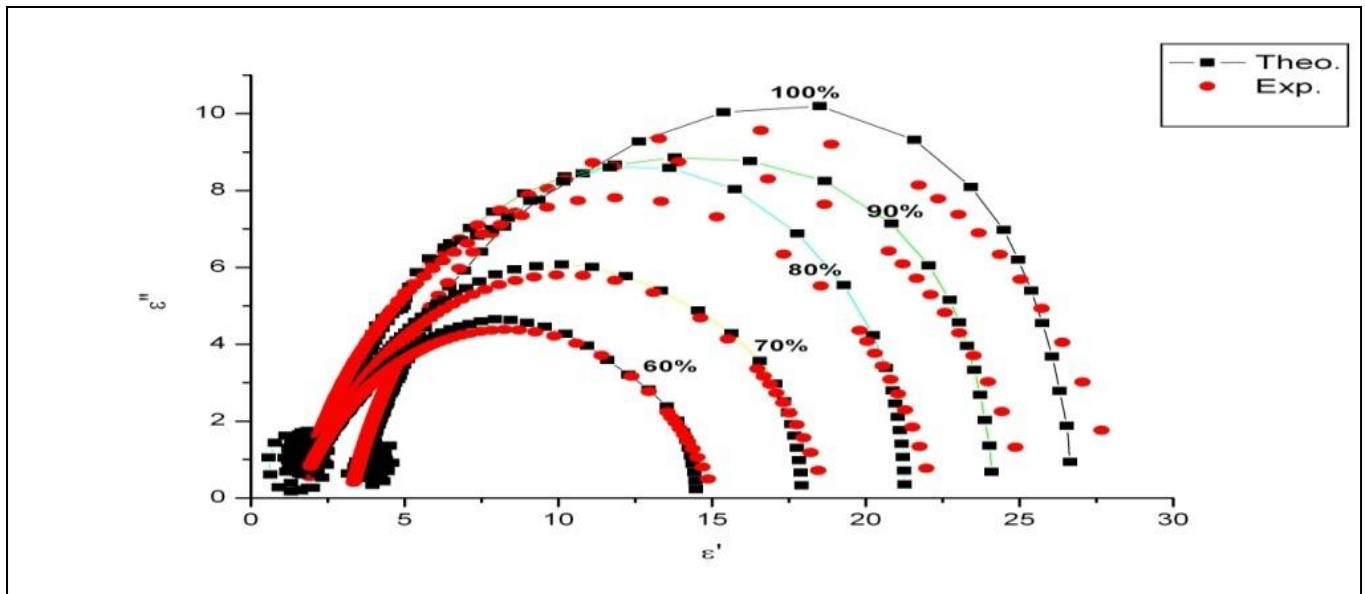
Figure 1. The Cole–Cole plot for 1,3-butanediol–Dx mixture at 25°C.

3.1 Complex Permittivity Spectra

Figure 2shows the complex permittivity spectra (CSP) for 1,3-BD-1,4-Dx binary mixture in the frequency range $0.01 \leq v/\text{GHz} \leq 50$. This spectrum shows the systematic variation of dielectric permittivity ε' and dielectric loss ε''. As frequency increases, dielectric permittivity of solution decreases for all concentrations including 1,3-BD but for pure 1,4-Dx variation is not significant due to its low dipole moment.
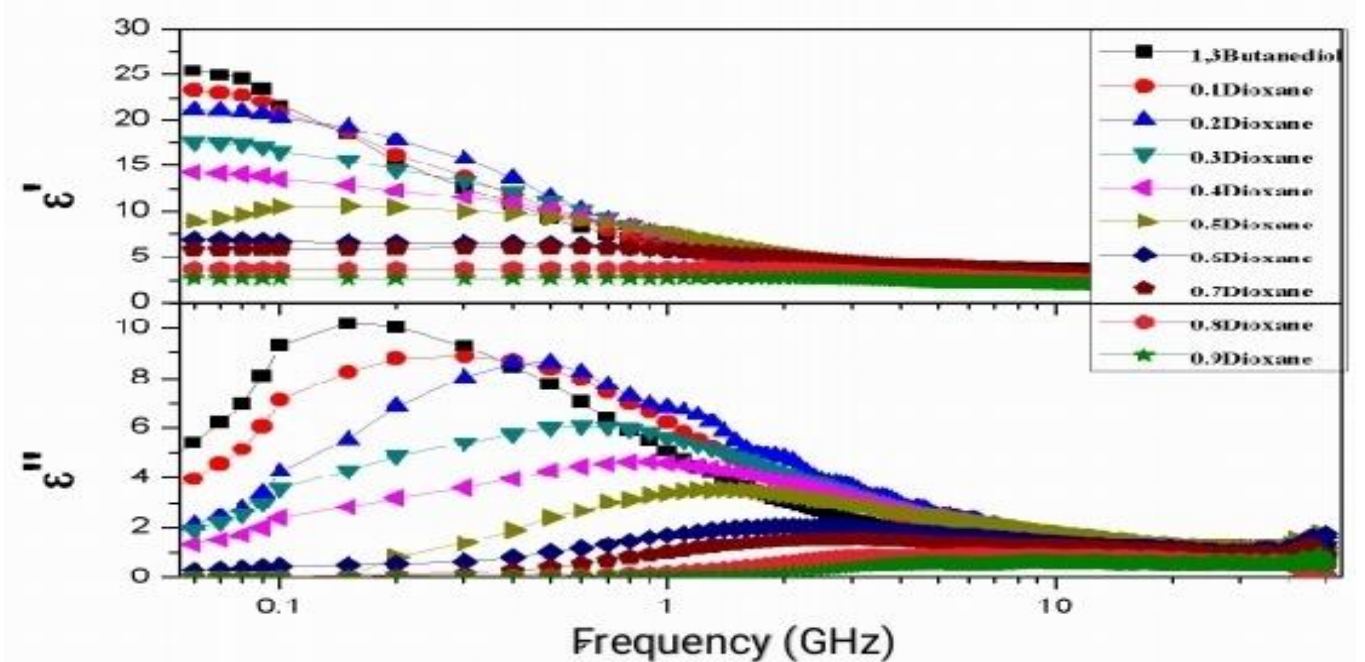
Figure2: Complex permittivity spectra for Butanediol - Dioxane binary mixture at 25⁰C.

3.2 Dielectric constant and relaxation time:

The change in dielectric constant (ε_s) values for Butanediol-Dioxane system at 25⁰C temperature is shown in **Figure3.** The ε_s values have been increasing linearly with increasing the volume fraction (V_w) of 1,3-BD in 1,4-

Dx, suggest the self-association, hydrogen bonding and aggregation of molecules changes from spherical to elongated aggregation in solutions [13].
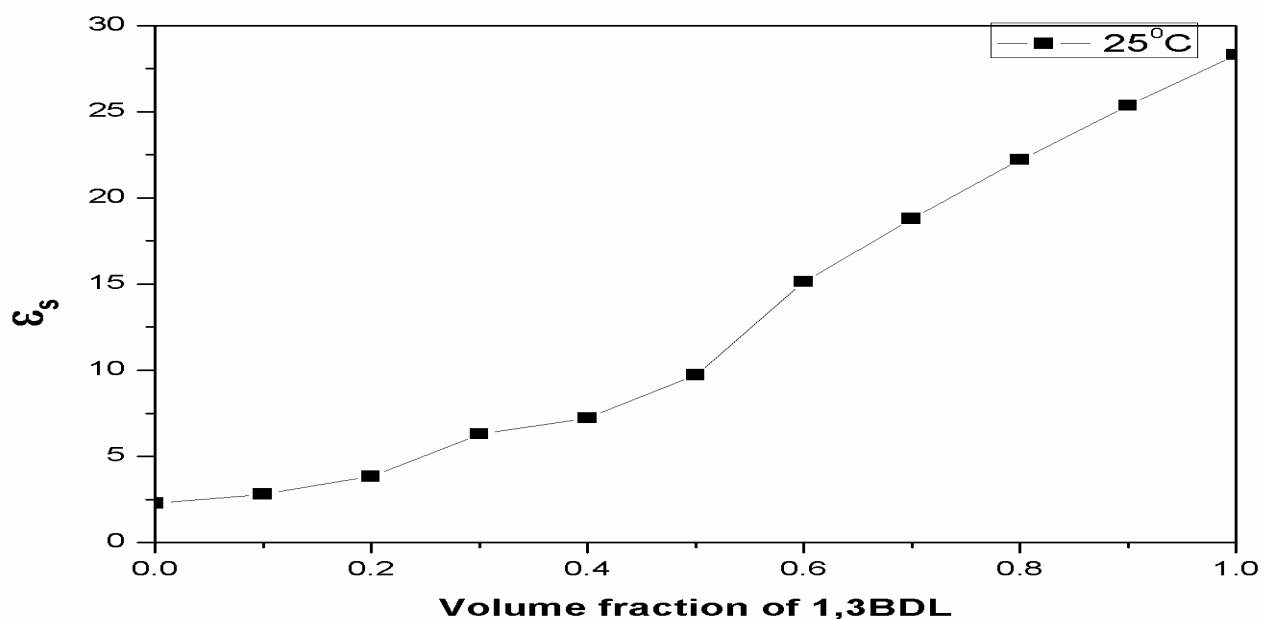
Figure3:static dielectric constant vs. volume fraction of 1,3-butanediol at 25ºC.

Figure 4 shows the concentration dependence of relaxation time (τ) of 1,3-butanediol–dioxane mixtures. The relaxation time (τ) increases with increasing 1,3-BD concentration in dioxane. When dioxane is added to 1,3-BD, the number of hydrogen bonds decreases. The distribution of hydrogen bonds would affect the concentration dependence of the relaxation time. The relaxation time of alcohol–dioxane system increases non-linearly with increasing alcohol concentration. These values also suggest the net change in orientation polarization configuration in the mixture over entire concentration range [14].
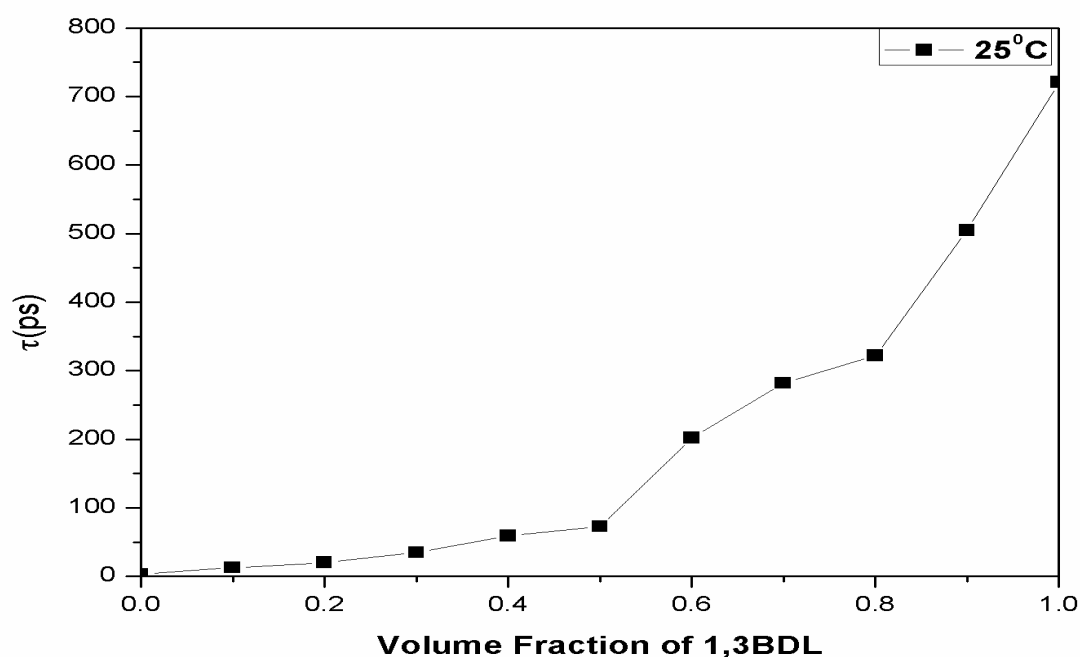
Figure4: Relaxation time vs. volume fraction of 1,3-butanediolat 25ºC

3.3 Excess inverse relaxation:

The excess inverse relaxation property is useful for perception of cooperative domain in the mixture and may affirm the formation of multimers in mixture due to molecular interaction. The excess inverse relaxation time is definedSas $(1/\tau)^E = (1/\tau)_M - [(1/\tau)_{Dx}X_{Dx} + (1/\tau)_{BD}(1-X_{Dx})]$ (2)

where the subscripts M,D and BD represents Mixture, 1,4-Dx and 1,3-BD respectively and X_{Dx} represents the volume fraction of 1,4-Dioxane in 1,3-BD.The plot of excess inverse relaxation time vs. volume fraction of 1,3-BD is shown in **Figure 5** Negative vales of excess inverse relaxation suggest that there is slower rotation of dipoles in mixture due to solute-solvent interaction form the hydrogen bonded structure i.e., multimer which produces a field in such a way that the effective dipole moment get reduced [2].
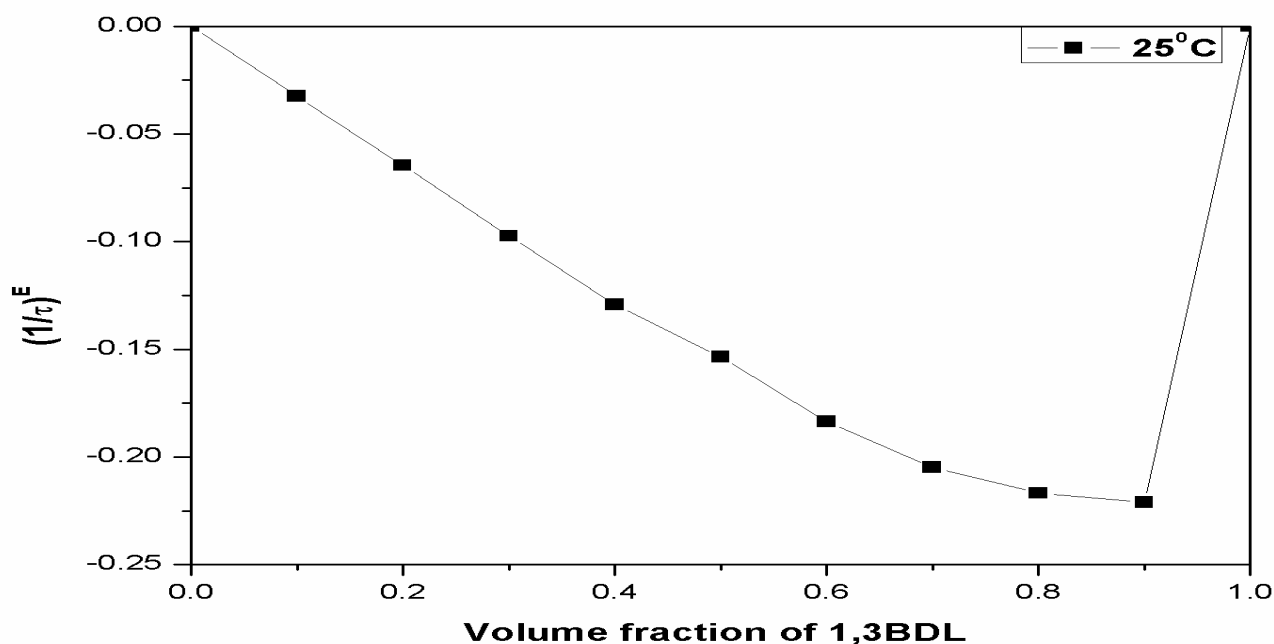
Figure 5. Excess inverse relaxation time $(1/\tau)^E$ verses volume fraction of butanediol at 25^0C.

3.4 Excess dielectric permittivity:

The excess dielectric permittivity (ε_s^E)can be written as: $\varepsilon_s^E = (\varepsilon_s)_M - [(\varepsilon_s)_{Dx}X_{Dx} + (\varepsilon_s)_{BD}(1-X_{Dx})]$(3)

where the subscripts M, Dx and BD represents Mixture, 1,4-Dioxane and 1,3-Butanediol respectively and X_{Dx} represents the volume fraction of dioxane in 1,3-Butanediol. The plot of ε_s^E vs volume fraction of butanediol is shown in **Figure 6**. The negative values of ε_s^E suggest that molecules of1,3 Butanediol break the structure of Dioxane and the Butanediol- Dioxane molecules grow together which results into the formation of polymeric structure and decrease in total number of effective dipoles [2].
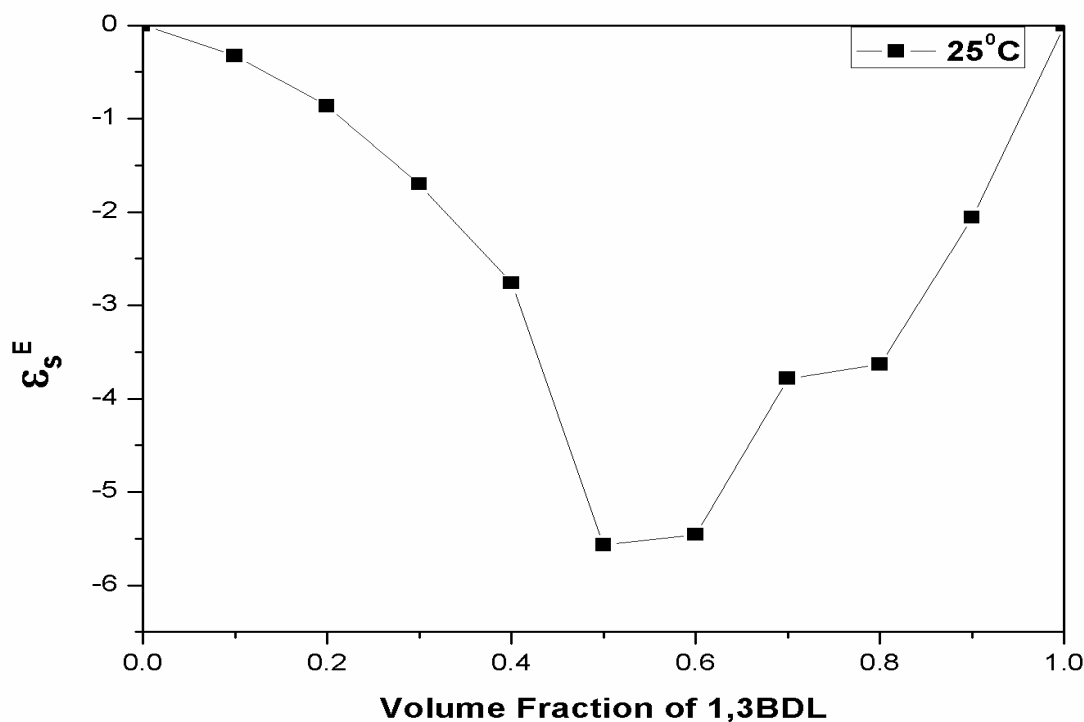
Figure 6. Excess static Dielectric Permittivity for 1,3-BD-1,4-Dx mixture.

3.5 Bruggeman dielectric theory

The static permittivity of a mixture with the volume fraction of solute is given byBruggeman mixture formula [15]

$$f_B = \left(\frac{\varepsilon_{sm} - \varepsilon_{sDx}}{\varepsilon_{sBD} - \varepsilon_{sDx}}\right)\left(\frac{\varepsilon_{sBD}}{\varepsilon_{sm}}\right)^{1/3} = 1 - V_{Dx} \quad (4)$$

Where, $f_B$is the Bruggeman dielectric factor. E_{sm}, $\varepsilon_{sDx}$and ε_{sBD} are the static dielectricConstants corresponding to the mixture, 1,4-Dx and 1,3-BD respectively and $V_{Dx}$is the volume fraction of dioxane. From the above equation, a linear relation is expectedfrom a plot $f_B$vs. V_{Dx}. From **Figure 7**, it can be seen that f_B is not a linear of volumeFraction of 1,3-BD as predicted by Bruggeman equation. The Bruggeman equation maybe modified for binary liquids as [7]

$$f_B = \left(\frac{\varepsilon_{sm} - \varepsilon_{sDx}}{\varepsilon_{sBD} - \varepsilon_{sDx}}\right)\left(\frac{\varepsilon_{sBD}}{\varepsilon_{sDx}}\right)^{1/3} = 1 - [a - (a-1)V_{Dx}]V_{Dx} \quad (5)$$

In this equation, volume fraction $V_{Dx}$is changed by a factor *[a–(a–1) V_{Dx}]* of the mixture. Where *a* = 1 corresponds to Bruggeman equation. The value of *a* is determined by theLeast squares fit method and found to be 1.17 and deviation of *a* from unity indicates theMolecular interaction in the mixture[9].
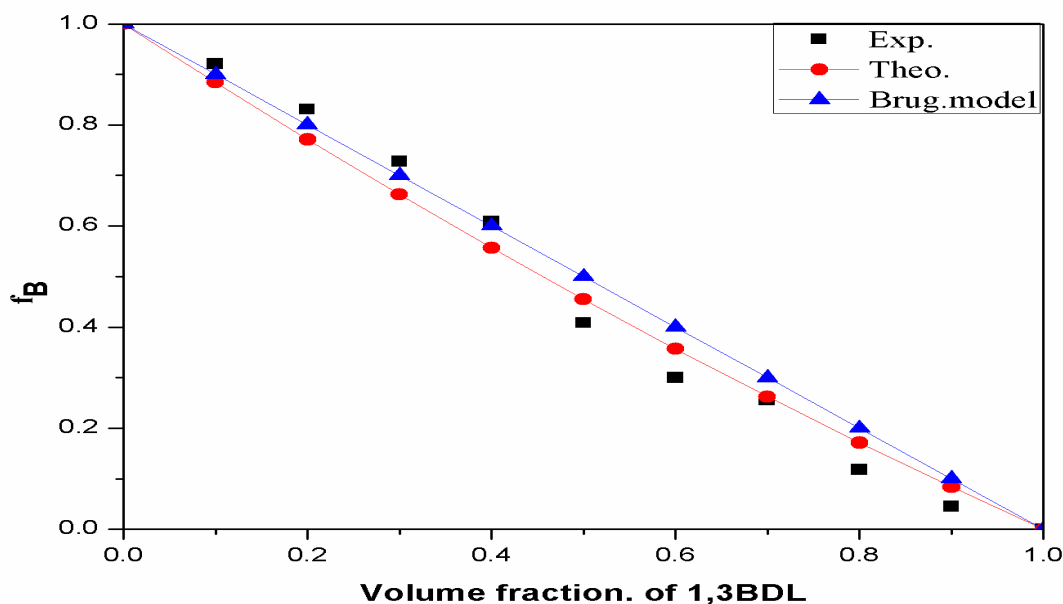
Figure 7. Plot of Bruggeman factor as a function of volume fraction of 1,3-BD

IV. CONCLUSIONS

The complex permittivity spectra of 1,3Butanediol with 1,4-Dioxane have been studied at 25°C, using TDR technique in the frequency range of $0.01 \leq \nu/GHz \leq 50$. The dielectric constant for the mixture can be explained by using Cole-Davidson's model. The relaxation time for 1,3-BD is found to be 750 ps which indicates there is excessive H-bond network formation in 1,3-BD. The excess dielectric properties and Bruggeman factor shows the molecular interaction in mixtures.

V. ACKNOWLEDGEMENTS

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Survey on Students' Choice on Career Opportunities after B.Sc

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ABSTRACT

After doing Graduation in B.Sc. there are so many Career Opportunities for Students. They can choose to do anything after Graduation. A survey was carried out on students studying in B.Sc. to study about their career Scheme and Choice after Graduation In Small Scale. Total 50 students were surveyed on. Students from B.Sc. 1st, 2nd and 3rd year were included from different colleges and having contrasting subjects currently taken by them. Findings in this study was that Major quantity of students ought to go for further Education after graduation i.e. M.Sc, Medium quantity of students want to give Competitive Exams & scant number of students want to go for other desperate fields. So, this study shows that what career path students choose after their Graduation.

Keywords: - Questionnaire, Career Opportunity, Survey, Graduation, Career Choice

I. INTRODUCTION

We all know, after COVID-19, major impact of pandemic on students has occurred. A lot of deprivation occurred, like interruptions in their studies, jobs and many other things. So, Students need to know more about their Career Opportunities after Bachelor's Degree and expand their possibilities in their careers for a better future and jobs. And Students have many aspirations for accomplishing their Goals. For that reason an attempt is made to know what students actually want to do after their Bachelor's Degree.

There are so many Career Options after B.Sc. Here, given below, are basic and common Careers Options for all.

- Students can pursue for further education in M.Sc. degree and also go for Ph.D. as a research scholar. And so many good jobs become available for students.
- Students can teach in schools after applying in B.Ed. and apply in Private or Government Schools.
- They can also teach from home as Online Tutors.
- They can enroll for Integrated Ph.D.(M.Sc.+ Ph.D.) in the best universities in India.
- After B.Sc. there are many Private job options students can apply for, of their subject interest.
- Preparing for Government Exams like Railway, UPSC, MPSC, etc. they can apply for government jobs.
- And if students are not comfortable with their current subjects they can change their field to different one means Startup.
- Internship in related subject is also a good option for gaining experience and developing better skills.

- Students can also go for Apprenticeship or Trainee.

According to students' subject interest they can find many more other good fields of opportunities for a better future. Because interest in the Subject matters.

II. OBJECTIVITY

1. To find out students' career interest after graduation.
2. To study and sort out the various career options or opportunities after UG.
3. To determine the trend in careers of Science students after UG in small scale.
4. To find out students choice career choice after graduation.

III. METHODOLOGY

For this research, an **Online Questionnaire Method** was implemented which involves the analysis of students' future career plan. Through Google form, students were asked to fill up the form with some given questions and options regarding to their career interests and choices to get required (both quantitative & qualitative) data about their career choices.

IV. DATA ANALYSIS & INTERPRETATION

Here is the Data Analysis of students' further career choices. The following data comprises of a systematic Table & Pie Charts.

- **Analysis of students Career Choice**

Sr. No.	Career Options	No. of Students
1.	Post Graduation (M.Sc)	31
2.	Competitive Exams	10
3.	Research Field	2
4.	Internship	2
5.	Startup	2
6.	Online Tutoring	1
7.	Apprenticeship	1
8.	Trainee	1
	Total	**50**

Table of Students' Career Choice after Graduation
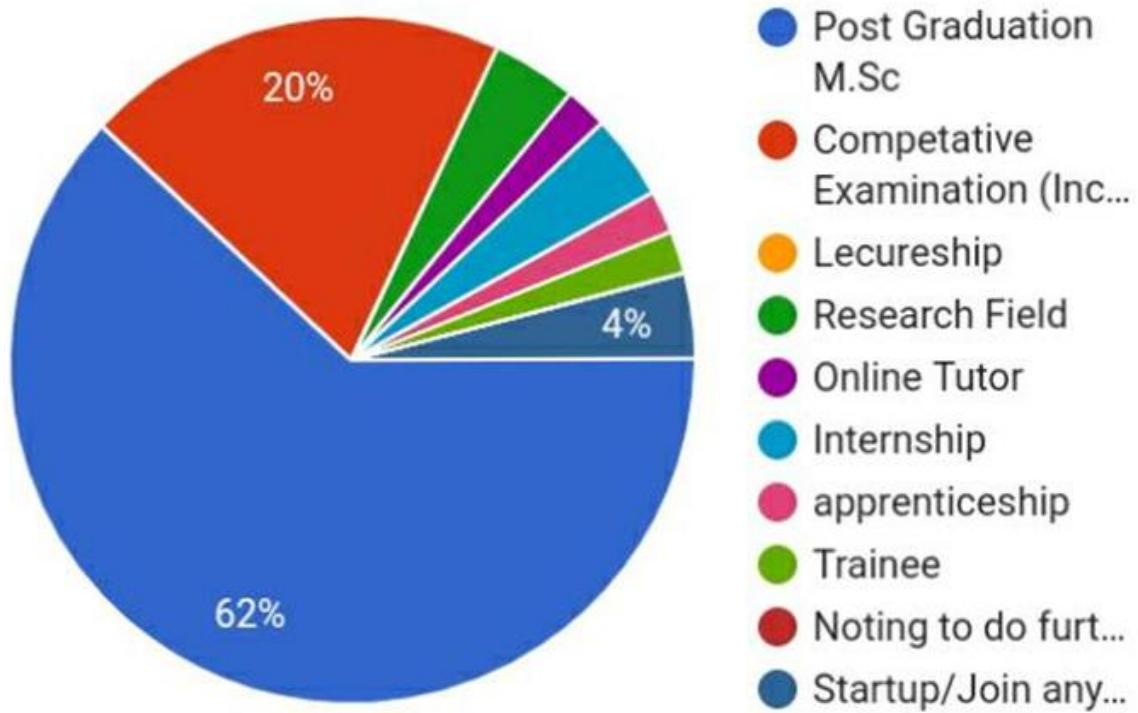
Fig. 1. A Pie Chart of Students' Career plan after graduation
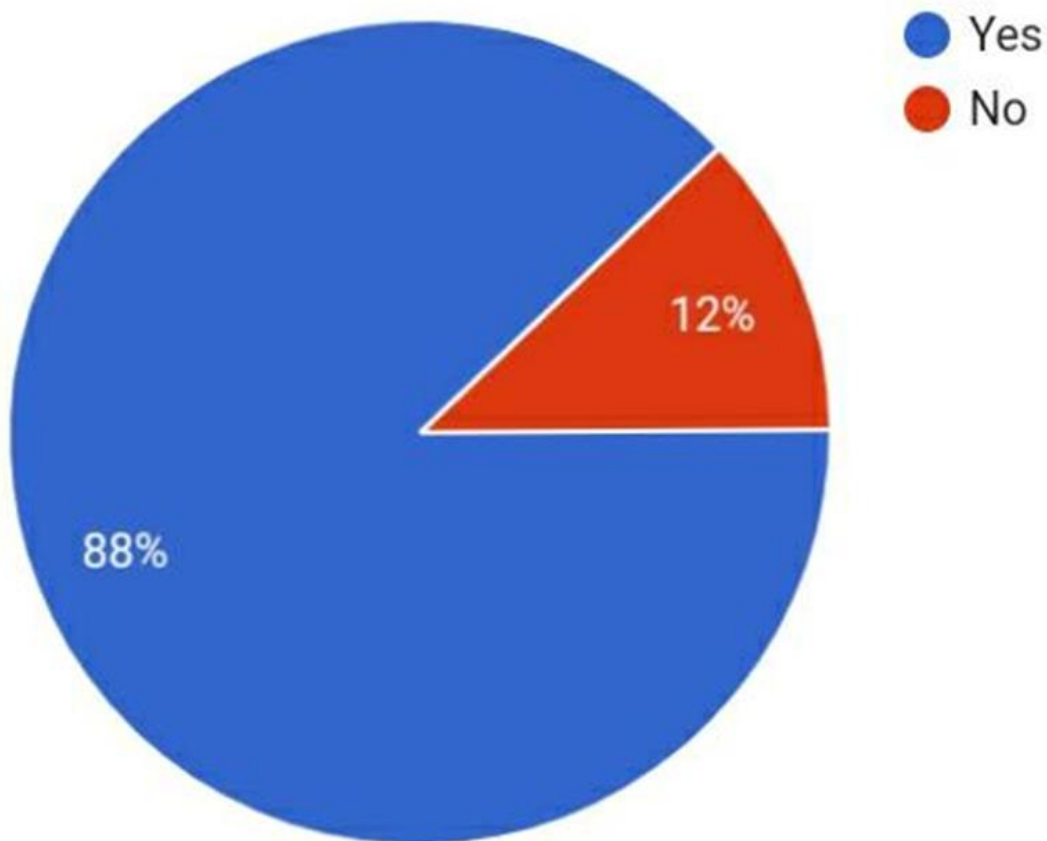
Fig. 1. B. Responses of Students for College Guidance

V. RESULTS AND CONCLUSIONS

- From the above obtained data most of the students chose to study further in M.Sc., **62%** in quantity.
- **20%** of students want to give Competitive Exams which are in trend.
- And other **18%** of students chose to go in contrasting fields as given in the above table No.1.
- From the **Fig.No. 2, 88%** of students seem to need Guidance.

VI. RECOMMENDATIONS & SUGGESTIONS

- From the above Data it seems like most of the students are yet demented & bewildered with their Career and need proper guidance for it.
- Colleges & Coachings (if have any), students should certainly consult their Teachers or Guides about more Career Opportunities. They will assurely help them to firmly determine their Career Path.

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Information Literacy : The Need and Importance in College Library

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ABSTRACT

With the advent of information and communication technology in the twenty-first century, enormous changes have occurred in higher education, libraries, and information centres to which the library and information profession is no exception. Every student is expected to adapt sophisticated information gathering techniques to locate, organise, evaluate, and use information effectively in order to be successful in their individual endeavours in today's changing complex of globalization and Information explosion in the higher education sector and the College environment. The Information Literacy Programme teaches students how to use information effectively in the current educational system and prepares them to deal with contemporary learning obstacles by teaching them information literacy skills. The notion of Information Literacy (IL) has become increasingly popular among the academic fraternity of India's higher education system. The goal of the IL is to raise awareness among individuals and organisations about how machine operating systems may aid in locating, accessing, analysing, and getting data and documents required for problem-solving and decision-making. The IL assists library users in developing fundamental skills in information use, which have become a must for everyone who wishes to participate effectively in information technology society today. The importance of IL programmes is that they bridge the skills and knowledge gaps between library and information professionals and college students, as well as acting as activators of the lifelong learning process, which has become a necessity in today's world. Information literacy is a comprehensive notion that encompasses information skills, ICT skills, library skills, problem-solving and cognitive abilities, as well as the attitudes and values that allow student learners to function well in the information landscape.

I. INTRODUCTION

Information literacy is also a series of skills that give students a basis for academic coursework, job performance, citizenship, and lifetime learning. The increase in quantity of information from all sources of information, such as various sorts of papers, media, and the Internet, has raised concerns about the authenticity, legitimacy, and dependability of information. This ambiguous quality and finite quantity of information, which has caused significant obstacles to information users and information science experts, can be addressed to a large extent by IL programmes and skills gained by users during their education.

II. DEFINITION

"Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information".

What is information literacy?

The American Library Association defines information literacy as a collection of skills that enable people to identify when they need information and to find, analyse, and use it effectively. While information literacy is frequently discussed on college campuses in relation to conducting library research for papers, annotated bibliographies, and other types of school assignments, we use and require information in every part of our life. Consider all of the unofficial research we conduct on a daily basis. We check for movie and book reviews, YouTube how-to videos, product reviews, and so on. We check up how to fill out a field on our tax forms, job advertisement and interview tips, and how to spell or describe an unknown word or phrase on Google. We all have information needs, and information literacy is defined as the ability to effectively recognise and address those needs. It's also important to be able to tell the difference between good and bad information. The American Library Association suggests six ways to think about information literacy. The six ways are as follows: authority, according to the Association is constructed and contextual; it sees creation of information as a process, it held that information has a value and regard research as an inquiry, scholarship as conversion and searching as a strategic exploration.

Benefits of Information Literacy in Colleges Library

The main advantage of IL programmes for students at academic colleges is that they provide valuable skills and training, which leads to more effective and efficient use of information sources and databases for improved educational outcomes. In addition, the IL has a number of advantages for students, including the following:

➢ IL assists students in exploring and learning about various types of resources, including both print and electronic media, as well as how to select the appropriate sources for various activities and actions.

➢ IL assists students in developing the capacity to analyse, assess, and extract information from a variety of sources, as well as selecting the most accurate and dependable sources of information.

➢ IL assists students in developing competence in developing strategies for discovering and accessing essential information; and

➢ IL assists students in developing the capacity to effectively organise, apply, and share information. This competence comprises accurate citation, excellent language use, copyright respect, and plagiarism avoidance.

➢ IL motivates students to become independent and lifelong learners by assisting them in developing the ability to synthesise and expand on existing information, thereby contributing to and creating new knowledge.

➢ The key to empowerment, development, and enjoyment is information literacy.

Components of information Literacy

Lokhande and Gadge lay out the following components of information literacy:

Basic Literacy: Reading and writing, speaking and listening, counting and calculating, perception drawing.

Library Literacy: Library literacy is too important to every student to understand how the library can assist them.

Media Literacy: Understanding the many types of media and the various reasons for which they can be employed is referred to as media literacy.

Technology literacy, like basic literacy, technology literacy is a set of skills that can constantly be enhanced, and, like library literacy, students receive technology exposure and education on a case-by-case basis, depending on which teachers they have throughout time.

Visual Literacy: It refers to the abilities and knowledge required to view visual and audiovisual materials with scepticism, critical thinking, and knowledge. It is the link between Media literacy and Technology Literacy.

III. NEED OF INFORMATION LITERACY

In our own lives, too much information might become a barrier. The information barrier is caused by the vast amount of data available, the rapidity with which it arrives from all directions, the necessity to make quick decisions, and the fear that we are making decisions without having all of the information available or that we require. The solution to the information hurdles is information literacy.

Because of ICT, IL is now highly significant, and its use in libraries and information centres is to maximise the use of information resources in teaching, learning, and research. The necessity of the hour is for an information literacy programme. It enables end users to retrieve information according to their requirements.

Role of information literacy in College Library

Both employees and students in the College Library require information literacy. The purpose of information literacy education is to equip and encourage students to learn about the variety of information resources available in the library. In other words, they should acquire over the course of their studies or through opportunities for professional development.

Library Activities towards Information Literacy

Information literacy programmes for users should be developed by college librarians. The following activities can be used by college librarians to make users aware of information.

The college librarian may assist in providing full information on the procedure process, collection services, laws and regulations, and other topics are included in the college prospectus, which is revised annually. The librarian has an active role in library brochures, publication of a handbook/brochure with thorough information on the library. He/She might organise a book talk by selecting a group of 10 to 20 students asking them to participate in a conversation about a specific book, and also a script reading session can be scheduled for that particular book. The librarian can start a counselling centre within the library wherein it can provide the most up-to-date information literacy on the syllabi of numerous competitive examinations and employment prospects. Also a readers club can be established in order to promote the reading culture. Through library user education programme can be introduced by the means of lecture method as well as arranging an activity like visits to library. The librarian may assist student in co-curricular activities just as newspaper clipping files and alike activities. The activity like the exhibition of books can be organised in order to encourage readers in inculcating reading habit among them. The library aids in education and research work, it can organise the author-reader visit programme, can form clubs like movie club etc. The programmes by library such as user orientation, quiz and debate, offering best readers awards etc are without doubt very important steps in the direction of information literacy.

IV. ROLE OF LIBRARIANS IN INFORMATION LITERACY

The complete scenario in libraries has transformed as a result of information and communication technologies. The library has evolved into a resource-based learning centre, and the job of the librarian is evolving rapidly in tandem with new educational paradigms. Moving from text-based to resource-based learning will result in increased use of library materials as well as a demand for more and more diverse media resources, both print and non-print. The librarian is in charge of loading, obtaining, disseminating, and tracking a variety of information resources. Database searching, inter-library loans, monitoring internet news groups, and maintaining a computerised library information system are all examples. Libraries and librarians play a critical role in preparing people to use information effectively and efficiently by teaching them information skills at all stages of education, enabling them to be well-informed citizens.

V. CONCLUSION

Due to information and communication development and changes that affect every educational programme and procedure, the college library, and indirectly all educational structures, faced challenges. In India, educational reforms are currently underway to improve educational outcomes, and these changes are creating significant changes. Students are demanding better educational outcomes in order to become competitive, hence curriculum modifications are required. Librarians must maximise their potential in this setting in order to play a role in the teaching and learning process.

To help students develop information literacy abilities, each academic must be involved in instructional strategies and learning materials. Because we must be willing to promote and share our experience in this information area in support of our institutional educational mission, we must have an active and ongoing programme concerning information access, development, and support from faculty makers, librarians, and other information providers. We are convinced that our approach for developing and integrating an effective information literacy course will be adopted since it will improve students' general talents, such as problem solving, critical thinking, creativity, communication, and presentation of their ideas.

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Recognition of Typed Devnagari Characters Based on Linear Binary Pattern (LBP)

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ABSTRACT

The crucial issue of the character recognition is the identification of similar characters. In this paper, a character recognition technique is proposed for identification of similar characters by increasing commonly used feature of selected image with gradient features from potentially discriminative image regions. The crucial regions of identical characters sets are automatically detected here. Experimental results on Typed Devnagari Character using LBP demonstrate the capability of the proposed method in discriminating visually similar characters. The method also out performs existing character recognition methods by considerable margins. It has a great potential for character recognition of other alphabets.

I. INTRODUCTION

Typed Devnagari Character recognition is the task of transforming a language represented in its spatial form of graphical marks into its symbolic representation. There are two kinds of Typed Devnagari Character input, on-line and off-line [1]. On-line Typed Devnagari Character input maintains the time series of writing points, order of strokes and additional information about pen tip (velocity, acceleration). For example, Typed Devnagari Character input methods on cell phones and tablets receive on-line. The Typed Devnagari Character input when users touch the screen. Preprocessing of on-line recognition includes noise removal, stroke and character segmentation. Off-line Typed Devnagari Character input only preserves images of the completed onboard writing area. For example, banks recognize Typed Devnagari Character amounts on checks. Preprocessing of off-line recognition includes setting thresholds to extract writing points, removal of noise, segmentation of writing lines, and finally segmentation of characters and words.

Character acknowledgment framework is significant part of the of example acknowledgment. Character acknowledgment is a stepwise cycle of preprocessing, highlight extraction, and characterization. Character acknowledgment precision depends of the adequacy of each progression[5]. In character acknowledgment, precision diminished because of certain limitations like mathematical misalignment through character style varieties, clamor, and undesirable data in picture, size of the picture and in particular the fluctuating picture foundation. Expanding the exactness and improving the FRT model, need to choose of the legitimate element extraction system and appropriate classifiers.

The main significant advance in any character acknowledgment framework is pre-handling followed by division and highlight extraction. Pre-handling includes with the means that are needed to shape the info picture into a structure reasonable for division. In division step, the information picture is divided into singular characters and afterward, each character is resized into m x n pixels towards preparing the organization[6].

In proposed system we present the character acknowledgment calculation incorporates LBP and Character recognition using LPB using region crop method. The system will talk about ability of picture commotion, brightening, impact of scaling and revolution invariant[2].

There are six major stages in the Character Recognition those are

- Image Acquisition
- Pre-Processing
- Image Segmentation
- Feature Extraction
- Image classification
- Post processing

- Image Acquisition :- Take a picture using digital camera of the document or scan the document and save it in a computer with proper image extension.
- Pre-Processing :- In this process the image undergoes the input to the Pre-Processing stage is the stored image in the computer.
- Image Segmentation :- Image segmentation is nothing but dividing the whole image into small sub-images based on the uniqueness
- Feature Extraction :- Feature extraction is the main part of the Character identification process, this is the process where each character will be represented as a feature vector ,the unique feature of this step, the focus of this stage is to extract a set of features of the segmented image to improve character recognition rate
- Image Classification :- Once the features are extracted in feature vectors the will be given to image classifiers such as K-Nearest Neighborhood (KNN), Bayes Classifier, neural networks, Hidden Markov Model (HMM) and so on. These classifiers are the decision makers of the algorithms.
- Post-Processing :- In this stage based on the decision from classification stage the recognized fonts will be printed in editable form on digital screen.
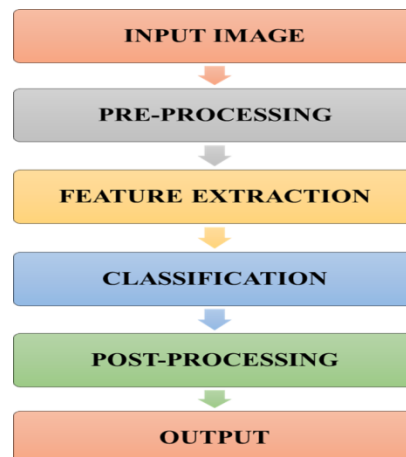
Figure: Block diagram of the proposed character recognition system

II. LOCAL BINARY PATTERNS (LBP)

To group images, the element vector may now be produced using the Support vector machine, outrageous learning machines, or any other AI computation. Such classifiers can be used for character recognition or texture analysis.

The claimed uniform example is a useful addition to the first administrator since it can be used to shorten the component vector and perform a simple pivot invariant descriptor. This idea is driven by the fact that some twofold examples occur more frequently in surface images than others. If the paired example has two 0-1 or 1-0 modifications, the neighboring parallel example is called uniform.

This idea is driven by the fact that some twofold examples occur more frequently in surface images than others. If the paired example has two 0-1 or 1-0 modifications, the neighboring parallel example is called uniform. It has demonstrated to be profoundly discriminative and its central issues of revenue, specifically its invariance to monotonic dark level changes and computational capability, make it reasonable for requesting picture investigation errands. The fundamental nearby parallel example administrator, presented by Ojala et. al. [13] was dependent with the understanding that surface has locally two reciprocal angles, an example and its solidarity. LBP highlight extraction comprises of two chief advances: the LBP change, and the pooling of LBP into histogram portrayal of a picture. As clarified in [13] dark scale invariance is accomplished due to the distinction of the power of the adjoining pixel to that of the focal pixel. It additionally embodies the nearby math at every pixel by encoding binarized contrasts with pixels of its neighborhood area:

$$LBP\left(P, R, t\right) = \sum_{p=0}^{p-1} S_t\left(g_p - g_c\right)2^p$$

Where gc is the focal pixel being encoded, gp are P evenly and consistently examined focuses on the fringe of the roundabout space of sweep R around gc , and st is a binarization work boundary by t. The examining of gp is performed with bilinear insertion. t, which in the standard definition is viewed as nothing, is a boundary that decides when neighborhood contrasts are viewed as large enough for thought.

In our LBP the first form of the nearby double example administrator works in a 3^x3 pixel square of a picture. The pixels in this square are edged by the value of the center pixel, duplicated by forces of two, and then summed to obtain a value for the middle pixel. Because the local is made up of 8 pixels, a total of 28 = 256 unique marks may be obtained by depending on the general dark estimations of the center and the pixels around it[9].

For our situation, we utilize the uniform LBP as referenced in [8] Which are the basic properties of LBP, for the improvement of a summed up dark scale invariant administrator. The term 'uniform' if there should be an occurrence of nearby twofold example alludes to the consistency of the appearance for example the roundabout introduction of the example has a predetermined number of advances or discontinuities. The examples which are considered as uniform give a lion's share more than 90%, of the 3^x3 surface examples in the verifiable archives. The most as often as possible noticed 'uniform' designs compare to central miniature highlights like corners, spot and edges. These are likewise considered as highlight locators for setting off the best example coordinating. For our situation, where P = 8, LBP8; R can have 256 distinct qualities.

The LBP highlight vector, in its easier structure, is made in the accompanying way:

- Analyzed window is divided into cell.
- For each pixel in a cell, compare it to each of its eight neighbors (to its left side top, left- center, left-base, right-top, and so on) Follow the pixels around in a circle, either clockwise or counter-clockwise.

- Declare "0" where the value of the middle pixel is greater than the value of the neighbor. Another topic, say "1" This results in an 8-digit double number (which is generally changed over to decimal for comfort).

- Generate the histogram of the occurrence of each "number" over the phone (i.e., every blend of which pixels are more modest and which are more prominent than the middle). This histogram may be thought of as a 256-dimensional element vector.

- Standardize the histogram if desired.

- All things considered, concatenate (standardized) histograms. This returns a component vector for the whole window.
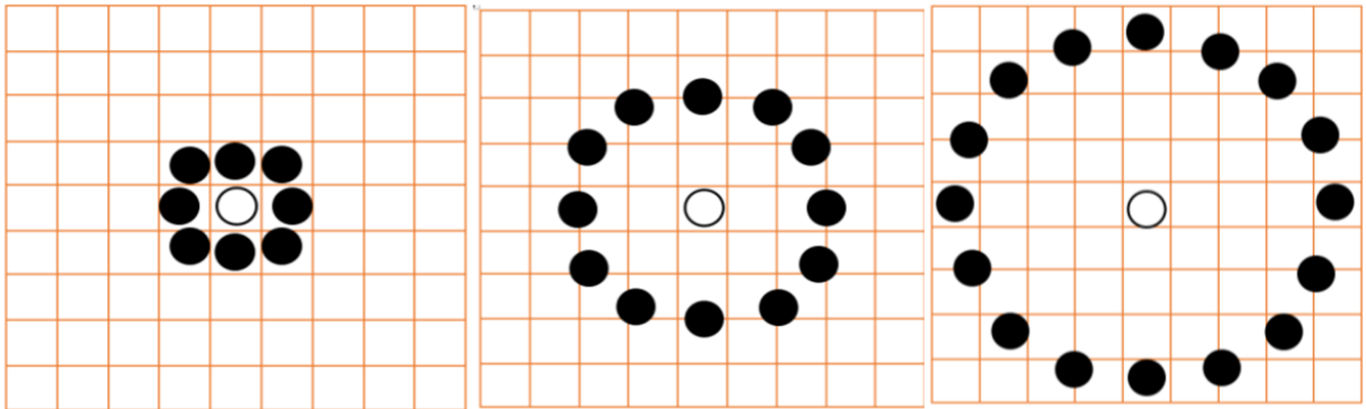
Figure : Three neighborhood examples used to define a texture and calculate a Local Binary Pattern (LBP)

o Read in a sample image and convert it to grayscale.
o Extract unnormalized LBP features so that you can apply a custom normalization.
o Reshape the LBP features into a number of neighbors -by- number of cells array to access histograms for each individual cell.
o Normalize each LBP cell histogram using L1 norm.
o Reshape the LBP features vector back to 1-by- N feature vector.

2.1 Character recognition based on LBP

The best advantage of Local Binary Pattern is gray scale and rotational invariant texture operator illumination variant, because if the light changes on the face image, the pixel values will change but the relative difference between pixels will be the same[9].

Algorithm

Start

1. Input Training and Testing Character
2. Image preprocessing (conversion of grayscale image, image resizing)
3. Segmentation using Bounding Box properties
4. Applying LBP operator on image
5. Feature extraction from LBP image using dividing image by beans
6. Combining features generate single feature vector.
7. Classify using KNN, LDA, SVM and ESD.
8. Recognise the accuracy

Stop

Algorithm : Character Recognition based on LBP
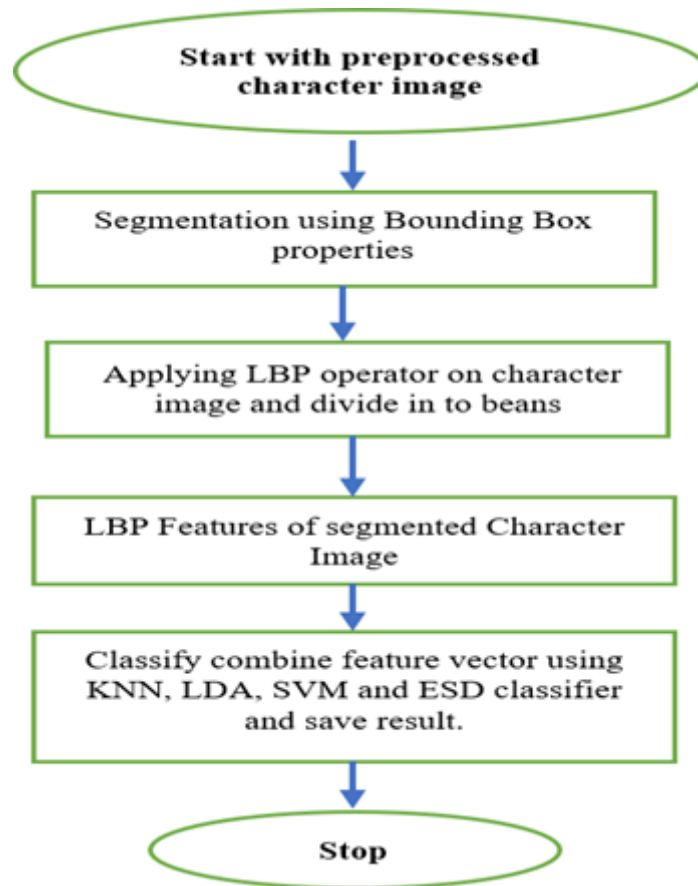
Figure : Character Recognition using LBP

III. FEATURE EXTRACTION USING LBP

Databases are divided into two groups based on their appearance: numerical databases and alphabetical databases. Alphabets are made up of both consonants and vowels. In the Marathi language, there are 12 vowels and 36 consonants. There are also a total of ten numerical values. Starting with 0 and working our way up to 9.

It is now recognised in the field of character recognition that a single attribute and a single classification algorithm cannot necessarily produce a very low error rate. As a result, it is hypothesized that combining features will result in a higher recognition rate. As a result, various fonts of different font sizes are used in this thesis also various classifiers SVM and classifier KNN are used.

Here are eight types of different fonts are used namely followed as, Aparajita, Arial, Kokila, Mangal, Nirmala, Nirmal semi light, Sanskrit, Utsaah. Different sizes are studied starting from size 12 and increases it by the size of two till 36 size with each font.

Words expressed in greater font size are thought to be more memorable and have better learning judgments. One probable explanation for this phenomenon is that individuals believe font size affects memory. It is unknown, however, why individuals think this. Another hypothesis is that font size reflects importance, with larger letters indicating more significant details. More essential information is perceived to be more memorable and, as a result, is remembered better.

As previously said, we used two kinds of databases in this case: alphabetical databases and numerical databases. Numeric databases are generated by using numbers ranging from 0 to 9. As for the Alphabetical database, it's a

mix of consonants and vowels. According to the appearance of letters they are again classified into three types as No Bar Character, End Bar Character and Middle Bar Character.

IV. EXPERIMENTAL SETUP : LBP (LOCAL BINARY PATTERN)

The LBP for feature extraction it is a conceptually simple yet efficient technique for gray scale and rotation invariant texture classification, as well as nonparametric discriminating of sample and prototype distributions. To performing the result, take 59 features for classification and various (KNN, SVM AND ITS VERIANTS) classifier use to classify the data. We show the results in four category i.e. numeric dataset, middle bar characters, and end bar characters and no bar characters. First upon us display data set wise results then show the comparative analysis of various dataset results analysis.

4.1 Numeric Database

In numeric data set the take 0 to 9 number having varying the font size and style. Total number of images in database is 500. Each class contains total 50 images with 10 different font styles and 5 different font Size. In proposed technique we apply the LBP on each image and extract 59 features per image i.e. total 29500 features and make the class of each number having predictor label. Classify that data set using the classifier. Comparative analysis shown in following Table.

Recognition	Recognition Accuracy (%)	Classifiers
10-Fold	88.60	ESK
Holdout 20-80	92.00	ESK
Holdout 40-60	84.50	ESK
Holdout 50-50	80.40	Quadratic SVM

Table : Result for numerical database using LBP

4.2 Alphabetical Database

Alphabetical Database is combination of consonants and vowels. According to the appearance of letters they are again classified into three types as No Bar Character, End Bar Character and Middle Bar Character.

4.2.1. No Bar Character

No Bar means letters are written without any bar that is no vertical line. In No bar character data set the take the various character having no bar with the different font size and style. In such dataset total 9 characters appear. Total number of images in database is 315. Each class contains total 35 images with 7 different fonts style and 5 different font Size. In proposed technique we apply the LBP on each image and extract 59 features per image i.e. total 18585 features and make the class of each number having predictor label with character name. Classify that data set using the classifier and result shown below.

Recognition data set model	Recognition Accuracy	Classifiers
10-Fold	80.30	ESK
Holdout 20%	88.90	Fine KNN
Holdout 40%	74.50	ESK
Holdout 50%	75.40	Cubic SVM

Table : No bar character results by using LBP

4.2.2. Middle Bar Character

Middle Bar Character can be defined as the letter which having Bar or vertical line in middle. In middle bar character data set the take the various character having Middle bar with the different font size and style. In such dataset total 2 characters appear. Total number of images in database is 70. Each class contains total 35 images with 7 different fonts style and 5 different font Size. In proposed technique we apply the LBP on each image and extract 59 features per image i.e. total 2450 features and make the class of each number having predictor label with character name. Classify that data set using the classifier and result shown below:

Recognition	Recognition Accuracy (%)	Classifiers
10-Fold	95.70	ESK
Holdout 20-80	100.00	ESK
Holdout 40-60	96.40	Weighted KNN
Holdout 50-50	97.10	ESK

Table : Middle bar character results by using LBP

4.2.3. End Bar Character

End Bar Character can be defined as the letter which having Bar or vertical line in end. In end bar character data set the take the various character having end bar with the different font size and style. In such dataset total 18 characters appear. Total number of images in database is 630. Each class contains total 35 images with 7 different font's style and 5 different fonts Size. In proposed technique we apply the LBP on each image and extract 59 features per image i.e. total 37,170 features and make the class of each number having predictor label with character name. The recognition accuracy on 10-fold cross validation technique is 74.90%, as we see in following Table.

Recognition	Recognition Accuracy (%)	Classifiers
10-Fold	74.90	ESK
Holdout 20-80	72.20	Fine KNN
Holdout 40-60	69.80	Fine KNN
Holdout 50-50	66.30	Cubic SVM

Table : End bar character results by using LBP

V. COMPARATIVE ANALYSIS OF VARIOUS METHOD

As per the testing of various methods used for the character recognition, the following shows various methods are used to recognition of character. In this section, we display the comparative table of all method to find out the efficient method for character recognition. In this LBP, summation method and LBP by cropping the important segment in character. In such table we calculate the average of 10-fold cross validation, 80% training 20 % random testing, 60% training 40 % random testing and50% training 50% random testing operations perform to calculate the highest effective method for character recognition.

Character recognition using LPB using region crop method

Character recognition using LPB using region crop method	Data validation Technique	Average Recognition Accuracy	Average Accuracy (%)

	10-Fold	(77.9+87.9+100+94.80)/4	90.15
	50% Holdout	(76.8+70.7+100+87.6)/4	83.77
Character recognition using Colom sum features vectors	10-Fold	(82.50+91.70+100+93.80)/4	92
	50% Holdout	(78.40+91.70+100+89.20)/4	89.82
LBP	10-Fold	(88.60+80.30+95.70+74.90)/4	84.87
	50% Holdout	(80.40+75.40+97.10+66.30)/4	79.8

VI. CONCLUSION

In this paper we listed the most popular techniques or algorithms that are already used in optical character recognition field under the branch of Image processing and pattern recognition. There are plenty of feature extraction methods using standard transformations, still there is lot more scope in extracting the good quality features from the binary image segments, and also its observed that noise filtering at the preprocessing section improves the quality of algorithm. Here the Typed Devnagari Character Recognition is best represented with the help of LBP character recognition technique.

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Physico-Chemical Characterization of Mine Water Produced During Various Mining Activities, Treatment and Possible Usage

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ABSTRACT

Investment plays a vital role in a developing country such as India, as it provides the necessary funds for undertaking productive activities to be circulated in the economy. Savings are our country's largest source of investment. Investments are assume they control their own destiny, whereas individuals with external LOC relate their experiences to destiny, luck or chance. Consequently, LOC has a great influence on an individual's investment decision-making behaviour. As a result, this study attempts to assess the LOC of an individual and segment the investors based on their level of internal and external LOC.

Keywords: Locus of control, Individual investor, Segmentation of investors.

I. INTRODUCTION

To estimate the Physico-chemical characterization of mine water produced during various mining activities, treatment and possible usage

II. OBJECTIVES

The mining industries are discharging millions of litres of water every day to the adjacent water courses creating water pollution problems in and around the mining area. Therefore it becomes essential to first assess the mine water quality and based on characteristics put it for beneficial usages (recycle and reuse), so as to avoid the mine water for its beneficiary use discharge pattern creating water pollution problems rather use it in the industry itself to save the fresh water requirement.

III. MATERIAL AND METHODS

i) **Sampling Site:** Mine water samples were collected phase wise (extractions) from ponds where the mine water was stored. Mine water samples were collected in polyethylene bottles of 1 litre capacity.

ii)　**Analysis of mine water:** All the parameters reflecting mine water quality were analyzed as per the standard method (WHO standards).

IV. RESULTS AND DISCUSSION:

1. Mine water quality Assessment:

A classification of mine water is made based on the characteristics of mine waters from coal and non-coal mines i.e. alkaline mine water (A1, A2 and A3) and acidic mine water (B1 and B2). The characteristics of these mine waters are summarized in different categories as shown in **Table 1.**

The characteristics and the levels of concentration are shown in **Tables 2 to 5**. The characteristics of mine water collected from different mines are compared with water quality Standards (WHO, 2008 and IS 10500).

The results of analysis of collected mine waters in different seasons are depicted in **Tables 3, 4, and 5**. The pH of all mine water samples were found to be alkaline in nature, pH ranged from 7.2 to 8.2 with dissolved solids in the range of 83-301 mg/l, buffering capacity in the form of alkalinity ranged from 111-145 mg/l, turbidity in the range of 27-198 NTU with hardness in the range of 45-80 mg/l. Further, the organic content was also estimated in the mine water and expressed in terms of BOD and COD. The DO levels were also significant and recorded. The concentration level of demand parameters in the form of DO, BOD and COD ranged from 4.8-5.3 mg/l, < 3 mg/l and 6.8-11.3 mg/l respectively. It was observed that concentration levels of several metals like iron, zinc, chromium and cadmium ranged from 0.34 – 0.52 mg/l, 0.21-0.28 mg/l, 0.01-0.09 mg/l, and 0.2-0.3 mg/l respectively, whereas acidic mine water had pH in the range of 3.8-4.6, total dissolved solids 356-421 mg/l with hardness 78-102 mg/l. The demand parameters in the form of DO, BOD and COD ranged from 3.8-4.2 mg/l, ND and 30-56 mg/l respectively. From the characteristics of coal mine water, it was observed that the mine water was contributed by minerals with higher concentration levels of dissolved solids, however pH was found to be alkaline in nature. The organic load in terms of BOD was found to be less whereas COD was found to be in higher side might be due to the contamination of oil and grease and phenolic compounds.

This acidic mine water creates harmful effects on aquatic flora and fauna if discharged in water bodies and also to human beings if used for domestic purposes. Based on water quality characteristics, the acid mine water quality is categorized as B1 and B2 and shown in **Table 6**.

The overall characteristics of coal mine water was found to be alkaline in nature with permissible dissolved solids. However turbidity in the form of suspended load was found to be high dissolved oxygen was favorable to aquatic flora and fauna. Organic load observed was also not much and heavy metals content were in less concentration. Whereas the non-coal mine water quality was found to be acidic in nature, contains high dissolved solids due to the dissolution of minerals during mining process. The mine water was highly turbid in nature however levels of metal concentration were found to be low except iron content. It is mentioned that the alkaline mine water can be put in to use for domestic or irrigation purposes, whereas acidic mine water can-not be used for the same purposes unless treatment is given.

V. TREATMENT OF MINE WATER

Considering the mine water quality of both coal and non-coal mines, it becomes necessary to give treatment to the storage water in ponds or pits before put it into use. Alkaline mine water should be neutralized first and treated by applying coagulation and flocculation technique for the removal of suspended load or turbidity

followed by pressure filtration with disinfection treatment alongwith polishing with activated carbon. The acidic mine water, should be neutralized first with lime followed by sedimentation, filtration and polishing with activated carbon.

VI. RECYCLE AND REUSE

There is a plenty of scope for the application and reuse/recycle of mine water for the wastewater management in mining industry. The quality of the mine water whether it is alkaline or acidic should be neutralized and treated as mentioned above. The treated water further should stored in a mine out pits so that this will be the system of water harvesting and recharging of ground water also. This treated mine water could be used for water sprinkling for dust suppression during excavation and transportation activities. It could also be used for gardening depending on the soil quality and the characteristics of treated water to avoid any soil deterioration. Further, if the volume of mine water stored in mine out pits is in large quantity then, it is advisable to create a reservoir with plantation around for recreation and aesthetic point of view [17] (**Fig. 2-4**). This will provide a better and safer environment for future generation.

VII. CONCLUSION

Mine water sample were collected from coal and non-coal mine areas and analyzed with respect to quality parameters to assess the mine water quality. It was observed that there was variations in concentration levels of some quality parameters i.e. pH and total dissolved solids based on the composition of ores and mines. The mine water quality was compared with drinking water quality standards prescribed by WHO and CPCB. The mine water quality in both coal and non-coal areas was found to be much better, however, certain treatments for mine waters (both acid and alkaline) were suggested prior to put into use for domestic purposes.

Table 1: Characteristics of Alkaline Mine waters

	Unit	Category of the Alkaline Mine waters		
		A-1	A-2	A-3
Water Quality Parameters				
pH		7.7-8.5	7.0-8.5	6.0-8.0
Alkalinity	mg/l, as $CaCO_3$	200-7000	100-500	10-30
Hardness	mg/l, as $CaCO_3$	50-150	200-1500	1000
Total Dissolved Solids	mg/l	300-700	500-1500	1500-2500
ccTotal Suspended Solids	mg/l	5-30	12-50	10-50
Demand Parameters				
DO	mg/l	5.5-8.0	5.0-8.0	5.0-8.0
BOD	mg/l	<1	<1-2	<1-2
COD	mg/l	8-30	15-50	15-60
Element or Ion Content				
Calcium	mg/l, as Ca	10-50	50-200	100-150
Magnesium	mg/l, as Mg	10-30	40-180	80-100
Iron	mg/l	0-2	0-5	0-5

Sulphate	mg/l	10-100	100-800	1000 and above

Table 2: Characteristics of collected mine waters (post-monsoon) (Jharia coalfield)

Parameters	Unit	Phase I	Phase II
pH		7.2	8.27
EC	µS/cm	157	152
Turbidity	NTU	90	153
Total Dissolved Solids	mg/l	116	115
Total Alkalinity	mg/l as CaCO$_3$	128	133
Total Hardness	mg/l as CaCO$_3$	45	70
CO_3^{--}	mg/l	7.20	11.0
HCO_3^{-}	mg/l	180	210
Fe^{+3}	mg/l	0.60	0.40
Ca^{+2}	mg/l	30	40
Mg^{+2}	mg/l	15	30
Na^{+}	mg/l	7.7	5.40
K^{+}	mg/l	3.10	2.80
As^{---}	mg/l	0.01	0.01
SO_4^{--}	mg/l	1.33	1.70
PO_4^{---}	mg/l	1.20	1
SiO_2^{--}	mg/l	36	36
NO_3^{-}	mg/l	0.18	0.12
Cl^{-}	mg/l	5.32	5.96
NH_3	mg/l	ND	ND
DO	mg/l	5.10	4.80
BOD	mg/l	<3	<3
COD	mg/l	8.2	10.8
Cd^{+2}	mg/l	0.05	0.028
Zn^{+2}	mg/l	0.21	0.24
Cr^{+3}	mg/l	0.09	0.02

ND: Not detectable

Table 3: Characteristics of collected mine waters (water season)(Jharis coal field)

Parameters	Unit	Phase I	Phase II
pH		8.03	7.33
EC	µS/cm	91	174
Turbidity	NTU	28	34
Total Dissolved Solids	mg/l	83	127
Total Alkalinity	mg/l as CaCO$_3$	113	125

Total Hardness	mg/l as $CaCO_3$	80	71
CO_3^{--}	mg/l	9	6
HCO_3^{-}	mg/l	146	177
Fe^{+3}	mg/l	0.45	0.34
Ca^{+2}	mg/l	55	45
Mg^{+2}	mg/l	25	26
Na^{+}	mg/l	6.20	7.20
K^{+}	mg/l	2.80	3.30
As^{---}	mg/l	0.01	0.01
SO_4^{--}	mg/l	1.30	1.23
PO_4^{---}	mg/l	1.20	1.10
SiO_2^{--}	mg/l	35	35
NO_3^{-}	mg/l	0.13	0.17
Cl^{-}	mg/l	6.39	6.03
NH_3	mg/l	0.25	0.17
DO	mg/l	4.80	4.60
BOD	mg/l	<3	<3
COD	mg/l	6.80	8.50
Cd^{+2}	mg/l	0.030	0.03
Zn^{+2}	mg/l	0.26	0.24
Cr^{+3}	mg/l	0.01	0.02

Table 4: Characteristics of collected mine waters (summer season)(Jharia coalfield)

Parameters	Unit	Phase I	Phase II	Phase III
pH		7.75	7.63	7.71
EC	µS/cm	352	323	403
Turbidity	NTU	90	198	27
Total Dissolved Solids	mg/l	256	241	301
Total Alkalinity	mg/l as $CaCO_3$	134	111	145
Total Hardness	mg/l as $CaCO_3$	55	46	60
CO_3^{--}	mg/l	6	21	26
HCO_3^{-}	mg/l	136	225	254
Fe^{+3}	mg/l	0.52	0.47	0.39
Ca^{+2}	mg/l	35	29	38.5
Mg^{+2}	mg/l	20	17	21
Na^{+}	mg/l	4.10	3.50	5.50
K^{+}	mg/l	2.13	1.90	2.70
As^{---}	mg/l	0.01	0.01	0.01
SO_4^{--}	mg/l	1.40	1.50	1.31
PO_4^{---}	mg/l	1.50	1.40	1.54

SiO_2^-	mg/l	43	53	45
NO_3^-	mg/l	0.15	0.19	0.18
Cl^-	mg/l	5.04	5.68	5.54
NH_3	mg/l	0.13	0.18	0.14
DO	mg/l	5.30	4.80	5.10
BOD	mg/l	<3	<3	<3
COD	mg/l	10.80	11.30	8.60
Cd^{+2}	mg/l	0.024	0.035	0.032
Zn^{+2}	mg/l	0.27	0.28	0.23
Cr^{+3}	mg/l	0.017	0.016	0.014

Table 5: Characteristics of collected mine waters (non-coal mine, North-East)

Parameters	Unit	Post-monsoon	Winter	Summer
pH		3.8	4.1	4.6
EC	µS/cm	586	712	648
Turbidity	NTU	112	148	160
Total Dissolved Solids	mg/l	356	421	388
Total Acidity	mg/l as $CaCO_3$	48	62	56
Total Hardness	mg/l as $CaCO_3$	78	84	102
Ca^{+2}	mg/l	30.4	33.3	40.8
Mg^{+2}	mg/l	5.6	7.6	12.8
Na^+	mg/l	4.10	3.50	5.50
Fe^{+2}	mg/l	3.2	2.8	6.1
DO	mg/l	3.8	2.2	3.8
BOD	mg/l	-	-	-
COD	mg/l	30.8	48.2	56.7
Trace elements (Al, Cr, Zn, Pb, Cu, Cd, Ni, Co)	µg/l	Present in less quantity to non detectable levels		

Table 6: Characteristics of Acid Mine waters

	Unit	Category of the Acid Mine waters	
		B-1	B-2
Water Quality Parameters			
pH		5.0-7.0	2.0-4.5
Acidity	mg/l, as $CaCO_3$	25-150	100-250
Hardness	mg/l, as $CaCO_3$	200-500	500-3500
Total Dissolved Solids	mg/l	400-800	1000-4000
Demand Parameters			
DO	mg/l	5.5-8.5	3.8-7.5
BOD	mg/l	1-2	1-5

COD	mg/l	10-60	20-100
Metal concentration			
Calcium	mg/l	20-80	100-250
Magnesium	mg/l	10-70	50-100
Ferric Iron	mg/l	0-20	10-250
Ferrous Iron	mg/l	200-600 and above	100
Trace Elements Al, Cu, Zn, Mg, Ni, Pb, Cr, Sb, etc		Present in less quantities depending types of strata	

Fig. 1: Sampling location for mine water collection in coal field area

Fig. 2: Open Cast Mining (Coal)

Fig. 3: Mining activities in hilly area with storage of excavated materials

Fig. 4: Mining activities with storage of mine water in mine out pit with plantation around

Synthesis, Characterization, Magnetic Susceptibility and Antibacterial Screening of Novel Transition Metal Ion Complexes of (E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one

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ABSTRACT

The novel transition metal ion complexes were synthesized by refluxing the ethanolic solutions of Schiff Base (E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one and Metal Acetates in 2:1 ratios respectively. The Structural confirmation and Characterization of synthesized complexes of Mn (II), Co (II), Ni (II),Cu (II) & Zn (II) were elucidated by using 1H NMR, FT-IR, UV-Vis, & X-Ray spectroscopic techniques. The synthesized compounds were also been screened against gram +ve and gram -ve bacteria. The novel compounds were further carried out for the study of magnetic susceptibility.

Keywords: Schiff Base; transition Metal ion complexes; Antibacterial Screening; Magnetic Susceptibility.

I. INTRODUCTION

Schiff-base macroligands synthesized from reaction of dialdehydes and amino compounds [1-3] form stable complexes, perhaps selective to specific metallic ions with applications in electrochemistry, bioinorganic, antimicrobial activity, fluorescence properties, catalysis, metallic deactivators, separation processes, and environmental chemistry among others [3]. Preparation of new ligands is an important step in development of metal complexes, which exhibit unique properties and reactivity. For example, in asymmetric catalyst systems, small changes in donating ability of the ligand or the size of its substituents can have a dramatic effect on catalyst efficiency and enantioselectivities [3-4]. The nitro group is a strong electron-withdrawing group and due to its steric effects it has played an important role in affecting the reactivity and enantioselectivities in asymmetric cyclopropanation and allylic alkylation reactions [4]. In continuation of our research on preparation of Schiff bases [4-5] and their complexes [6–9], we decided to prepare new Schiff bases containing electron 1 withdrawing and donating substituents. This article describes the synthesis and spectroscopic characterization of several Schiff bases and their complexes with transition metal ions. The corresponding materials were characterized by spectroscopic (IR, UV-Vis, ^{1}H- NMR) and physical (melting point, Magnetic Susceptibility) data.

II. MATERIALS AND METHODS

Preparation of Schiff Base (L₄) Derived From Guanine and Salicylaldehyde:

Synthesis of (E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one (GS-1) (L₄)

The Schiff base (ligand GS-1) was synthesized by taking Guanine (0.01 M) Salicylaldehyde (0.01 M) in ethanolic medium followed by the addition of 2-3 drops of conc. sulphuric acid in a catalytic amount and poured it in a round bottom flask connected with a reflux condenser. The above given reaction mixture was reflux for 7-8 hrs. Water formed during the reaction was collected through Deane Stark funnel. The solvent was removed under sunlight irradiation. The chemical reaction mentioned below in figure 2.1. The resulting pale yellowish solid was recrystallized from ethanol. Color - (Pale yellow), M.P. – 132.8 °C, Yield- 66%.

Reaction:

Guanine   **salicylaldehyde**

(*E*)-2-(2-hydroxybenzylideneamino)
-1*H*-purin-6(7*H*)-one

(GS-1)
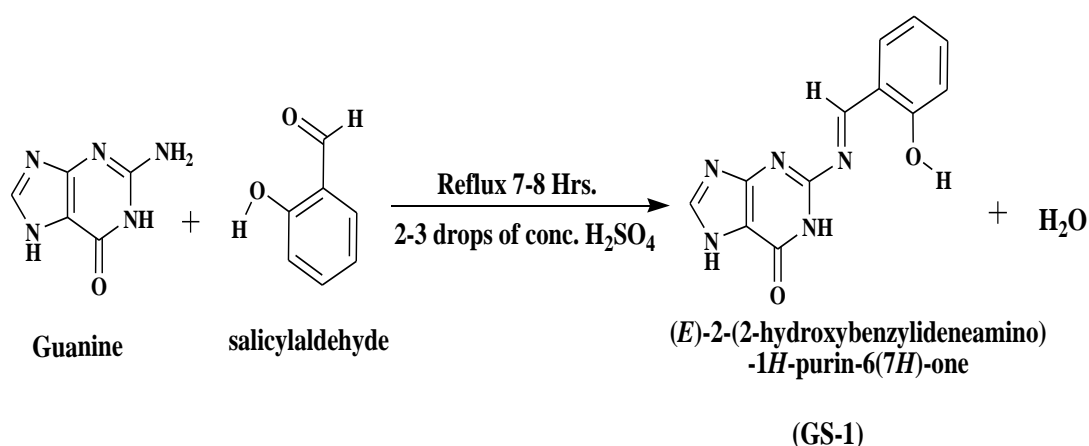
Figure 2.1: Preparation of (E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one (GS-1) from Guanine and Salicylaldehyde.

Synthesis of Transition Metal-Ligand Complexes of Schiff Base (L₄) Derived From Guanine and Salicylaldehyde.

The Metal-Ligand mole ratio was taken in 1:2 proportions. Metal Acetate salt (0.01M) and (E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one (GS-1) (0.02 M) was dissolved in 50 ml ethanolic solutions with vigorous stirring and warm it until the solution will not become clear. Then the solution was poured in round bottom flask equipped with refluxed condenser and refluxed it for 4-5 Hrs. The Solid complex with characteristic colored was formed within few minute after cooling at room temperature. The resultants filtered off by using whatman-41 filter paper and wash it with ethanol. The product was dried by irradiation with sunlight. The synthetic route of formation of complex is mentioned below in Figure.

Reaction:
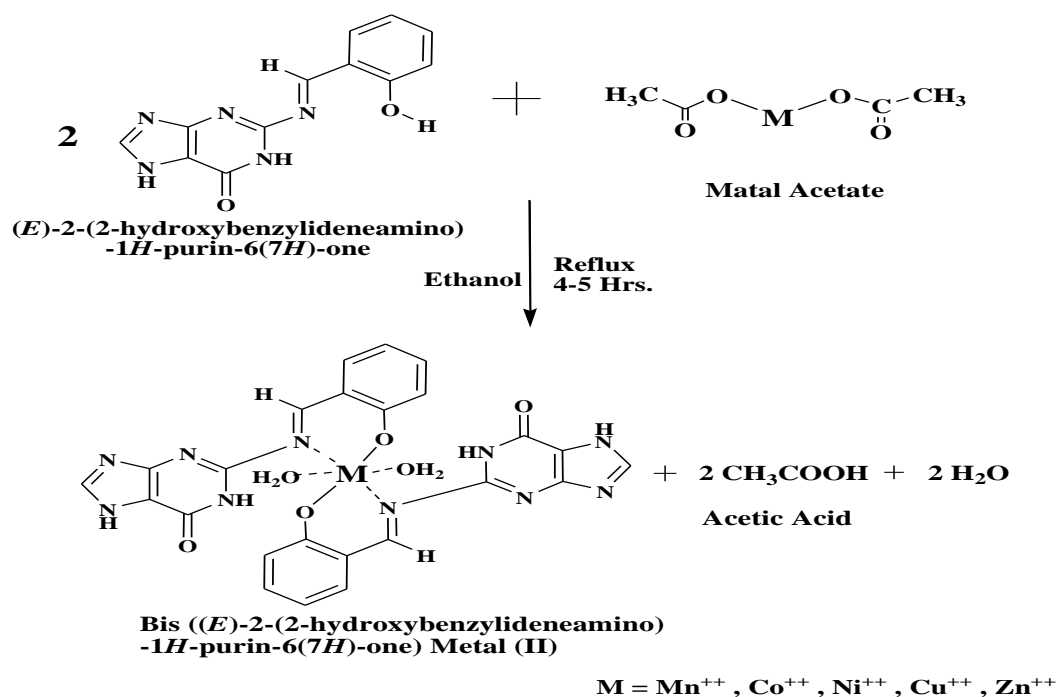
Figure 2.2: Preparation of Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Metal (II) complex.

III. RESULTS AND DISCUSSION

Instrumentation: FTIR spectra in the range, 4000-400 cm⁻¹, were recorded on Agilent Technology Spectrophotometer; Uv-visible spectra were measured by using Shimadzu 160 spectrophotometer in the range 200-800 nm. The magnetic susceptibility values of the prepared complexes were obtained at room temperature using Magnetic Susceptibility on Bruker Magnet B.M.6, The ^{1}H nuclear magnetic resonance spectra were recorded on a BRUKER ADVANCED II 400 MHz spectrometer in DMSO as a solvent, relative to the internal standard Tetramethylsilane (TMS). Melting points were recorded on a Tanco Laboratory melting point apparatus.

(E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one (GS-1):
Solid, M.P.-132.8 °C, UV (λ max) in ethanol: 295 nm, **(IR) υ max (KBr/cm⁻¹):** 3460.33 (Ar-OH), 3314.50 (Ar-N-H), 3115.95 (Ar-C-H), 1668.34 (Amide), 1668.34 (Ar-C=C), 1547.22 (Ar-C=N), 1414.30 (C-C), 1200.24 (C-N), 1114.59 (C-O), 918.51 (Trans disubstituted C=N), 763.24 (Ortho disubstituted aromatic). **¹H-NMR (δ-ppm):** 4.90 (s, 1H, Ar-O-H), 6.80 - 7.50 (m, 4H Ar-H), 7.90 (s, 1H -N=C-H), 8.20 (d, 1H, Ar-N=C-H), 8.80 (s, 1H, Ar-N-H), 10.30 (d, 1H, Ar-N-H).

Bis((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one)Manganese(II) complex. (GSM-1):
Solid, M.P.-145.7 °C, UV (λ max) in ethanol: 288 nm, **(IR) υ max (KBr/cm⁻¹):** 3316.64 (Ar-N-H), 3107.62 (Ar-C-H), 1668.06 (Amide), 1622.12 (Ar-C=C), 1547.97 (Ar-C=N), 1415.70 (C-C), 1202.48 (C-N), 1115.10 (C-O),

921.58 (Trans disubstituted C=N), 774.22 (Ortho disubstituted aromatic), 686.23 (Mn-O). ¹H-NMR (δ-ppm): 6.70 - 7.60 (m, 4H Ar-H), 8.10 (s, 1H -N=C-H), 8.40 (d, 1H, Ar-N=C-H), 9.10 (s, 1H, Ar-N-H), 10.45 (d, 1H, Ar-N-H).

Bis((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Cobalt (II) complex. (GSC-2):

Solid, M.P.- 155.6 ᵒC, UV (λ max) in ethanol: 290 nm, (IR) υ max (KBr/cm⁻¹): 3316.82 (Ar-N-H), 3109.50 (Ar-C-H), 1664.97 (Amide), 1617.41 (Ar-C=C), 1557.08 (Ar-C=N), 1415.54 (C-C), 1254.43 (C-N), 1114.98 (C-O), 947.40 (Trans disubstituted C=N), 772.25 (Ortho disubstituted aromatic), 688.21 (Co-O). ¹H-NMR (δ-ppm): 6.30 - 7.20 (m, 4H Ar-H), 7.70 (s, 1H -N=C-H), 7.90 (d, 1H, Ar-N=C-H), 8.60 (s, 1H, Ar-N-H), 10.50 (d, 1H, Ar-N-H).

Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Nickel (II) complex. (GSN-3):

Solid, M.P.- 160.2 ᵒC, UV (λ max) in ethanol: 295 nm, (IR) υ max (KBr/cm⁻¹): 3314.94 (Ar-N-H), 3111.11 (Ar-C-H), 1668.44 (Amide), 1615.26 (Ar-C=C), 1556.31 (Ar-C=N), 1416.80 (C-C), 1250.47 (C-N), 1115.98 (C-O), 947.31 (Trans disubstituted C=N), 774.52 (Ortho disubstituted aromatic), 685.22 (Ni-O). ¹H-NMR (δ-ppm): 6.50 - 7.50 (m, 4H Ar-H), 8.00 (s, 1H -N=C-H), 8.60 (d, 1H, Ar-N=C-H), 9.20 (s, 1H, Ar-N-H), 10.40 (d, 1H, Ar-N-H).

Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Copper (II) complex. (GSC-4):

Solid, M.P.- 168.6 ᵒC, UV (λ max) in ethanol: 285 nm, (IR) υ max (KBr/cm⁻¹): 3316.86 (Ar-N-H), 3111.64 (Ar-C-H), 1668.42 (Amide), 1615.26 (Ar-C=C), 1557.38 (Ar-C=N), 1415.73 (C-C), 1256.48 (C-N), 1116.45 (C-O), 947.94 (Trans disubstituted C=N), 775.01 (Ortho disubstituted aromatic), 697.13 (Cu-O). ¹H-NMR (δ-ppm): 6.70 - 7.70 (m, 4H Ar-H), 8.00 (s, 1H -N=C-H), 8.55 (d, 1H, Ar-N=C-H), 9.30 (s, 1H, Ar-N-H), 10.70 (d, 1H, Ar-N-H).

Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Zinc (II) complex. (GSZ-5):

Solid, M.P.- 157.8 ᵒC, UV (λ max) in ethanol: 290 nm, (IR) υ max (KBr/cm⁻¹): 3315.37 (Ar-N-H), 3110.43 (Ar-C-H), 1666.40 (Amide), 1619.57 (Ar-C=C), 1556.48 (Ar-C=N), 1410.05 (C-C), 1252.25 (C-N), 1114.85 (C-O), 946.97 (Trans disubstituted C=N), 751.96 (Ortho disubstituted aromatic), 689.84 (Zn-O). ¹H-NMR (δ-ppm): 6.80 - 7.60 (m, 4H Ar-H), 7.90 (s, 1H -N=C-H), 8.20 (d, 1H, Ar-N=C-H), 8.90 (s, 1H, Ar-N-H), 10.30 (d, 1H, Ar-N-H).

Table: Magnetic Moment, Conductivity measurements in DMF solvent

Symbol	Name	Conductivity ohm⁻¹cm²mol⁻¹	Magnetic moment (B.M)	Suggested structure
(GS-1) (L₄)	(E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one.	-	-	-
(GSM-1)	Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one)Manganese(II) Complex.	17	4.30	Tetrahedral
(GSC-2)	Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-	14	3.46	Tetrahedral

	6(7H)-one) Cobalt(II)complex.			
(GSN-3)	Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Nickel(II)complex.	18	4.88	Tetrahedral
(GSC-4)	Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Copper(II)complex	28	1.90	Square planner
(GSZ-5)	Bis ((E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one) Zinc(II)complex.	16	3.85	Tetrahedral

IV. PHARMACOLOGY

Antibacterial activity

The titled compounds were screened for their antibacterial activity using disc diffusion method. The bacterial organisms used included both gram positive and gram negative strains like Staphylococcus aureus, Escherichia coli, Salmonella enteric Ser para typhi, Klebsiella Pneumonia and Pseudomons aeruginosa.

For antibacterial susceptibility testing of title compounds, the sterile disc of 6 mm diameter (SD067, Hi-Media, Mumbai) was loaded with 20µl of title compound solution (1000 µg/ml) in DMF. The discs were then placed at centre on the Mueller-Hinton agar seeded with bacterial inoculums approximately 106 CFU/ ml, incubated at 37° C for 24 hrs and growth inhibition zone formed around disc was measured. Test was done in triplicate and mean value was considered as inhibition zone. Solvents were used as controls and showed no inhibitions in preliminary studies. All the synthesized complexes exhibited moderate to good activity against the test organisms.

Table: Antimicrobial Activity

Compound	Gram positive bacteria	Gram negative bacteria			
	Staphylococcus aureus	Salmonella enterica Serpara Typhi	Escherichia Coli	Klebsiella Pneumonia	Pseudomons aeruginosa
(GS-1) (L₄)	-	+	++	-	+
(GSM-1)	++	+	-	++	-
(GSC-2)	+	-	++	+	-
(GSN-3)	++	++	++	++	+
(GSC-4)	+	+++	+	++	+++
(GSZ-5)	++	++	++	+++	+

+++ = Zone size 16-22 mm; ++ = Zone size 9-15 mm; + = Zone size 6-8 mm;

— = No inhibition.

Infra-red spectroscopy:

The above given data of FT-IR spectrum of the ligand ABS-3, shows the characteristic bands at 3630.05 cm^{-1}, 3290.30 cm^{-1} & 1590.63 cm^{-1} which are assigned to Ar-O-H, Ar-N-H & C=N stretching respectively. These bands reveal the formation of Schiff Base. The formation of complexes of Schiff Base with Mn (II), Co (II), Ni (II), Cu (II) and Zn (II) acetates was confirmed by the disappearance of –O-H band in the region of 3200-3600 cm^{-1} and occurrence of Metal-Oxide bands at 717.45 cm^{-1}, 722.86 cm^{-1}, 725.78 cm^{-1}, 732.59 cm^{-1} and 729.58 cm^{-1} for Mn-O, Co-O, Ni-O, Cu-O, Zn-O stretching respectively. In the free ligand, the band at 1590.63 cm^{-1} was assigned to the stretching of C=N bond. On complexation this band was shifted to a lower frequency region. This shift is due to the metal-ligand electron sharing effect. The IR data of the compounds are shown in the table lists the stretching frequency (υ) for some of the characteristics groups exhibited by the ligand and complexes.

Ultraviolet-visible spectroscopy:

The ultraviolet visible electronic spectrums of the compounds were recorded in DMSO solvent. The bands at wavelengths (290, 288, 285, 280, 295 and 282 nm) these transitions are attributed to $\pi \rightarrow \pi^*$ electronic transition [11]. The electronic spectra of complexes showed, as expected, different absorptions from that of the free ligand. In the complexes these bands were shifted to different wavelength than the corresponding bands in the ligand as shown above, which appears in the wavelength range between 280-300 nm. The ligand field electronic transitions between the metal d orbital's appear in Ni (II) and Cu (II) bands located in the visible region at 460 nm for Ni (L)$_2$ assigned to the transition 3A2$\rightarrow$3T1 (p) and 610 nm for Cu (L)$_2$ assigned to the transitions 2B1g$\rightarrow$2A1g. The other complexes were diamagnetic as expected for d10 ions so that no (d-d) transition can be expected in the visible region.

NMR spectroscopy:

The data of proton NMR of the ligand (ABS-3) and its complexes displayed good solubility in DMSO. The proton nuclear magnetic resonance spectral data gave additional support for the composition of the complexes. The observed changes are the evidences of complexation had happened because the chemical shift of a compound is heavily depended on its electronic environment. The ^{1}HNMR spectrum of the complexes confirmed the disappearance of O-H signal at 4.90 ppm in the free ligand. The δ 6.80 - δ 7.50 ppm resonance signal protons of the aromatic ring shifted to the higher field upon complexation. It is most likely that shift is due to the decrease of electron density at ^{1}H protons when oxygen is bonded to metal ion.

Magnetic susceptibility and conductivity measurements:

The experimental magnetic moments for metal complexes are listed in Table. Magnetic measurements are widely used in studying transition metal complexes. The magnetic properties are due to the presence of unpaired electrons in the partially filled d-orbital in the outer shell of these elements. This magnetic measurement gives an idea about the electronic state of the metal ion in the complexes. The magnetic moment for Mn(II), Co(II), Ni(II) & Zn(II) in any complex is approximately 3.46 to 4.88 B.M., this value refers to a high spin tetrahedral structure, while the value of Cu (II) is approximately 1.90 led to suggest the square planar

structure which can become in a good agreement with the data of electronic transitions. Other complexes have no magnetic moment because it's diamagnetic. Molar conductivity measurement in DMF solvent at 25ºC showed that the complexes were non-electrolyte.

V. CONCLUSION

The ligand **(E)-2-(2-hydroxybenzylideneamino)-1H-purin-6(7H)-one** (GS-1) was successfully synthesized by condensation method. The ligand (GS-1) was treated with Mn(II),Co(II),Ni(II),Cu(II),Zn(II) metal acetate salts to afford the corresponding complexes. The Characterization data of ^{1}H NMR, IR & UV-Vis reveals the successful formation of ligand and their complexes. The Magnetic susceptibility data was attributed to the square planar geometry for Cu (II) complex and tetrahedral geometry of other complexes. The Antibacterial Study reveals that Ni(II), Cu(II) & Zn(II) metal ion complex showed best inhibition activity towards all the strains of bacteria where as other complexes showed good activity against the gram positive and gram negative bacteria.

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Effect of Fungicide Bavistin on Growth and Chlorophyll Content in Triticum Aestivum L

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ABSTRACT

Fungicide Bavistin is widely used to control pests in crop plants. However, it has been reported that different fungicide may have negative effects on crop on growth and physiology of plant. An alteration in photosynthesis might lead to a reduction in photo assimilate production, resulting in a decrease in both growth and yield ofcrop plants. Systemic fungicides such as benzimidazoles, anilides, and pyrimidine are also phytotoxic, whereas azolesstimulate photosynthesis. Carbendazim is used for the control of a wide range of fungal diseases such as mold, spot, mildew, scorch, rot and blight in a variety of crops. In the present study, seeds of Triticum aestivum L. were treated with different concentration of Bavistin 0.2%, 0.4%, 0.6%, 0.8% and 1%., for the period of 12h. After three days germination percentage recorded, whereas 10 days seedling height and root shoot ratio recorded. After sowing seeds in small pots after 15 days chlorophyll content was recorded. The data obtained indicates that germination percentage of seeds and root shoot length of seedlings was decrease with increase in concentration of bavistin. The result showed that the percentage of germination, seedling growth and chlorophyll contentwas found to be decreasedas there is increase in concentration.

Keywords: Triticum aestivum, bavistin, fungicide, germination, seedling height and chlorophyll.

I. INTRODUCTION

Agriculture is evolve as a parallel system to nature in order to satisfy the ever-increasing needs of man. Large amounts of fungicides and pesticides are being used in modern agricultural practices to cure insects and pests. Most of those chemical agents are not only kills fungus or pest but also cause serious damage to crop plants. In present days, high utilization of fungicides taken place which shows their direct impact on the crop yield production in is the form of reduction in percent seed germination, seedling growth as well as chromosomal abnormalities in the crop plant also affect physiology of plant (Pandey and Upadhyay, 1997).

Fungicide application is the common practice in modern agriculture for the control of fungal pathogen. Bavistin is a systematic fungicide from the benzimidazole group. It may act either by killing or inactive the pathogen or by increasing resistance in the host pant or by interfering with pathogenic processes which may block the symptoms development. (Diamond, 1965; Grossam, 1965 and Wood Cock, 1971).Wheat (*Triticum*

aestivum L.) is the second most important cereal crop of India next to Rice. It is rich in proteins, vitamins and carbohydrates and provides balanced food. Fungicides do their best work in fighting the yield-limiting effects of diseases such as stripe rust, head scab and powdery mildew all diseases that can wreak havoc on a crop. The test system used was hexaploid Wheat (*Triticumaestivum*2n=6X=42). It has relatively large chromosome and has been extensively used in radiation and induced mutation studies. It has well known relatively simple, quick, inexpensive and easy protocol. Therefore the effect of bavistin fungicide on germination, seedling growth and total chorophyll content was investigated.

II. MATERIALS AND METHODS

Materials

Commonly cultivated hexaploid wheat *(Triticum aestivum* L. var. Kalyansona 2n= 6X=42) seeds were used as the experimental material in the present investigation. The effect carbendazim (Bavistin) on germination, seedling height, root shoot ratio and chlorophyll content was investigated.

Preparation of test solutions and treatment:

The seeds were treated with different concentrations of Bavistin solution i.e. 0.2%, 0.4%, 0.6%, 0.8% and 1.0%. The test solutions were prepared by diluting 2ml of Bavistin in 100ml of distilled water. Rest of the concentrations (0.4%, 0.6%, 0.8% and 1.0 %) was prepared accordingly. The seeds were washed with distilled water then treated with 1% mercuric chloride for sterilization for 5min. 30 seeds in triplicate were soaked in distilled water for the control and for treatments; the seeds were soaked in 0.2%, 0.4%, 0.6%, 0.8% and 1.0 % Bavistin solution for 12 hrs. After the completion of the treatments the seeds were thoroughly washed under tap water for 3-4 times to remove the excess of fungicides sticking to seeds. An individual control was also maintain in distilled water.

Germination: For germination, 30 seeds were kept in pertriplates lined with moist blotting paper (fig.1). Germination counts were taken after 3 days. Germination percentage was calculated by following formula (Rehman *et al*. 1998 and Rangwala *et al.,*2013).

$$Germination\ percentage\ (\%) = \frac{No.\ of\ seeds\ germinate}{No.\ of\ seeds\ sown} \times 100$$

Fig. 1: Seeds treated with different concentrations of Bavistin solution and untreated control.

Shoot Length (cm): The seedling height was measured after 10 days for each concentration along with control (Fig.2). The seedling height and root length was taken from root stem transition region to the tip in cm. (Kabir, 2008 and Rangwala *et al.,* 2013).
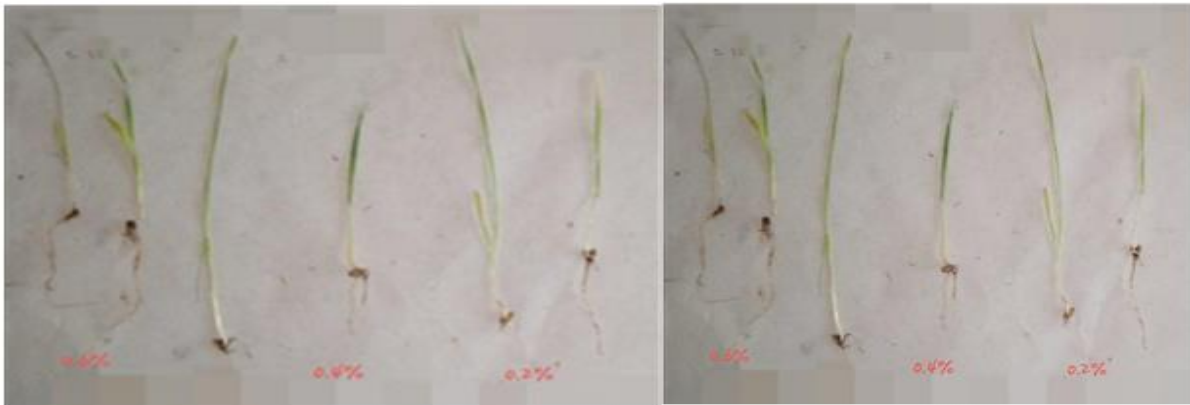
Fig.2: Effect of fungicide (Bavistin) on Root and Shoot length of *Triticum aestivum* L.

Estimation of Chlorophyll content: Chlorophyll b , Chlorophyll a and Total chlorophyll was calculated after 15 days following the protocol prescribed (Manickam, 2006).

Calculation:

Amount of chlorophyll present in the extract mg chlorophyll per g tissue using the following equations:

$$mg\ Chlorophyll\ a\ /\ gm\ tissue\ = 12.7\ (A\ 663) - 2.69\ (A645) \times \frac{v}{1000 * W}$$

$$mg\ Chlorophyll\ b\ /\ gm\ tissue\ = 22.9(A\ 645) - 4.68(A663) \times \frac{v}{1000 * W}$$

$$mg\ Chlorophyll\ Total\ /\ gm\ tissue\ = 20.2(A\ 645) + 8.02(A663) \times \frac{v}{1000 * V}$$

Where,

A = absorbance of specific wavelengths

V = final volume of chlorophyll extract in 80% acetone

W = fresh weight of tissue extracted.

III. RESULTS & DISCUSSION

In the present investigation, the effect of bavistin (fungicide) on germination rate, root and shoot length, chlorophyll content of *Triticum aestivum* (L) was studied. The effect of different concentrations of fungicide bavistin after 12 hours exposure of the seeds at the intervals of 10 and 15 days. The result obtained in the present study has been tabulated in Table, 1, 2, 3 and Figure, 1.2,3,4 &5. Thus, germination percentage was recorded significantly decrease with increase in concentration of bavistin (Fig.3).

Table No.1: The effect of fungicide (Bavistin) on germination and seedling growth (root and shoot length) of *Triticum aestivum* (L.) after 10 & 15 days of interval.

Sr. No.	Concentration	No. of seeds sown	No. of seeds germinated	Germination rate (%) 10 days	Germination rate (%) 15 days	Root length (cm)	Shoot length (cm)
1	Control	30	28	93.33	96.68	8.2	21.2
2	0.2%	30	21	70	73.33	7.4	19.8
3	0.4%	30	18	60	70	7.2	18.4
4	0.6%	30	16	53.33	55.70	6.5	17.3
5	0.8%	30	12	40	46.48	5.5	13.5
6	1.0%	30	10	33.33	35.30	4.0	10.2

Fig. 3. Effect of Bavistin on germination percentage
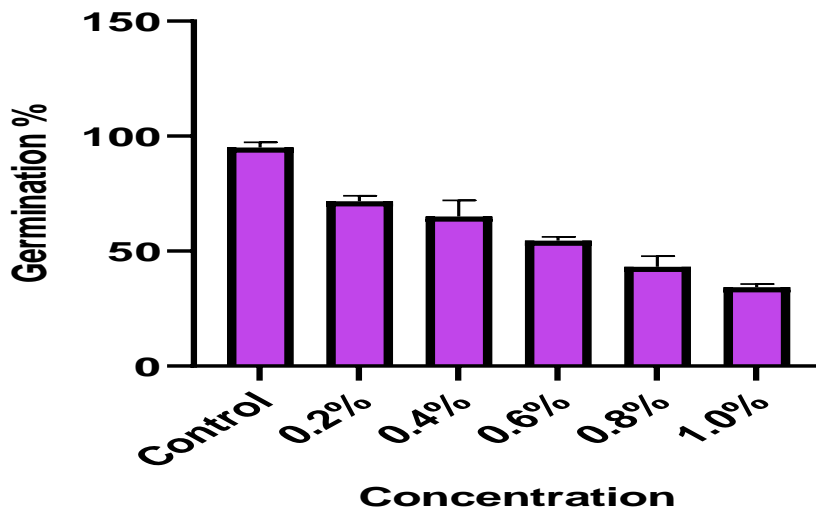
Table.2. Summary of One Way Analysis of Variance for the Data on Seed Germination of different concentrations of bavistin with control.

Source of Variance	Sum of Square	Degree of Freedom	Mean Sum of Square	F-ratio
Between the Groups	4710	5	941.9	65.03****
Within Group	86.90	6	14.48	

P<0.0001   P value summary   ****

Seedling height was 8.2 cm in control and root length was 21.2cm. It reduced with increasing concentration of Bavistin. Data for bavistin treatment indicated that seedling height 7.4cm, 7.2cm, 6.5cm, 5.5cm, 4.0cm and root length 19.8cm, 18.4cm, 17.3cm, 13.5cm and 10.2cm. decreased with in 0.2, 0.4, 0.6, 0.8 and 1.0% concentrations, respectively (Table. 1).

The effect of various concentrations of Bavistin on chlorophyll content of seedling exhibited that the content of chlorophyll a was found to be decreasing when there is increase in concentrations. The highest content of chlorophyll a was recorded in control as compared to the various concentrations of fungicide. The results are tabulated in (Table.2,3 and Fig.4 &5).

Table No. 3: Effect of fungicide (Bavistin) on chlorophyll content of *Triticum aestivum* (L.) after 10 days interval.

Sr. No.	Concentration	Chlorophyll a mg/g	Chlorophyll b mg/g	Total chlorophyll mg/g
1	Control	2.86	1.64	4.50
2	0.2%	2.83	1.64	3.45
3	0.4%	2.40	1.55	3.15
4	0.6%	1.45	0.84	1.91
5	0.8%	1.03	0.66	1.90
6	1.0%	1.08	0.45	0.91

Fig. 4: Estimation of Chlorophyll content from *Triticum aestivum* L. seedlings after 10days interval.
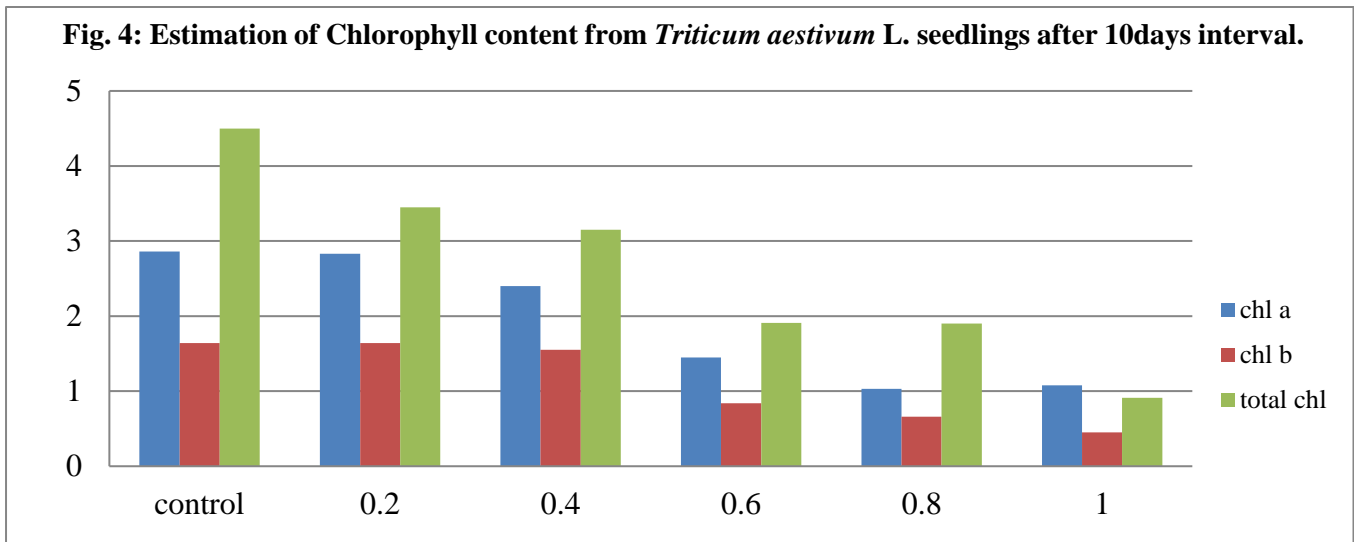
Table No. 4: Effect of fungicide (Bavistin) on chlorophyll content of *Triticum aestivum* (L.) after 15 days interval.

Sr. No.	Concentration	Chlorophyll a mg/g	Chlorophyll b mg/g	Total chlorophyll mg/g
1	Control	0.60	2.06	2.00
2	0.2%	0.24	1.39	1.92
3	0.4%	0.16	0.73	1.85
4	0.6%	0.13	0.71	0.85
5	0.8%	0.06	0.69	0.66
6	1.0%	0.07	0.50	0.50

Fig. 5:Estimation of Chlorophyll content from *Triticum aestivum* L. seedlings after 10th day interval.
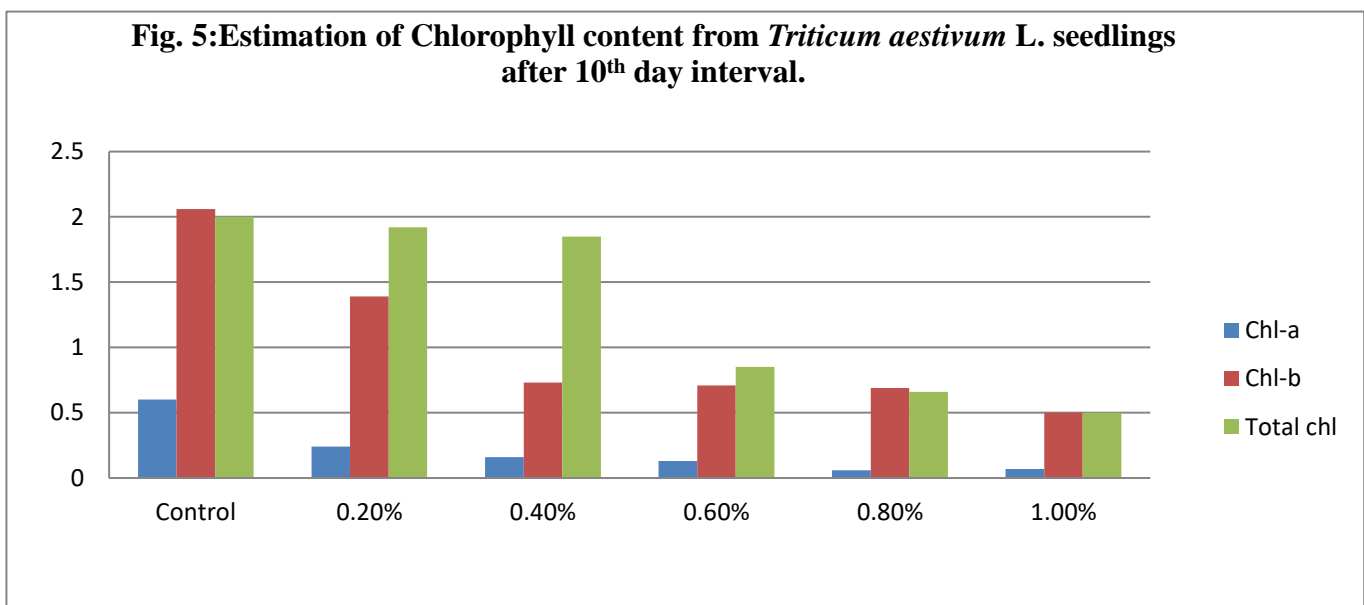
Seeds considered being as a suitable host to maintain the pathogenic microorganisms even inthe absence of the host. Treating such seeds with fungicides/bactericides will protect them from being attack by fungi, nematodes

or other pests (Buss *et al.,* 2001). Treating vegetable and crops seeds with fungicides will protect them against soil-borne fungi which could cause diseases, especially root-rot (Pimentel and Greiner 1997). Therefore,there was a crucial need to study the effect of fungicides on growth parameters of plants and ultimate effect on soil pH and moisture content.

It has been observed that the use of pesticide cause serious detrimental effect on the seed germination and seedling growth. It has been reported that the pesticides used viz., Captaf, Bavistin, Blitox, Sitara and Domarck have inhibitory effect as well as growth promoting effect on the germination and seedling growth of radicle and plumule of *Cicer arietinum* and *Zea mays*. In both the cases of *Cicer arietinum and Zea mays*. The improvement in growth parameters may be because of its application suppressed and /or elimination of pathogenic population and the other factors. Growth stimulation may also be due tothe increase in the growth promoting factors i.e. increase in cytokinin or gibberellins production etc.

IV. CONCLUSION

Data showed that the recommended concentration of Bavistin favors growth of seedling but concentration higher than recommended could be unfavorable for proper growth of seedling. The chlorophyll content observed to decrease as the concentration of fungicide increases, which shows that Bavistin fungicide had harmful effect on chlorophyll content of the wheat plant.It suggest that, it should be used at concentration, which would not inhibit growth and chlorophyll degradation. This study has direct application in the fungicide management programme.

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Chemical Composition & Nutritional Assessment of Seeds of Underutilized Wild Legume Rhynchosia Lour

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ABSTRACT

The aim of the present research is to study the chemical composition and nutritional potential of immature and mature seeds of four species of Rhynchosia like R.cana, R.hirta, R.minima, R.rufescence. The preliminary phytochemical analysis was done by using four solvents systems, such as methanol, acetone, aqueous and chloroform. A high amount of phytochemicals like alkaloids, phenols, tannin, caumarin, and glycosides was found in the methanolic extract than the others. In proximate analysis high content of ash (4.5%), crude fat (6%) and protein (8.31%) were observed in immature seeds of R.cana, while dry matter (88%) was observed in mature seeds of R. hirta. A high amount of crude fibre content (17%) was observed in mature seeds of R.minima and moisture (40%) was noted in immature seeds of R.hirta .In mineral analysis High amount of nitrogen (1.33±0.014%), phosphorus (0.24±0.008%) and potassium (1.27±0.005%) were observed in immature seeds, whereas manganese(1220±0.005 mg/100g) in mature seeds of R.cana. A High amount of zinc (730±0.008 mg/100g) and calcium (1.8%) were observed in mature seeds of R.rufescence. In mature seeds of R.minima high magnesium content (9.11%) & copper (1113±0.001mg/100g) were observed, while iron content (6180±0.01mg/100g) in immature seeds of R.minima. From the above study, it is conclude that all four species of Rhynchosia are nutritionally rich, whereas R.cana having high nutritional content as compared to other three species which reviled that wild legume Rhynchosia is a rich source of phytochemicals and nutrition and provides possibilities for advancement as a stand-by for cultivated species as a vegetable.

Key words- Preliminary phytochemical & nutritional, Rhynchosia, immature &mature, wild vegetables

I. INTRODUCTION

The role of seed legumes in animal and man diets is well known in developing countries (Oke *et al.*, 1995); Awareness of the chemical composition of foods is the basic food recommendations for a healthy nutritious diet. At the macro level, a table of food composition is used to plan food demand and supply, and at the micro level to establish prescribed diet as well as to determine and correct the nutritional values of a given diet (Southgate, 1974).Given both population explosion and urbanization, there is a serious problem of inadequate availability

and consumption of protein foods in India. There is a growing need to make efforts to identify better and cheaper protein sources. Despite the urgent need to meet the nutritional needs of ever-increasing populations, largely unexplored remained the available cheap protein options (Murhty *et al.*, 2003). With the rise in new food sources, wild plant seeds, like tribal pulses, are attracting more attention because they are well suited to adverse environmental conditions, are highly resistant to disease and pests, and have strong nutritional qualities (Maikhuri, *et al.*, 1991).Legumes seeds are essential nutrient sources and can serve as dietary protein sources of high quality to fulfill nutritional requirements (Perumal *et al.*, 2001; Escudero *et al.*, 2006). Legume seeds have twice as much protein on average as cereals, and the protein's nutritional value is typically high (Vijayakumari *et al.* 1997). In this sense, the underused legumes, which have enormous potential for commercial exploitation but remain overlooked, offer a strong variety (Bhag Mal, 1992). Accounts have been given of important pulses under exploited that await exploration for food, fodder, electricity, and industrial purposes (Siddhuraju *et al.*, 2000; Kalidass and Mohan, 2011).

II. MATERIAL AND METHODS

2.1 Collection of Plant Material & Preparation of Extract

The plant materials of all four *Rhynchosia* species were collected from various locations, such as *R.minima*, collected from the village of Kondi in Solapur District, Maharashtra. *R.hirta*, *R.cana*, *R.rufescence* were collected from Karnataka's Nandi hills. Plant material identification was carried out using the flora of the district of Kolhapur and JCB herbarium digital flora of Karnataka. In order to avoid contamination, the immature and mature plant seeds were collected and air dried in laboratory condition and made fine powder using a mechanical grinder. For further nutritional & phytochemical analysis, this fine powder was used.

2.2 Preliminary Phytochemical screening

Weighed dry plant powder (W1) was placed in a cheese cloth and extracted using several solvents in a Soxhlet extractor, including methanol, ethanol, chloroform, petroleum ether, and distilled water. To screen all of these extracts for chemical composition, various qualitative chemical assays were done. Trease and Evans (1985), Brindha *et al.* (1981), Kokate et al. (1995), and Khandewal (2005) were used to conduct qualitative phytochemical analysis. The following assays were carried out on extracts to detect the presence of specific phytoconstituents.

2.2.1   Phenols (Ferric Chloride test)

The ferric chloride test was used to assess the presence of phenols. Two grams of extract were placed in a test tube, along with a few drops of 5% ferric chloride solution. The presence of phenols was indicated by a dark green color (Mace, 1963).

2.2.2   Anthraquinones (Borntrager's test)

In 1 ml of plant extract, a few drops of 2.5% magnesium acetate solution were added. The presence of anthraquinones was shown by the formation of a pink color.

2.2.3   Tannins

The 50 mg extract was dissolved in distilled water, and then 3ml of a 10% lead acetate solution was added to it. The presence of tannins was indicated by a thick white precipitate (Raaman, 2006).

2.2.4   Saponin

The extract was diluted with distilled water to a level of 20 ml, and the suspension was agitated for 15 minutes in a graduated cylinder. Saponins were detected by the presence of a thick lather (Kokate, 1999).

2.2.5 Alkaloids

i. Mayer's test

A drop of Mayer's reagent was applied to the edge of the test tube after mixing the 1 ml extract with a few drops of 2.5 N HCl. The positive test was indicated by a white or creamy precipitate (Evans, 1997). [Mayer's reagent: Separately dissolve mercuric chloride (1.36 g) and potassium iodide (5 g) in water. These two solutions were combined, and the volume was increased to 100 ml by adding water].

ii. Dragendorff's test

1 ml plant extract and few drops of 2.5N HCLwas mixed with 1 ml Dragendorff's reagent [solution A = Bismuth nitrate (0.17 g) in acetic acid (2 ml) and distilled water (8 ml), solution B= KI (4 g) in acetic acid (10 ml) and distilled water (20 ml)] . Then combine solution A and B and dilute with distilled water to 100 ml.]. The presence of alkaloids was revealed by the formation of a reddish brown precipitate (Evans, 2002).

2.2.6 Reducing sugar (Fehling's test)

On a water bath, one ml of extract was heated with 1 ml Fehling solution A and 1 ml Fehling solution B. The presence of sugar was indicated by a reddish precipitate. (Ramakrishnan *et al*, 1994). [Fehling's solution A: Copper sulphate (34.66 g) was dissolved in distilled water and a volume of 500 ml was obtained by adding distilled water. Fehlings solution B was prepared by dissolving potassium sodium tartarate (173 g) and sodium hydroxide (50 g) in water and diluting to 500 ml].

2.2.7 Glycosides (Keller – Kiliani test)

1 ml glacial acetic acid, a few drops of $FeCl_3$, and a few drops of concentrated H_2SO_4 were added to a 2 ml extract. The presence of cardiac glycosides was revealed by the blue green color.

2.3 Nutritional Analysis

2.3.1 Dry matter and Moisture

The sample's dry matter represents the amount of material left after all moisture has been removed. The material's dry matter and moisture were determined using the AOAC technique (1990). Dishes were washed with detergents and then rinsed with water before being dried in the oven overnight at 60℃. The dishes were then taken out of the oven and placed in a desiccator to cool. Two grams of sample were placed in plates and baked at 60℃ overnight. The following formula was used to compute the dry matter and moisture.

$$\text{Dry matter (\%)} = \frac{(\text{Weight of dish} + \text{Weight of dried sample}) - \text{Weight of dish}}{\text{Weight of sample before drying}} \times 100$$

$$\text{Moisture content (\%)} = \frac{(\text{Weight of fresh sample} - \text{Weight of dry sample})}{\text{Weight of fresh sample}} \times 100$$

2.3.2 Total Ash

The AOAC (1990) method was used to determine the ash content. For one hour, the crucible was held in a muffle furnace at 600℃. To avoid moisture absorption, it was instantly transported from the furnace to a desiccator, cooled to ambient temperature, and weighed. Two grams of dry sample powder were placed in the crucible and heated to 600℃ in a muffle furnace for six hours. The crucible was put in a desiccator and allowed to cool to room temperature. To avoid moisture absorption, the crucible was moved as rapidly as feasible. The following formula was used to estimate the ash percentage.

$$\text{Ash (\%)} = \frac{\text{Weight of Ash}}{} \times 100$$

<div align="center">Weight of Sample</div>

2.3.3   Crude fiber

Sadasivam and Manikam developed a method for determining crude fiber content (1992). To eliminate fat content, two grams of dried material were extracted using petroleum ether. The plant powder was dried and taken for further examination. This two-gram dry powder was heated for 30 minutes with 200 ml of 0.255 N H_2SO_4 and bumping chips. It was then filtered through muslin fabric and rinsed with hot water until it was acid-free. The residue was then heated for 30 minutes with 200 ml of 0.313 N NaOH. It was filtered again through muslin cloth and rinsed with 25 ml boiling 1.25% H_2SO_4, three 50 ml portions of water, and 25 ml alcohol. Removed the residue and placed it in an ashing dish that had been pre-weighed (W1 g). Then it was burned over 600°C for 30 minutes. It was reweighed after cooling in the desiccator (W3 g). Using the formula below, the proportion of crude fiber was calculated.

$$\text{Crude fiber content (\%)} = \frac{\text{Loss in weight on ignition (W2 -W1) - (W3 -W1)}}{\text{Weight of sample}} \times 100$$

   Where, W1= Preweighted ashing dish,

          W2= Ashing dish with dry residue,

          W3= Ashing dish with ash.

2.3.4   Crude fat

Sadasivam and Manikam's approach was used to determine the crude fat content (1992). In a thimble, two grams of dried material were placed in the soxhlet device. Dry pre-weighed solvent flasks ('a' g) were attached beneath the apparatus, and the needed volume of petroleum ether was supplied, after which the condenser was connected. The temperature was tuned to produce 2-3 drips of condensation every hour, and the sample was extracted for 16 hours. The thimble was then removed, and the ether was kept in the instrument. On a hot water bath, the excess ether was evaporated from the solvent flask. Then it was allowed to cool before being weighed ('b' g). The following formula was used to determine crude fat.

$$\text{Crude fat content (\%)} = \frac{(b - a)}{\text{Weight of sample}} \times 100$$

2.3.5   Crude Protein

The total nitrogen content was calculated using Hawk *et al.* (1948) method. A pinch of microsalt (200 g K_2SO_4 + 5 g dehydrated $CuSO_4$), 5 ml H_2SO_4, and double distilled water (1:1) were added slowly to 0.5 g powder of plant samples in Kjeldahl's flask. A few glass beads were added to speed up digestion and prevent the solution from banging around in the flask. The digestion process was continued until a clear solution was obtained. It was brought to room temperature and then double distilled water was added to get the volume up to 100 ml. It was filtered through Whatman No.1 filter paper after being stored at room temperature overnight. The nitrogen content of this filtrate was calculated. 1 ml filtrate, a drop of 8% $KHSO_4$, and 15 ml Nessler's reagent (Reagent A- 7 g KI + 10 g HgI_2 in 40 ml distilled water, Reagent B- 10 g NaOH in 50 ml distilled water) were used in the assay. Reagents A and B were combined in a 4:5 ratio. This was diluted in distilled water up to 50 ml. Distilled water was used to make the blank. On a spectrophotometer, the absorbance was measured at 520 nm. The nitrogen concentration was estimated using an ammonium sulphate standard curve (0.05 mg/ml). The crude protein content was calculated by multiplying the total nitrogen content of the sample by 6.25 (AOAC, 1990).

2.3.6 Carbohydrates analysis: Total Sugar

The sugars were calculated using the technique (Anthrone).100 mg of plant material was injected into a boiling tube and hydrolyzed with 5 ml of 2.5 N HCl for three hours in a boiling water bath. Then, using solid sodium carbonate, it was neutralized until the effervescence continued, yielding a final amount of 100 ml. After that, the extract was centrifuged at 7000 rpm for 10 minutes. After centrifugation, the supernatant was collected for further analysis. 4 ml of anthrone reagent was added to the test tube after 1 ml of supernatant and 2 ml of distilled water were added. The test tubes were then placed in a boiling water bath for eight minutes. The test tube was allowed to cool to room temperature after heating. Finally, as the color changed from green to dark green, then absorbance was measured at 630nm.

2.3.7 Reducing sugar

The method of calculating the reducing sugar was used (Anthrone). 100 mg of plant material was injected into a boiling tube and hydrolyzed for three hours in a boiling water bath with 5 ml of 2.5 N HCl. It was then neutralized with solid sodium carbonate until the effervescence continued, yielding a final volume of 100 ml. After that, the extract was centrifuged for 10 minutes at 7000 rpm. The supernatant was collected after centrifugation for further examination. After mixing 500 μl of supernatant and 3 ml of DNSA reagent (20 ml 2N NaOH + 50 ml sodium potassium tartrate + 20 ml DNSA) into the test tubes. The test tubes were then immersed in a boiling water bath for 15 minutes before being allowed to cool to room temperature. The absorbance was measured using a spectrophotometer at 540nm.

2.3.8 Starch

To extract the sugars, 0.5g of plant material was homogenized in hot 80% ethanol. The extract was then centrifuged for 10 minutes at 7000 rpm to remove the residue. The leftovers were then washed several times with hot 80% ethanol until no color was produced by the washing with anthrone reagent. After washing, it was placed in a water bath to dry. The residue was then mixed with 5 ml distilled water and 6.5 ml 52% perchloric acid. The extract was then maintained at 00 C for 20 minutes. After the incubation period, the supernatant was centrifuged many times with perchloric acid and preserved for further investigation. A test tube was filled with 0.1 ml of supernatant and distilled water to make a final volume of 1 ml. Then, in a test tube, 4ml of anthrone reagent (200mg anthrone in 100ml ice cold 95% Sulphuric acid) was added. The test tubes were then immersed in a water bath for 8 minutes. After the test tubes had been heated to the desired temperature, they were removed from the water bath and allowed to cool at ambient temperature. Finally, using a spectrophotometer, the intensity of the green to dark color was assessed at 630nm.

2.3.9 Mineral Analysis:

i. Preparation of acid digests

In the examination of inorganic components, the acid digestion method of Toth *et al.*, (1948) was used. A total of 0.5g mg of oven dried powder was transferred to a clean 150 ml beaker, to which 10 ml of concentrated HNO_3 was added. It was covered with a watch glass and left for an hour to allow the primary reaction to die down. The mixture was then boiled on a hot plate until all of the material had dissolved entirely. After allowing it to cool to room temperature, 10 ml of 60% perchloric acid was added and carefully mixed. The solution was then boiled on a hot plate until it turned colorless and was reduced to around 2-3ml. It was decided not to allow the solution to dry out while it was heating. It was transferred to a 100ml volumetric flask after cooling, diluted to 100ml with distilled water, and stored overnight. The extract was filtered the next day using Whatman No.44 filter paper. The resulting filtrate was then utilized to analyze various inorganic components.

Using an Atomic absorption Spectrophotometer, the levels of calcium, magnesium, sodium, iron, manganese, zinc, and copper were determined. If necessary, a suitable dilution of the plant extract was made using double distilled water. Flame photometry was used to assess sodium and potassium using the usual flame photometer method (Model- Elico, ch-22A). Various amounts of sodium and potassium were created for standardization, ranging from 10 to 80 ppm, by diluting a stock solution of NaCl (100 ppm). Using an atomic absorption spectrophotometer, the remaining inorganic elements, such as calcium, potassium, magnesium, iron, manganese, zinc, and copper, were calculated (Perkin-Elmer, 3030 A).

ii. Estimation of Phosphorus

The method reported by Sekine *et al.* was used to measure phosphorus from the same acid digest (1965). In a test tube, two ml acid digest was mixed with two ml 2N HNO_3, one ml Molybdate-Vanadate reagent (Reagent A: 1.25 g ammonium vanadate dissolved in 1N HNO_3), and the volume was increased to 500 ml with 1N HNO_3. Reagent B: 25g ammonium molybdate was dissolved in distilled water and the volume was increased to 500ml. Then, in equal amounts, reagents A and B were combined). With distilled water, the volume was increased to 10 mL and left to react for 20 minutes. A reaction mixture was used to measure the yellow color intensity at 420 nm after 20 minutes. The standard curve was plotted using the color given by standards of known phosphorus concentration in KH_2PO_4 solution (0.110 g KH_2PO_4 per liter = 0.025 mg P. ml-1) using Molybdate Vanadate reagent. The content of Phosphorus in the plant material was expressed in mg/100g on a dry weight basis using a standard curve.

iii. Total nitrogen:

The total nitrogen content was calculated using Method of Hawk *et al* (1948). 5 ml H_2SO_4 and double distilled water (1:1) were carefully added to the 0.5g powder of plant samples in Kjeldahl's flask, together with a pinch of microsalt (200 g K_2SO_4 + 5 g dehydrated $CuSO_4$) and a few glass beads were added to speed up digestion and prevent the solution from banging around in the flask. The digestion process was continued until a clear solution was obtained. It was brought to room temperature and then double distilled water was added to make the capacity 100 ml. It was filtered through Whatman No.1 filter paper after being stored at room temperature overnight. This filtrate was used to calculate nitrogen levels. 1 mL filtrate, a drop of 8% $KHSO_4$, and 15 mL Nessler's reagent (Reagent A-7 g KI + 10 g HgI_2 in 40 mL distilled water, Reagent B-10 g NaOH in 50 mL distilled water) were used in the test. Reagents A and B were combined in a 4:5 ratio. This was diluted in distilled water up to 50 ml. Distilled water was used to make the blank. A double beam spectrophotometer was used to measure the absorbance at 520 nm (Shimadzu UV 190). The nitrogen concentration was estimated using an Ammonium sulphate (0.05 mg/ml) standard curve.

III. RESULT AND DISCUSSION

In present study the preliminary phytochemical analysis was done by using four solvents systems, such as methanol, acetone, aqueous and chloroform. A high amount of phytochemicals like alkaloids, phenols, tannin, caumarin, and glycosides was found in the methanolic extract than the others. In proximate analysis high content of ash (4.5%), crude fat (6%) and protein (8.31%) were observed in immature seeds of *R.cana*, while dry matter (88%) was observed in mature seeds of *R. hirta*. A high amount of crude fibre content (17%) was observed in mature seeds of *R.minima* and moisture (40%) was noted in immature seeds of *R.hirta* .In mineral analysis High amount of nitrogen (1.33±0.014%), phosphorus (0.24±0.008%) and potassium (1.27±0.005%) were observed in immature seeds, whereas manganese(1220±0.005 mg/100g) in mature seeds of *R.cana*. A High

amount of zinc (730±0.008 mg/100g) and calcium (1.8%) were observed in mature seeds of *R.rufescence*. In mature seeds of *R.minima* high magnesium content (9.11%) & copper (1113±0.001mg/100g) were observed, while iron content (6180±0.01mg/100g) in immature seeds of *R.minima*.

The reducing sugar content of immature and mature seeds of all four species of *Rhynchosia* like *Rhynchosia cana, Rhynchosia hirta, Rhynchosia rufescence, Rhynchosia minima* are showed in (Figure 1). In *R. hirta* high amount of reducing sugar is in mature seeds (0.803± 0.78 g/100g) than that of immature seeds (0.528± 0.53 g/100g) while in case *of R. cana, R. rufescence* and *R. minima* immature seeds showing high amount of reducing sugar (0.940± 1.74 g/100g), (1.391± 0.39 g/100g) and (0.966± 0.53 g/100g) respectively, than that of mature seeds which having low amount of reducing sugar (0.855± 1.29 g/100g), (0.810± 0.25 g/100g) and (0.666± 0.39 g/100g) respectively.

The total sugar content of immature and mature seeds of all four species of *Rhynchosia* like *Rhynchosia cana, Rhynchosia hirta, Rhynchosia rufescence, Rhynchosia minima* are showed in (Figure 2). In *R. cana* high amount of total sugar is in mature seeds (0.915± 0.39 g/100g) than that of immature seeds (0.865± 0.67 g/100g) while in case of *R. hirta, R. rufescence* and *R. minima* immature seeds having high amount of total sugar content (0.813±0.39g/100g), (1.214±1.17g/100g) and (0.901±1.29g/100g) respectively than that of mature seeds which having low amount of total sugar content (0.710± 0.67 g/100g), (0.827± 0.82 g/100g) and (0.792± 0.39 g/100g) respectively.

The starch content of immature and mature seeds of all four species of *Rhynchosia* like *Rhynchosia cana, Rhynchosia hirta, Rhynchosia rufescence, Rhynchosia minima* are showed in (Figure 3). In *R. hirta* high amount of starch content is in mature seeds (1.266± 4.16 g/100g) than that of immature seeds (1.084± 2.51 g/100g) while in case of *R. cana* high amount of starch content is in immature seeds (1.582± 2.08 mg/100g) than that of mature seeds (1.477±3.78 mg/100g). In *R. rufescence* high amount of starch content is in mature seeds (1.577± 1.52 g/100g) than that of immature seeds (1.453± 4.04 g/100g) whereas in *R. minima* high amount of starch content is in immature seeds (1.581± 5 g/100g) than that of mature seeds (1.442± 2.51 g/100g).

Kalidass, C., & Mohan, V. R., (2012) studied the nutritional and antinutritional composition of some species of *Rhynchosia*. They found   proximate composition of species *Rhynchosia* are reveals, the content of crude protein was found to be high in *R. rufescens* (19.40%). This is comparable to some common traditional protein source, such as *Centrosema pubescens* (18.97%), *Centrosema pascuorum* (18.15%), *Lablab purpureus* (17.28%) (Nworgu and Ajayi, 2005), and *Dioscorea pentaphylla* var tribal food tubers. Pentaphylla (9.18%), *Dioscorea var oppositifolia* (7.00%), *Dioscorea spicata* (6.38%), and *Dioscorea tomentosa* (8.31%), respectively (Mohan and Kalidass, 2010). The crude lipid content of *Rhynchosia cana* accessions *Siruvani and Petchiparai, R. filipes, R. rufescens* tends to be higher than the common / tribal pulses previously studied such as *Mucuna flegellipes* (Ihedioha and Okoye, 2011), and *Dioscorea pentaphylla var tubers. Dioscorea oppositifolia var. Pentaphylla. Dioscorea spicata, Dioscorea tomentosa and Dioscorea* (Mohan and Kalidass, 2010). The overall dietary fiber content of all of the *Rhynchosia* species studied is found to be more than the other *Luffa cylindrica* tribal pulses (Olaofe *et al.,* 2008); *Canavalia ensiformis* (Doss *et al.,* 2011). The ash content of the investigated species of *Rhynchosia* (2.80-3.50 percent) would be important to the extent that it contains the nutritionally important mineral elements. Kalidass, C., & Mohan, V. R. 2012).It seems that, because of their low fat content, the *Rhynchosia* species have a high carbohydrate range (64.25 – 72.51 per cent). All the *Rhynchosia* species investigated have a high energy range (1563.21 – 1593.37 kJ 100g-1 DM) compared to the commonly grown pulse crops such as cowpea, green gram, horse gram, moth bean and peas (Narasinga Rao *et al.,* 1989), which are within 1318 – 1394 kJ 100g-1 DM. Robinson (1987) indicated that a diet that meets the RDA

(Recommended Dietary Allowances) values of two-thirds should be considered sufficient for an person. Minerals such as calcium, iron, copper, zinc, potassium and magnesium are a good source of food legumes (Salunkhe *et al.*, 1985). According to (Kalidass, C. & Mohan, V. R. 2012) the seeds of all the *Rhynchosia* species studied contained higher levels of sodium , potassium and calcium compared to other legumes, *Phaseolus vulgaris, Phaseolus limensis, Vigna unguiculata, Cicer arietinum, Pisum sativum and Lens culinaris* (Meiners *et al.*, 1976); In this study, all species of *Rhynchosia* reported a higher potassium level relative to the acceptable dietary allowance value (RDA) of infants and children (< 1550 mg) (NRC / NAS 1980). The high potassium content can be beneficially used in the diet of people taking diuretics to control hypertension and suffering from excessive potassium excretion by body fluid (Siddhuraju *et al.*, 2001). The iron content *of Rhynchosia filipes*, manganese content of *Rhynchosia cana* accessions Siruvani and Petchiparai, *Rhynchosia rufescens* and *Rhynchosia suaveolens* were found to be higher than that of the ICMR's recommended dietary allowance for iron and manganese (1992).

Table 1. Preliminary phytochemical analysis of immature & mature seeds of *Rhynchosia* in methanol extract.

Parameter	RMI	RMM	RCI	RCM	RRI	RRM	RHI	RHM
Alkaloids	+++	+++	+	+++	+++	+++	++	+++
Phenols	+++	+++	+	+	-	+	+++	+++
Tannins	++	++	+++	++	+++	+++	+++	+++
Saponins	+	+	+	+	+	+	-	-
Flavones	+	+	+	-	-	-	++	++
Anthraquinones	-	-	-	-	-	-	-	-
Carbohydrates	-	-	-	-	-	-	-	-
Xanthoprotein	-	-	-	-	-	-	-	-
Caumarine	+++	+++	+++	++	++	++	++	++
Glycoside	++	++	++	++	++	+++	+++	+++

(+ = Low, ++ = Medium, +++ = High, - = Absent, RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).

Table 2. Preliminary phytochemical analysis of immature & mature seeds of *Rhynchosia* in chloroform extract.

Parameters	RMI	RMM	RCI	RCM	RRI	RRM	RHI	RHM
Alkaloids	-	-	-	-	-	-	-	-
Phenols	-	-	-	-	-	-	-	-
Tannins	+	+	+	+	++	++	+	+
Saponins	+++	++	++	++	+	+	+	+
Flavones	-	-	-	-	-	-	-	-
Anthraquinones	-	-	-	-	-	-	-	-
Carbohydrates	+++	+++	+++	+++	+++	+++	+++	+++
Xanthoprotein	-	-	-	-	-	-	-	-
Caumarine	-	-	-	-	-	-	-	-
Glycoside	-	-	-	-	-	-	-	-

(+ = Low, ++ = Medium, +++ = High, - = Absent, RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).

Table 3. Preliminary phytochemical analysis of immature & mature seeds of *Rhynchosia* in acetone extract.

Parameter	RMI	RMM	RCI	RCM	RRI	RRM	RHI	RHM
Alkaloids	-	-	-	-	-	-	-	-
Phenols	-	-	-	-	-	-	-	-
Tannins	-	-	-	-	-	-	-	-
Saponins	-	-	-	-	-	-	-	-
Flavones	+	+	+	+	++	++	-	-
Anthraquinones	-	-	-	-	-	-	-	-
Carbohydrates	-	-	-	-	-	-	-	-
Xanthoprotein	-	-	-	-	-	-	-	-
Caumarine	++	++	++	++	++	+++	-	-
Glycoside	++	++	++	++	++	++	++	++

(+ = Low, ++ = Medium, +++ = High, - = Absent, RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).

Table 4. Preliminary phytochemical analysis of immature & mature seeds of *Rhynchosia* in aqueous extract.

Parameter	RMI	RMM	RCI	RCM	RRI	RRM	RHI	RHM
Alkaloids	+	+	+	+	+	+	+	+++
Phenols	-	-	-	-	-	-	-	-
Tannins	+	+	+	+	+	+	+	+
Saponins	++	++	+++	+++	++	+	++	+++
Flavones	+	++	++	++	+	+	+	++
Anthraquinones	-	-	-	-	-	-	-	-
Carbohydrates	-	-	-	-	-	-	-	-
Xanthoprotein	-	-	-	-	-	-	-	-
Caumarine	-	-	-	-	-	-	-	-
Glycoside	-	-	-	-	-	-	-	-

(+ = Low, ++ = Medium, +++ = High, - = Absent, RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).

Table 5. Proximate analysis of immature & mature seeds of *Rhynchosia*.

Sr. No	Plant Name	Dry Matter (%)	Moisture (%)	Ash (%)	Crude Fat (%)	Crude Fiber (%)	Protein (%)
1	RHI	60	40	3.5	2	9	6.81
2	RHM	88	12	02	4	12	5.37
3	RCI	73	27	4.5	6	4	8.31
4	RCM	72	14.5	03	2.5	8	6.75
5	RRI	65	17	04	3.5	8.5	5.43
6	RRM	74	30.5	03	4.5	3	6.25
7	RMI	43	57	02	3.5	5	5.06
8	RMM	82	6.5	03	2.5	17	5.25

(RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).

Table 6. Mineral analysis of immature & mature seeds of *Rhynchosia*.

Sr. No	Plant Name	(Z) mg/100g	(Fe) mg/100g	(Mn) mg/100g	(Cu) mg/100gm	(PO4) %	(Ca) %	Nitrogen %	Phosphorus %	(Mg) %
1	RHI	527±0.05	3250±0.02	160±0.03	1110±0.04	1.18±0.03	0.544±0.001	1.08±0.03	0.2±0.05	0.10±0.03
2	RHM	610±0.05	3930±0.0145	110±0.005	1200±0.08	1.03±0.03	0.706±0.001	0.86±0.05	0.19±0.05	0.14±0.05
3	RCI	670±0.003	4290±0.01	140±0.005	980±0.003	1.27±0.05	0.496±0.005	1.33±0.014	0.24±0.08	0.11±0.03
4	RCM	640±0.05	2550±0.02	1220±0.005	1103±0.02	1.12±0.05	0.579±0.003	1.18±0.014	0.23±0.012	0.11±0.03
5	RRI	620±0.08	4580±0.02	220±0.08	890±0.027	1.24±0.05	1.248±	0.97±0.015	0.24±0.015	0.11±0.06
6	RRM	730±0.08	6170±0.01	220±0.012	1390±0.17	1.23±0.03	1.837±0.015	1.3±0.08	0.21±0.08	0.093±0.08
7	RMI	600±0.023	6180±0.01	137±0.005	860±0.001	1.02±0.03	0.08±0.017	0.81±0.02	0.22±0.01	0.12±0.03
8	RMM	680±0.08	3920±0.01	190±0.005	1113±0.01	1.02±0.08	0.374±0.005	0.87±0.01	0.23±0.1	9.11±0.06

(RCI- *Rhynchosia cana* immature, RCM- *Rhynchosia cana* mature, RHI- *Rhynchosia hirta* immature, RHM- *Rhynchosia hirta* mature, RRI- *Rhynchosia rufescence* immature, RRM- *Rhynchosia rufescence* mature, RMI- *Rhynchosia minima* immature, RMM- *Rhynchosia minima* mature).
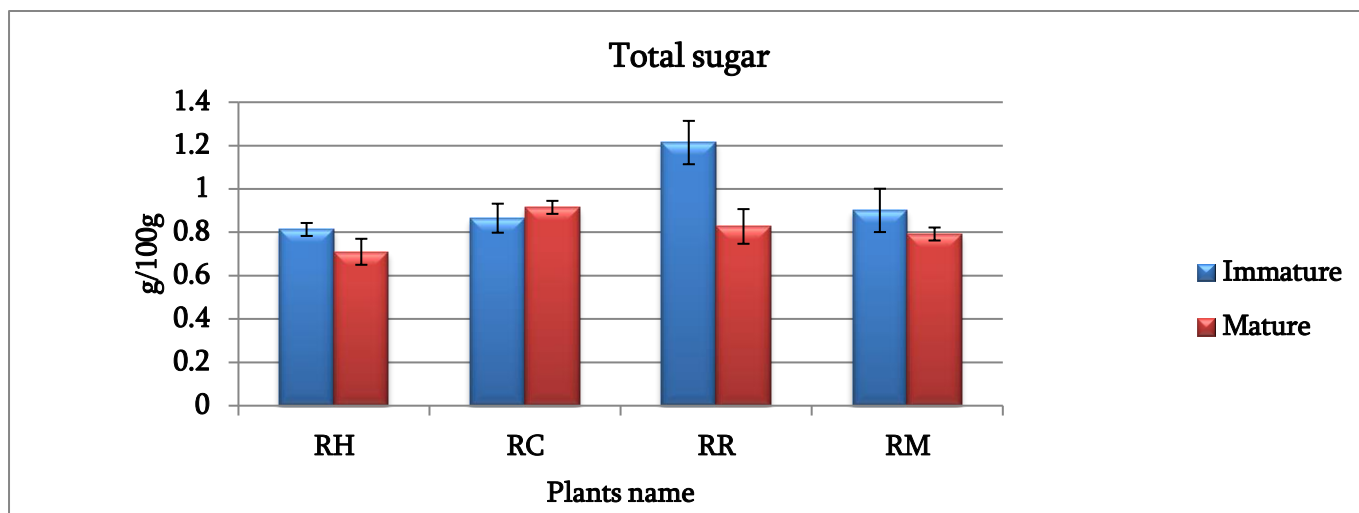
Total sugar

Fig.1. Total sugar content of immature and mature seeds of four species of *Rhynchosia.*
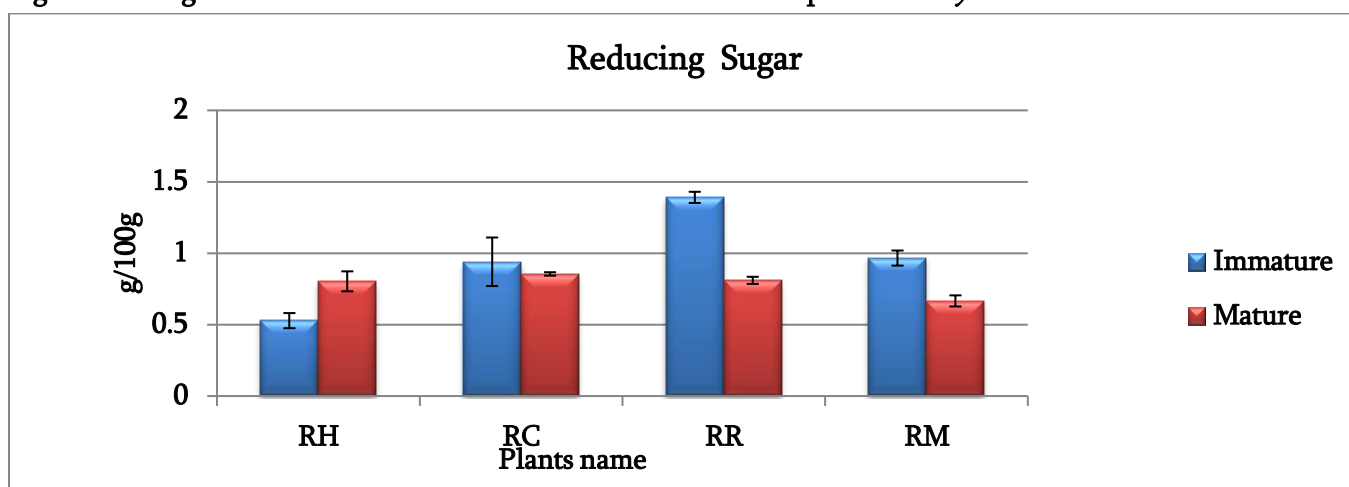
Reducing Sugar

Fig.2. Reducing sugar content of immature and mature seeds of four species of *Rhynchosia.*
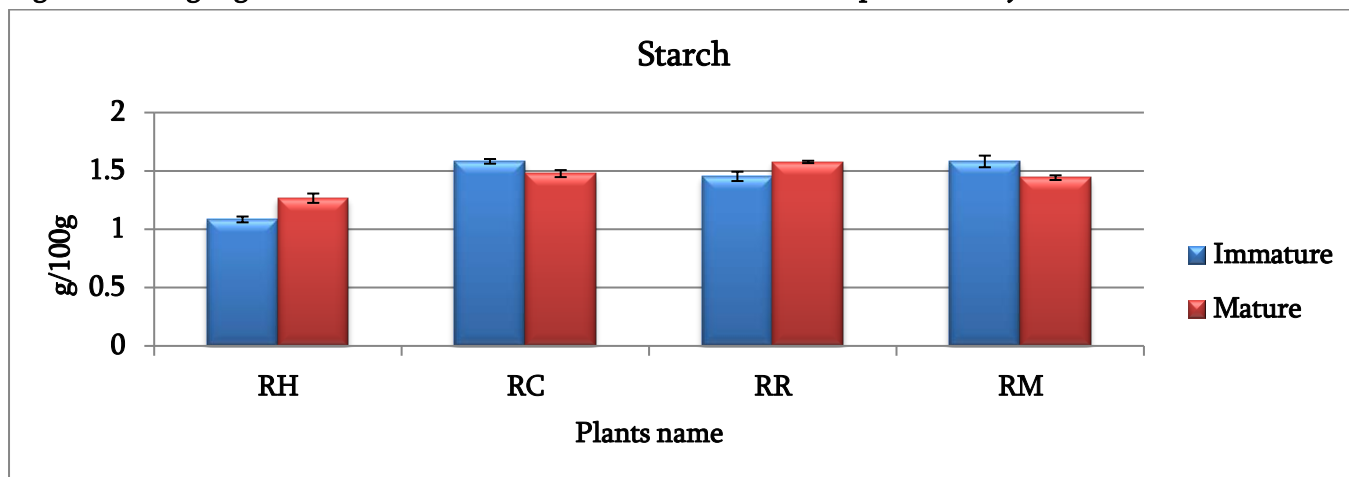
Starch

Fig.3. Starch content of immature and mature seeds of four species of *Rhynchosia.*

IV. CONCLUSION

From the above study, it is conclude that all four species of *Rhynchosia* are nutritionally rich, whereas *R.cana* having high nutritional content as compared to other three species which reviled that wild legume *Rhynchosia* is a rich source of phytochemicals and nutrition and provides possibilities for advancement as a stand-by for

cultivated species as a vegetable. *Rhynchosia* is an economically important genus that is distributed all over the world. The *Rhynchosia's* preliminary phytochemical screening revealed alkaloids, flavonoids, tannins, saponine, terpenoids, and glycosides.

V. ACKNOWLEDGMENT

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Antioxidant Potential and Secondary Metabolites in the Fruits of Spondia Pinnata (L. F) Kurz

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ABSTRACT

Spondias pinnata L.(Family- Anacardiaceae) is often known as Indian hog plum. This plant is using traditionally in the treatment of infectious diseases like bronchitis, ulcer, dysentery and skin diseases. The aim of the present study was to evaluate the antioxidant potential and secondary metabolites of the pulp extracted from the fruits S. pinnata L. In the estimation of antioxidant analysis the highest antioxidant activity was found in reducing power assay in methanol extract of ripe fruit at 4 mg concentration (1853.44 ± 0.1 mg/100g) than the other antioxidant assays. In secondary metabolite assessment more activity was found in alkaloid at 4mg concentration (2094.47 ± 0.88 mg/100g) of methanol extract of ripe fruit than the flavonoid content. The present study demonstrates that the fruit pulp of S. pinnata can be considered as a valuable source of an antioxidant activity and secondary metabolite. In brief, all concentration manifests good antioxidant and secondary metabolite activity.

Key words- Antioxidant, secondary metabolite, ripe fruit, unripe fruit, S. pinnata

I. INTRODUCTION

Spondias pinnata L. belonging to family Anacardiaceae is commonly known as Indian hog or Ambada in Marathi. It is a deciduous, medium-sized glabrous plum and tree up to 10.5 m tall with a straight trunk. The fruit is drupe, ovate, elliptical in shape and more than an inch long, acidic, fragrant, greenish yellow when ripe (Angami et al., 2020). In various languages, plants are known by many names, such as hog-plum, wild mango (English), amra (Bengali), mambulichi (Tamil), jangali aam (Hindi) etc (Manik M. et al., 2013). Its fruits are highly nutritious and rich in vitamin A and C, minerals and iron (Raju et al., 2017). Literature has shown that fruits are astringent and antiscorbutic, as well as sedation by bilious dyspepsia (Rao and Raju, 2010). Plants of the genus Spondias, made up of as a traditional medicine, 18 species were included, to treat multiple illnesses (Sri Laksemi, 2019). Oxygen is the crucial part of aerobic life. Under certain condition, it can seriously affect our well living system by the formation of reactive oxygen species such as free radical and non-free radical species as a result form harmful effect like atherosclerosis, ischemic heart diseases, ageing, inflammation, diabetes, immunosuppressant, neurodegenerative diseases, cancer and others (Das et al., 2011). This plant is using traditionally in the treatment of infectious diseases like bronchitis, ulcer, dysentery and skin diseases (Grasvenor et al., 1995) and (Hout et al., 2006). The S. pinnata plant is important for medicinal, nutritional and

economical purposes. The fruit as well as root used as an anti-thirst remedy (Bora et al., 2014). Studies of plant extracts are essential in the search for molecules of antioxidants and anti-radical compounds. The ability to scavenge radicals and endogenous reactive oxygen species from plant extracts and isolated compounds and to act as enzyme inhibitors participating in their generation (such as peroxidases and oxidases), may be useful for the treatment of different types of drugs radical species-mediated diseases (Vellosa et al., 2008). In the living system, free radicals are sometimes formed and it may be responsible for damage to cells and tissues. As a result, research is focused on exploring stable and healthy efficient antioxidants and the enhancement of intake natural antioxidants from food supplements and traditional dietary supplements (Yazdanparast and Ardestani, 2007). Flavones are a class of flavonoids and a number of beneficial effects have been associated with their intake, including increased erythrocyte superoxide dismutase activity, decreased lymphocyte DNA damage, decreased urinary 8-hydroxy-2-deoxyguanosine (an oxidative damage marker) and increased plasma antioxidant ability (Williamson and Manach, 2005). Flavonoids also have strong antioxidant activity due to their ability to reduce the formation of free radicals and scavenge free radicals (Pietta, 2000). In antioxidants, secondary metabolites have a significant function any plants capacity (Kudale et al., 2016). Vitro antioxidant action has shown by Quercetin and rutin (Araújo da Silva et al, 2005). Flavonoid involve in oxidation of lipids and other molecules because they immediately donate hydrogen atom to free radicals (Schroeter et al., 2002). The present study deals with antioxidant activity and secondary metabolites in the fruit pulp of S. pinnata.

II. MATERIAL AND METHODOLOGY

2.1 Collection and Preparation of Plant Material
Fresh fruits of Spondias pinnata were collected from Amba (Kolhapur) in the month of July 2017, air dried and ground to a fine powder. Methanol, ethanol, acetone and aqueous extracts were then prepared for further analysis. The plant extract had been prepared mg/ml. The specimen was identified by using Flora of Kolhapur. The voucher specimen was submitted to SUK Herbarium. The plant extract was prepared through ultrasonic machine (Rivotek).

2.2 DPPH radical scavenging activity
DPPH radical scavenging activity was determined as described by Wang et al., (1998).100 μl of plant extract (mg / ml) was combined with 2.9 ml of DPPH methanol solution for each extract at various concentrations (1, 2, 3, 4 mg/ml). After an incubation time of 30 min, the absorbance against blank methanol was measured at 517 nm using a UV-visible spectrophotometer. Based on the following formula, the DPPH radical scavenging activity (%) was calculated: DPPH scavenging activity (%) = [(AB-AT) / AB] X 100 where AB and AT are respectively the absorbance of blank and plant content. The percentage of scavenging activity of each extract was compared with the positive control, L-Ascorbic acid. The initial free radical concentration of DPPH is reduced by 50 %. The methanol was used as a blank

2.3 Ferric Ion Reducing Antioxidant Power (FRAP Assay)
Ferric Ion Reducing Antioxidant Power was analyzed following Benzie and Strain (1996). The FRAP reagent was prepared in 0.3 mM Acetate buffer (pH 3.6), 10 mM TPTZ (2, 4, 6-tripyridyl-s-triazine) in 40 mM of HCl and 20 mM of $FeCl_3$ is combined in a 10: 1: 1 ratio. The plant extract (100 μl) was Mixed with 2.9 ml of FRAP reagent and absorbance it was measured at 593 nm.

2.4 Reducing Power

Anti-oxidative activity (reducing power) was determined as described by Oyaizu, (1986). Each extract (1 ml) of various concentrations (1,2 3, 4 mg/ml), 2.5 ml of phosphate buffer and 2.5 ml of 1 % potassium ferricyanide were combined with double-distilled water. The mixture was incubated for 20 minutes at 50 °C, after which 2.5 ml of 10% trichloroacetic acid (TCA) was added and centrifugated for 10 min at 3000 rpm. Then add 2.5 ml of top layer of supernatant was combined with 2.5 ml of distilled water and 0.5 ml of 0.1 % ferric chloride while L-Ascorbic acid was used as a positive control. Using a UV-visible spectrophotometer, the absorbance was measured at 700 nm.

2.5 Total Antioxidant Capacity

Total antioxidant capacity (TAC) by Prieto et al., (1999). Each 0.2 ml extract of methanol, ethanol, acetone and aqueous with a concentration of 0.2 mg/ml was combined with 2ml (600 mM sulfuric acid, 28 mM sodium sulphate and 4 mM ammonium molybdate) of reagent solution, the reaction mixtures were then incubated at 950C with 90 min. The absorbance has been calculated Using a UV-visible spectrophotometer at 695 nm against a blank that includes 3 ml of reagent solution. The overall antioxidant activity of the crude extract was expressed in mg/100g of dry weight as an L-ascorbic acid equivalent.

2.6 Chelation Power on Ferrous (Fe2+) Ions

Chelation Power on Ferrous (Fe2+) Ions was determined with the method suggested by Decker and Welch (1990). The plant extracts mixed with 0.1 ml of 2 mM FeCl2 was 0.5 ml of methanol plant extract (100 μg / ml), 0.2 ml of 5 mM ferrozine solutions were able to react at room temperature for 10 min. The absorbance was measured by a spectrophotometer at wavelength 562 nm. The percentage of ferrous ion inhibition was determined by comparing the results of the L-Ascorbic acid (100 μg / ml).

2.7 Total Flavonoid

The total flavonoid content was calculated using the (Luximon-Ramma et al., 2002). The each extract (1 ml) or std. solution of Quiercitine (1,2 3, 4 mg/ml), 5% Sodium nitrate and keep in 5 min, then add 0.3 ml of 10 % AlCl3. After 5 min 2 ml of 1 M NaOH was added. The reaction mixture was measured against the blank and absorbance taken at 510 nm.

2.8 Total Alkaloids

The total alkaloid content calculated using the 1, 10 Phenanthroline method was determined by (Singh et al., 2004) with minor modification. The extracts were preparing in 70 % methanol, ethanol, acetone and aqueous. There was 100 μl of plant extract in the reaction mixture. The reaction mixture was 1 ml of 0.05 M solution of 1, 10- Phenanthroline in methanol solvents and 1 ml of 0.025 M solution of FeCl3 in 0.5 M solution of HCL. The reaction mixture was incubated for 30 min. in water bath at 70±20C. The absorption of the red-colored substance against the blank reagent was measured at 510 nm. The contents of alkaloids were measured and determined using the typical colchicine curve.

2.9 Statistical Analysis

Statistical data was calculated using MS Excel. Pearson's correlation analysis was used for the correlation study.

III. RESULTS AND DISCUSSION

The values for DPPH radical scavenging activity, Ferric Ion Reducing Antioxidant Power (FRAP), Reducing power, Total Antioxidant Capacity, Chelation Power on Ferrous Ion, Total flavonoids and Total Alkaloids, in the extracts of various solvents, at various concentrations have been presented in Table 3.

3.1 DPPH radical scavenging activity

The DPPH activity was high in methanol as compared to other solvents such as ethanol, acetone and aqueous. The lowest activity was showing in aqueous. The inhibition percentage also increases with increased concentration (mg/ml). The ripe fruit was observed the highest scavenging activity than the unripe fruits. The highest activity in both ripe and unripe fruit was shown by the methanol extract result. More activity was seen at 4 mg/ml (85.05±0.09) concentrations in ripe fruit of methanol extract. The lowest activity was observed at 1mg/ml (20.95±0.4) concentrations in unripe fruit of aqueous extract. The unripe fruit demonstrated the lowest activity when comparing between both ripe and unripe fruits. The unripe acetone extract displayed the highest activity relative to ripe fruit. According to (Jain et al., 2014) highest DPPH activity was found in ethanol extract of Spondias pinnata (85.3±3.05%). In present study ethanol extract result show in 4 mg/ml (83.87±0.1%) of unripe fruit approximately similar activity was showed by Jain et. al.

3.2 Ferric Ion Reducing Antioxidant Power (FRAP Assay)

The reducing potential of antioxidants was estimated through FRAP assay to react with ferric tripyridyl triazine (Fe3+-TPTZ) complex and produce the blue color of ferrous form which can be measured at absorbance 593 nm (Benzie and Strain, 1996). In present study taken crude pulp extract of Spondias pinnata and result showed better FRAP activity. The FRAP activity is highest as compared to other methods. The highest activity was observed in the ripe fruits of methanol extract in 1mg/ml (553.62±0.6) and lowest activity was observed in aqueous extract of 1mg/ml (188.02±0.6) of unripe fruit. The concentrations of mg/ml increases activity also increases. Acetone extract showed FRAP activity as like methanol and ethanol extract. The values are depicted in table no.I. The antioxidant capacity was calculated in FRAP based on the ability to decrease Fe3 + to Fe2 + ions. (De Almeida et al., 2017). The FRAP activity in crude fruit juice of S. mombin (11.8 ± 0.2 µmol) studied by (Coolborn et al. 2016) and S. pinnata observed FRAP activity in crude ripe fruit of 1 (mg/ml) (553.62±0.6) of methanol extract. Hence compare between both fruits S. mombin showed less FRAP activity than the S. pinnata. The amount of extract increases the reducing power activity was increases reported by (Hafiz et al., 2010)

3.3 Reducing power activity

In present study various extracts for different concentrations used and observed that reducing power was increased with increasing amounts of extract. In reducing power best activity was observed in methanol extract of ripe fruit of 4 mg/ml (1853.44±0.1) and less activity in aqueous extract of unripe in 1mg/ml (220.34±5.1). In reducing power showed best activity in all solvents. So result showed all solvents are good for reducing activity. Antioxidant study showed better activity in methanol extract of S. purpurea Uchoa et al., (2015). The results are given in table no 3.

3.4 Total Antioxidant Capacity

The assay is depending on the reduction of Mo (VI) to Mo (V) when sample was analyzed, it has a reduction potential after formation of stable green Mo (V) phosphate complex (Prieto et al., 1999). The S. pinnata extract was decreased in the following order: methanol>ethanol>acetone>water. The greater activity was found in methanol extract of 4mg/ml in ripe fruit (146.98±0.4) and lesser activity was observed in 1mg/ml (29.20±0.4) of aqueous extract of unripe fruit. When compare with all antioxidant activity Phosphomolybdenum antioxidant activity is less than other antioxidant activity. The results are showing in table no 3.

3.5 Chelation Power on Ferrous (Fe2+) Ion

The presence of chelating agent ferrozine produces a violet complex with Fe2+ complex formation is interrupted and as a result the violet color of the complex is decreased Hazara et al.,(2008). Hafiz et al. 2010 was also observed in his experiment 70% methanol of S. pinnata bark extract has well potent of iron chelation. Iron-chelating activity is an antioxidant molecule which prevents oxyradical generation and oxidative damage (De Angelis da Costa Barros Gomes et al., 2018).The highest activity was observed in methanol extract of ripe of 4mg/ml (53.33±0.6%) and low activity of 1mg/ml (20.78±0.3%) of ripe fruit of aqueous extract. The negligible difference observed between all solvents. The Ferrous (Fe2+) Ion chelating ability result also showed all solvents are good for extract preparation for antioxidant activity. The values are showing in table no 3.

3.6 Total flavonoid

In the present study for the estimation of flavonoids taken four solvents such as methanol, ethanol, acetone and aqueous. In unripe fruits of acetone extract observed highest activity and lowest activity in the aqueous extract. Next to aqueous extract lowest activity was found in the acetone and methanol solvent respectively. Compare to ripe and unripe fruit highest flavonoid activity was observed in unripe fruits. Little difference observed between ripe and unripe fruits. The highest activity observed in 4mg/ml in unripe fruits of acetone extract (793.9±2mg/100g) as well as lowest activity was observing in 1 mg/ml in ripe fruits of aqueous extract (157.23±2.93mg/100g). Uddin et al., 2016 examined aerial components such as leaves. They were prepared different extracts and found the highest flavonoid activity (132.27 ± 0.25 mg/gm) in ethyl solvent. In present study in ethyl solvent was showed (340.01±0.3 mg/100g) in 4mg/ml concentrations of unripe fruit. The results are showed in Table No 5 and 6

3.7 Total Alkaloids

For the evaluation of alkaloids were taken four solvents such as methanol, ethanol, acetone and aqueous. The alkaloid content is highest in the methanol extract of ripe fruits (2094.47±0.88 mg/100g). Highest range show in series such as Methanol>Acetone>Ethanol>Aqueous. Alkaloid content high than the flavonoids in fruit pulp of Spondias pinnata. The results are depicted in Table No 7 and 8.

3.8 Correlation of antioxidant activity with total flavonoids

In several plants were observed high antioxidant capacity and show direct linear correlation with high phenol content and antioxidant activity (Cai et al., 2004); (Djeridane et al., 2006), (Kolar et al., 2014). In some plant extract has been established good correlation between antioxidant activity and reducing power. The reducing power is used as a good indicator of potential activity (Yen et al., 2001). The highly positive relationship between Flavonoid/FRAP was observed dominantly in ripe fruit of aqueous extract and in unripe fruit of

acetone extract (R2 is 0.985 and 0.996 P<0.05). In reducing power ripe fruit showed significant correlation between flavonoid and reducing power in ethanolic extract R2 is 0.957 P<0.05. In unripe fruit also observed significant correlation in acetone extract R2 is 0.946 P<0.05. The highest correlation of Flavonoid with phosphomolybdenum was observed in aqueous extract of ripe fruit R2 is 0.909 and in unripe fruit showed strong correlation in acetone extract R2 is 0.915 P<0.05.

The stronger correlation of ferrous ion chelating ability with Flavonoid was observed in ripe fruit of acetone extract which is significant R2 is 0.975 (P<0.05). In unripe fruit highest correlation was observed in methanol extract which is significant R2 is 0.994 (P<0.05). The values are depicted in Table No 1 and 2.

The correlation studies showed that Flavonoids had significant correlation with antioxidant activity.

Table NO. 1 Correlation between secondary metabolites and antioxidants of ripe fruits of Spondias pinnata

Solvents	Correlation between secondary metabolites and antioxidants			
	FRAP	Reducing power	PMO	FICA
Methanol	0.847	0.9114	0.9169	0.9225
Ethanol	0.7855	0.9571	0.9287	0.9675
Acetone	0.9543	0.9027	0.9227	0.975
Aqueous	0.985	0.8379	0.8261	0.9527

Table NO. 2 Correlation between secondary metabolites and antioxidants of unripe fruits of Spondias pinnata

Solvents	Correlation between secondary metabolites and antioxidants			
	FRAP	Reducing power	PMO	FICA
Methanol	0.865	0.8898	0.8837	0.9942
Ethanol	0.7981	0.8284	0.873	0.9251
Acetone	0.996	0.9463	0.9152	0.9925
Aqueous	0.7691	0.5923	0.6379	0.7458
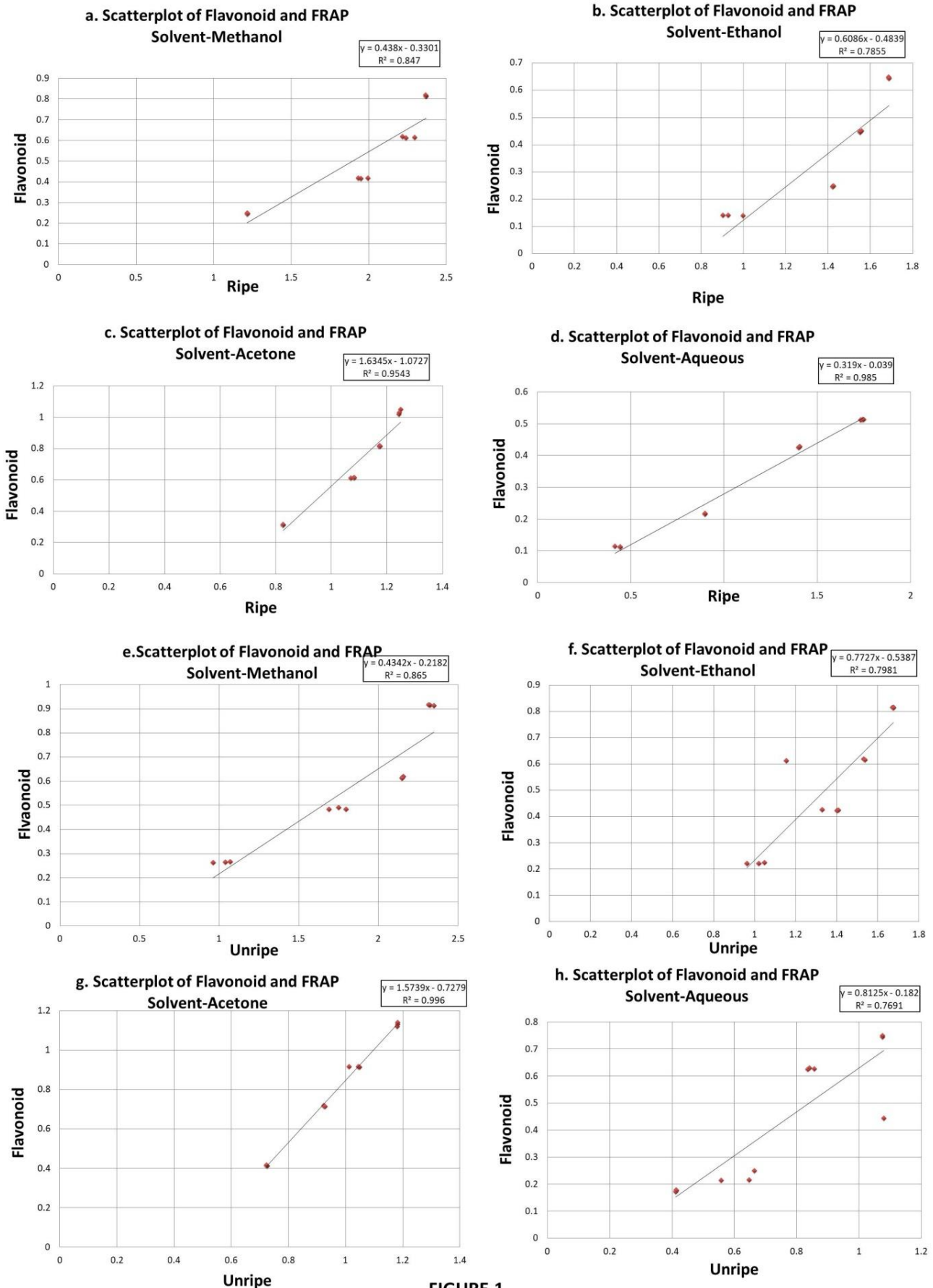
FIGURE.1
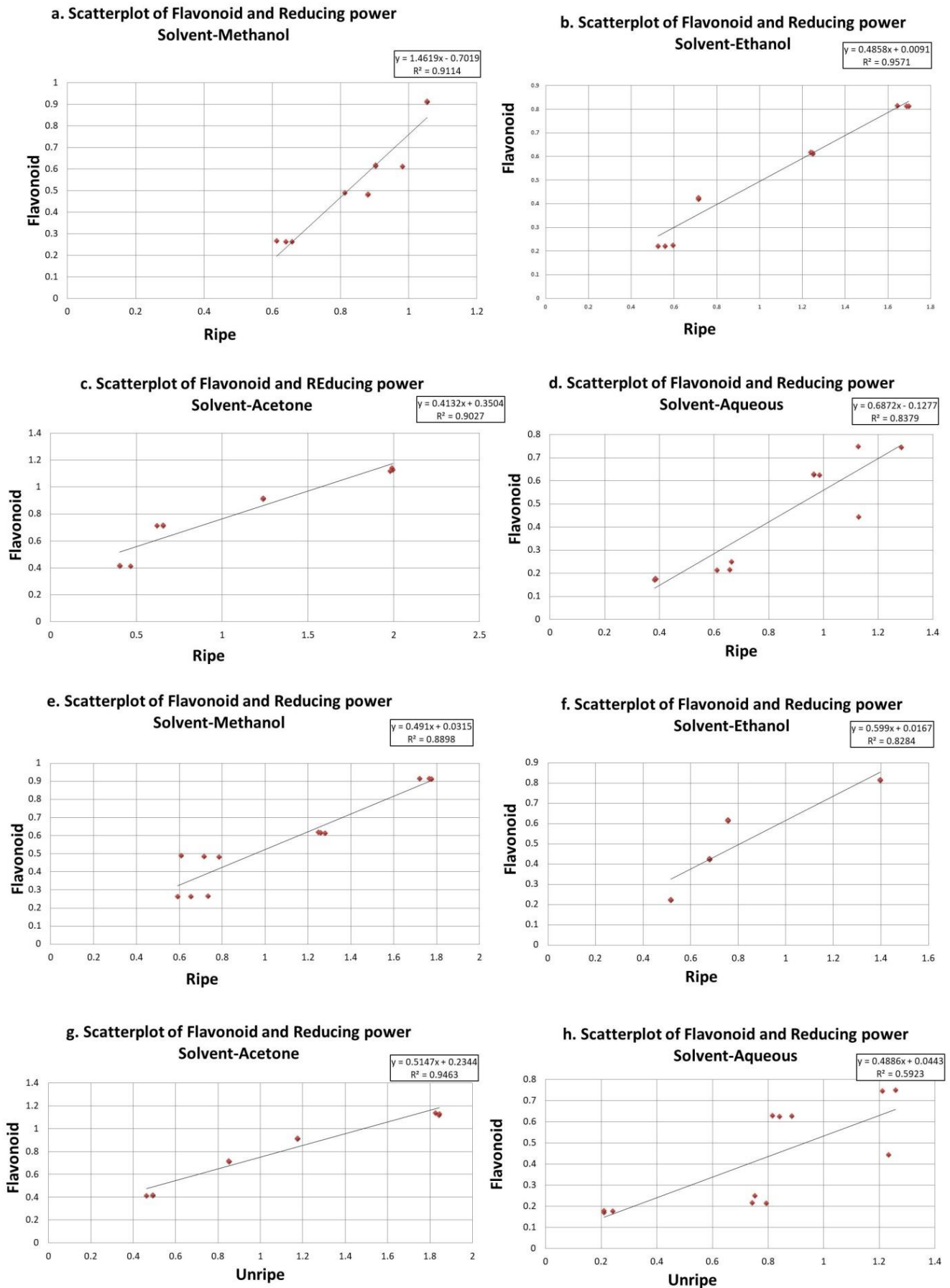
FIGURE.2
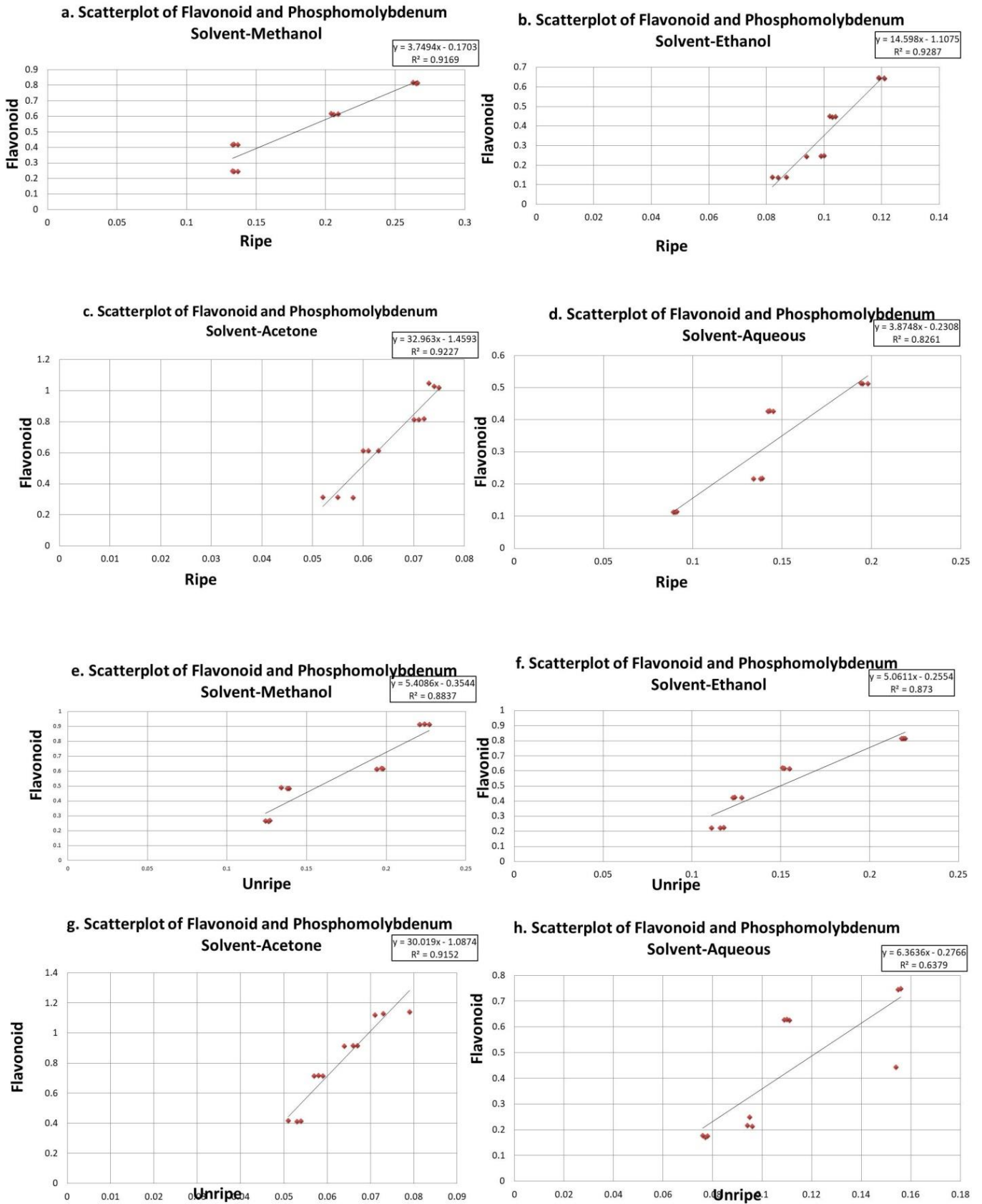
FIGURE.3
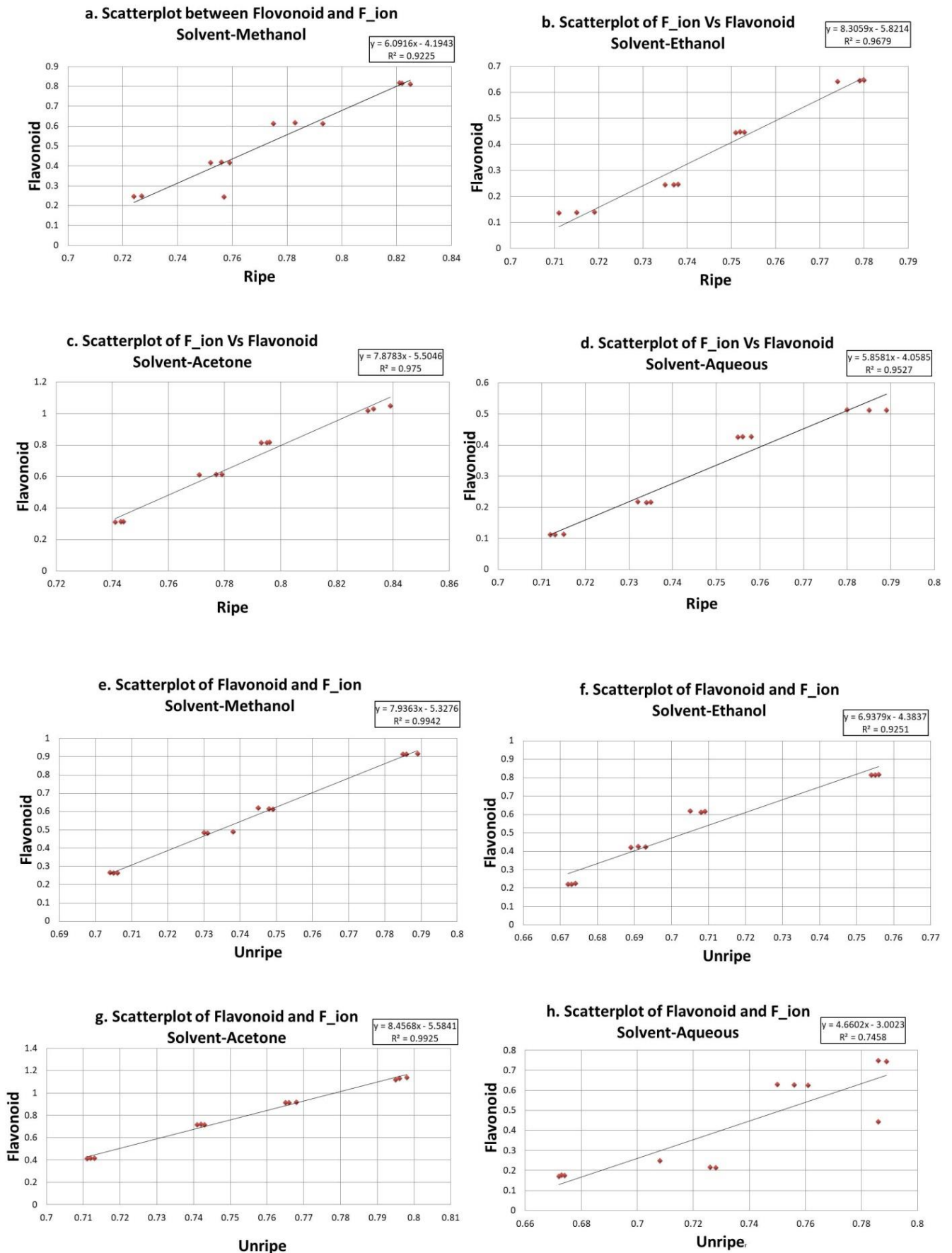
FIGURE.4

Table No.3Antioxidant potential of ripe and unripe fruits of Spondias pinnata

Solvent	Conc.	DPPH inhibition (%)		FRAP (mg/100g)		Reducing power (mg/100g)		PMO (mg/100g)		FICA mg/100g	
	Mg/ml	R	UR	R	UR	R	UR	R	UR	R	UR
Methanol	1	32.18±0.1	42.52±0.1	553.62±0.6	472.87±2.8	637.15±0.9	593.01±0.3	74.80±0.6	69.75±0.4	41.3±5.6	53.18±0.3
	2	54.97±0.1	64.41±0.1	879.99±0.7	792.34±1.0	914.34±1.3	786.07±0.6	97.90±0.4	76.05±0.7	53.33±1.0	61.79±1.3
	3	76.69±0.1	66.94±0.1	1044.53±0.02	979.68±0.7	1316.04±0.1	1263.11±4.4	114.57±0.7	109.01±0.6	65.47±2.8	68.6±0.6
	4	84.66±0.1	85.05±0.2	1076.81±0.25	1059.38±4.	1853.44±0.1	1754.47±8.4	146.98±0.4	124.38±0.8	72.75±0.6	75.64±0.6
Ethanol	1	28.13±2.5	30.83±2.4	452.72±0.78	329.38±0.1	725.50±0.4	516.0.1±0.1	46.79±0.7	63.83±1.1	30.98±1.2	42.9±0.3
	2	45.50±0.1	55.77±0.2	647.40±0.9	420.90±0.7	824.67±0.09	679.54±0.03	54.20±0.9	69.38±0.8	43.31±0.5	49.64±3.4
	3	51.68±0.1	72.45±0.2	706.35±1.13	470.64±5.5	1244.43±1.6	757.81±0.04	57.16±0.2	84.76±0.6	54.41±0.3	57.43±1.7
	4	66.00±0.5	83.87±0.1	767.42±0.3	537.41±0.5	1696.6±0.52	1396.74±0.2	66.42±0.3	121.61±0.3	65.55±1.0	66.85±0.5
Acetone	1	33.09±0.1	45.00±0.1	375.90±0.2	438.47±0.9	763.80±0.32	482.31±4.7	49.94±0.3	42.72±0.3	53.33±0.4	55.57±0.3
	2	45.54±0.3	53.97±0.03	490.14±2.12	638.02±1.0	920.67±0.07	851.64±0.08	76.05±0.8	52.72±0.3	65.47±1.3	65.55±0.3
	3	53.90±0.1	64.86±0.1	533.77±0.5	698.47±1.3	1238.5±0.13	1175.34±0.1	79.57±0.4	61.05±0.29	76.76±0.5	76.53±0.5
	4	65.55±0.1	77.52±0.1	566.35±1.03	761.65±0.4	1986.8±2.2	1837.64±2.8	108.64±0.61	86.05±0.2	77.87±1.3	77.65±0.4
Aqueous	1	22.89±0.1	20.95±0.4	197.26±3.8	188.02±0.6	385.23±0.6	220.34±5.1	30.49±0.8	29.20±0.4	20.78±0.4	32.06±0.3

	2	34.92 ±1.3	24.28± 0.1	408.32± 0.5	302.11 ±0.7	894.43± 0.8	762.91± 7.7	34.01±0 .4	32.16± 0.3	32.06 ±0.5	38.58 ±0.6
	3	46.30 ±0.6	36.83± 0.1	638.02± 1.2	383.93 ±2.9	984.90± 0.02	815.78± 0.04	39.38±0 .29	36.42± 0.4	37.54 ±0.8	53.22 ±0.6
	4	55.80 ±0.1	40.92± 0.1	791.96± 2.24	489.53 ±0.7	1528±0. 17	1214.81 ±0.8	41.05±0 .29	41.24± 1.23	42.16 ±1.4	65.36 ±0.3

± SE (Standard Deviation), FRAP- Ferric Reducing Antioxidant activity, PMO-Phosphomolybdenum, FICA-Ferrous ion chelating ability, R-Ripe, UR-Unripe. (%) - Percentage.

Figure No.5 Flavonoid content of ripe fruits of Spondias pinnata
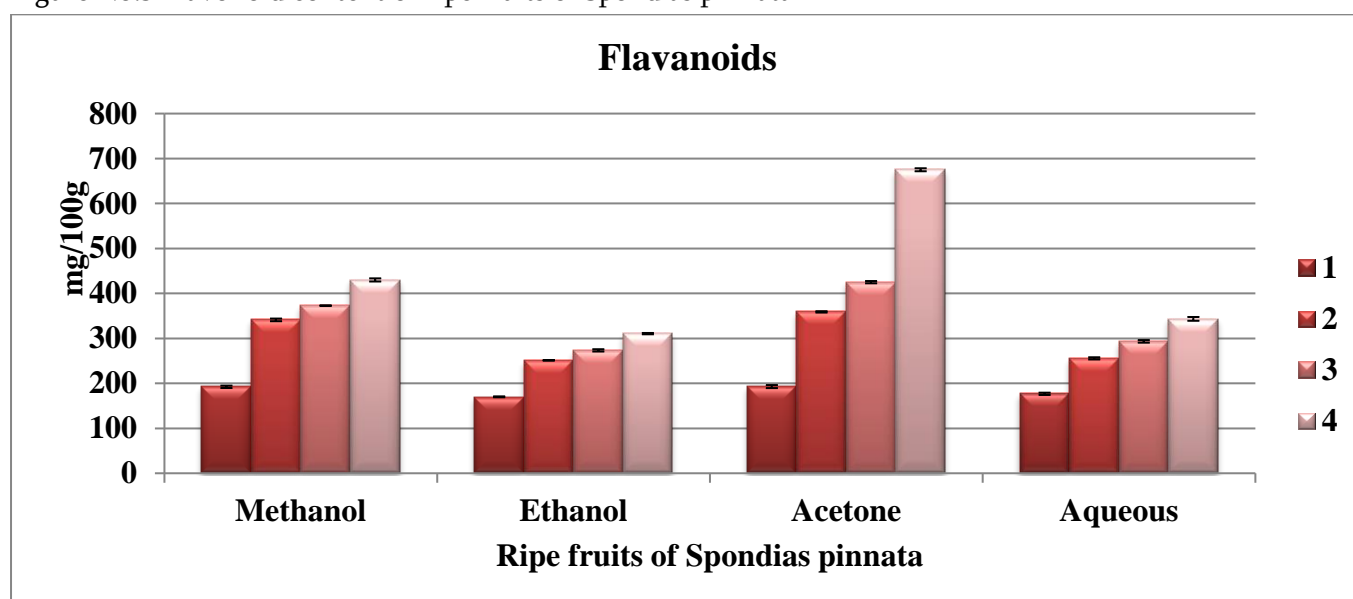
Figure No.6 Flavonoid content of Unripe fruits of Spondias pinnata
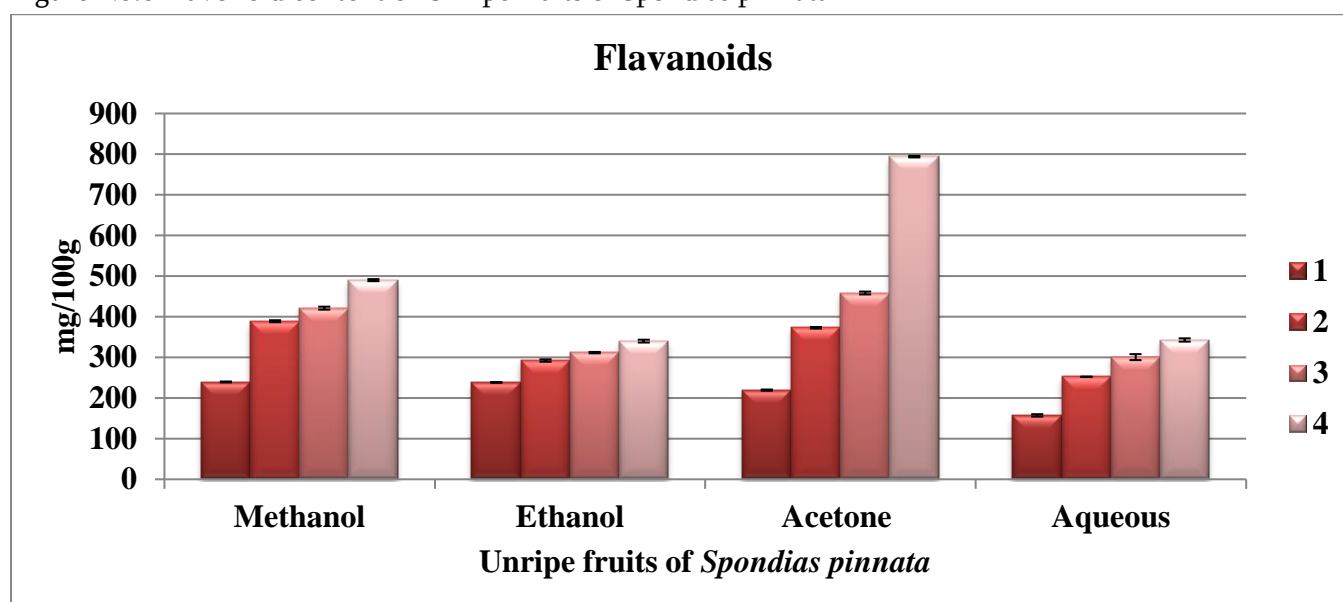
Figure No.7 Alkaloid content of ripe fruits of Spondias pinnata
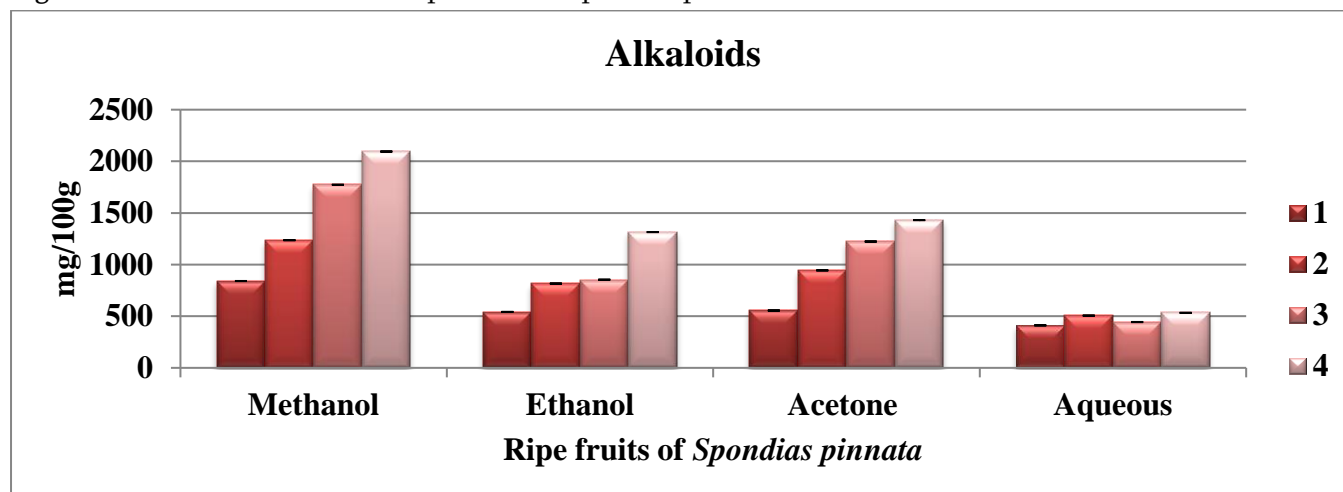
Figure No.8 Alkaloid content of Unripe fruits of Spondias pinnata
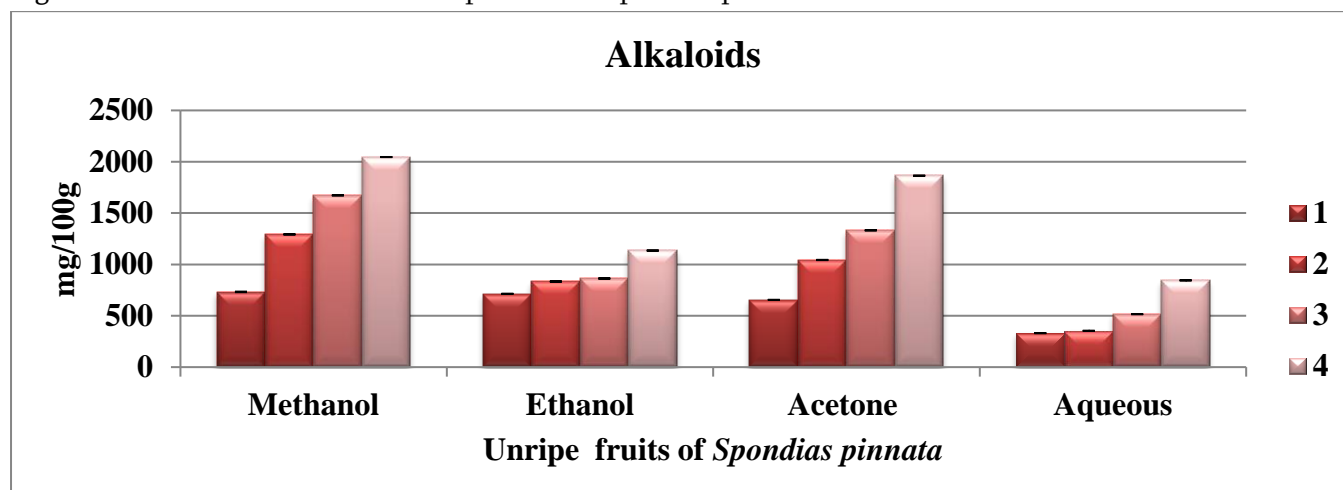
IV. CONCLUSION

The present study demonstrates that the pulp of Spondias pinnata fruit can be considered as a valuable source of an antioxidant activities and secondary metabolites. In brief, all concentration manifests good antioxidant and secondary metabolite activity. Based on the findings of present study, it was concluded that high antioxidant and free radical scavenging activities are exhibited by 70% methanol, ethanol, acetone and aqueous extract of S. pinnata pulp, which contains significant amounts of flavonoids and alkaloid compounds. It also chelates iron and has the ability to decrease it. S. pinnata fruit extracts are a major source of natural antioxidant that may be helpful in preventing various progressing form of diseases. The correlation result showed that Flavonoid is strong correlate with antioxidant activity.

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Sensory Evaluation of Murrah Buffalo Milk Dahi Prepared by Using Different Heat Treatments and Incubation Conditions

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ABSTRACT

In the present investigation attempts were made to standardize the methods to improve sensory quality of dahi made from Murrah buffalo milk for its production under ordinary condition by giving different heat treatments and incubation conditions and by to employing suitable lactic cultures. The buffalo milk dahi maximum scoring was recorded at 8.41, 7.18, 8.32 ,8.37 and 8.39 respectively for general appearance, aroma, consistency , body and overall acceptability under the boiling treatment.

Within the incubation treatments, the incubation at room temperature for 10 hours was rated as the highest with the values at 7.99, 6.96, 7.92, 7.85 and 7.88 for the respective parameters. From the organoleptic and overall acceptability point of view boiling coupled with incubation at room temperature for 10 hours seemed to be very favorable to result into the dahi of desired attributes.

Key words: dahi, heat treatment, incubation condition, Murrah buffalo, sensory quality.

I. INTRODUCTION

Dahi is a fermented product of milk used in this country since times immemorial as an article of diet, refreshing beverage , as an intermediary in the preparation of shrikhand, butter and ghee. It has a extensive use in the Ayurvedic System of Medicine (Dutt et. al. , 1872). The use of dahi and buttermilk in the feeding of children not only for treatment of common intestinal or other diseases but also for general improvement of their health. Due to variations in the manufacturing techniques, nature of milk, treatment of milk, concentration of starter, time and temperature of incubation and environmental conditions ,there is no uniformity in the quality of market dahi (Iya and Lakshminarayana, 1952). This is the main reason that the dahi failed to achieve a much commercial status in India. In some areas dahi production is highly specialized and a product of good quality with the desirable attributes such as smooth texture, sweet or mild sore taste and pleasant aroma are obtained. One such technique is that the use of good quality dahi containing proper combination of acid and flavour producing bacteria as starter. The purpose of the study is to prepare a good quality dahi by giving simple heat treatments and incubation conditions to dahi prepared from Murrah buffalo milk.

II. MATERIALS AND METHODS

In the present investigation attempts were made to standardize the methods to improve sensory quality of dahi for its production under ordinary conditions by giving different heat treatments and incubation conditions to the Murrah buffalo milk dahi. The whole, fresh and clean buffalo milk was collected from Dairy farm, Naigaon (Bz.)during the course of investigation.

Heat treatments : HT1 – boiling of milk for 10 min., HT2 – steaming of milk at 85^0C for 20 min. and HT3 – pasteurization of milk at 63^0C for 30 min.

Incubation conditions : I1 – incubation at room temperature for 10 hrs., I2 – incubation at 37^0C for 10 hrs. and I3 – incubation at 37^0C for 12 hrs.

Fresh dahi samples were subjected to sensory evaluation . The samples were evaluated by a fixed panel of five judges for the appearance, flavour, consistency, body and overall acceptability. The scoring was done as per the 9 point hedonic scale developed by the Quarter Master 'Food and Container Institute, USA.

III. RESULTS

Table No. 1 Effect of different heat treatments and incubations on sensory score recorded for Murrah buffalo milk dahi

Treatments	Average score for				
	General appearance	Aroma	Cosistency	Body	Overall acceptability
HT1	8.41	7.18	8.32	8.37	8.39
HT2	7.85	6.84	7.89	7.83	7.84
HT3	7.22	6.64	7.23	6.83	7.11
S.E.±	0.05	0.10	0.05	0.06	0.09
C.D. at 5%	0.14	0.27	0.16	0.18	0.26
I1	7.99	6.96	7.92	7.85	7.88
I2	7.76	6.90	7.85	7.72	7.79
I3	7.72	6.80	7.66	7.46	7.67
S.E. ±	0.05	0.10	0.05	0.06	0.09
C.D. at 5%	0.14	0.27	0.16	0.18	0.26

General appearance:

It may be noted from Table No. 1 that the heat treatment and incubation conditions also contributed significantly to the sensory attributes of dahi samples. It may be gauged from the data presented that significant differences existed within the treatment so father general appearance of dahi sample was concerned. The values range between 7.22 to 8.41 respectively in case of HT3 and HT1, the highest being with HT1. As for the incubation condition it is notable that the treatment I1 was significantly superior over I2, the value being at 7.99 with regards to I3 which was at par with I2 (7.72 and 7.76).

Aroma:

Significant differences existed within the treatments particularly HT1 and HT2, the HT1 being the highest at 7.18. The treatments HT2 and HT3 were statistically non-significant. The incubation conditions had no

significant effect on the average scoring of dahi as could be seen from the same column, the highest value being associated with I1 at 6.96.

Consistency:

The consistency character of dahi also exhibited significant differences in relation to the heat processing offered to milk prior to dahi formation, the range of scoring being within 7.23 to 8.32. The highest value was associated with HT1 (8.32). As for the incubation conditions significant differences existed between I2 and I3, the lowest being at 7.66. The numerically highest value was at 7.92 in relation with I1.

Body:

The body character of dahi also contributed significantly to the sensory attributes in relation to the type of heat treatment offered to milk during dahi formation. The values occured in the range of 6.83 to 8.37, the highest being with HT1 (8.37). The incubation conditions also contributed significantly in case of I2 which was at 7.72. Numerically higher value of 7.85 was related with I1.

Overall acceptability:

The overall acceptability of dahi samples narrated significant differences that occurred within the range of 7.11 to 8.39, the highest being with HT1. The incubation conditions contributed non significantly to the organoleptic scores in the opinion of judges, numerically greater value being at 7.88 in case of I1.

IV. DISCUSSION

As explained under result in the Table No. 1, it is important to understand that the organoleptic qualities of dahi samples were greatly affected with the type of heat treatments offer to milk prior to its formation.

General appearance :

The corresponding values for buffalo milk dahi were in the range of 8.41 to 7.22 for HT1 and HT2 respectively. Here it may be understood also , that the dahi has been an indigenous dairy product and the concept of this product has been fixer in the minds of the consumers and so also it must have with the judges. The results may be simplified with the words that pasteurization heat treatment offered to milk resulted in a dahi which had lesser appeal for the general appearance as compared to the one obtained with boiling heat treatment .

Shrestha (1978) recorded scores for general appearance in the range of 8.0 to 8.2 for the buffalo milk dahi prepared with various cultures. **Davadyakar (1982)** noted the score for the same as 7.50 to 7.57 for the dahi samples having different total solids concentration . In case of buffalo milk a thicker and hard type of curd in the finished product form having compact texture might have been resulted. This might be explained as the causes for the specific scores offered for general appearance. As for the incubation conditions, it may be understood that the differences were statistically non-significant. Highest values were recorded for I1 at 7.99 for the incubation in buffalo milk dahi samples. It may be added further that the incubation at room temperature for 10 hours could also be regarded as a favourable condition for the growth of dahi microflora in absence of the incubators which may not be available in common Indian household. As is experienced the product may be of fairly acceptable quality so far as the general appearance is concerned.

Aroma :

From Table No. 1, aroma character was also governed by the type of heat treatment offered to the milk and statistically significant differences existed within the treatments. The scores ranged between 6.64 to 7.18 in buffalo milk dahi. The highest values were associated with HT1.

Shrestha (1978) recorded scores for aroma ranging between 6.6 to 7.6 for buffalo milk dahi. Whereas **Davadayakar (1982)** noted lower score i.e. 6.47 for the dahi samples in reference to total solid concentration. Aroma character of dahi has been the key parameter to contribute towards the acceptability of the product. In other words aroma is the only indicator to guide the very nature of the type of fermentation. The higher values associated with HT1 i.e. boiling condition offered to milk may be looked upon as the key factor that might have contributed to the aroma parameter of this product. Besides the fermentation changes, it may also be added that the typical changes induced inside the milk as a result of specific heat treatment may also be the contributing agent . The lowest scores for aroma were associated with the pasteurized milk dahi which could be analysed and understood in this light. As regards the incubation conditions it may be evidenced from the data that non significant differences occured within the treatments. Numerically, higher values were scored for I1 i.e. 6.96.

Consistency :

From Table No. 1 consistency of dahi was changed significantly with the type of heat treatment offered to milk. Significantly, higher score at 8.32 were offered to HT1 for The buffalo milk dahi. The lowest values being at 7.23 in case of HT3 in buffalo milk dahi samples.

Humphreys and PlunKett(1969) emphasized that the quality of dahi including consistency was governed by the selection of milk, standardization, heat treatment, fermentation and setting of curd. **Garg and Jain (1980)** contended that milk standardized to 4% fat gave maximum hardness to the curd. The consistency of dahi may be regarded as the sum total of the desirable fermentation changes brought about during the process of dahi formation. The trend noticed here has been quite conspicuous through the higher values recorded with HT1. This may be attributed to the fact as noticed and explained under the parameters of chemical composition namely moisture and total solids. Boiling conditions at HT1 might have caused the evaporation of moisture that had enhanced total solids level. These might have resulted consequently in a thicker consistency of fermented product. The heat denaturation changes i.e. coagulation of serum proteins and shifting of serum casein to induce the coagulation as explained elsewhere also had been very additive factors to the effect the consistency of the product.

Yu and Hwag (1981) observed that addition of lactose, fat and especially solids not fat increased the viscosity of dahi. As may be expected the incubation conditions differed non significantly with regard to consistency character of dahi. The highest scores were associated with I1 recorded at 7.92 in case of buffalo milk dahi samples. It may be exerted that the incubation at room conditions also could bring about desirable changes during the fermentation of dahi. The higher temperatures associated with I2 and i3 i.e. 37^0C have had laser chance to confer their implications on the resultant product due to the shorter incubation period.

Body :

The body of the final product obtained under different heat treated sample of buffalo milk dahi exhibited no significant differences. Numerically the highest values were scored for 8.37 for dahi samples . As regards the HT3 i.e. pasteurization treatment, it may be understood that buffalo milk had total solids occurred in the range 15.74 to 16.18 % inherently. As such the body characters of dahi are greatly influenced by the total solids content in the original milk or the processed milk which inturn is used for inoculation. The heat treatments offered seemed to be at par with each other to cause any effective changes. The higher score offered for HT1 are again the indication of the evaporation changes brought about at boiling conditions and subsequent desirable body characters in the final product. **Shrestha (1978)** recorded score for body of dahi prepared from buffalo milk as 7.0 to 7.8 prepared with different starter cultures. As regards the incubation temperatures it

may be registered that the treatment differed significantly, the highest being at 7.85 for buffalo milk dahi samples. The incubation at I2 and I3 recorded the changes brought about by the growth and development of thermophilic strain. it may be stressed that the incubation period being restricted to 12 hours no drastic significant changes were brought about.

Overall acceptability :

The overall acceptability significantly influenced with the type of heat treatment offered in case of buffalo milk dahi. The treatment HT1 was noted to be the higher at 8.39 .

Shrestha (1978) observed average scores of 7.05 to 7.80 for buffalo milk dahi. While **Davadayakar (1982)** recorded the score for the same as 6.28 to 7.21 with increasing total solids concentration in dahi.

The results obtained could be resolved further with an explanation that the boiling conditions offered to the milk greatly enhanced the desirable changes in the parameters like aroma, consistency and body characteristics that subsequently contributed to the higher overall acceptability of this product .It may be concluded therefore, from the consumer acceptability point of view and also from the market quality that the treatment HT1 i.e. boiling for 10 min may be a very worthwhile condition to induce the establishment growth and development of desirable microflora which may result subsequently into as acceptable quality product. The incubation conditions contributed non significantly to the acceptability of the final dahi product which may be noticed from the values recorded. Numerically higher values occurring at 7.88 and 7.79 with I1 and I2 respectively could be looked upon and the plus points for both these incubation temperature i.e. room condition for 10 hours and 37^0C for 10 hours from overall acceptability and market / consumer point of view.

V. SUMMARY AND CONCLUSION

As for the buffalo milk dahi maximum scoring was recorded at 8.41, 7.18, 8.32, 8.37 and 8.39 respectively for general appearance, aroma, consistency, body and overall acceptability under the boiling treatment. Within the incubation treatments, the incubation at room temperature for 10 hours was rated as the highest with the values at 7.99, 6.96, 7.92, 7.85 and 7.88 for the respective parameter.

From the organoleptic and overall acceptability point of view boiling coupled with incubation at room temperature for 10 hours seemed to be very favourable to result into the dahi of desired attributes.

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Biochemical Composition and Nutritional Analysis of Leaves of Portulaca Pilosa L

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ABSTRACT

The Preliminary Phytochemical analysis shows the presence of Phenols, Flavones, Alkaloids, Carbohydrate, Glycosides, Tannin and Saponin. Flavones and saponins are observed in all three solvent systems namely Methanol, Acetone and Alcohol. The proximate composition of leaves of Portulaca pilosa L. has Total ash (10%), Crude Fat (20%), Crude fibre (13.5%), Crude Protein (14.81%), Dry matter (32%) and Moisture (68%). Mineral analysis showed highest amount of Potassium (42.3mg/g) followed by Nitrogen(23.7mg/g), Calcium(15.3 mg/g) and other trace elements. The Screening of Methanolic extract of leaves of Portulaca pilosa L. by Gas chromatography and Mass Spectrometry revealed the presence of fifteen bioactive compounds showing a wide spectrum of biological properties including antibacterial, anti-inflammatory, antioxidant, hypocholesterolemic etc. FTIR analysis shows the presence of different functional groups like Aromatic ether, Hydroxyl, Phosphate, Ester, Phenol, Nitrate, Saturated aliphatic alkanes etc., The results from present study offer a platform of using Portulaca pilosa L. leaves in pharmaceutical industries as well as for traditional practitioners for herbal drug formulations.

Key words: Bioactive compounds, P. pilosa, GC-MS, Nutritional analysis, Methanolic extract.

I. INTRODUCTION

The genus *Portulaca* belongs to family Portulacaceae which is commonly known as Purslane family. In India this genus *Portulaca* is represented by 9 species [7, 18]. *Portulaca pilosa* L. is perennial, robust, succulent herb, stem is densely pilose having pink showy flowers and called as hairy pigweed in English. Plant is cosmopolitan in distribution but it is native to Asia (Japan, China, Singapore) and spread in North and South America. Leaves of the plant are eaten as potherb, added in soups and salads in many Mediterranean and tropical Asian countries. [18]. Plants serve as source of secondary metabolites with interesting Biological activities. These compounds include mainly Phenolics, Flavonoids, Alkaloids, Fatty acids, Amino acids etc. [13].

The essential compounds like Fats, Carbohydrate, Proteins and phenols are synthesised as a result of Primary plant metabolism. Carbohydrates, Proteins and Fats are referred as Proximate Principles which form major portion of the diet whereas minerals are seen to play an important role in regulating the metabolic activities in the body [11]. The Gas Chromatography and Mass Spectrometry technique is used to identify important bioactive compounds. . This is a valuable technique for the analysis of non-polar compounds, volatile essential

oils, fatty acids, lipids and alkaloids [26]. Fourier transform infrared (FTIR) is used to identify the characteristic functional groups in the plant extract. It also provides the information about the structure of molecule which is frequently obtained from its absorption spectrum [15].

II. MATERIALS AND METHODS

i) Collection of Plant Material:

The plant material was collected from Badami plateau, Bagalkot District of Karnataka (15.9186° N, 75.6761° E) in early month of July and identified. The leaves of plant were washed repeatedly with distilled water and blotted gently and then shade dried. After drying the leaves were grinded into fine powder and stored in air tight containers at room temperature for further analysis.

ii) Phytochemical analysis

Phytochemical analysis was done using the methods of Evans W. C. (1977) and Brindha *et al.* (1981) [5,10]. 2g of Dried powder powder was used for soxhlet extraction. For that extraction Methanol, Alcohol (60-700C) and Acetone (40-500C) were used as solvents. After evaporation of the extract, solid residue was again reconstituted to particular solvent and was used for phytochemical analysis.

iii) Proximate analysis

For Proximate analysis standard methods such as AOAC (1990) and Sadashivam and Manikam were used.[2,24]. Total ash content, Crude fat, Crude fibre, Crude Protein, Dry Matter and moisture was calculated.

iv) Mineral analysis

Nitrogen was estimated by Hawk *et al.* (1948) method [12]. The acid digestion for analysis of inorganic constituents was done by method given by Toth *et al.* (1948) [28]. Phosphorus was estimated from acid digestion and following the method described by Sekine *et al.* (1965) [25]. Remaining inorganic constituents were estimated by using Atomic absorption spectrophotometer.

v) GC-MS and FTIR

The dried powder (2g) was extracted successively with 200 ml of methanol in Soxhlet apparatus. The obtained extract was then evaporated to dryness at 40° C and residual extract was reconstituted in methanol and stored at 4°C in refrigerator. This extract was then further used for GC-MS analysis. Fine powder was used for FTIR analysis.

GC-MS analysis of the extract was performed using instrument model GC-MS TQ8050 Shimadzu, Japan. It is well equipped with SH-Rxi-5 sil MS fused silica capillary column of 3m in length, 0.25mm inner diameter and .25mm thickness. Carrier gas used was helium (99.9%) at constant flow rate of 1mL/min with 2μl injection volume at temperature of 250°C.The spectrum data was interpreted by using the database of National institute of standard and technology (NIST-08 LIB) and WILEY-08 LIB. The FTIR spectrum was used for identification of the functional group of the active components based on the peak value in the region of infrared radiation.

III. RESULT AND DISCUSSION

Phytochemical studies of Leaves of *Portulca pilosa* L. showed presence of Flavones and saponins in all three solvents namely Methanol, Acetone and Alcohol. Apart from saponins and Flavones the Methanolic extract of leaves also showed presence of Phytochemicals like Alkaloids, Phenols, Carbohydrates and Glycosides. In case of Acetone, Tannins and carbohydrates were also present and in alcoholic extract Alkaloids and Glycosides

were observed along with Flavones and saponins. [Table no. 1] Investigation of phytochemicals of *Portulaca quadrifida* L. showed good proportion of secondary metabolities in Ethanolic and aqueous extract as compared to Petroleum ether and chloroform [19].

Proximate analysis revealed total ash (10%), Crude fat (20%), Crude Fibre (13.5%), Crude Protein (14.81%), Moisture (68%) and dry matter (32%). Crude Protein and Crude fibre are present in good quantity whereas plant has high moisture content. Quantification of minerals showed highest amount of potassium followed by Nitrogen, Calcium and Magnesium [Fig no.3]. These mineral elements are very important in human nutrition. Calcium, potassium and magnesium are required for repair of worn out cells, strong bones and teeth in humans, building of red blood cells and for body mechanisms [30]. Trace elements like Iron, Manganese, copper, zinc and sodium are also present in small quantities which are essential for enzymes metabolism. *Protulaca oleracea* L. has great nutritive value. Proximate and mineral analysis of *Portulaca oleracea* L. showed Proteins, Fats, Fibre, Calcium, Magnesium, Phosphorus and Potassium in relatively high amount [6].

Total fifteen compounds were detected through the GC-MS analysis on the basis of molecular formula, molecular weight, retention time and peak area. The major compounds present in the leaves were n-Hexadecanoic acid (26.66%), Benzoic acid (18.15%), Hexadecanoic acid, methyl ester- (10.37%), 2-Pentadecanone 6, 10, 14-trimethyl (6.83%), Heptadecanoic acid, 16-methyl-, methyl ester (5.46%) etc., with some other minor and major compounds. These compounds could contribute to the medicinal quality of the plant. The mass spectrum of the different compounds is shown above (Fig no. 4 and Table 4). n-Hexadecanoic acid has the highest peak area percentage as per results of GC-MS. Earlier GC-MS analysis of Ethanolic extract of dried whole plant of *Portulaca oleraceae* L. revealed the presence of esters of cyclopropanepentanoic acid, hexanedoic acid, octadecanoic acid besides n-nonadecanol, phosphoric acid, dibutyl 3-trifluoromethyl-3-pently ester, 9,12,15 octadecatrienal. These compounds have been tested for various antibacterial, antiviral and other pharmaceutical applications [9]. Results of GC-MS analysis of *P. oleracea* vary depending on the growth conditions and time of harvest also plays important role in determining the Phytochemicals and their amount [21].

The powder of *Portulaca pilosa* L. was passed into the FTIR and the functional groups of the components were separated based on its peak ratio. FTIR analysis confirmed the presence of Aromatic ether, Hydroxyl, Phosphate, Phenol, Ester, Nitrate, Saturated aliphatic alkane and alkyl functional groups which shows peaks at 1243.24, 3339.03, 1016.91, 1458.02, 1730.93, 822.57, 2916.72 and 2849.76, (Fig no.5 Table no. 5) (John Coates 2000). The absorption spectral lines of *P.pilosa* L. and *P. quadrifida* L. were very similar. The absorption peak at 3470 indicates the presence of phenolic and flavonoids; it also suggests that there are also amines, acids (oxalic acid, succinic acid, citric acid, propionic acid, lactic acid and butyric acid and amino acids. Rear absorption at 2156 cm^{-1} is related to unsaturated compounds and amino acids. Peaks 1300 to 1400 cm^{-1} indicate poly sulphur and polyphenolic compounds. Very weak absorption signals observed at 3525-3515 cm^{-1} indicates the presence of stretching [27].

Fig no.1 Habit

Fig no. 2 Flowering twig

Table no- 1. Preliminary Phytochemical Analysis of Leaves of Portulaca pilosa L.

Sr. No.	Test	Methanol	Acetone	Alcohol
1	Alkaloids	+	_	+
2	Phenols	+	+	_
3.	Tannin	+	+	_
4.	Saponin	+	+	+
5.	Flavones	+	+	+
6.	Anthraquinone	_	_	_
7.	Carbohydrate	+	+	_
8.	Xanthoprotein	_	_	_
9.	Coumarine	_	_	_
10.	Glycosides	+	_	+

+ → Presence of phytochemical   - → Absence of phytochemical

Proximate analysis
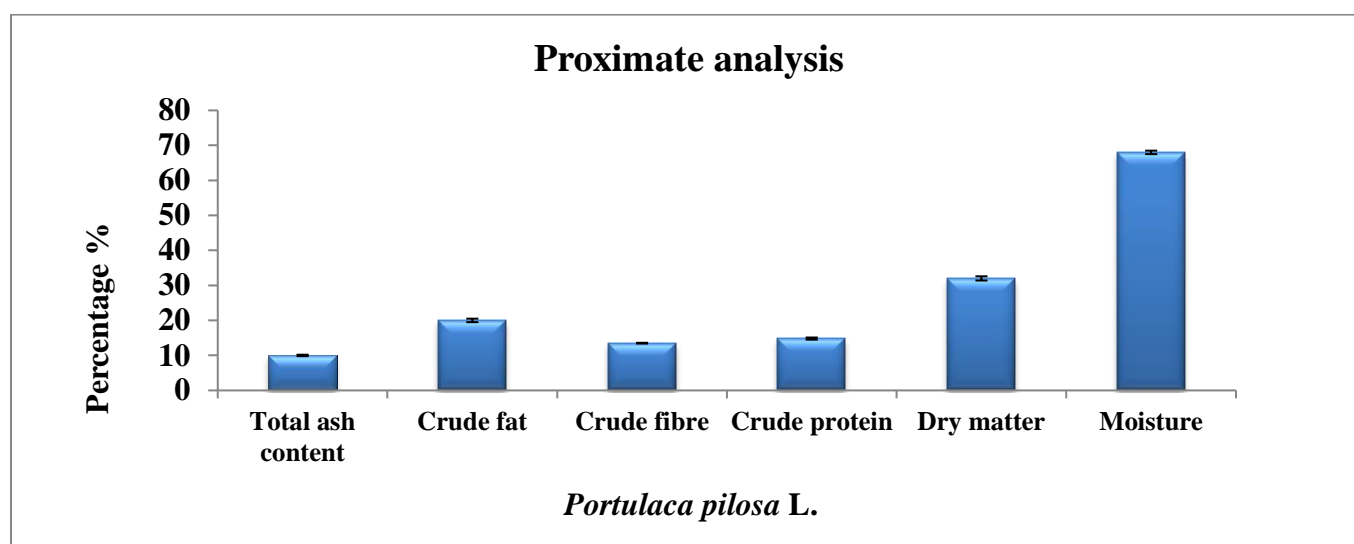
Fig no.3 Graphical representation of results obtained by proximate analysis

Mineral analysis

Table No.2

Sr.no	Macronutrients	Quantity (%)
1.	N	2.37±0.07
2.	P	0.24±0.06
3.	K	4.23±0.10
4.	Ca	1.57±0.07
5.	Mg	0.58±0.02
6.	S	0.06±0.04

Table no. 3

Sr no.	Micronutrients	Quantity (ppm)
1	Fe	530.59±0.08
2	Mn	541.05±0.1
3	Zn	34.33 ±0.08
4	Cu	9.73±0.01
5	Na	0.17 ±0.02

IV. GAS CHROMATOGRAPHY MASS SPECTROMETRY
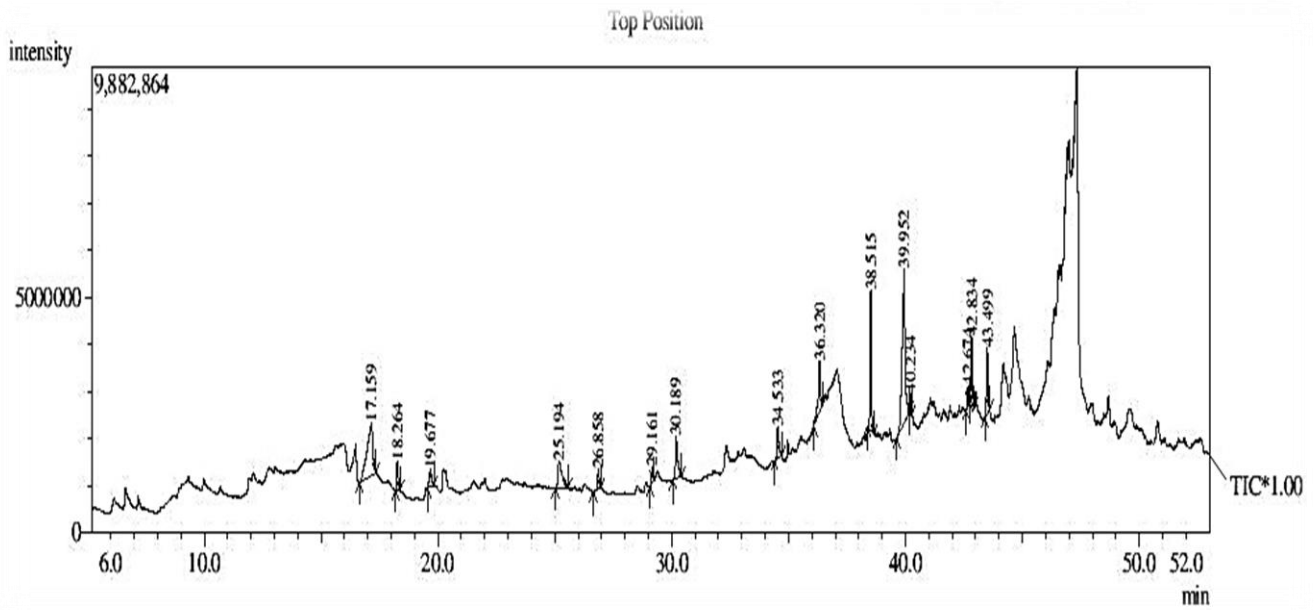
Fig no. 4: GC-MS chromatograph of methanolic extract of leaves of *Portulaca pilosa* L.
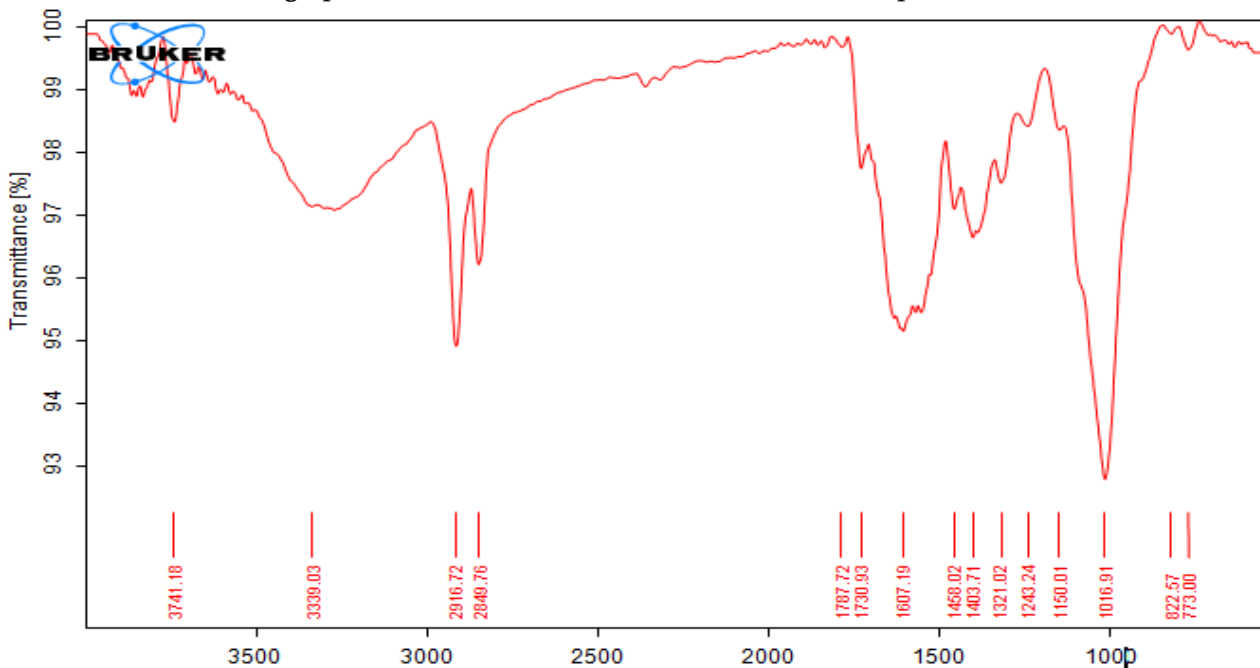
Fig no.5 FTIR spectrum of *Portulaca pilosa* L. leaves

Table no.4: Compounds identified from GC-MS analysis and their biological activity of methanolic extract of *P.pilosa* L. Leaves

Sr no	Name of the Compound	Molecular formula	Retention time	Peak area (%)	Biological activity
1	Benzoic acid	$C_7H_6O_2$	17.159	18.15	Anti-sickling, Antimicrobial [17,23]
2	2-Decenal, (E)-	$C_{10}H_{18}O$	18.264	2.74	Not reported
3	Nonanoic acid	$C_9H_{18}O_2$	19.677	2.46	Antimicrobial [1]
4	Cycloheptasiloxane, tetradecamethyl-	$C_{14}H_{42}O_7Si_7$	25.194	6.74	Not reported
5	Phenol, 2,5-bis(1,1-dimethylethyl)-	$C_{14}H_{22}O$	26.858	1.83	Antibacterial, Antioxidant [3]
6	E-15-Heptadecenal	$C_{17}H_{32}O$	29.161	1.22	Fatty acid amide hydrolase [8]
7	Cyclooctasiloxane, hexadecamethyl-	$C_{16}H_{48}O_8Si_8$	30.189	5.50	Not reported
8	Cyclononasiloxane, octadecamethyl-	$C_{18}H_{54}O_9Si_9$	34.533	3.84	Antioxidant, Antimicrobial [23]
9	2-Pentadecanone, 6,10,14-trimethyl-	$C_{18}H_{36}O$	36.320	6.83	Antibacterial, Allelopathic [4]
10	Hexadecanoic acid, methyl ester	$C_{17}H_{34}O_2$	38.515	10.37	Antifungal, 5-Alpha reductase inhibitor, Pesticide [4]
11	n-Hexadecanoic acid	$C_{16}H_{32}O_2$	39.952	26.66	Antioxidant, Hypocholesterolemic Nematicide, Antiandrogenic, haemolytic.[30]
12	1-Heptacosanol	$C_{27}H_{56}O$	40.234	1.09	Anticancer, Nematicide, Antioxidant, Flavour and fragrance agent, cholesterol Lowering, Antimicrobial and Cytotoxicity [3,20]
13	n-Propyl 9,12-octadecadienoate	$C_{21}H_{38}O_2$	42.674	1.22	Not reported
14	6-Octadecenoic acid, methyl ester	$C_{19}H_{36}O_2$	42.834	5.90	Not reported
15	Heptadecanoic acid, 16-methyl-, methyl ester	$C_{19}H_{38}O_2$	43.499	5.46	Used against skin cancer protein.[14]

Table no.5. Fourier- Transform Infrared Spectroscopy (FTIR) analysis for *Portulaca pilosa* L. leaf powder

Sr No.	Absorption Frequency	Functional group
1.	3741.18	Amine NH stretch
2.	3339.03	Normal polymeric OH stretch
3.	2916.72	Saturated aliphatic Methylene
4.	2849.76	Saturated aliphatic Methylene
5.	1787.72	Carbonyl compound
6.	1730.93	Ester
7.	1607.19	Quinone or conjugated ketone
8.	1458.02	Phenol
9.	1403.71	Amide
10	1321.02	Alkyl ketone
11.	1243.24	Aromatic ethers
12.	1150.01	Secondary amine CN stretch
13.	1016.91	Phosphate ion
14.	822.57	Nitrate ion
15.	773.00	Aliphatic chloro compounds C-Cl strech

V. CONCLUSION

Present investigation reveals that the leaves of *Portulaca pilosa* L. have the potential to act as source of useful drugs because of presence of various phytochemical constituents such as flavonoids, alkaloids, phenols, saponins and carbohydrates. These constituents play important role in improving the health status. The results of proximate analysis showed that plant is edible has considerable amount of crude protein, fat and fibre. The mineral content is within the permissible range for human consumption. An impressive and growing number of bioactive compounds have been identified that have potentially important health benefits. Through GC-MS five major compounds detected had Hypocholesterolemic, Anti-androgenic, Haemolytic, Antimicrobial, Antifungal, 5-Alpha reductase inhibitor and Allelopathic activity. Antioxidant activity is shown by n-Hexadecanoic acid which is found in high amount in the sample. In FTIR analysis absorption frequency of observed functional groups ranges from 773 to 3741.18 cm^{-1}.The above study about nutritional value of *Portulaca pilosa* L. reveals the knowledge about edibility, habitat, distribution, medicinal uses of *Portulaca pilosa* L.

VI. ACKNOWLEDGEMENT

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Synthesis, Characterization and antibacterial activity of 2-aminopyridine based Schiff`s Bases

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ABSTRACT

Schiff`s bases play a vital role in the field of pharmaceutics. They are important class of molecules for the synthesis of novel drugs as intermediates. The present work involves condensation of 2-aminopyridine derivatives and salicylaldehyde to yield 2-{(Z)-[(3-methylpyridin-2-yl)imino]methyl}phenol and 2-{(Z)-[(3-methoxypyridin-2-yl)imino]methyl}phenol. This method is experimentally simple, clean, high yielding with reduced time period. The compounds are characterised by IR, 1HNMR, and elemental analysis. The final products are purified in ethanol and screened for biological activities by using broth dilution method.

Keywords: Schiffs base, 2-aminopyridine, SalicylaldehydeAntibacterial activity.

I. INTRODUCTION

During the past decade, life-threatening infectious diseases caused by gram positive and gram negative pathogenic bacteria have increased to an alarming level around the world. This increase coupled with emergence of bacteria resistant to commonly used antibiotics has resulted in the need to evolve new classes of antibacterial agents to combat infections. Understanding the chemistry of molecular biology has created a significant class of compounds that are now employed as antibacterial agents[1]. A class of compounds that has shown great promise in this area are the Schiff bases. A Schiff base is the nitrogen analogue of aldehyde in which the C=O group is replaced by a C=N group. Schiff bases are reported to exhibit antibacterial, antifungal and antitumor activity[2,3]. In addition, the compounds and their metal complexes exhibit interesting photophysical properties[4]. Salicylidimines show important photochromism where light absorption causes interconversion between enol-imine and keto-amine tautomers through intramolecular hydrogen transfer[5]. They have also been shown to exhibit a variety of biological activities with substituted salicylaldehyde compounds possessing higher activities[6,7]. Aromatic aldehydes especially with an effective conjugation system, form stable Schiff bases, where as those aliphatic aldehydes are unstable and readily polymerize. Schiff base ligands with aldehydes are formed more readily than with ketone (carbonyl carbon).Schiff bases have very flexible and different structures[8]. A wide range of Schiff base compounds and their behaviour studied because these compounds have very flexible and diverse structureSchiff bases are generally are bi ,tri, or tetra-dentate chelate ligands and from very stable complexes with metal ions.

II. MATERIALS AND METHODS

The reagent grade chemicals were obtained from commercial sources and purified by either distillation or recrystallization before use. The purity of synthesized compounds was checked by thin layer chromatography (TLC) on silica gel plate using ethyl acetate:CycloHexene (7:3). Melting points were determined by open capillary method and are uncorrected. Elemental analyses were performed with a Perkin-Elmer 2400 CHNS/O analyzer. IR spectra are recorded on FT-IR Perkin-Elmer spectrophotometer using KBr disc. 1H-NMR spectra are recorded in CDCl3 on a Bruker -400 MHz using TMS as internal standard.

Scheme 1
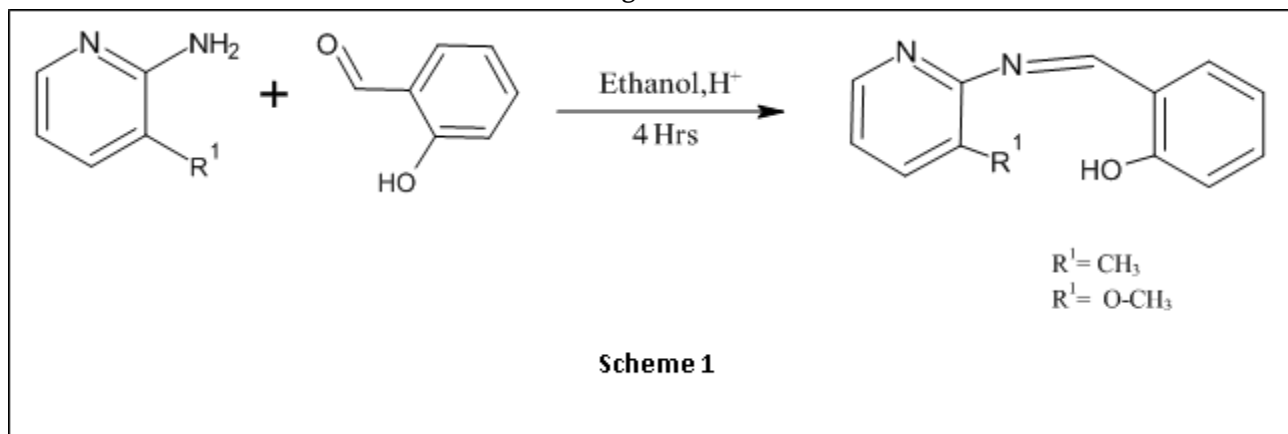
General procedure for preparation of Schiff bases

[A] 2-{(Z)-[(3-methylpyridin-2-yl)imino]methyl}phenol

A mixture of 3-methylpyridin-2-amine (1.08gm, 0.01M) and Salicylaldehyde (1.22gm, 0.01M) in absolute ethanol was refluxed in waterbath for 4 hrs. in presence of 1ml glacial acetic acid.Yellow orange coloured Solid Product obtained after crystallization from absolute ethanol.

IR (cm -1): 3434,2920, 1613, 1589, 1278, 1256, 1148, 993, 915, 845, 790, 732,695, 578. 1HNMR (CDCl3, 400mHz): 6.91-8.49(m, 8H), 9.41(s,1H), 13.40(s,1H),(s,3H). Yield, 2.05gm (89.13%), M.P: 63°C ($C_{13}H_{12}N_2O$); Calculated: C, 73.58; H, 5.66; N, 13.20; O,7.6 Found: C, 72.92; H, 5.64; N, 13.34; O,7.54%).

[B] 2-{(Z)-[(3-methoxypyridin-2-yl)imino]methyl}phenol

A mixture of 3-methoxypyridin-2-amine (1.24gm, 0.01M) and Salicylaldehyde (1.22gm, 0.01M) in absolute ethanol was refluxed in waterbath for 4 hrs. in presence of 1ml glacial acetic acid. Orange coloured Solid Product obtained after crystallization from absolute ethanol.

IR (cm -1): 1609, 1575, 1549, 1484, 1325, 1271, 1143, 1027, 991,890, 830, 770, 623. 1HNMR (CDCl3, 400 MHZ): 3.77(s, 3H), 6.92 to 8.48(m,7H), 9.37(s, 1H), 12.93(s, 1H). Yield, 2.1gm (92.10%), M.P: 65°C ($C_{13}H_{12}N_2O_2$); Calculated: C, 68.42; H, 5.26; N, 12.28; O,14.03 Found: C, 67.90; H, 5.10; N, 12.30; O,14.1%).

III. RESULTS AND DISCUSSION

Synthesis Condensation of the 3-methylpyridin-2-amineand 3-methoxypyridin-2-amine with the corresponding aldehyde readily gave rise to the corresponding Schiff bases 2-{(Z)-[(3-methylpyridin-2-yl)imino]methyl}phenoland 2-{(Z)-[(3-methoxypyridin-2-yl)imino]methyl}phenol. All the compounds are air stable with sharp melting points indicating the purity of the compounds. The elemental analysis of the compounds is in agreement with the composition suggested for the compounds. The IR of each compound

confirms the formation of imine bond (–C=N-) and absence of the original aldehydic bond (-C=O)[9]. A band at 1607-1615 cm -1 is assigned to the stretching vibration of the imine group v (C=N)[10,11]. All the compounds displayed a band at 1271-1289 cm -1 which is assigned to v(C-O) stretching vibration of the Phenolic – OH, respectively. The v(OH) band at 3434-3438 cm -1 was observed only in compounds I and II. Proton NMR showed sharp singlet at 9.34-9.53 ppm which further confirmed the formation of –C=N- bonds[12-14].

IV. ANTIBACTERIAL ACTIVITY

Antibacterial Activities of the compounds in DMF and dioxane are reported in Table 1 and 2[12]. The morphology of the cell wall is a key factor that influences the activity of antibacterial agents. The cell wall of the bacteria is composed of peptidoglycan which is thicker in gram positive bacteria and this usually possess a barrier to the degree of diffusion of antibacterial agents in to the enzyme. Four standard bacteria strains screened were gram positive S.aureus(ATCC 25923), and E. feacalis (ATCC 29212) and gram negative E.coli(ATCC 25922) and P.aeroginosa (ATCC 27853)[15-18].All compounds were active against S. aureusand E.coli and inactive against E. feacalis and P.aeroginosa. . The unsubstitutedsalicylaldehyde Schiff base I had minimal activity against bacteria studied in both solvents. The change of solvent to less polar dioxane I was active at lower concentrations of 5 m g/ml respectively. The higher activity reported in less polar solvent may be due to easier diffusion across the cell wall[19-21].

Table1.

Compounds	S. aureus				E. feacalis	E.coli				P.aeroginosa
	Concentrations (mg/ml) 40	20	10	5	40-5	40	20	10	5	40-5
I	3+	2+	0	0	0-0	3+	2+	2+	0	0-0
II	3+	3+	3+	2+	0-0	3+	3+	2+	0	0-0

Table 2.

Compounds	S. aureus				E. feacalis	E.coli				P.aeroginosa
	Concentrations (mg/ml) 40	20	10	5	40-5	40	20	10	5	40-5
I		3+	3+	1+	0	0-0	1+	0	0	0	0-0
II	3+ 2+ 3+ 1+				0-0	3+	3+	2+	0	0-0

V. CONCLUSION

The 2-aminopyridine based Schiff bases are synthesized by condensing 3-methylpyridin-2-amine and 3-methoxypyridin-2-amine with Salicylaldehyde. The obtained products are characterized by IR, ^{1}HNMR spectral data and elemental analysis. The compounds have the capacity of inhibiting metabolic growth of S. aureus and E. coli to different extent. The antibacterial activity of the compounds depends on the nature of substituent present on the pyridine ring. The importance of this lies in the potential use of the compounds as narrow spectrum antibiotics in treatment of some common diseases.

VI. ACKNOWLEDGEMENT

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Development of Singularities in Radiating Dyon Solution with Cosmological Constant in Higher Dimensional Space-Time

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ABSTRACT

We study here the development of singularities in radiating dyon solution with cosmological constant in higher dimensional space time and cosmic censorship violation in the gravitational collapse of radiating dyon solution in higher dimensional space-time. We study here the final outcome of the collapse does not depends on cosmological constant but it sensitively depends on electric and magnetic charge respectively. We expand the earlier work of gravitational collapse of radiating dyon solution in any arbitrary dimensions. Here is no restriction is adopted on the number of dimensions. This might be important that cosmological constant does not affect on the development of singularities.

Keywords: Gravitational constant, naked singularity, cosmological constant, Dyon.
PACS number(s): 04.20.Dw, 04.20.Cv, 04.70.Bw

I. INTRODUCTION

The final outcome of gravitational collapse is one of the most important issue in the theory and astrophysical applications of advance day black hole physics and cosmic censorship conjecture(CCC)[1]. The CCC postulates states that any physically realistic gravitational collapse of a massive star must end generically into black hole i.e they can not observe by external observer. In recent years, a wide variety of complete gravitational collapse of massive star have been discovered where the dynamical evolution leads to a naked singularity in place of black hole[2]. The physical phenomenon in astrophysics and cosmology involve gravitational collapse in a fundamental way. The final outcome of a massive star, when it collapses under its own gravity at the end of its life cycle, is one of the most important question in astronomy and astrophysics today. A sufficiently massive star of size more than 1.4 times the size of sun would undergo continuous gravitational collapse, on exhausting its nuclear fuel, without achieving an equilibrium state such as a neutron star or white dwarf.

If the occurrence of naked singularities, the final outcome of collapse were non-generic in some appropriately well-defined sense, then it will supported to the CCC. While one can imposes various sets of physically reasonable and regular conditions under which the collapse of massive particle is to be dynamically evolved to examine its final state, again the problem arises here is, the meaning or precise definition of such genericity necessarily not available in gravitation theory. Under such a circumstances, what's actually required is a

detailed investigation of the gravitational collapse phenomena within framework of general relativity, from which the only path can provide useful and adequate insight into the final outcome of collapse in terms of black hole or naked singularities.

Over the last forty years, there has been considerable interest in the formation of black hole, naked singularities and cosmic censorship hypothesis(CCH)[2]. Generally naked singularities are singularities that may be observed far away by observers. CCH state that for physically reasonable initial data, the gravitational collapse of space-time can not yield a naked singularity i.e. if singularity is form which is hidden inside the event horizon of the gravity. Now a days this hypothesis has become the most challenging open problem in theory of relativity. A rigorous formation and proof for CCH is not available so far, therefore some examples showing the occurrence of naked singularities remain important for this hypothesis for the formulation. Some important cases of naked singularities studied so far include dust collapse[3-8], radiation collapse[9-16], collapse of perfect fluid[17-20] and strange quark matter[21-22].

In this paper we study the development of naked singularities i.e.cosmic censorship hypothesis violation and effect of cosmological constant on gravitational collapse of radiating dyon solution in higher dimensional space-time. We conclude the paper in section IV by some concluding remarks.

II. GRAVITATIONAL CONSTANT WITH RADIATING DYON SOLUTION IN (N+2)-DIMENSIONAL SPACETIME

The metric in (n+2)-dimensional radiating Dyon space- time can be written as [23]

$$ds^2 = -\left[1 - \frac{2m(u,r)}{(n-1)r^{n-1}}\right] du^2 + 2dudr + r^2 d\omega_n^2 \qquad (1)$$

Where u is advanced Eddington time co-ordinate, r is the radial co-ordinate with $0 < r < \infty$ and $m(u,r)$ gives the gravitational mass which is arbitrary inside the sphere of radius r.

$$2m(u,r) = \left[\lambda(n-1)u^{n-1} - \frac{q_e^2(u)+q_m^2(u)}{nr^{n-1}}\right] \qquad (2)$$

and $d\omega_n^2 = d\theta_1^2 + sin^2\theta_1 d\theta_2^2 + sin^2\theta_1 sin^2\theta_2 d\theta_3^2 + \cdots + sin^2\theta_1 sin^2\theta_2 \cdots sin^2\theta_{n-1}d\theta_n^2$ (3) is the line element in a n-sphere in polar co-ordinate and $n = D - 2$, where D denotes the total number of dimensions.

Here, q_e^2 and q_m^2 are electric and magnetic charge respectively.

The non-vanishing components of the Einstein tensor are given by

$$G_{00} = \frac{n\dot{m}}{(n-1)r^n} - \frac{nm'}{(n-1)r^n}\left[1 - \frac{2m}{(n-1)r^{n-1}}\right], \qquad G_{01} = -\frac{nm'}{(n-1)r^n}, \qquad G_{22} = \frac{m''}{(n-1)r^{n-3}} ,$$

$$G_2^2 = G_3^3 = \cdots \cdots = G_{n+1}^{n+1} \qquad (4)$$

Here dash and dot denote derivative with respect to r and u respectively.

The energy momentum tensor for type II fluid is given by [13-15].

$$T_{ik} = \mu l_i l_k + (\rho + p)(l_i \eta_k + l_k \eta_i) - p g_{ik} \qquad (5)$$

Where,

$$l_i l^i = \eta_i \eta^i = 0 \ , \ l_i \eta^i = 1 \qquad (7)$$

The null vector l_i is twice null eigen vector of T_{ik}. Physically occurring distribution is null radiation flowing in the radial direction corresponding to $\rho = p = 0$, the Vaidya space-time of radiating star. When $\mu = 0$, T_{ik} reduces to degenerate type I fluid and further it represents string dust for $\mu = 0 = p$. The energy condition for such a distribution are as follows [16,17].

 (a) Weak and strong energy condition

$$\mu > 0, \quad \rho > 0, \quad p \geq 0 \qquad (8)$$

(b) Dominant energy condition

$$\mu > 0, \quad \rho \geq 0, \quad p \geq 0 \tag{9}$$

In the case of $\mu = 0$, the energy conditions would be,

(c) Weak condition

$$\rho + p \geq 0, \quad \rho \geq 0 \tag{10}$$

(d) Strong condition

$$\rho + p \geq 0, \quad p \geq 0 \tag{11}$$

(e) Dominant condition

$$\rho \geq 0, \quad -\rho \leq p \leq \rho \tag{11}$$

The energy momentum tensor (5) has support along both the two future pointing null vectors l_i and η_i , and it is exactly, as we shall show later, in the form to give Bonnor-Vaidya metric in higher dimensions [18-22]. We also note that $T_{ik}l^i l^k = 0$ and $T_{ik}\eta^i\eta^k = \mu$.

For the metric (1) can be written as,

$$l_i = g_i^0, \qquad \eta_i = g_i^1 + \frac{1}{2}\left(1 - \frac{2m}{(n-1)r^{n-1}}\right)g_i^0 , \tag{12}$$

Now the Einstein field equations

$$G_{ik} = -T_{ik} \tag{13}$$

Equation (5) satisfies the condition (11)

Substituting (5) in (13) we obtain,

$$\sigma = \mu = -\frac{n\dot{m}}{(n-1)r^n}, \qquad \rho = \frac{nm'}{(n-1)r^n} , \qquad p = -\frac{m''}{(n-1)r^{n-1}} \tag{14}$$

Let us introduce the term with cosmological constant in the above mass function. Hence the mass function $m(u,r)$ can be written as

$$2m(u,r) = \left[\frac{\Lambda r^{n-1}}{3} + \lambda(n-1)u^{n-1} - \frac{\left(q_e^2(u)+q_m^2(u)\right)}{nr^{n-1}}\right] \tag{15}$$

Let us consider the electric charge parameter $q_e^2(u) = \alpha^2 u^{2n-2}$

and magnetic charge parameter $q_m^2(u) = \beta^2 u^{2n-2}$ \qquad\qquad (16)

Using the equation (15) and (16) equation (1) becomes,

$$ds^2 = -\left[1 - \frac{\Lambda r^{n-1}}{3(n-1)r^{n-1}} - \frac{\lambda u^{n-1}}{r^{n-1}} + \frac{\alpha^2 u^{2n-2}}{n(n-1)r^{2n-2}} + \frac{\beta^2 u^{2n-2}}{n(n-1)r^{2n-2}}\right]du^2 + 2dudr + r^2 d\omega_n^2$$

i.e $ds^2 = -\left[1 - \frac{\Lambda}{3(n-1)} - \frac{\lambda u^{n-1}}{r^{n-1}} + \frac{\alpha^2 u^{2n-2}}{n(n-1)r^{2n-2}} + \frac{\beta^2 u^{2n-2}}{n(n-1)r^{2n-2}}\right]du^2 + 2dudr + r^2 d\omega_n^2$ \qquad (17)

III. NATURE OF THE SINGULARITY

To identify the structure of the singularity either it may black hole or naked, we follow the method given in reference [23] i.e. $ds^2 = 0$. The singularity is said to be naked, then the radial null geodesic equation admits at least one real and positive root.

The outgoing radial null geodesic equation for metric (17) is given by

$$\frac{dr}{du} = \frac{1}{2}\left[1 - \frac{\Lambda}{3(n-1)} - \frac{\lambda u^{n-1}}{r^{n-1}} + \frac{\alpha^2 u^{2n-2}}{n(n-1)r^{2n-2}} + \frac{\beta^2 u^{2n-2}}{n(n-1)r^{2n-2}}\right] \tag{18}$$

It is note that the equation (18) has a singularity at $r \to 0, u \to 0$ In order to differentiate the radial and non-radial outgoing non-space like geodesics ending at the singularity in the past, we consider limiting value of $X = \frac{u}{r}$ along a singular geodesic at the singularity is approached [24-25].

Let us consider $\quad X_0 = \lim\limits_{\substack{u \to 0 \\ r \to 0}} X = \lim\limits_{\substack{u \to 0 \\ r \to 0}} \frac{u}{r} = \lim\limits_{\substack{u \to 0 \\ r \to 0}} \frac{du}{dr}$

Therefore $\quad X_0 = \dfrac{2}{\left[1 - \frac{a}{(n-1)} - \frac{\lambda u^{n-1}}{r^{n-1}} + \frac{\delta u^{2n-2}}{n(n-1)r^{2n-2}} + \frac{\gamma u^{2n-2}}{n(n-1)r^{2n-2}}\right]}$ $\qquad$ (19)

i.e. $\qquad \dfrac{(\alpha^2+\beta^2)}{n(n-1)} X_0^{2n-1} - \lambda X_0^n + \left(1 - \dfrac{\Lambda}{3(n-1)}\right)X_0 - 2 = 0$ $\qquad$ (20)

The above equation gives the nature of the singularity. If this equation has at least one real and positive root, then the final outcome of the collapse will be naked. If this will not happen then the collapse ends into black hole i.e observer can see the singularity.

For this we study the equation (20) , now considering some different values of $n, \alpha^2, \beta^2, \lambda \,\&\, \Lambda$.

Case I: Consider $n = 3$, then the equation (20) reduces to five dimensional space-time. In particular we select $n = 3, \alpha^2 = 0.05, \beta^2 = 0.01, \lambda = 0.01 \ and \ \Lambda = 0.5$ then equation (20) transform to

$$\frac{(0.05+0.01)}{6} X_0^5 - (0.01)X_0^3 + \left(1 - \frac{0.1}{6}\right) X_0 - 2 = 0 \qquad (21)$$

then one of the real and positive root of equation (21) is $X_0 = 1.9531$, which shows that naked singularity is obtained.

If we varies the value of β^2, λ and fixed $\alpha^2 = 0.003, \Lambda = 0.7$ to get different roots in tabular form as

Table 1 Values of X_0 for different values of λ and β^2

λ	X_0		
	$\beta^2 = 0.01$	$\beta^2 = 0.05$	$\beta^2 = 0.09$
0.1	3.3427	2.5315	2.2491
0.3	6.5561	4.5717	3.7080
0.5	8.5835	6.0301	4.9000
0.7	10.1985	7.1848	5.8488
0.9	11.5847	8.1721	6.6590
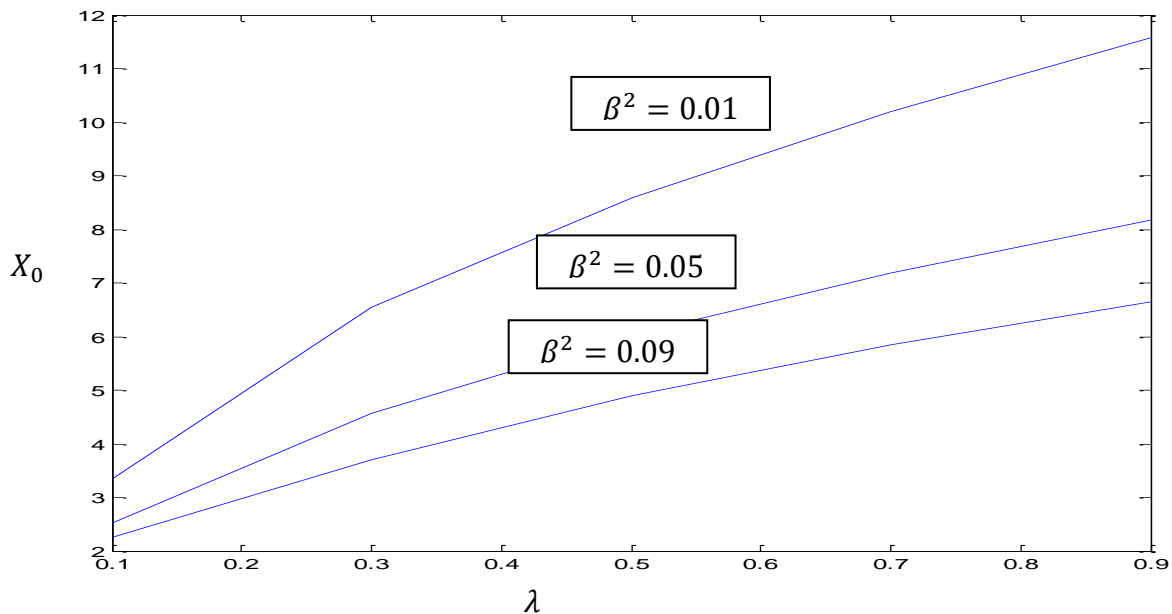
Figure 1: Graph of the values of X_0 against the value of λ.

From the above graph we may observe that the values of X_0 have positive real roots. It is also observe that if we increase the value of λ then X_0 also increases for particular charge simultaneously when we increase β^2 then X_0 decreases with positive roots, if for large values of β^2 then X_0 may be negative.

For $n = 4$ (i.e. for 6D) and fixed $\alpha^2 = 0.001, \lambda = 0.2$ then equation (20) can be written as

$$\frac{(0.001+\beta^2)}{12} X_0^7 - 0.2 X_0^4 + \left(1 - \frac{\Lambda}{9}\right) X_0 - 2 = 0 \tag{22}$$

from this we will get real and positive roots for different values of β^2 and Λ i.e. to get naked singularities in six dimensional radiating dyon solution with cosmological constant are shown in following table.

Table 2 Values of X_0 for different values of Λ and β^2

Λ	X_0		
	$\beta^2 = 0.03$	$\beta^2 = 0.05$	$\beta^2 = 0.07$
0.1	4.2126	3.5522	3.1716
0.4	4.2159	3.5570	3.1776
0.6	4.2181	3.5601	3.1815
0.8	4.2203	3.5631	3.1854
1.2	4.2246	3.5693	3.1931
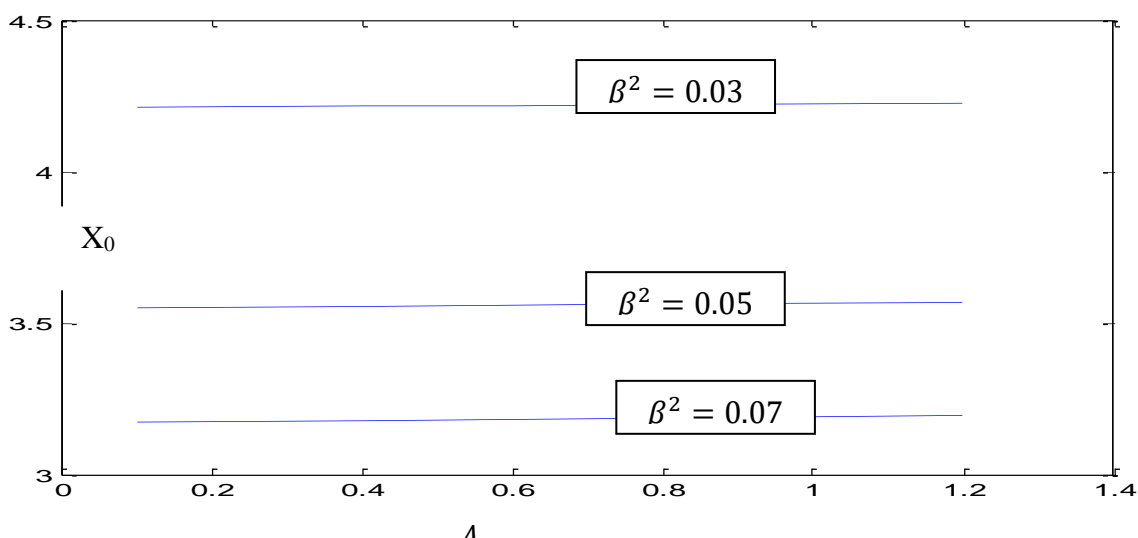
Figure 2: Graph of the values of X_0 against the value of Λ.

From the above graph when we change the values of β^2 and Λ that there is slight change in the values of X_0, but the roots are positive approximately same real values. It insures that cosmological constant in higher dimension doesn't affects on the structure of singularities.

IV. CONCLUDING REMARKS

Cosmic censorship conjecture has become most challenging and a significant open problem in general relativity. In the present work we have analyzed the development of singularities in radiating dyon solution with cosmological constant in higher dimensional space-time. We used here electric and magnetic charge parameter in mass function, It has been clear that the structure of the singularities arise in this space-time are

not hidden inside the event horizon. It means that cosmological constant does not affects the development of singularities in higher dimensional space time.

We may also argue that the dimensions of the space-time with cosmological constant does not play a fundamental role in the formation of naked singularities. Occurrence of naked singularities in higher dimensional in the presence of cosmological constant and charge parameter the cosmic censorship conjecture would be violated so that singularity can be observed by an external observer. Thus we may suggest that the introduction of cosmological constant to gravity can't prevent to vanishing the apparent horizon i.e. naked singularity for forming completely. It reflects that cosmic censorship conjecture is actually violets.

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Libraries in the Cloud

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ABSTRACT

Cloud computing is a paradigm shift of computing and information technology to a new phase ofplatform to cater the clients in more sophisticated manner and also in more cost effective manner from acommon pool of service providers platforms. Cloud computing technology continues to grow at a rapidrate with new applications and architecture. It is used to practice of storing, accessing and sharing data,applications and computing power in cyberspace. This technological development has brought adramatic change in every field and libraries are not exception to it. Libraries have also started adoptingthis technology as cost effective tool which involves delivering hosted service over the web. Budgetaryprovision for building collection development and procurement of computing resources and peripheralshave been reducing gradually, so cloud computing is the best option for the libraries to solve the abovementioned problem. This paper aims to demonstrate and elaborate the journey of library from actual to virtual, itsuses in the field of library and information centers. This paper also tries to give a clear idea that how cloudtechnology helps libraries to provide a better service to the user community.

I. INTRODUCTION

In this technological era, libraries are improved constantly by adopting many new ITtechnologies. The theories of conventional libraries have been changed now a days. Introduction of newand innovative technologies like cloud technology helps libraries to provide better services to the usercommunity. Though libraries have been using some of cloud computing services for over a decade likeonline databases, large union catalogues as cloud applications, the library community can further adoptthe concept of cloud computing to strengthen the power of collaboration or cooperation and to build a major, fused existence on the worldwide network.

II. WHAT IS CLOUD COMPUTING

Cloud computing is the delivery of computing services over the Internet. Cloud servicesallow us to use software and hardware that are managed by third parties at remote locations. Examples of cloud services include onlinefile storage, social networking sites, webmail, and online business applications. The cloud computing model allows access to information and computer resources from anywhere that a network

connection is available. Cloud computing provides a shared pool ofresources, including data storage space, networks, computer processing power, and specialized corporate and user applications.

U.S. National Institute of Standards and Technology (NIST) defines Cloud Computing as:

"Cloud computing is a model for enabling convenient, ondemand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essentialcharacteristics, three service models, and four deployment models."[1]

Definition by Wikipedia:

Cloud computing is the computing in which large groups of remote servers are networked to allow centralized data storage and online access to computer services or resources. Clouds can be classified as public, private or hybrid.[2]

Cloud computing is a term that describes the means of delivering any and all information technologyfrom computing power to computing infrastructure, applications, business processes, and personalcollaboration to an end user as a service whenever and wherever they require it. Cloud computing is anemerging style of computing where applications, data and resources are provided to the users as a serviceover the web. The services which are provided by the service provider may be available globally, alwayson, low in cost, on demand, massively scalable, pay-as-you-grow. Cloud computing is a technology thatallows user to access software applications, store information, develop and test new software, createvirtual services, drawn on disparate IT resources and more- all over the Internet or other network. Incloud computing, users only think about what the service does for them but don't think about how it isimplemented.

In other words, cloud computing refers to applications and services that run on a distributednetwork using virtualized resources and accessed by Internet protocols and networking standards. In thistechnology, the resources are virtual and limitless. Cloud computing takes the technology, services andapplications that are similar to those on the internet and turns them into a self-service utility. The use ofthe word "cloud" makes reference to the two essential concepts:

Abstraction: Cloud computing abstracts the details of system implementation from users anddevelopers applications run on physical systems that aren't specified, Data is stored in locations that areunknown.Administration of system is outsourced to others, and access by users is ubiquitous.

Virtualization: Cloud computing virtualizes systems by pooling and sharing resources. Systemsand storage can be provisioned as needed from a centralized infrastructure.Costs are accessed on ametered basis.Multi-tenancy is enabled and resources are scalable with agility.

Cloud computing is an abstraction based on the notion of pooling physical resources andpresenting them as a virtual resource. It is a new model for provisioning resources, for stagingapplications, and for platform-independent user access to services. Cloud computing represents a realparadigm shift in the way in which systems are deployed.[3]
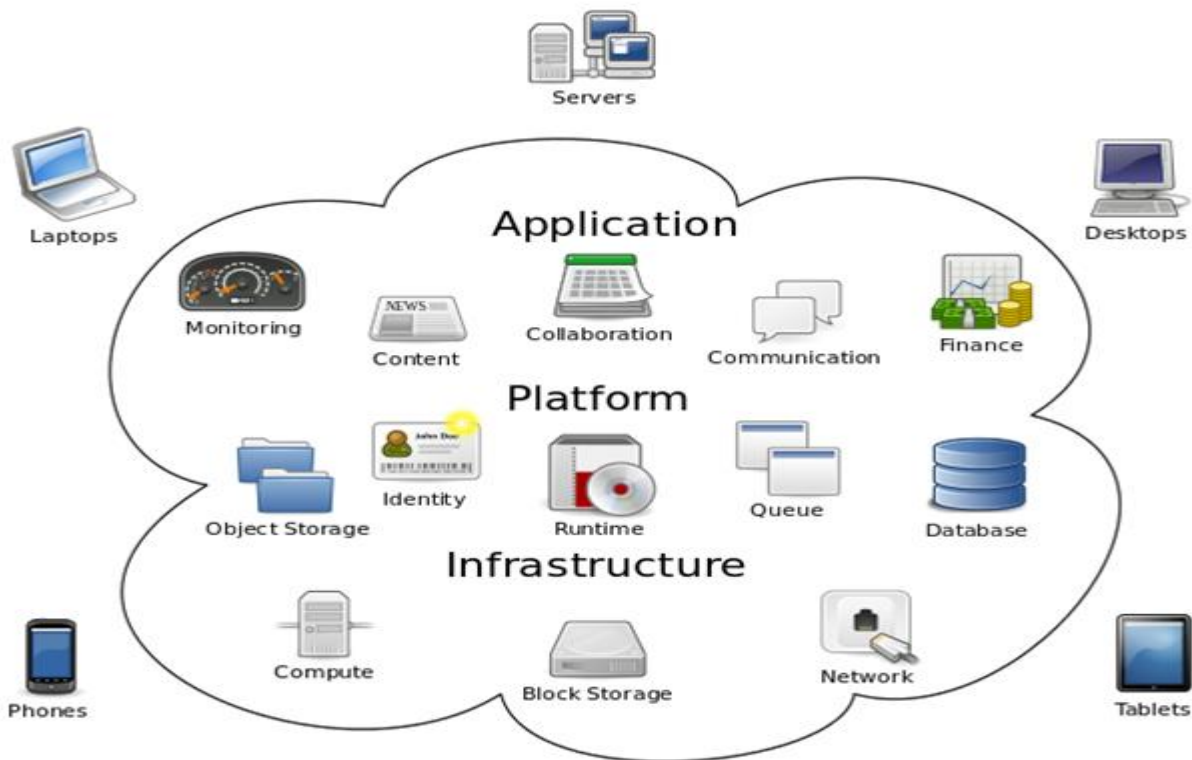
Fig : Cloud Computing[4]

III. CHARACTERISTICS OF CLOUD COMPUTING

1. Self Healing: Any application or any service running in a cloud computing environment has the property of self healing. In case of failure of the application, there isalways a hot backup of the application ready to take over without disruption.There are multiple copies of the same application - each copy updating itselfregularly so that at times of failure there is at least one copy of the applicationwhich can take over without even the slightest change in its running state.

2. Multi-tenancy: With cloud computing, any application supports multi-tenancy - that ismultiple tenants at the same instant of time. The system allows severalcustomers to share the infrastructure allotted to them without any of them beingaware of the sharing. This is done by virtualizing the servers on the availablemachine pool and then allotting the servers to multiple users. This is done insuch a way that the privacy of the users or the security of their data is notcompromised.

3. Linearly Scalable: Cloud computing services are linearly scalable. The system is able tobreak down the workloads into pieces and service it across the infrastructure.An exact idea of linear scalability can be obtained from the fact that if oneserver is able to process say 1000 transactions per second, then two servers canprocess 2000 transactions per second.

4. Service-oriented: Cloud computing systems are all service oriented - i.e. the systems aresuch that they are created out of other discrete services. Many such discreteservices which are independent of each other are combined together to form thisservice. This allows re-use of the different services that are available and thatare being created. Using the services that were just created, other such servicescan be created.

5. SLA Driven: Usually businesses have agreements on the amount of services.Scalability and availability issues cause clients to break these agreements. Butcloud computing services are SLA driven such that when the

systemexperiences peaks of load, it will automatically adjust itself so as to complywith the service-level agreements. The services will create additional instancesof the applications on more servers so that the load can be easily managed.

6. Virtualized: The applications in cloud computing are fully decoupled from theunderlying hardware. The cloud computing environment is a fully virtualizedenvironment.

7. Flexible: Another feature of the cloud computing services is that they are flexible.They can be used to serve a large variety of workload types - varying fromsmall loads of a small consumer application to very heavy loads of acommercial application

IV. TYPES OF CLOUD COMPUTING

1. Software as a service (SaaS): Software package such as CRM or CAD/CAM can be accessed undercloud computing scheme. Here a customer upon registration is allowed to usesoftware accessible through net and use it for his or his business process. Therelated data and work may be stored on local machines or with the service providers. SaaS services may be available on rental basis or on per use basis.

2. Platform as a Service (PaaS): Cloud vendors are companies that offer cloud computing services andproducts. One of the services that they provide is called PaaS. Under this acomputing platform such as operating system is provided to a customer or enduser on a monthly rental basis. Some of the major cloud computing vendor isAmazon, Microsoft, and Google etc

3. Infrastructure as a service (IaaS): The cloud computing vendors offer infrastructure as a service. One mayavail hardware services such as processors, memory, networks etc on agreedbasis for specific duration and price.[5]

V. CLOUD COMPUTING FOR LIBRARIES

So turning to cloud computing and libraries, are their real problems that can be solved?The answer is yes. The library community can apply the concept of cloud computing toamplify the power of cooperation and to build a significant, unified presence on the Web.This approach to computing can help libraries save time and money while simplifyingworkflows.A brief list of potential areas of improvement could include:

1. Most library computer systems are built on pre-Web technology
2. Systems distributed across the Net using pre-Web technology are harder and morecostly to integrate
3. Libraries store and maintain much of the same data hundreds and thousands oftimes.
4. With library data scattered across distributed systems, the library's Web presence isweakened.
5. With libraries running independent systems, collaboration between libraries is madedifficult and expensive
6. Information seekers work in common Web environments and distributed systemsmake it difficult to get the library into their workflow.
7. Many systems are only used to 10% of their capacity. Combining systems into acloud environment reduces the carbon footprints, making libraries greener.

These improvements can be grouped into three basic areas: technology, data andcommunity. Each offers some general and some unique opportunities for libraries. Lookingfirst at the technology that most current library systems employ, several benefits of cloudcomputing solutions surface.[6]

VI. ROLE OF CLOUD COMPUTING IN LIBRARIES

Cloud computing is a completely new in technology and it is known as3rd revolution after PC and Internet. Cloud computing is an enhancement ofdistributed computing, parallel computing, grid computing and distributeddatabases. Among these, grid and utility computing are known as predecessorsof cloud computing.

Cloud computing has large potential for libraries. Libraries may put more and more content into the loud. Using cloud computing user would be able tobrowse a physical shelf of books, CDs or DVDs or choose to take out an item orscan a bar code into his mobile device. All historical and rare documents wouldbe scanned into a comprehensive, easily searchable database and would beaccessible to any researcher. Many libraries already have online catalogues andshare bibliographic data with OCLC. More frequent online catalogues arelinked to consortium that share resources.

Data storage cloud be a main function of libraries, particularly those withdigital collections storing large digital files can stress local serverinfrastructures. The files need to be backed up, maintained, and reproduced forpatrons. This can strain the data integrity as well as hog bandwidth. Movingdata to the cloud may be a leap of faith for some library professionals. It is anew technology and on the surface it is believed that library would have somecontrol over this data or collections. However, with faster retrieval times forrequests and local server space it could improve storage solutions forlibraries. Cloud computing or IT infrastructure that exists remotely, often givesusers increased capacity and less need for updates and maintenance, and hasgained wider acceptance among librarians.

VII. ADVANTAGES OF CLOUD COMPUTING IN LIBRARIES

- Innovative and productive library operations.
- Experience the efficiency and convenience of librarymanagement with the help of proven technology.
- Flexibility in choice of auto identificationtechnology, and seamless transition from barcode to Radio-Frequency Identification (RFID) technologies.
- Modular yet scalable deployment at preferred paceand schedule.
- Improved customer service provided to librarypatrons as a result of reducing time to borrow.
- Library materials, cutting down queue and queuingtime, and ease of identifying the library materialsrequired from the library.
- Provide quality service to library patrons by raisingthe librarian service standard to higher value addedand professional service provider in information andresource.
- Cuts down laborious tasks.
- Smoothens business workflow and upgrades thelibrary image to its library patrons

In short its advantages are Cost saving, Flexibility and innovation, User centric, Openness, Transparency, Interoperability, Representation, Availability anytime anywhere, Connect and Converse, Create and collaborate.[7]

Examples of Cloud libraries:
1. OCLC
2. Library of Congress (LC)

3. Exlibris
4. Polaris
5. Scribd
6. Discovery Service
7. Google Docs / Google Scholar
8. Worldcat
9. Encore

VIII. CONCLUSION

Cloud computing builds on decades of research in virtualization,distributed computing, utility computing, more recently networking, and websoftware services. It implies a service oriented architecture, reduced informationtechnology overhead forth end-user, great flexibility, reduced total cost ofownership, on demand services and many other things. In today's globalcompetitive market, companies must innovate and get the most from itsresources to succeed. Cloud computing infrastructures are next generationplatforms that can provide tremendous value to companies of any size. They canhelp companies achieve more efficient use of their IT hardware and softwareinvestments and provide a means to accelerate the adoption of innovations.

Cloud computing increases profitability by improving resourceutilization. Costs are driven down by delivering appropriate resources only forthe time those resources are needed. Cloud computing has enabled teams andorganizations to streamline lengthy procurement processes.Cloud computing enables innovation by alleviating the need ofinnovators to find resources to develop, test, and make their innovationsavailable to the user community. Innovators are free to focus on the innovationrather than the logistics of finding and managing resources that enable theinnovation.

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Optically Stimulated Luminescence (OSL) Properties of Limgpo4:Tb3+, Al Phosphor for Radiation Dosimetry

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ABSTRACT

The polycrystalline sample of $LiMgPO_4:Tb^{3+}$, Al phosphor was successfully synthesized by using solid state method. The X-ray powder diffraction, photoluminescence (PL) emission & excitation spectra and optically stimulated luminescence (OSL) were thoroughly measured. The PL spectra of as-prepared $LiMgPO_4:Tb^{3+}$, Al phosphor showed characteristic blue-green emission, when excited by 224 nm under UV excitation. The $LiMgPO_4:Tb^{3+}$, Al phosphor shows good OSL sensitivity, which was found to be more than α-Al2O3:C and $LiMgPO_4:Tb^{3+}$, B phosphor. The effective atomic number of $LiMgPO_4:Tb^{3+}$, Al phosphor (Zeff = 11.44) is nearly similar to Zeff of α-Al2O3:C phosphor (Zeff = 11.28).

Keyword: Radiation dosimetry; OSL; PL; Phosphate; $LiMgPO_4:Tb^{3+}$, Al

I. INTRODUCTION

Radiation dosimetry using luminescence techniques has made tremendous progress during the last three decade. Some techniques (TL, OSL and passive solid state detectors) have now found routine use and have received due recognition. Among them, optically stimulated luminescence dosimetry (OSLD) is one of the techniques used in radiation dosimetry. OSL has virtually replaced thermoluminescence (TL) dosimetry. The OSL technique is a now well developed and extensively used in radiation dosimetry application [1]. Antonov- Romanovskii et al firstly suggested application of OSL for personal dosimetry [2]. This technique got momentum for personnel dosimetry after the development of α-Al2O3:C and properties of α-Al2O3:C has been investigated for personnel dosimetry, environmental dosimetry, medical dosimetry and space dosimetry. OSL technique is more popular in radiation dosimetry because of its advantages [3].

The LiMgPO4 host is a typical example in phosphate based ABPO4 compounds [4]. Recently, LiMgPO4:Tb3+, B has become a material of choice for OSL dosimetry, because it has excellent dosimetric properties such as high sensitivity, reusability, stability and effective atomic number (Zeff=11.44) as compared to commercial available material α-Al2O3:C (Zeff=11.28) [5]. The OSL/TL properties LiMgPO4:Tb3+, B phosphor was first

time reported by Dhabekar et al. in 2011 [1]. Kumar et. al. have focused over the theoretical and experimental studies on OSL properties of LiMgPO4:Tb3+, B [6]. Gai et al. reported Sm doped LiMgPO4:Tb3+, B phosphor for real-time dosimeter based on the OSL technology for personal monitoring as well as for food irradiation. Bajaj et. al. reported role of boron in LiMgPO4:Tb phosphor [7].

Form review it is confirmed that earlier workers developed this LiMgPO4 phosphor for various applications. There were no reports found on OSL properties of LiMgPO4:Tb3+, Al phosphor for radiation dosimetry.

In the present report we developed LiMgPO4:Tb3+, Al phosphor via modified solid state reaction for radiation dosimetry application.

II. EXPERIMENTAL DETAILS

The preparations of the LiMgPO4:Tb3+, Al was carried out by modified solid state reactions [8]. The structural confirmation of as prepared material was done by XRD analysis using Rigaku miniflex II X-ray diffractometer. The TL/OSL measurement was carried out using an automatic Risø TL/OSL-DA-20 reader system at RPAD divison BARC (Mumbai). Irradiations of all the samples were performed at room temperature using a calibrated 90Sr/90Y β source in-housed in RISO TL/OSL Reader (DA-20 Model). PL and PL excitation (PLE) spectra were measured on (Hitachi F-7000) fluorescence spectrophotometer with a 450W xenon lamp, in the range 200–700 nm, with spectral slit width of 1 nm and PMT voltage 700V at room temperature.

III. RESULTS AND DISCUSSION

Structural confirmation

The crystal phase formation of the sample was checked by using powder X-ray diffraction technique. The XRD pattern of LiMgPO4:Tb3+, Al as shown in Fig. 1. The experimental pattern of LiMgPO4: Tb3+, Al phosphor was compared with the ICDD (International Centre for Diffraction Data) pattern having PDF card No- 00-032 0574. By comparison between them the positions and intensity of the main peaks are same. No impurity lines were observed, indicating the only crystalline nature of sample. The crystallographic data are given in Table 1.

Table 1: Crystallographic data of Li2MgPO4:Tb3+, Al phosphor

Chemical Formula	LiMgPO4:Tb3+, Al
Crystal Structure	Orthorhombic
Space Group	Pmnb (62)
a (Å)	5.906
b (Å)	10.139
c (Å)	4.690
α (°)	90.000
β (°)	90.000
γ (°)	90.000
V (Å3)	280.84
Z	4
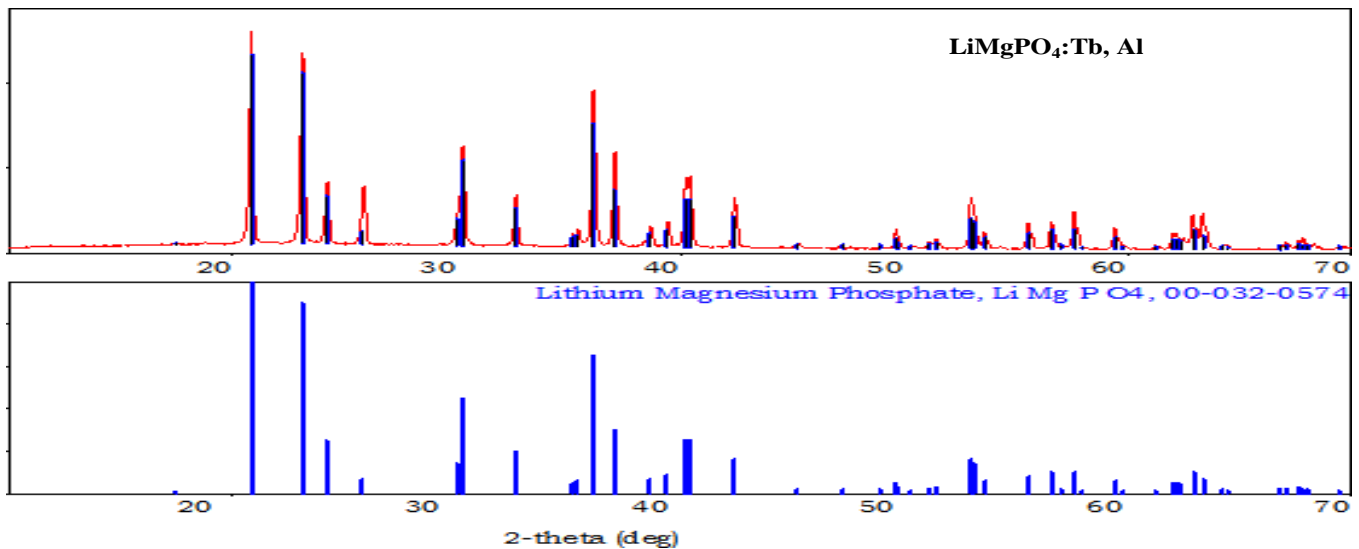
Fig. 1: X-ray diffraction pattern of LiMgPO4:Tb3+, Al phosphor with standard ICDD File.

Photoluminescence (PL) properties

Excitation and emission spectra of LiMgPO4:Tb3+, Al phosphor are as shown in Fig. 2. The excitation was measure at 544 nm and emission was measure at 224 nm.
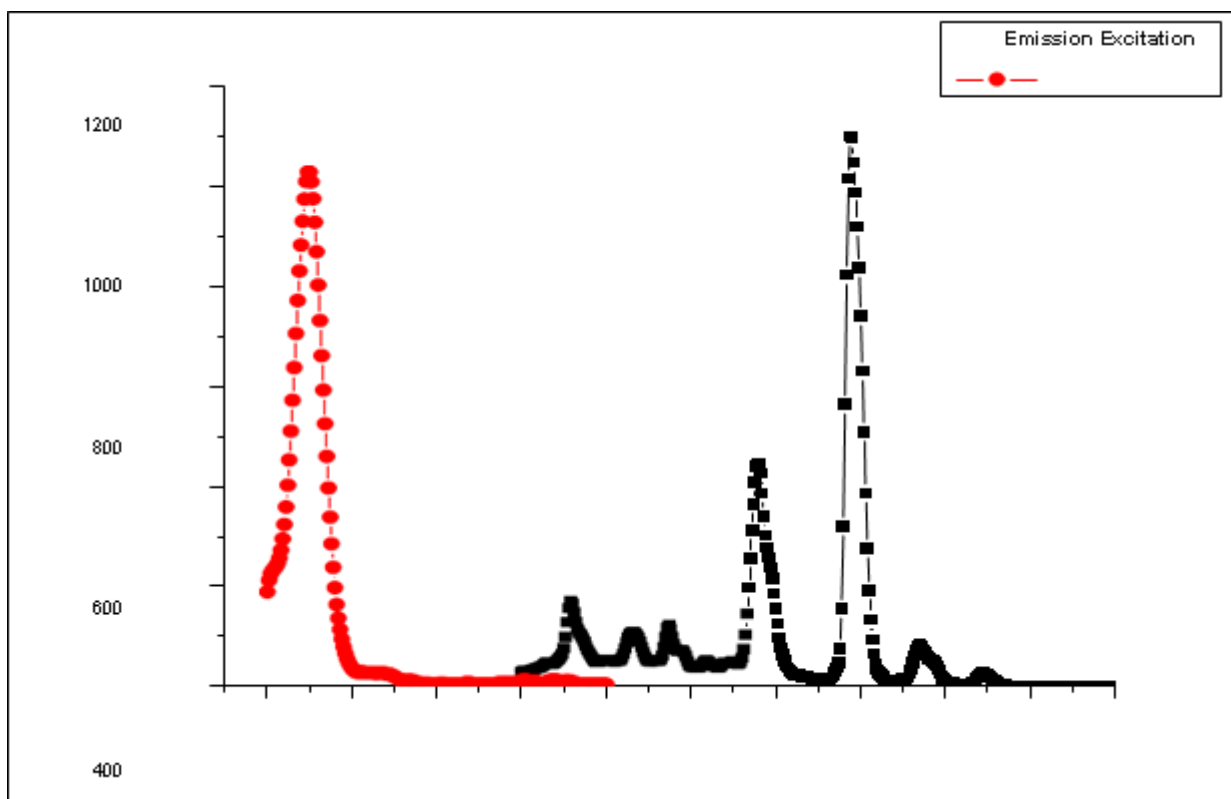
Fig. 2 Excitation and emission spectra for LiMg(1-0.015)PO4:0.01Tb3+,0.005Al.

The excitation spectra consist of broad band around 224 nm, corresponds to 4f–5d transitions of Tb3+ The emission spectrum consists of a series of sharp line speaking at 380, 418, 439, 490, 544, 583 and 621 nm corresponding to transitions 5D3 – 7F6, 5D3 – 7F5, 5D3 – 7F4, 5D4 – 7F6, 5D4 – 7F5, 5D4 – 7F4, 5D4 – 7F5 and 5D4 –7F6 respectively [9].

OSL Characterization

CW-OSL Studies

The sample was studied for its OSL response using blue LED stimulation (470 nm). For getting background OSL singles obtained for un-irradiated sample was subtracted from the OSL signals obtained for irradiated sample.
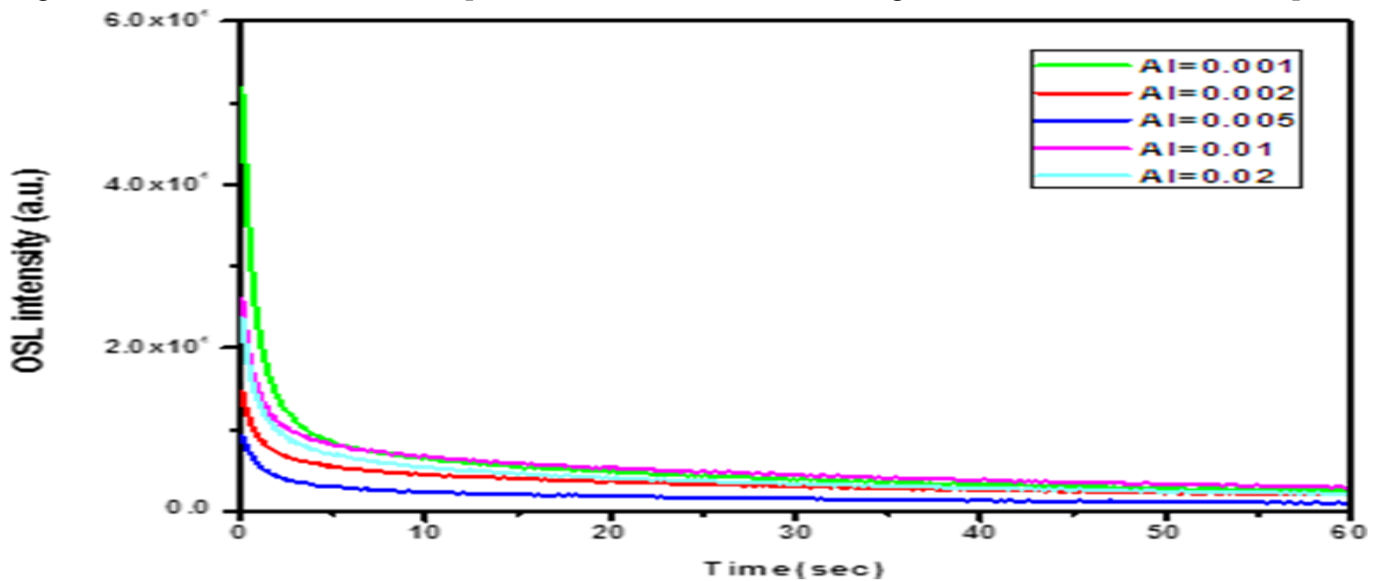
Fig. 3 OSL response of LiMgPO4:0.01Tb3+, yAl (y = 0.001, 0.002, 0.05, 0.01, 0.02) phosphor under β irradiation
Fig. 3 shows the OSL response of LiMg(1-0.01-y) PO4:0.01Tb3+, yAl (y = 0.001, 0.002, 0.005, 0.01 and 0.02) phosphor under 20 mGy of β irradiation. Also form same figure observed that OSL intensity was optimum at Al = 0.001 mol. The OSL sensitivity of LiMgPO4:Tb3+, Al phosphor was compared with the α-Al2O3:C and LiMgPO4:Tb3+, B phosphor as shown in Fig. 4. OSL sensitivity of LiMgPO4:Tb3+, Al phosphor was more than α -Al2O3:C and LiMgPO4:Tb3+, B phosphor.
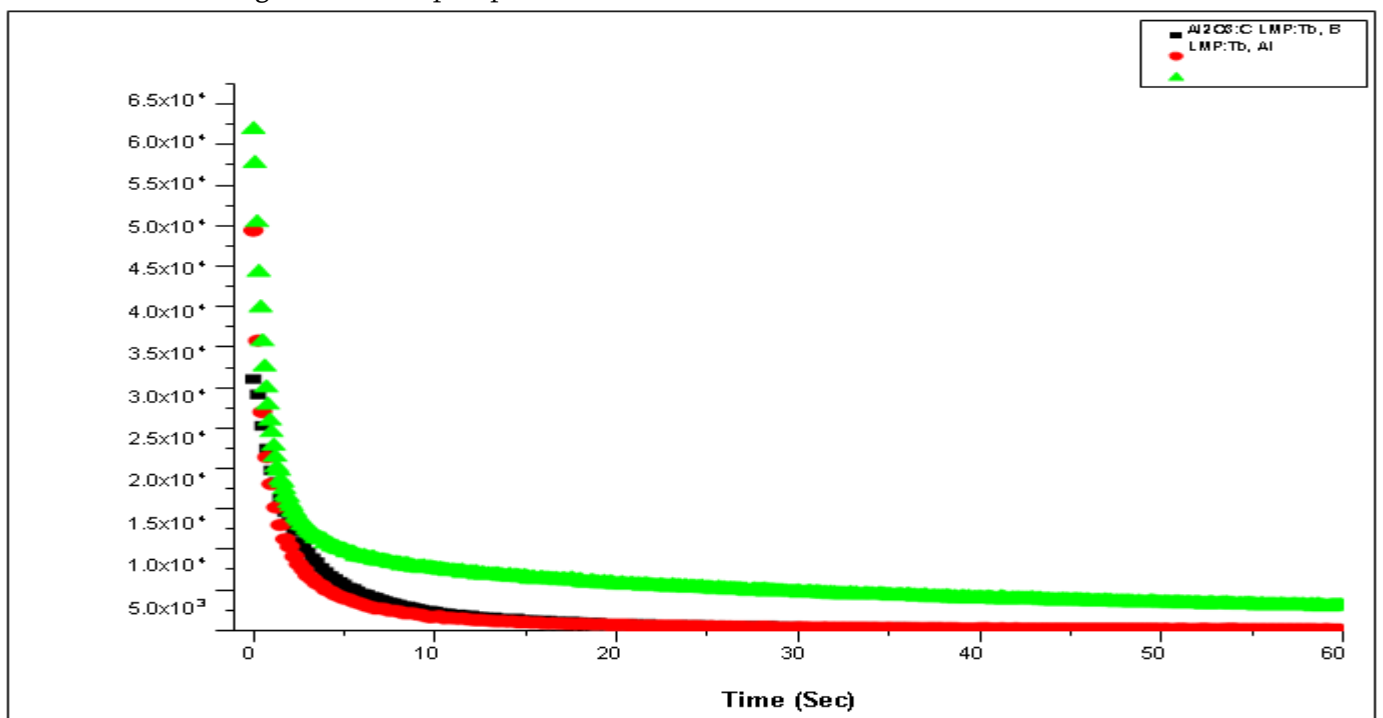
Fig.4: OSL sensitivity of LiMgPO4:Tb3+, Al phosphor compared with α-Al2O3:C and LiMgPO4:Tb3+, B Phosphors

IV. CONCLUSIONS

The polycrystalline sample of LiMgPO4:Tb3+, Al phosphor was successfully synthesized by using solid state method. The XRD pattern of LiMgPO4:Tb3+, Al phosphor was in good agreement with the ICDD file with card No. 00-032 0574. The PL emission spectra show characteristic blue-green emission under UV excitation. In OSL mode LiMgPO4:Tb3+, Al phosphor show good OSL sensitivity more than that of α-Al2O3:C and LiMgPO4:Tb3+, B phosphors . The Zeff of LiMgPO4:Tb3+, Al phosphor is nearly equal to Zeff of α-Al2O3:C phosphor. This LiMgPO4:Tb3+, Al phosphor can be proposed as a suitable candidate for radiation dosimetry applications.

V. ACKNOWLEDGEMENT

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Google Tools Supporting 21-Century Education

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ABSTRACT

Digital technologies used in the precise way offer potential never before imagined. It is entangled with humans day-to-day activities, perception, and thinking in modern civilization. Digital predominance highly influenced key aspects of society as growth, sustainability, welfare, equality, security, economy, democracy and Education. It constitutes a strong and powerful influencing force on how education is to be carried out and what is expected for the future generation .hence students and teachers must have access to modern learning tools that are required for contemporary education. This paper discuss about the effectiveness of using the e-environment based on G Suit for Education.

Keywords: G Suit for Education Google tools, efficiency and student's attentiveness, teaching, learning, evaluation.

I. INTRODUCTION

Education is the key factor for the progress of the society. It is changing as per the time. One should incorporate new and effective technologies to make education interesting and functional. Use of Google tools help us increase opportunities for critical thinking, communication, collaboration and creativity, all while supporting the standards and learning objectives that one have for the students. Covid-19 pandemic has been the major contributor for the use of such digital tools in education sector.

There are number of tools offered by Google for education. They have following features:

- Are free, ad-free, reliable and secure.
- Not bound by Geography (access available all over the world)
- Are available on any device or platform with 24/7 access
- Use one login for EVERYTHING!
- Provides interactive sessions
- Easy documentation
- Allows more control over your schedule

FIG 1: Google tools

1. Google Classroom

The Google classroom is available as an effective tool for developing teaching and learning process all over the world. Google Classroom provides a useful, interactive, and learner-centered atmosphere and turns out to be an effective substitute for the conventional teacher-centered chalk and talk classrooms. It is fascinating in educating and learning process. It is also trustworthy and efficient in improving student access and attentiveness towards learning, activities conducted in Google classroom changes students from passive to active learners.

It helps a teacher to keep track of the continuing progress of students through assignments and questionnaires. Parents can check and monitor the performances and progress of their children easily and at their convenient time. The learners, on the other hand, find in Google Classroom an effective medium to profuse their creativity. Being paperless is a crucial factor in developing learning strategies. Thus, and need less stored students can keep their files more organized paperless in a single program.

This tool is user friendly and have features shown in the figure 2 for its easy access
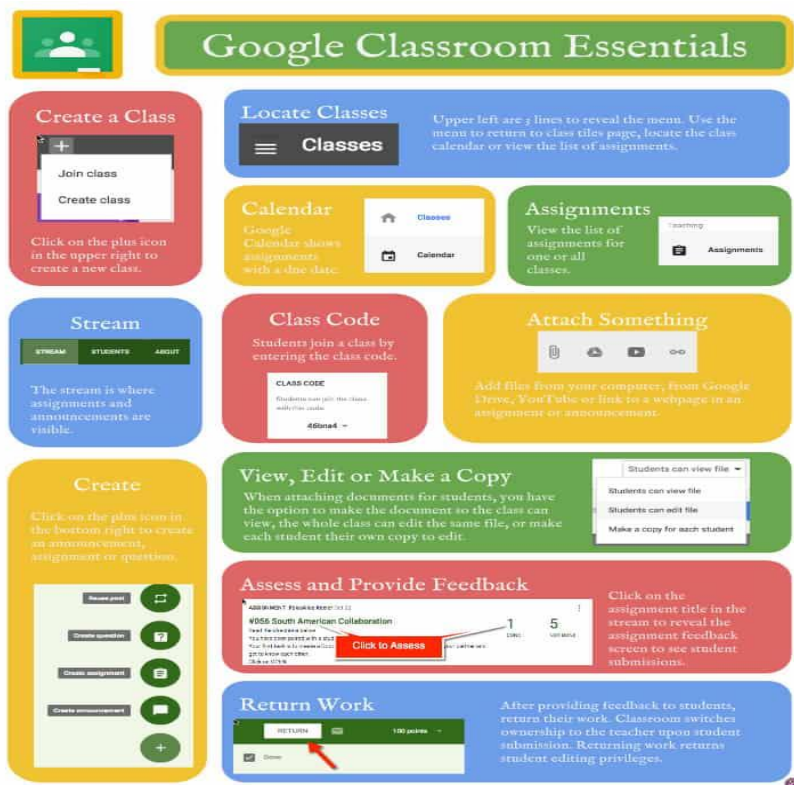
Fig 2:classroom essentials

It provides a stream line of communication and workflow for students. They can communicate through the tools described in table below.

9Table1:Google Communication Tools

Logo	Application	where	Description	uses
	Gmail	www.mail.google.com	email	Send and respond to email
	Google Contact	www.Contacts.google.com	Directory	Locate contact information
	Google Calendar	www.Calendar.google.com	Calendar	Schedule and respond to events with Teachers, Principal, students and experts.
	Google Classroom	www.Classroom.google.com	**Classroom**	**Assign class work digitally**
	Google Hangouts	www.Hangouts.google.com	**Text Chat**	online conversations in real-time
	Google Meet	www.Meet.google.com	**Video chat**	**Video chat with experts**

Google Classroom is a tool that connects Google Docs, Google Drive, and Gmail which allows creating and organizing assignments, assessing, commenting, and organizing effectively communication with students in real-time. The sharing of the information through these tools has strong, secure mechanism. It is having a wide range of other tools attached with it to make the education seemless with all possible creativities. Some of those are discussed below.

1. **JAMBOARD**

It is an online, digital and interactive whiteboard for synchronous or asynchronous remote teaching. It is a useful tool for promoting interactivity of classroom. It allows working as a team and staying organized. New features are constantly being added.

2. SLIDES

It is a Presentation tool having Multiple usages such as Access, create and edit with various types of templatesavailable.A wide variety of presentation themes, animations, embedded video are being used by number of teachers to make the education interactive.

3. SHEETS

It is a tool used to make Spreadsheets regarding budgets, schedules with Different templates allowing multiple usages like Access, create and edit for the purpose to surve.

4. FORMS

It is a great tool for making Survey,quizzes,contact forms ,collecting feedbacks and much more. It is when tied up with spreadsheet allows to track results and provides and stores records to make easy documentation.

5. Google Docs

It is Word processing tool.it again has Multiple usages for access, create and edit to a document.the better feature is that smart formatting ,editing and styling tools are available.

One can also add links, images in the document to give the life to it. Direct web Search from the docs is the most favorite and useful characteristic of docs. It is also a powerful collaborating tool. It offers a more productive alternative of collaborating through e-mail. Apart from collaborating in writing multi-authored paper, academicians can use Google Docs in monitoring student research paper. In online collaboration, there are many tools available, for example Google Docs, Zoho, Window Live and so on. Google Docs is a powerful collaborating tool. Traditionally, collaboration can be done by attaching documents to e-mail and sending them to collaborators. By using Google Docs, one needs to have only one copy of document which is kept in the web. To collaborate, one needs to create a Google document and invite others as collaborators. The document owner needs allocate so tasks to collaborators that each of the collaborators knows which part they are supposed to contribute.

6. Google Drive

This amazing Google tool provides unlimited cloud storage to Store any type of file. It has an element to create and Save file automatically. It is accessible from any device to Share files and set access levels to secure the documents. It again allows viewing activity on all files in Drive. We can Search and Sort files as per ones need.

Drive cloud storage allows students to find the information they need, work with documents together, and organize folders and files. Due to the Documents, Tables, and Presentations services, students can complete general group tasks. The service also allows students to add web applications, extensions, and themes to their own Google account (Ercan: 2010; Sultan: 2010).

7. Drawing

This service allows quickly building various charts and diagrams. **Mindomo** is a network-based service for creating and storing concept maps. **PowToon** service is an online application for creating animated video presentations, which provides several options for animating text on slides: writing text by hand, the sequential appearance of letters, as well as simple options for animating text.

The service provides an extensive library of animated images: models in vector graphics and many infographic elements. The service allows exporting the created multimedia presentation to YouTube (Gleaves et al.: 2007; Li et al.: 2013).

8. Google calendar

It allows creating different calendars for groups and sharing them with all users. A wide range of shared access management tools helps to ensure security and privacy. Google Calendar is integrated into Gmail and is compatible with other popular calendar apps. The app allows transferring a specific calendar or event to another person to manage. Students can use the mobile app or sync with the built-in calendar on mobile devices.

9. Google site

It is a web- page creation tool which **allows** students to create and edit web pages, even if they are not familiar with HTML and web design. One can build sites from scratch or using ready-made templates, upload content such as photos and videos, and provide flexible access control at the level of not only the site but also individual pages. It is also used for Collaborative Student Research Projects.

10. Hangouts

Hangouts communication service, students and teachers have the opportunity to conduct online conversations in real-time from a computer or mobile device. It can have different usage as to conduct online parents meet or to have a interactive session with teachers of different campus. Team members can show their screens, watch, and work on everything together. Google Hangouts allows streaming live on Google+, YouTube, and the site (Lindh et al.: 2016; González-Martínez et al.: 2015).

9.The task of group project work of students includes a lot of information; it is the **Keep** service that helps students save thoughts, plans, notes, and reminders. (Ozcelik, Acarturk: 2011).

11. Google+

Google+ is a social service that provides an opportunity to unite participants of the educational process in one social network for online communication. Students can share their experience and knowledge in Google+, post updates on topics that are interesting to the team, and broaden new ideas (Wang, Wu: 2011).

12. Google Groups

Google Groups is a communication tool There are four Group types for you to choose from:
1. Email list
2. Web forum
3. Question and Answer (Q&A) forum
4. Collaborative inbox

13. Google Maps/Earth

Google Maps/Earth is a tool used for Interactive maps and satellite imagery. It is a web-based 3-Dvirtual globe that presents the worlds geographic information ranging from natural sciensec to social science,history,art and engineering in a geospatial context.

II. CONCLUSION

This digitalization has transformative impact on the society Today, educational institutions recognize cloud computing as useful for simplifying the management and administration of the educational process. By using various cloud computing models or software services we can have following benefits

The main advantages of G Suit for Education are the openness of services and the ability to effectively use them in professional activities

- Educational institutions can reduce costs and improve the efficiency of the learning process, as well as store, process, and analyze data.
- This is beneficial for universities, since getting constant access to various collaboration environments and important applications require minimal investment in hardware and licensed cloud software.
- Cloud technologies, in particular G Suit for Education, have an impact on group forms of distance learning, as they assist collaboration and enlarge communication opportunities.
- The use of cloud technologies encourages innovative solutions in the teaching methodology, the use of the project method, coaching, technology of the inverted class, and mixed learning.
- Educationally oriented cloud resources and services allow activating knowledge, help to search for and design new ideas, stimulate creative thinking, and promote the development of independent decision-making skills.
- It was found that the academic success of students who used the online collaborative tools with synchronous techniques in is better than students who collaborated face-to-face in the control group in a traditional class.
- The functionality of the cloud environment, which includes services for planning activities, establishing communication and collaboration, resources for non-formal education, tools for assessment and reflection, affects the effectiveness of the educational process, the development of professional and personal skills.

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Recognition of Devanagari CAPTCHA Code Using Novel Feature Extraction Methods and PNN Classifier

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ABSTRACT

The CAPTCHA is a test deployed on most of the websites to safeguard its services from illegal users.. It stands for Completely Automated Public Turing Test to Tell Computers and Humans Apart. The CAPTCHA test is used to classify between authentic user and unauthentic user. The authentic user is always a human and unauthentic user is an automated program called bot. The CAPTCHA code should be such that it can be easily recognized by a human, but at the same it must be difficult for illegal bots. Thus the CAPTCHA is like a gatekeeper who checks the legacy of the user. Some of the Indian government/non-government websites have started publishing the information and offering various online services in regional languages. Most of the regional languages are derived from Devanagari. But, the CAPTCHA employed during log-in time, is still in English script, which reduces the accessibility of websites. The native users are always comfortable if the CAPTCHA test is offered in their native language. Therefore, in order to simplify the task, this paper emphasize on employing a Devanagari CAPTCHA in place of English CAPTCHA. The recognition of Devanagari CAPTCHA code is always a challenging task. The work in this paper, proposed a system that use some novel feature extraction methods like various shape descriptors and a statistical method called moment invariant. In order to recognize the characters in Devanagari CAPTCHA code, the extracted features are classified by using Probabilistic Neural Network (PNN) classifier. The achieved recognition accuracy of the Devanagari characters by using PNN is better as compared to other techniques.

Keywords: PNN, Shape Descriptors, Devanagari, script.

I. INTRODUCTION

All most every important website has incorporated a security test called CAPTCHA to authenticate its users. This test is used during login time. CAPTCHA is a challenge-response test to authenticate that the user is a human and it also ensures that the response is not generated by any automated computer bots [1]. CAPTCHAs are actually a type of Human Interaction Proofs (HIP) [1]. This process involves one computer asking a user to complete a test. The CAPTCHA test normally consist of alphabetic characters, numerals, images or audio that

any user entering a correct response is accepted as a human and the user failing to enter the correct response is determined as a robot. The permission to access the website is denied if a user fails to pass the test.

The purpose is to create a test that the human can pass it easily but not the computer bots [1]. This paper proposed the process of recognizing characters of Devanagari CAPCHA code. It is based on various feature extraction methods that includes various shape descriptors: Convex Area, Filled area, Euler Number, Eccentricity, EquivDiameter, Centroid, Bounding Box and invariant moments. In order to recognize the Devanagari CAPTCHA code characters, Probabilistic Neural Network (PNN) classifier is used to classify the extracted features. The proposed method has been implemented on Devanagari characters. These characters are used as an input by applying font effects such as Bold, Italic, rotated left and right with specified degrees, and adding background noise.

II. DEVANAGARI SCRIPT

The Devanagari script is one of the ancient and widely used scripts of India [2]. It is adopted by more than 120 Indo-Aryan languages which include Sanskrit, Hindi, Marathi, Pali, Awadhi, Konkani, Bodo, Bhojpuri, Newari, Maithili and Nepali languages [3]. Beside this, it also used as a supportive script for other Indian languages such as Punjabi, Sindhi and Kashmiri making it one of the commonly used and adopted writing systems in the world [3]. It is the fourth mostly adopted script in the world [4].

Devanagari script has 49 primary characters which includes 13 vowels, 36 consonants and 11 modifiers [5], as shown in following figure 1.

Vowels [स्वर]	अ	आ	इ	ई	उ	Modifiers	ाा	ि	ी	ु
	[1]	[2]	[3]	[4]	[5]		[1]	[2]	[3]	[4]
	ऊ	ए	ऐ	ओ	औ		ू	े	ै	ो
	[6]	[7]	[8]	[9]	[10]		[5]	[6]	[7]	[8]
	अं	अः	ऋ				ौ	ं	ृ	
	[11]	[12]	[13]				[9]	[10]	[11]	
Consonants [व्यंजन]	क	ख	ग	घ	ङ	च	छ	ज	झ	ञ
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	ट	ठ	ड	ढ	ण	त	थ	द	ध	न
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
	प	फ	ब	भ	म	य	र	ल	व	श
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
	ष	स	ह	ळ	क्ष	ज्ञ				
	[31]	[32]	[33]	[34]	[35]	[36]				

Fig.1: Devanagari character set

From the Sanskrit language, "Deva" means God and "Nagari" means city/lipi/script [2]. Therefore, Devanagari is a "Script of God" or "Language of God". Devanagari script is commonly used to write languages such as Sanskrit, Hindi, Marathi, Konkani, Maithili, Bhojpuri, Rajasthani, Haryanvi and Nepali.

There are officially 22 languages and 13 major scripts in India. Devanagari is one of the widely used scripts [3]. It is used to write Hindi, which is the third mostly spoken language in the world [2]. There are nine major Indian states whose official language is Hindi. These states are: Madhya Pradesh, Rajasthan, Himachal Pradesh, Madhya Pradesh, Haryana, Uttarakhand, Chhattisgarh, Zarkhand and Delhi [3].

III. IMPORTANCE OF DEVANAGARI CAPTCHA

Devanagari script-based CAPTCHA is used by a large number of Indian languages including Hindi, which is the third most spoken language in the world [6]. Many other official languages like Marathi, Gujrathi, Bhojpuri and Rajasthani are also used on large scale.

Most of the Indian Government websites provide its contents in Devanagari script based languages like Hindi, Marathi, Haryanvi, and Gujrati [7]. But to secured its contents from any misused by an unauthorized computer bots, the CAPTCHA test is generated in English language. Many regional users, who know only their native language, face difficulties in passing CAPTCHA test. Thus, to improve the accessibility of the websites, the CAPTCHA test needs to be constructed in their own languages, which are mostly originated from Devanagari script.

The proposed system offers the CAPTCHA test in Devanagari script. The aim is to increase the usability and security of the Indic websites by incorporating strong CAPTCHA test in the languages which are originated from Devanagari script [8].

IV. DATABASE DESIGN

In order to accomplish the task of Devanagari character recognition, the very first step is to prepare a database of its characters. At present, no such a dataset is available on Internet for Devanagari characters. Hence, the database is prepared using different Devanagari fonts, considering only commonly used basic consonants, limited vowels and numerals.

The specific dataset of limited characters is prepared in order to improve the usability and security of Devanagari CAPTCHA script. The purpose is to make the character recognition task easier for the user while going through CAPTCHA test and should be difficult for the computer bots.

There are 34 consonants and 13 vowels in Devanagari script. Devanagari consonants and vowels are categorized according their structural properties. Therefore, the CAPTCHA code containing Devanagari letters can be divided into three groups based on the presence and position of a vertical bar, namely:

1. End bar characters,
2. Middle bar characters and
3. No-bar Characters

Accordingly, the 23 Devanagari consonants and 1 vowel that terminates woth end-bar, the 9 Devanagari consonants with no-bar, 2 with middle-bar and 3 vowels with no-bar (Figure 3) along with 10 numeric characters, from 5 different fonts of Devanagari characters are considered to prepare a dataset. The database will consist of 48 Devanagari characters.

Fig.2: Devanagari characters with middle-bar and no-bar

Fig.3: Devanagari characterswith end-bar.

Fig.4: Devanagari numeric characters(digits).

The algorithm used for designing database is given below:

Algorithm: To Create Datasheet

Step1. The selected character is typed in MS-Word.

Step2: The character is stored in Excel sheet.

Step3: Preprocessed the character.

Step4: Resize the character.

Step5: The steps 1 to 4 are performed for 34 characters.

Algorithm 5.1: Generation of Datasheet.

As an example, a sample of datasheet created for Devanagari letter ' क ' is shown in figure 5.

Fig.5: Sample Data sheet of letter ' क '

The above algorithm will result in creation of 48 datasheets for 48 Devanagari characters. All the datasheets created are stored in one directory. Each sheet of characters is then segmented into separate characters with the help of following algorithm:

Algorithm: To convert datasheet into a database.

Step1: Read Datasheet file

Step2: Convert to gray

Step3: Convert gray to binary

Step4: Take compliment of this data file

Step5: Crop each character

Step6: Resize each character to 40 x 40 size

Step7: Store each character in same directory.

Algorithm 5.2: Conversion of Datasheet into a database.

The above algorithm results in creation of 250 images of each character which are then stored in a separate file. The database created, thus comprises of 12000 (48X250) images. In this way the individual character is available in the form of image in database. Some sample characters from the database are shown in figure 6.
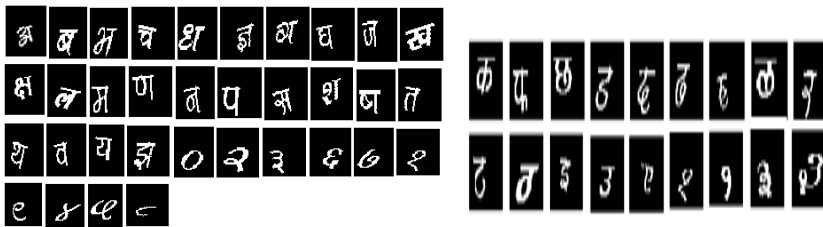
Fig. 6: Sample of character images taken from dataset.

V.   FEATURE EXTRACTION METHODS

Feature extraction is commonly used to obtain the characteristics and important features of the given character image. Feature extraction is one of the important stages in pattern recognition. If you used right feature extraction technique, then it leads to achieve higher character recognition rate. In order to extract features of characters, the regional descriptors like Area, Solidity, BoundingBox, Centroid, ConvexArea, Eccentricity, EquivDiameter, EulerNumber, Extent, FilledArea, MajorAxisLength, MinorAxisLength and statistical method like Moment Invariants are used. Seven moment invariants are evaluated for each character along with all these descriptors. The various shape descriptors and moment invariant methods used to extract features, are briefly described.

- **Area:** Area is given by the number of pixels of which the region consists. The real area of each pixel may be taken into consideration to get the real size of a region. If an image is represented as a rectangular raster, simple counting of region pixels will provide its area [9].
- **Bounding Box:** The bounding box or bounding rectangle of an object is a rectangle which circumscribes the object. The dimensions of the bounding box are those of the major and minor axes. The area of the bounding box is [9]:
- o Area of bounding box = (Major axis length x (Minor axis length)
- **Convex area:** The convex area of an object is the area of the convex hull that encloses the object [9].

- **Centroid:** It is the measured as a center of mass of the region. The first element of Centroid is the horizontal coordinates (or x-coordinate) of the center of mass, and the second element is the vertical coordinate (or y-coordinate).

- **EquivDiameter:** It is the diameter of a circle with the same area as the region and it is computed as sqrt (**4xArea/pi**) [9].

- **Extent:** It considers the proportion of pixels in the bounding box that are also in the region and Centroid is computed as Area divided by the area of the bounding box [9].

- **FilledArea:** FilleArea is the number of 'on' pixels in FilledImage. Filled image is the binary image of the same size as the bounding box of the region. The 'on' pixels are corresponding to the region with all holes filled [9].

- **Euler's number:** It describes a simple topologically invariant property of the object. S is the number of contiguous parts of an object and N is the number of holes in the object (an object can consist of more than one region) [9]. $\vartheta = S - N$

- **Eccentricity:** The eccentricity is the ratio of the distance between the foci of the ellipse and its major axis length. The value is between 0 and 1 being degenerate cases (an ellipse whose eccentricity is 1 is a line segment, while an ellipse with an eccentricity of 1 is a circle [9].

- **Perimeter:** Perimeter is number of pixels in the boundary of the shape. How closely-packed the shape is: perimeter^2/area. The most compact shape is a circle (4π). All other shapes have compactness larger than 4π. If $x_1,\ldots, x_N$ is a boundary list, the perimeter is given by: –
  Perimeter $= \sum_{j=1}^{N-1} di = \sum_{j=1}^{N-1} | Xi - Xi + 1 |$
  The distances di are equal to 1 for 4-connected boundaries and 1 or for 8-connected boundaries [9].

- **Major Axis Length:** The major axis endpoints (x1, y1) and (x2, y2) are found by computing the pixel distance between every combination of border pixels in the object boundary and finding the pair with the maximum length. The major-axis length of an object is the pixel distance between the major-axis endpoints and is given by the relation [9]:

$$\text{Major-axis length} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- **Minor Axis Length:** The minor axis endpoints (x1, y1) and (x2, y2) are found by computing the pixel distance between the two border pixel endpoints. The minor-axis length of an object is the pixel distance between the minor-axis endpoints and is given by the relation [9]:

$$\text{Minor-axis length} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- **Solidity:** Solidity measures the density of an object. · A measure of solidity can be obtained as the ratio of the area of an object to the area of a convex hull of the object: **Solidity = Area / Convex Area** [9].

- **Moment Invariants:** The way to describe the shape that uses statistical properties is called moments. Region moment representations interpret a normalized gray level image function as a probability density of a 2D random variable. Properties of this random variable can be described using statistical characteristics - moments. Assuming that non-zero pixel values represent regions, moments can be used for binary or gray level region description. A 2-D moment of order (s + t) of a digital image f(x, y) of size m x n is dependent on scaling, translation, rotation, and is given by [9]:

$$m_s = \sum_{x=0}^{m-1} \sum_{y=0}^{n-1} x^s\, y^t\, f(x, y),$$

Where s = 0, 1, 2…and t=0, 1, 2…are integers, x, y are the region point co-ordinates (pixel co-ordinates in digitized images).

The corresponding central moment of order (s + t) is define as follows:

$$H_{st} = \sum_{x=0}^{m-1} \sum_{y=0}^{n-1} (x - x?)^s\, (y - y?)^t\, f(x,y)$$

Where s =0, 1, 2… and t=0, 1, 2, …., $\bar{x} = m_{10}/m_{00}$, $\bar{y} = m_{01}/m_{00}$

The moments that are computed with their centroid being about the origin are called central moments, denoted by μ_{st}. The normalized central moment of order (s + t) is define as follow.

$\eta_{st} = \mu^\gamma$, where $\gamma = (s + t)/2 + 1$

The set of seven moment invariants are derived from these equations, as follows: The invariant moment has 7 moments (ϕ) and they are defined using the normalized central moment, such as:

$\Phi 1 = \eta_{20} + \eta_{02}$

$\Phi 2 = (\eta_{20} - \eta_{02})^2 + 4\,\eta^2{}_{11}$

$\Phi 3 = (\eta_{30} - 3\eta_{12})^2 + (3\eta_{21} - \eta_{03})^2$

$\Phi 4 = (\eta_{30} + \eta_{12})^2 + (\eta_{21} + \eta_{03})^2$

$\Phi 5 = (\eta_{30} - 3\eta_{12})\,(\eta_{30} + \eta_{12})\,[\,(\eta_{30} + \eta_{12})^2 - 3\,(\eta_{21} + \eta_{03})^2] + (3\eta_{21} - \eta_{03})\,(\eta_{21} + \eta_{03})\,3\,(\eta_{30} + \eta_{12})^2 - (\eta_{21} + \eta_{03})^2]$

$\Phi 6 = (\eta_{20} - \eta_{02})\,[(\eta_{30} + \eta_{12})^2 - (\eta_{21} + \eta_{03})^2] + 4\eta_{11}\,(\eta_{30} + \eta_{12})\,(\eta_{21} + \eta_{03})$

$\Phi 7 = (3\eta_{21} - \eta_{03})\,(\eta_{30} + \eta_{12})\,[(\eta_{30} + \eta_{12})^2 - 3(\eta_{21} + \eta_{03})^2] + (3\eta_{21} - \eta_{03})\,(\eta_{21} + \eta_{03})]\,(\eta_{30} + \eta_{12})^2 - (\eta_{21} + \eta_{03})^2]$

The above 7 moments are treated as 7 features of the invariant moment.

These feature extraction methods used to extract the characteristics of each character from the 250 character images and with the help of feature selection algorithm, it generates the feature vector containing 14 features for each character image from dataset of 12000 images.

From the database, 250 samples of each character are used for feature extraction. In this way, the feature is a matrix of 250 x 14 features for each character. To improve the accuracy of extracted features, the value with 4 digits precision is used. As an example, the sample of '14' extracted features of Devanagari character ' क 'are given in table 1. The algorithm 5.3 is used for feature extraction of these features.

> **Algorithm:** Feature Extraction & Selection
> Step1: Read the data image from database
> Step2: Extract feature of image
> Step3: Store these features
> Step4: Use feature selection to form features vector
> Step5: Repeat the procedure for each character in database
> **Algorithm 5.3**: Feature Extraction & Selection

Table 1: The first 50 sample Features (out of 250) of character ' क '

Features --->

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
क	1.1225	5.2261	9.5989	9.0427	19.0168	12.1569	18.6685	1.5159	12.6905	16.1178	9.8956	23.2391	16.5993	23.66211
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क	0.6543	7.9349	3.3100	3.7538	7.9508	10.1889	8.9560	1.4621	9.0429	13.2059	8.9387	20.2562	13.8263	25.16055
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क्क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222
क	0.6633	7.9860	3.3370	3.7714	7.9833	10.0082	9.1398	1.4606	9.0350	13.1955	8.9226	20.2271	13.8064	25.01222

VI. CLASSIFICATION

The classifiers are used to classify the features extracted. Each classifier will have its advantages and disadvantages depending on your particular application. This paper has chosen Probabilistic Neural Network (PNN) classifier to classify the features extracted and further to recognize the characters.

1. PNN CLASSIFIER

Probabilistic Neural Network (PNN) is often used in classification problems. It is a feed- forward neural network and is widely used in pattern recognition problems. Using PNN, the operations are arranged systematically into a multilayered feed-forward network with four layers [10]. In the presence of input, the 1st layer gives the distance from the input vector to the training input vectors. This result into a vector where its elements shows how close the input is to the training input. The 2nd layer gives the contribution for each class of inputs and result into the net output as a vector of probabilities. At last, using transfer function on the output of the 2nd layer, which is then, picks the maximum of these probabilities. The complete PNN is illustrated in figure 7. Thus, it produces a positive identification (1) and negative identification (0) for non targeted classes. The major advantage of using PNN over other classifiers like MLP (Multilayer Perceptron) is that PNN networks produces accurate predicted target probability scores [11].

If a Probabilistic Neural Network (PNN) is chosen, all the weights of the network can be calculated analytically. In this case, the number of cluster centers is by definition equal to the number of exemplars, and they all are set to the same variance (which may be optimized if a cross validation set is specified) [12].
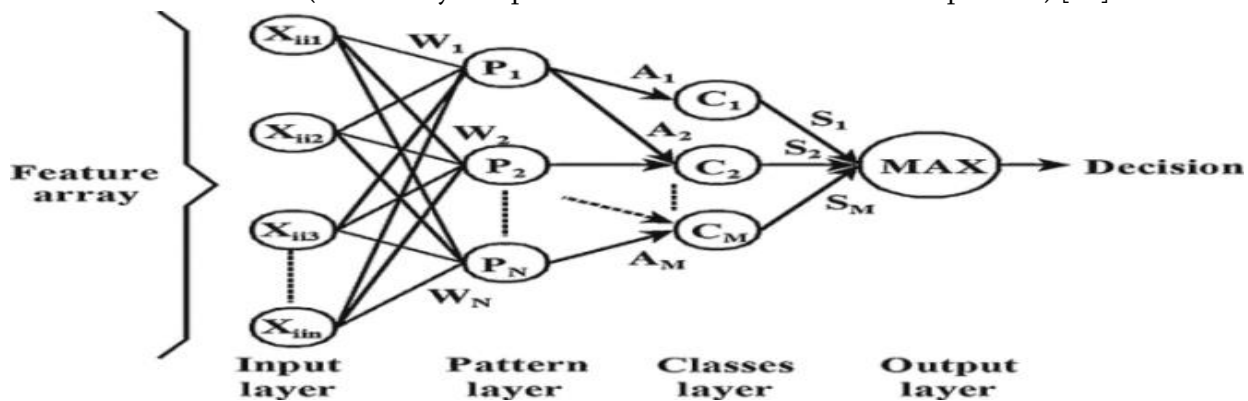
Fig.7: Probabilistic Neural Network (PNN).

VII. RESULT AND ANALYSIS

Character recognition is always a challenging and difficult task, because of variety in font size, font faces, distortions and noises applied to CAPTCHA code. So, the attempt was to achieve higher accuracy in character recognition. The result of classification using PNN is given in performance metrics 1 & 2:

Performance Metrics 1: Result of end-bar characters and digits using PNN classifier

Model Name: **Probabilistic Neural Network**

Training		
MSE	r	Correct
0.000944	0.986532	99.29%
Cross Validation		
MSE	r	Correct
0.003405	0.935513	96.86%
Testing		
MSE	r	Correct
0.001401	0.971967	96.28%
Training	Cross Val.	Testing

# of Rows	5100	1275	2125
MSE	0.000944	0.003405	0.001401
Correlation(r)	0.986532	0.935513	0.971967
# Correct	5064	1235	2046
# Incorrect	36	40	79
% Correct	99.29%	96.86%	96.28%

From the performance metrics 1, for the Devanagari characters with end-bar, the average accuracy of all, Training, Cross Validation and Testing is **97.48%.**

Performance Metrics2: Result of middle-bar, no-bar characters and digits using PNN classifier

Model Name: Probabilistic Neural Network	Training		
	MSE	r	Correct
	0.000144	0.998219	99.78%
	Cross Validation		
	MSE	r	Correct
	0.001069	0.990502	96.78%
	Testing		
	MSE	r	Correct
	0.001761	0.975215	96.07%
	Training	Cross Val.	Testing
# of Rows	3600	900	1500
MSE	0.000144	0.001069	0.001761
Correlation (r)	0.998219	0.990502	0.975215
# Correct	3592	871	1441
# Incorrect	8	29	59
% Correct	99.78%	96.78%	96.07%

From the performance metrics 2, for the Devanagari characters with middle-bar, no-bar and digits, the Average accuracy of all, Training, Cross Validation and Testing is **97.54%.**

Thus, using PNN classifier, for all 48 Devanagari characters the Average accuracy achieved is 97.51%. Ramteke and et al. [13] used ANN classifier and recorded an average recognition rate of 87.88% for Devanagari characters. Prof. Sheetal A. Nirve & Dr. G. S. Sable in their work [14], obtained recognition rate of all Devanagari characters is nearly up to 95% using ANFIS. It is observed from our experimental results that the proposed scheme, as compare to other techniques, has given the better average recognition rates for Devanagari characters.

VIII.   FUTURE SCOPE

The proposed system used only limited Devanagari characters with middle-bar, no-bar and 10 numerals. This system can be extended to all Devanagari consonants and vowels along with modifiers. The proposed scheme hopefully can inspire a new thinking and innovative way to tackle the character recognition problem.

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Efficacy of Different Grain Protectants on the Mortality of Adults, Emergence of F1 adults, Weight loss in Rice Grain and Infestation in Rice Grains of Rhizoperthadominica (Fabricius)

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ABSTRACT

To find out of some non-toxic material for the protection of stored rice against R. dominica, efficacy ofvarious grain protecants were evaluated.The rice grains treated with deltamethrin was found significantly superior (49.39 per cent) in comparison to all other protectants and untreated check. The response of protectants viz DDVP, neem oil, camphor and menta oil viz. 42.04, 35.33, 26.91 and 20.29 per cent, mortality, respectively, were also found significantly superior than diflubenzuron (13.53 per cent) and Tulsi oil (10.23 per cent).The protectants deltamethrin, DDVP, camphor, mentha oil neem oil after two month of application showed significant reduction in F1 adult emergence being 4.57, 6.33, 12.00, 12.33 and 13.33 adults in comparison to untreated check 114.67 adults. The grain protectants Tulsi oil, diflubenzuron and mercury tablets were proved to be at par regarding adult emergence of R. dominica giving 24.33, 36.67 and 44.33 adults, respectively.The loss in weight of rice grains in various protectants after 60 days of treatment due to attack of lesser grain borer are ranged from0.20 to 5.67 per cent. The minimum loss 0.20 per cent was observed in deltamethrin and it was significantly superior to DDVP, Tulsi oil, neem oil, camphor, mentha oil, diflubenzuron, mercury tablets and turmeric powder providing 1.81, 2.74, 3.24, 3.47, 4.04, 4.53, 5.54and 5.67 per cent, respectively. The protectants tulsi oil, neem oil and camphor were superior to mentha oil, diflubenzuron and mercury tablet which provide 2.74, 3.24 and 3.47 per cent weight loss.

Keywords: Grain Protectants,Diflubenzuron,Deltamethrin, Murcury tablet, DDVP, Camphor, Turmeric, Neem oil, Tulsi oil, Mentha oil.Rhizoperthadominica.

I. INTRODUCTION

India is the main rice growing country covering about 45 million hectares of land with about produce of 65 million tons of rice. Girish et al. (1990) declared that about 70 to 80 million tons of rice grains are utilized in the country. Thus, we may conclude that rice has an important place in Agricultural industry and national economy. In India An average of 13.98 million tons of food grains worth of Rs. 6845 crores lost every year(Mohan and Kavitharaghavan, 2008). The storage losses are measured around 10 per cent (Narang, 2002), which were directly correlated with insect population.Insects are not present in the grains, but are infested through old gunny bags, cracks in the floor and walls etc., were inoculum is already present. Once the inoculums is spread in the grains it becomes absolutely difficult to control on account of higher multiplication rate and shorter life span of the insects. Insects feed on grain, bore the Kernel, destroy the germ portion lowering the value of entire lot.

Rice is damaged by a number of stored grain pests, in which the chief pest in store is *Rhizoperthadominica* (Fabricius) (Coleoptera, bostrichidae) which commonly known as lesser grain borer has an important position among the stored grain pest, which is observed causing considerable damage to rice in storage (Kennard 1965). It is largely responsible for damage and frequently found in the stores, mills and warehouses according to Takahasi (1931), Douglas (1942), Adams 1995).Brease (1964), Cogburn (1974, Prakash et al. (1980), Prakash et al. (1981) and Damardauti and Barette (1986). According to Potter (1935), this insect having various choice of food and distribution, produces serious devastation in various stored products including wood also.

Plant product as grain protectants are one of the eco-friendly and economic approaches to keep the stored food grains free from insect attack. Use of botanicals with stored products has been in practice since ages which are known to repel insects or deter them from feeding (Yahaya *et al.,* 2013).

Stored products can be protected from insect pest by the using insecticides as grain protectants and for seed treatment (Athanassiou*et al.* 2005; Kavallieratos *et al.* 2011; Derbalah*et al.* 2012). Judicious use of insecticides is not safe for environmental issues as well as for human health, and insect developing resistance against these insecticides, due to these issues researchers trying to find some safe and economical solutions likeusing insecticides of natural origin that are eco-friendly and safer than traditional ones such as natural oils (Ileke*etal.* 2014).

Therefore, this study attempted to evaluate the efficacy of some insecticides (Diflubenzuron, Delta methrin, Mercury tablet and DDVP,) that are relatively safe compared to other chemical insecticides against *R. dominica*in rice grain with respect to mortality of adults, progeny and weight loss of treated wheat grain.

We also evaluated the efficacy of Camphor, Turmeric powder, Neem oil, Tulsi oil and Mentha oil a safe alternative to chemical insecticides against *R. dominica.* Our final aim was to evaluate the combined effect of examined chemical insecticides and some plant products against *R. dominica*in rice grain as a way to reduce the side effects of chemical insecticides on human health and to overcome insect resistance towards these insecticides.

II. MATERIAL AND METHODS

Rearing of the test insect:

This study was conducted at Narain college Shikohabad, Firozabad, India.*Rhizoperthadominica*(Fabricius) Bostrichidae- Coleoptera, which is commonly known as lesser grain borer was selected as test insect for the

present studies.For mass rearing the adults were collected from the local granaries and kept for egg laying in jars. The top of which covered with black paper. Large number of eggs laid on the grains were isolated carefully with camel hair brush and transferred into beljars (18 cm. diameter) containing rice grains to obtain the enough number of adults. The newly emerged adults were taken as parental population for the study. The newly emerged adults were separated for sexing. The males are small, cylindrical and dark brown in colour having shallow groove on the fifth abdominal sternum, while females are less dark brown and without shallow groove. The pest population was maintained at an optimum temperature of 32 +1º C and 75 per cent relative humidity throughout the period of investigation (Andrewartha, 1961). For this study Sona variety of rice was used.

Test insecticides:

To find out of some non-toxic material for the protection of stored rice against *R. dominica,* the following grain protectants were evaluated Diflubenzuron10 wp, Deltamethrin2.5wp, Murcury tablet, DDVP76%, Camphor, Turmeric, Neem oil, Tulsi oil, Mentha oil.

Selected grain protectants were measured with the help of micropipette and by weighing with electronic balance in every vial containing 100 gram of rice grain and 10 pairs (1:1 Sex ratio) of newly emerged adults were released in each vial. The mouth of every vial was closed with a plastic lid having small holes and kept in laboratory.

To assess the toxic effect of selected protectants, mortality count 1,3 and 7 days after release of adults, was recorded. The dead ones could be easily distinguish from the living ones after examination with naked eyes and with the help of hand lens and provoking them with the fine needle and camel hair brush.The rice of each vial was spread over a white paper daily from 20th days after release till the end of experiment and number of adults emerged in each treatment was recorded in each replication. Loss in weight was recorded after 45 days at end of the experiment. The loss in weight of seed was obtained after removing all the dead/alive insects. The loss in weight of seed was worked out by subtracting the final weight from the initial weight. The percentage in loss was calculated recorded. At the end of experiment per cent of seed damage was also recorded in each case.

Statistical analysis:

The data of each character (adult mortality, emergence of F1 adult, grain weight loss , and per cent germination) were subject to analysis of standard statistical method suggested by Chandel (1975). The calculation was performed in Completely Randomized Design. The differences between protectants were compared with C.D. values for their significance.

III. RESULTS

Efficacy of grain protectants on the mortality of adults of *R. dominica* :

To assess the effect of grain protectants, the mortality count was made after 1,3- and 7-days release of the adults. After one day of release, the data portrayed in Table 1 and Fig.1 indicated that various protectants were significantly superior regarding the mortality of adults of *R.dominica* in comparison to untreated check. The protectants deltamethrin, DDVP, neem oil, camphor and mentha oil were significantly superior to rest of protectants providing 9.12, 8.28, 8.17, 7.47 and 5.77 per cent mortality of the pest, respectively, but they did not differ to each other. The effectiveness of Tulsi oil, mercury tablets and turmeric powder, was at par to each other in reducing population of *R.dominica*viz 0.35, 1.18 and 1.19 per cent, respectively. The diflubenzuron was also found significantly effective in comparison of untreated check giving 3.24 per cent mortality.

The data presented in Table1 and Fig.1 after 3 days of release, depicted that all the treatments showed significant mortality over untreated check. The rice grains treated with deltamethrin was found significantly superior by giving highest mortality 49.39 per cent in comparison to all other protectants and untreated check. The response of protectants viz DDVP, neem oil, camphor and menta oil viz. 42.04, 35.33, 26.91 and 20.29 per cent, mortality, respectively, were also found significantly superior than the diflubenzuron (13.53 per cent) and Tulsi oil (10.23 per cent).

The protectants turmeric and mercury tablets providing 6.59 and 6.49 per cent mortality were at par but there were superior to untreated check.

The observations recorded on adult mortality after 7 days of release of insect are given in Table1 and Fig.1. The data indicated that the effect of various treatments significantly increase the adults mortality of lesser grain borer in comparison to untreated check. The seed treated   with deltamethrin was found to be significantly superior in causing the adult mortality 92.57 per cent in comparison to DDVP, camphor, neem oil, mentha oil, diflubenzuron Tulsi oil, mercury tablets and turmeric powder giving 86.78, 61.17, 48.81, 42.13, 33.34, 28.27, 26.49, and 21.23 per cent mortality, respectively.

The efficacy of neem oil, camphor and DDVP providing 48.81, 61.17 and 86.78 per cent mortality, respectively, were found significantly superior to turmeric powder, mercury tablets, Tulsi oil, diflubenzuron, mentha oil and deltamethrin. The treatment mentha oil and diflubenzuron were found significantly better over Tulsi oil and mercury tablets giving 28.28 and 26.49 per cent mortality, respectively. The seed of rice treated with Tulsi oil and mercury tablets were at par in the mortality of lesser grain borer provided 28.27 and 26.49 per cent, respectively.

Efficacy of grain protectants on the emergence of F1 adults of *Rhizoperthadominica*(Fabricius)

The data on the effect of grain protectants on the adult emergence of *R. dominica* after one month of treatment are given in Table 2 and Fig.2 It is evident from the data that treatments deltamethrin, DDVP, camphor, neem oil and mentha oil, were at par in F1 adults emergence giving 2.33, 3.33, 5.67, 7.00 and 10.33 adults, respectively. These treatments were significantly better to diflubenzuron, mercury tablets, Tulsi oil, and turmeric powder giving 17.33, 20.33, 22.33 and 24.67 adults, respectively, but did not differ to each other. In untreated check 114.67 adults, were emerged after one month of treatment.

The protectants deltamethrin, DDVP, camphor, mentha oil neem oil after two month of application (Table 2 and Fig.2) showed significant reduction in F_1 adult emergence being 4.57, 6.33, 12.00, 12.33 and 13.33 adults. The grain protectants Tulsi oil, diflubenzuron and mercury tablets were proved to be at par regarding adult emergence of *R. dominica* giving 24.33, 36.67 and 44.33 adults, respectively. All the grain protectants were found effective in reducing the pest population in comparison to untreated check in which the adult population was 234.33.

Efficacy of grain protectants on damage by   *R. dominica :*
Loss in grain weight :

It is clear from the data presented in Table 3 and Fig3 that the loss in weight in rice grains in different treatments after 30 days due to attack of *R.dominica* ranged from 0.11 to 2.78 per cent, while it was 8.0 per cent in untreated check. The minimum loss 0.11 was observed in deltamethrin and it was followed by DDVP. The treatment deltamethrin and DDVP were found to be significantly superior from neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron, mercury tablets, turmeric powder and untreated check having 1.49, 1.76, 1.7, 1.98, 2.20, 2.74, 2.78 and 8.00 per cent weight loss respectively. The response of neem oil, camphor, Tulsi oil and

mentha oil on the weight loss in rice grain was found statistically at par having 1.49, 1.76, 1.77 and 1.98 per cent, respectively.

The maximum loss in weight was recorded in turmeric treatment (2.78 per cent) which was significantly higher than deltamethrin DDVP. All the treatments were found statistically superior over untreated check, for decreasing loss in weight after one month of storage period.

The loss in weight of rice grains in various protectants after 60 days of treatment due to attack of lesser grain borer are given in Table 3 and Fig.3. Which ranged from0.20 to 5.67 per cent. The minimum loss 0.20 per cent was observed in deltamethrin and it was significantly superior to DDVP, Tulsi oil, neem oil, camphor, mentha oil, diflubenzuron, mercury tablets and turmeric powder providing 1.81, 2.74, 3.24, 3.47, 4.04, 4.53, 5.54and 5.67 per cent, respectively. The protectants tulsi oil, neem oil and camphor were superior to mentha oil, diflubenzuron and mercury tablet which provide 2.74, 3.24 and 3.47 per cent weight loss. Treatments mentha oil, diflubenzuron and mercury tablets did not differ significantly with each other. All the treatment were found to be significantly superior to untreated check in which it was 16.17 per cent, loss in weight was recorded.

Grains damage:

It is clear from the data presented in Table 4 and Fig.4 that the rice grain damage by the pest in different treatment after 30 days of treatment ranged from 1.75 to 13.05 per cent, being minimum in deltamethrin and maximum in turmeric powder, while it was 48.06 per cent in untreated check. The higher seed damage 13.05 per cent was recorded in turmeric powder, which was significantly higher than deltamethrin, DDVP, neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron and mercury tablets providing 1.75, 3.89, 6.00, 6.97, 8.51, 9.60, 10.65 and 11.02 per cent damage, respectively.The minimum damage (1.75 per cent) was observed in deltamethrin, which was at par with DDVP (3.89 per cent), these treatments were significantly superior to neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron , mercury tablets and turmeric power providing 6.0, 6.97, 8.51, 9.60, 10.65, 11.02 and 13.05 per cent, respectively. The neem oil and camphor were found to be superior to Tulsi and mentha oil.

Tulsiand mentha   oil were observed to be significantly different from diflubenzuron, mercury tablets and turmeric powder. The treatmentmentha oil, diflubenzuron and mercury tablet were at par in which grain damage was viz. 9.60, 10.65 and 11.02 per cent, respectively. All the treatments were found statistically superior over untreated check for decreasing seed damage after one month of storage period.

The seed damage in different treatments in rice after 60 days of treatment due to attack *R. dominica*are given in Table-4 and Fig.4 Significantly higher seed damage was found in turmeric as compared to mercury tablets, diflubenzuron, mentha oil, Tulsi oil, camphor, neem oil, DDVP and deltamethrin providing 25.02, 23.50, 21.21, 18.24, 16.12, 13.14, 10.95, 6.04 and 5.94 per cent, respectively. The minimum 5.94 per cent seed damage was observed in deltamethrin and it was at par with DDVP treatment (6.04 per cent). They were significantly superior to neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron, mercury tablets and turmeric powder providing 10.95, 13.14, 16.12, 18.24, 21.21, 23.50 and 25.02 per cent seed damage, respectively. The neem oil (10.95) and camphor (13.14) were found at par and they were superior to others. The protectants Tulsi oil and mentha oil were found more effective than diflubenzuron, mercury tablets and turmeric powder in reducing the seed damage. All the treatment, which have 0.20 to 5.67 per cent grain damage were found statistically superior over untreated check (16.17 per cent).

IV. DISCUSSION

Efficacy of grain protectants on the mortality of adults of *R.dominica*:

To know the effect of grain protectants on the mortality of *R.dominica*. The   mortality count was made after 1, 3 and 7 days release of the adults. After one day of release, the various protectants were significantly superior untreated check regarding the mortality of the pest. The protectants deltamethrin, DDVP, neem oil, camphor and mentha oil were significantly superior to rest of protectants and untreated check, providing 9.12, 8.28, 8.17, 7.47 and 5.77 per cent mortality of the pest, respectively, but they did not differ to each other. The effectiveness of other protectants viz. Tulsi oil, mercury tables and turmeric powder, was at par to each other in reducing population of *R.dominica* viz 0.35, 1.18 and 1.19 per cent, respectively. The diflubenzuron was also found significantly effective in comparison of untreated check giving 3.24 per cent mortality.

The after 3 days of release of adults all the treatments showed significant mortality over untreated check. The rice treated with deltamethrin was found significantly superior by giving highest mortality 49.39 per cent in comparison to all other protectants and untreated check. The protectants DDVP, neem oil, camphor and mentha oil gave 42.04, 35.33, 26.91 and 20.29 per cent mortality, respectively, which were also found significantly superior than diflubenzuron (13.53 per cent) and Tulsi oil (10.23 per cent) and they were also significantly superior than turmeric and mercury tablets in mortality of adults of *R.dominica*. The protectants turmeric and mercury tablets providing 6.59 and 6.49 per cent mortality were at par but there were superior to untreated check.

The observations recorded on adult mortality after 7 days of release of insect the effect of various treatments significantly increased the adult mortality of lesser grain borer in comparison to untreated check. The rice seed treated with deltamethrin was found to be significantly superior in causing the adult mortality 92.57 per cent in comparison to DDVP, camphor, neem oil, mentha oil, diflubenzuron, Tulsi oil, mercury tablets and turmeric powder giving 86.78, 61.17, 48.81, 42.13, 33.34, 28.27, 26.49 and 21.23 per cent mortality, respectively. The neem oil, camphor and DDVP providing 48.81, 61.17 and 86.78 per cent mortality, respectively, were found significantly superior to turmeric powder, mercury tablets, Tulsi oil, diflubenzuron mentha oil and deltamethrin. The treatment mentha oil (42.13) and diflubenzuro (33.24) were found significantly better over tulsi oil and mercury tablets giving 28.28 and 26.49 per cent mortality, respectively. The seed of rice treated with Tulsi oil and mercury tablets were at par in the mortality of lesser grain borer provided 28.27 and 26.49 per cent mortality, respectively.

Our finding are supported by the results of Verma *et al.* (1983) they tested toxicities of neem oil, castor and mustard against storage pests and found that the deltamethrin was the most toxic to *R. dominica.* Saxena and Singh (1994) found that the grain protectants, where found to be best to affect the fecundity, incubation, hatching percentage, larval, pupal period and longevity of the *R. dominica* over untreated check. Neem cake was found to be most effective in reducing the number of eggs laid by beetle while dharek was least effective. Oforoi and Reichmuth (1999) found that the filter papers impregnated with the camphor @ 100 mg / filter paper caused 93 to 100 per cent mortality of *S. oryzae.* Kumar (2002) found that highest mortality of the pest was in seed treated with deltamethrin, which was followed by neem oil, camphor and mentha oil. Kathirvelu (2003) found that mixing of neem oil @ 30 ml/kg of grains was effective against the pest, recording 57.95 per cent mortality of the borer, followed by neem leaf dust at 30 per cent (50.90 per cent borer mortality) and pongamia oil at 30 ml/kg of grains (46.74 per cent mortality).

Efficacy of grain protectants on the emergence of F₁ adults of *R. dominica*.(Fabricius) :

The effect of grains protectants on the adult emergence of *R. dominica* after one month of treatment, showed that deltamethrin, DDVP, camphor, neem oil and mentha oil, were at par in F1 adults emergence giving 2.33, 3.33, 5.67, 7.00 and 10.33 adults, respectively but these were significantly better to diflubenzuron, mercury tablets, Tulsi oil and turmeric powder giving 17.33, 20.33, 22.33 and 24.67 adults, respectively. The treatment diflubenzuron, mercury tablets, tulsi oil and turmeric powder did not differ significantly among themselves.

The grain protectants viz deltamethrin, DDVP, camphor, mentha oil and neem oil after two month of application, significantly reduced F_1 adult emergence being 4.57, 6.33, 12.00, 12.33 and 13.33 in respective treatments than the Tulsi oil, diflubenzuron, mercury tablets and turmeric powder giving 24.33, 36.67, 44.33 and 54.33 adults, respectively. The grain protectant Tulsi oil, diflubenzuron and mercury tablets were proved to be at par regarding adult emergence of *R. dominica* giving 24.33, 36.67, and 44.33 adults, respectively. All the grain protectants were found effective in reducing the pest population in comparison to untreated check in which the adult population was 234.33. Similar results were also obtained by Majumdar (1977) he found DDVP very effective for controlling *S.oryzae.* Ranpal *et al.* (1985) reported that the vegetable oils of mustard and soyabeen used @ 1ml and 3 ml/kg seed reduced the emergence of adults, when reared on the seeds treated with them. Chander *et al.* (1992) evaluated the effectiveness of turmeric powder and mustard oil in different combination as protectants for milled rice against infestation by *T. castaneum.* turmeric powder and mustard oil alone did not cause significant adult mortality. Singh *et al.* (1996) tested coconut, groundnut and mustard oil, as protectants for gram seed against *C. chinensis,* at 5ml and 7.5 ml/kg of seed, provide to be highly effective in protecting the seeds even up to 8 months storage in terms of seed damage and weight loss. Rahman *et al.* (1997) found 10 ml/kg of neem oil as effective treatment for stored rice against the infestation by *S.cerealella, S.oryzae* and *T. castaneum.* Huang *et al.* (2000) found that cardamom oil did not have any growth inhibitory or feeding deterrence effect on either adults or larvae of *T.castaneum.*

Efficacy of grain protectants on damage by *R. dominica*

Loss in grain weight :

The loss in weight in rice grains in different treatments after 30 days due to attack of *R. dominica* ranged from 0.11 to 2.78 per cent , while it was 8.0 per cent in untreated check. The minimum loss 0.11 per cent was observed in deltamethrin and it was followed by DDVP. The treatment deltamethrin and DDVP were found to be significantly superior form neem oil, camphor ,Tulsi oil, mentha oil, diflubenzuron, mercury tablets, turmeric powder and untreated check having 1.49, 1.76, 1.77, 1.98, 2.20, 2.74, 2.78 and 8.00 per cent, respectively the response of neem oil camphor, Tulsi oil and mentha oil on the weight loss in rice grain was found statistically at par having 1.49, 1.76, 1.77 and 1.98 per cent, respectively. The maximum loss in weight was recorded in turmeric treatment (2.78 per cent), which was significantly higher than the rest of the treatment. All the treatments were found statistically superior over untreated check, for decreasing loss in weight after one month of storage period.

The loss in weight of rice grains in various protectants after 60 days of treatment due to attack of lesser grain borer ranged form 0.20 to 5.67 per cent. The minimum loss 0.20 per cent was observed in deltamethrin and it was significantly superior to Tulsi oil, neem oil, camphor, mentha oil, diflubenzuron, mercury tablet and turmeric powder providing 2.74, 3.24, 3.47, 4.04, 4.53, 5.54 and 5.67 per cent respectively. The protectants Tulsi oil, neem oil and camphor were superior to mentha oil, diflubuzuron and mercury tablets which provide 2.74, 3.24 and 3.47 per cent weight loss. Treatment mentha oil, diflubenzuron and mercury tablets did not deffer significantly with each other. All the treatment were found to be significantly superior to untreated check in which the loss in weight was 16.17 per cent. In present findings deltamethrin and DDVP proved to

be superior to all treatments as protectant of rice seed against *R.dominica*.Similar results were obtained by Majumdar (1977) in case of DDVP for controlling storage pests. Our findings revealed that the neem oil was also effective protecting the seed. These findings are in conformity with the findings of Verma *et al.* (1983), and Bowry*etal.*(1984) who have reported that oil of mustard and Neem reduced the population of *S.oryzae.* Pranta (1986), who has reported that turmeric powder was more toxic to *R.dominica* in storage. The neem oil @ 10 ml/kg was found effective against infestation of storage pests (Rahman, 1997), Oforoi and Reichmuth (1999) found that the filter papers impregnated with the camphor @ 100 mg/ filter paper caused 93 to 100 per cent, mortality of *S.oryzae.*

Grains damage:

The rice grain damage in different treatments after 30 days of treatment due to attack lesser grain borer ranged from 1.75 to 13.05 per cent, being minimum deltamethrin and maximum in turmeric powder, while it was 48.06 in untreated check. The higher seed damage 13.05 per cent was recorded in turmeric powder, which was significantly higher than the deltamethrin, DDVP, neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron and mercury tablets providing 1.75, 3.89, 6.00, 6.97, 8.51, 9.60, 10.65 and 11.02 per cent, respectively. The minimum damage (1.75 per cent) was observed in deltamethrin, which was at par with DDVP (3.89 per cent), these were significantly superior to neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron, mercury tablet and turmeric powder providing 6.00, 6.97, 8.51, 9.60, 10.65, 11.02 and 13.05 damage per cent, respectively. The neem oil and camphor were found to be superior to Tulsi and mentha oil. Tulsi and mentha oil were observed to be significantly different from d diflubenzuron, mercury tablets and turmeric powder. The treatment mentha oil, diflubenzuron and mercury tablet were at par in providing lesser grain damage viz 9.60, 10.65 and 11.02 per cent, respectively. All the treatments were found statistically superior over untreated check for decreasing seed damage after one month of storage period.

The rice seed damage in different grain protectants after 60 days of treatment due to attack*R. dominica.* was significantly higher in turmeric (25.02 per cent) in comparison of mercury tablets, diflubenzuron mentha oil, Tulse oil camphor, neem oil, DDVP and deltamethrin providing 23.50, 21.21, 18.24, 16.12, 13.14, 10.95, 6.04 and 5.94 per cent, respectively. The minimum 5.94 per cent seed damage was observed in deltamethrin and it was at par with DDVP (6.04 per cent) treatment. These were significantly superior to neem oil, camphor, Tulsi oil, mentha oil, diflubenzuron, mercury tablets and turmeric powder providing 10.95, 1314, 16.12, 18.24, 21.21, 23.50 and 25.02 per cent seed damage, respectively. The neem oil and camphor were found at par. The protectants Tulsi oil and mentha oil were found more effective than diflubenzuron, mercury tablets and turmeric powder in reducing the seed damage. All the treatment which have 0.20 to 5.67 per cent grain damage were found statistically superior over untreated check (16.17 per cent). Our finding are supported by Jotwani and Sircar (1965) who found that power of neem seed was effective to store grains against *R.dominica*@ 1to 2 part /100 part of seed for at least 321 days. Pandey and Singh (1995) protected the seed of black gram, from the damage of *C.chinensis*by mixing in the seed with dried powder of neem leaf @ 100 to 400 mg/50g seed. Kumar (2002) tested protectants against *R. dominica*attacking wheat seed in storage. He found that highest mortality of pest was in seed treated with deltamethrin, which was followed by neem oil, camphor and mentha oil.

Authors' contribution: Every author has equal contribution in conducting experiments, data analysis and manuscript writing.

V. ACKNOWLEDGMENTS

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Determination of Stability Constant of La (III), Pr (III) and Nd (III) Chelates with Some Substituted Pyrazole

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ABSTRACT

Substituted pyrazoles such as 1-phyenyl-3-(2-hydroxy-4-methyl phenyl)-5- methyl pyrazole – L1 &4-(benzole)-3-(4-chlorophenyl)-5-(o-hydrohydroxy phenyl) pyrazole – L2are synthesized in laboratory. The interaction of the above substituted pyrazoles have been studied with La (III), Pr (III), Nd (III) and Metal - ligand stability constants have been evaluated in 70 % dioxane-water mixture at 0.1 ionic strength. The ratio logK1 / logK2 is positive in all cases. This implies that there is little or no steric hindrance to the additions of secondary ligand molecule

KEYWORDS: Pyrazole, Lanthanide metal ions, Dioxane.

I. INTRODUCTION

Metal complexes containing pyrazole-based have been the subject of much research interest owing to their rich coordination chemistry and a number of established and potential application area[1,2]. It has been known that pyrazole and substituted pyrazole possess numerous chemical, biological, medicinal and agricultural applications because of their versatile biological activities appearing as antimicrobial[3], antiviral[4], antitumer[5], antiinflammatory[6], antihistaminic[7], antifungal[8] and antiherbicide[9]. Similarly, pyrazolines have been reported to show a broad spectrum of biological activities including antibacterial[10], antifungal[11], antiinflammatory[12] and antidepressant[13] activities. The pyrazoline function is quite stable and has inspired to study for their complex formation. In the literature, the numerous metal complexes have been investigated for a long time in the study of complexes and measurement of complex stabilities. The many methods that have been used to determine stability, describes in detail the often-intricate calculation and gives a remarkable thorough bibliography of work in this field. It concerns itself with ionic and molecular association inall their forms. The nitrogen ligand metal complexes are used as catalyst for olefin polymerization[14], which modified to give different microstructures and high molecular weights. The zinc pyrazole complexes work as luminescent[15] that exhibit blue emission at room temperature.

Substituted pyrazoles fall in the class of aromatic compounds and have the structural features involving two nitrogen atoms in a ring, which make them interesting ligands.

The study of proton-ligand stability constants and metal-ligand stability constants of La (III), Pr(III) and Nd (III) complexes withsome substituted pyrazoles is still remaining. It was therefore interesting to study the chelating properties of some substituted pyrazoles (mentioned above) under suitable condition pH metrically.

II. EXPERIMENTAL

The ligands used in the present work are synthesized by standard known literature methods[16,17]. 0.01 M stock solution of each ligand was prepared by dissolving the requisite amount in dioxane (100%) solvent.

All the pH measurement was carried out with EQUIP-TRONICS digital pH-meter (model EQ-610) equipped with combined glass electrode and magnetic stirrer (accuracy ± 0.005 units).

Calvin-BjerrumTitration :-

The experimental procedure involved pH-metric titrations of solutions of (i) free acid i.e. HNO_3 (A) (ii) free acid + ligand (A+L) (iii) free acid + ligand + metal ion (A+L+M) against standard alkali solution (i.e. NaOH). The ionic strength of each solution was adjusted a constant volume (0.1 M) by addition of appropriate amount of 1 M KNO_3 solution. The glass beaker placed in a water bath to maintain a constant temperature $27 \pm 0.1°C$.

The titrating solution was allowed to attain the bath temperature before commencement of the titration. The titration vessel and its contents were purged with nitrogen for five minutes and then titration was begun. The pH meter readings were taken only after the gas bubbling and magnetic stirring were stopped. At the point, when the meter readings raised suddenly i.e. at the neutralization point of HNO_3, the rate of bubbling was increased to allow the reading to become steady more quickly, normally, it took about two/three hours to complete one titration.

The optical densities of the ligand solutions and their metal complexes have been measured by UV-VIS spectrophotometer model 1700 (Shimadzu, Japan) and accuracy = ± 0.005. The spectral range of the instrument was from 180 nm to 1100 nm.

Irving and Rossotti[18] have proposed a relation between the stability of the complexes and basicity of the ligand by equation.

log k = a pK + b

III. RESULTS AND DISCUSSION

The relation log K = a pK + b was, therefore, examined for 1:1 and 1:2 complexes of La (III), Pr(III) and Nd (III) metal ions with ligands by plotting log K_1 or Log K_2 against $pK_1 + pK_2$ having straight line graph.

The result obtained during the work is tabulated in following tables.

pH-METRIC TITRATION DATA

SYSTEM :Ligand (L_1)

Medium : 70% Dioxane-Water.

E^0=0.01 M	$T_L^0 = 20.00 \times 10^{-4}$ M	$T_M^0 = 4.00 \times 10^{-4}$ M
V_0=50 ml	N = 0.20 N Temp. = $27^0C \pm 1^0C$	$\mu = 0.1$M

Table 1:

Titration of					
Volume of Alkali added(ml)	Free Acid	Free Acid + Ligand 1	Free Acid + Ligand 1 + Metals		
			La(III)	Pr(III)	Nd(III)
	pH	pH	pH	pH	pH
0.0	2.15	2.15	2.15	2.15	2.15
0.2	2.16	2.16	2.16	2.16	2.16
0.4	2.19	2.19	2.19	2.19	2.19
0.6	2.21	2.21	2.21	2.21	2.21
0.8	2.23	2.23	2.23	2.23	2.23
1.0	2.26	2.26	2.26	2.26	2.26
1.2	2.29	2.29	2.29	2.29	2.29
1.4	2.31	2.31	2.31	2.31	2.31
1.6	2.34	2.34	2.34	2.34	2.34
1.8	2.37	2.37	2.37	2.37	2.37
2.0	2.39	2.39	2.39	2.39	2.39
2.2	2.43	2.43	2.43	2.43	2.43
2.4	2.46	2.46	2.46	2.46	2.46
2.6	2.51	2.51	2.51	2.51	2.51
2.8	2.57	2.57	2.57	2.57	2.57
3.0	2.61	2.61	2.61	2.61	2.61
3.2	2.66	2.66	2.66	2.66	2.66
3.4	2.74	2.74	2.74	2.74	2.74
3.6	2.85	2.85	2.85	2.85	2.85
3.8	2.97	2.97	2.97	2.97	2.97
4.0	3.10	3.10	3.10	3.10	3.10
4.2	3.25	3.25	3.25	3.25	3.25
4.6	3.50	3.50	3.38	3.46	3.58
4.8	5.75	4.50	3.95	4.06	3.80
5.0	9.47	7.41	6.39	6.70	6.25
5.2	10.25	8.25	7.60	7.25	7.45
5.4	10.73	9.10	7.87	8.05	7.73
5.6	10.90	9.35	8.14	8.45	8.00
5.8	11.00	9.59	8.72	8.90	8.57
6.0	11.10	9.85	9.30	9.25	9.15

pH-METRIC TITRATION DATA

SYSTEM : Ligand (L_2)   Medium : 70% Dioxane-Water.

$E^0 = 0.01$ M $T_L^0 = 20.00 \times 10^{-4}$ M $T_M^0 = 4.00 \times 10^{-4}$ M

$V_0 = 50$ ml   N = 0.20 N   Temp. = $27^0C \pm 1^0C$ $\mu = 0.1M$

Table 2:

Titration of					
Volume of Alkali added(ml)	Free Acid	Free Acid + Ligand 2	Free Acid + Ligand 2 + Metals		
			La(III)	Pr(III)	Nd(III)
	pH	pH	pH	pH	pH
0.0	2.15	2.20	2.20	2.20	2.20
0.2	2.16	2.22	2.22	2.22	2.22
0.4	2.19	2.24	2.24	2.24	2.24
0.6	2.21	2.26	2.26	2.26	2.26
0.8	2.23	2.29	2.29	2.29	2.29
1.0	2.26	2.31	2.31	2.31	2.31
1.2	2.29	2.34	2.34	2.34	2.34
1.4	2.31	2.36	2.36	2.36	2.36
1.6	2.34	2.38	2.38	2.38	2.38
1.8	2.37	2.41	2.41	2.41	2.41
2.0	2.39	2.45	2.45	2.45	2.45
2.2	2.43	2.48	2.48	2.48	2.48
2.4	2.46	2.52	2.52	2.52	2.52
2.6	2.51	2.57	2.57	2.57	2.57
2.8	2.57	2.62	2.62	2.62	2.62
3.0	2.61	2.67	2.67	2.67	2.67
3.2	2.66	2.73	2.73	2.73	2.73
3.4	2.74	2.79	2.79	2.79	2.79
3.6	2.85	2.85	2.85	2.85	2.85
3.8	2.97	2.93	2.93	2.93	2.93
4.0	3.10	3.05	3.05	3.05	3.05
4.2	3.25	3.20	3.20	3.20	3.17
4.6	3.50	3.45	3.40	3.42	3.39
4.8	5.75	4.95	4.71	4.85	4.05
5.0	9.47	7.00	6.98	6.95	6.10
5.2	10.25	7.44	7.29	7.39	6.95
5.4	10.73	7.88	7.60	7.70	7.64
5.6	10.90	8.31	8.00	8.10	7.96
5.8	11.00	8.74	8.41	8.51	8.29
6.0	11.10	9.25	8.74	8.84	8.64

Table 3: Metal–Ligand stability constants (log K)

System	Ligand (L₁)				Ligand (L₂)			
	log K_1	log K_2	log K_1- log K_2	log K_1/log K_2	log K_1	log K_2	log K_1- log K_2	log K_1/log K_2
La(III)-	8.9447	5.2538	3.6909	1.7025	8.6647	4.0938	4.5709	2.116542
Pr (III)	6.5047	2.9536	3.5511	2.202296	7.3447	3.0938	4.2509	2.374006
Nd (III)	5.7447	2.5539	3.1908	2.249383	5.7447	1.2139	4.5308	4.732433

IV. CONCLUSION

The above observations & results revealed that the change in colour during pH metric titration also indicate the formation of complex between ligand and metal ions. The departure between acid curve and ligand curve indicate the dissociation of phenolic -OH groups. The formation of straight line between pKvs log K hold good the relationship between log K = a.pK + b.

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A Study on Awareness about COVID 19 among Adolescent Girls

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ABSTRACT

Present study was carried out to assess an awareness about COVID -19 among adolescent girls from 11 and 12 standards (15 - 16 years) residing in Pusad taluka of Yavatmal district, Maharashtra State. Awareness about COVID-19 was assessed using a Pre tested questionnaire through a personal interview method. Data was collected, tabulated and frequency calculated. the findings of study showed that 70 percent of adolescent girls were aware about following three preventive measures to protect from COVID 19, also take proper care i.e., wash hand and legs immediately, cloth were washed and use sanitizer after coming outside to home whereas 70 percent of adolescent girls were aware about following three preventive measures to protect from COVID 19, also take proper care i.e., wash hand and legs immediately, cloth are washed and use sanitizer after coming outside to home. It was observed that 62 percent of adolescent girls used sanitizer. Among the respondents, 83.1% and 74.9% indicated they prefer frequent hand washing with soap and water and use alcohol-based sanitizer, respectively and only 31 percent adolescent girls were knowing exactly time sanitizer used to clean hand. Majority of girls were unaware about nutritional care i.e. need to be change in dietary pattern or food intake for improving immunity power and necessity of maintaining sound health.

Keywords: Adolescent girls, COVID-19, awareness, nutritional care, preventive measurements.

I. INTRODUCTION

Global health experts and South Asian governments have expressed concern about the spread of COVID- 19 and potential for more than 7.6 million deaths in South Asia if no action were taken (Walker et al, 2020). India reported its first COVID-19 case on January 30, 2020 and numbers began to rise in late March 2020, (Johns Hopkins Corona virus Resource Center, 2020) albeit at a low rate, which may be attributed to several government policies including stopping all international flights and implementing a nation-wide lockdown at an early stage of the pandemic. By early April 2020, country officials had identified several areas as hotspots of COVID-19 infections in the country. India faces threat of a serious outbreak due to deep challenges in practicing social distancing and access to water and soap for hand washing (Austrian etal 2020).

Adequate nutrition is required for all cells, including those of the immune system, to function at their best (Childs etal 2019). An "activated" immune system additionally enhances energy demands during the SARS-CoV-2 infection, with an increased basal metabolic rate. Therefore, optimized nutrition for the best immune outcomes would be one that supports immune cell function by allowing them to engage robust responses to pathogens, but also to improve the responsiveness when appropriate, avoiding any underlying chronic inflammation. Cena etal (2020) suggest that to improve the efficiency of the immune system, it would be advisable to include specific foods in the diet as good sources of antioxidants,such as fresh fruit and vegetables, soy, nuts (Yahfoufi etal 2018), and omega-3 fatty acids all being low in saturated fats and trans fats (Seidelmann etal 2018). These nutrients helps to improve immunity power during Corona Pandemic.

It is essential to take personnel care and preventive measure during Corona Pandemic because the Corona is transmitted disease whereas nutritional care is necessary i.e. change in dietary pattern to food intake for improving immunity power to maintain sound health. On this background present study is carried out during the IInd phse of Corona Pandemic to assess an awareness about COVID-19 among adolescent girls about personnel care, preventive measure and nutritional care.

II. METHODOLOGY

Purposively 100 adolescent girls of 15-16 years studying in 11th and 12th class were selected from Pusad taluka of Yavatmal District. Collected information on awareness about Coronavirus focusing on personal preventive measures and awareness about personnel care against Corona- 19, collected by personal interview method with a pre-planned questionnaire.

Data was collected, tabulated and percentages were calculated to assess the awareness among adolescent girls towards COVID-19.

III. RESULT AND DISCUSSION

Table1. Awareness about personnel preventive measure against COVID -19

Table 1 showed the information about personnel preventive measure against COVID -19.From the table it was noticed when asked how to protect yourself the responses were as follows 3 percent for maintaining social distance, 13 percent for use of mask, 14 percent for use of sanitizer and 70 percent adolescent girls gave responses for using the above three preventive measures. When asked adolescent girls What to do after coming home from outside, responses were as wash hand and legs (10 %), use of sanitizer (13%), wash wear cloth (7%) and 70 percent use all three preventive measures. When asked about hand cleaning majority responses getting for used sanitizer (62%) followed by soap (18%) and only use water 4 percent whereas 16 percent have no idea about hand cleaning. Response getting for at what exactly time hand should be scrub 31 percent responses getting for 20 seconds followed by 29 percent for 30 seconds, 27 percent for 10 seconds and 13 percent for 15 seconds. When asked about which ideal cloth mask responses getting for triple layer cloth mask 38 percent followed by 21 percent for single layer cloth mask and 15 percent responses for handkerchief whereas 26 percent had no idea respectively. Responses getting for type of mask majority responses for mask should cover nose and mouth (79%) whereas 13 percent and 3 percent responses for mask cover only mouth and cover face while remaining 5 percent have no idea about type of mask.

Table 2: Awareness about nutritional care during COVID -19

Table 2 depicted the information of awareness about nutritional care during COVID- 19.The question asked regarding the changes in diet, maintaining good health and requiring improving immunity power the responses recorded in yes or no. The response recorded for the changes in diet 24 percent of adolescents agree with change in diet while 76 percent were not agreeing with change in diet. Maintaining good health 24 percent adolescent girls were agree whereas 76 percent were not agreed while 29 percent adolescent were agreed for improving immunity and 71 percent were not agree for improving immunity.

IV. DISCUSSION

From table 1 it was observed that 70 percent of adolescent girls were aware about following three preventive measures to protect from covid 19, also take proper care i.e., wash hand and legs immediately, cloth were washed and use sanitizer after coming outside to home. Priya and Sheela (2020) observed that that majority of respondents have good knowledge (52.8%), average knowledge (43.50%) and 3.7% respondents had poor knowledge when conducting a survey among adolescent girls from Pune city.

It was observed that 62 percent of adolescent girls used sanitizer. Desalegn (2021) etal also observed the same during study on the public knowledge, attitude, and practice (KAP) and response of the service providers regarding COVID-19 most of the public had a positive attitude (60.7%) towards implementation of preventive measures against COVID-19.

Among the respondents, 83.1% and 74.9% indicated they prefer frequent hand washing with soap and water and use alcohol-based sanitizer, respectively and only 31 percent adolescent girls knew exactly the time sanitizer was used to clean their hands. In this context. It is necessary to get proper guidance regarding the correct way to clean hands by using sanitizer. In case of mask 38 percent responds for three-layer clothing mask and it was surprised that 79 percent adolescent girls knowing that mask should cover nose and mouth. It was noted that studied adolescent girls were well aware about personnel preventive measure against Corona-19.Where as from table 2, it was noted that majority of girls were unaware about nutritional care i.e. need to be change in dietary pattern or food intake for improving immunity power and also necessary to maintain sound health.

V. CONCLUSION

this survey was carried out during the second wave of corona-19 pandemic so it is urge to give proper education to adolescents to protect from Covid- 19 pandemic because adolescent is next responsible generation of Nation.

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Table1. Awareness about personnel preventive measure against COVID -19 (n=100)

S.No.	Awareness about personnel preventive measure against COVID -19	Percentage (%)
I	How to protect yourself	
A	Maintain social distance	3
B	Use of mask	13
C	Use of sanitizer	14
D	All of above	70
II	What to do after coming home from outside	
A	Wash hand and legs	10
B	Use sanitizer	13
C	wash clothes	7
D	All of above	70
III	Hand should be wash using	
A	only use water	4
B	Using soap	18
C	Using sanitizer	62
D	Using vinegar	16
IV	At what exactly time sanitizer used to clean hand	

A	10 seconds	27
B	20 seconds	31
C	15 seconds	13
D	30 seconds	29
V	**Which is ideal mask**	
A	Handkerchief	15
B	Single layer cloth mask	21
C	Tripple layer cloth mask	38
D	No idea	26
VI	**What type of mask used**	
A	Cover nose and mouth	79
B	Cover only mouth	13
C	Cover face	3
D	No idea	5

Table 2: Awareness about nutritional care during COVID -19 (n=100)

S. No.	Awareness about personnel care during COVID -19	Percentage (%)
I	**Change in diet is required**	
a	Yes	24
b	No	76
II	**Maintaining good health is necessary**	
a	Yes	24
b	No	76
III	**Improving immunity is necessary**	
A	Yes	29
B	No	71

Role of Digital Technology & Social Media in Higher Education

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ABSTRACT

In a digital technology world, Higher Education has undergone several changes. Digital platforms have simplified the way students can access to academic information. Therefore, the education industry can consider Social Media as a tool to effectively adapt business to students' needs. Social Media and its components have been emerging in Higher Education to improve its business practices. Therefore, institutions have been positive to endorse these mechanisms and implement them into their community structures. The use of online approach is a most favorable channel to attract students. Social Media has turned into the crucial tool to perceptively excel in the competition. This paper presents the analytical survey of Social Media for excelling Higher Education to potential users.

Keywords: Social Media marketing, Higher Education, Digital Education

I. INTRODUCTION

With introduction of Social Media in academic has changed the way consumers perceive education policies. In addition to that Social Media has completely influenced not only higher education marketing but whole higher education system [1]. Globally, all over world academic institutions are now using Social Media tools in teaching and learning also. Social Media made possible interaction with target audience directly. It is observed that behavior of modern students shows they are less responsive to traditional marketing approach. Instead they anticipate to be engaged through digital media. The educational institutions globally have been using Social Media as a tool to reach out to prospective students since birth of the Internet. After social media and Smartphone this has completely changed the education institution approach in reaching students, also in teaching and learning process.

In this digital world, a student finds desired institutes on various search engines. Google is one of the most favorite among search engines. Here how to be among top search results is the key of marketing your institute. Student's point of view challenging job to identify the suitable or authenticated institutions among lots of institutes received in result available.

Social community relation and marketing within the higher education depends on the nurturing and managing relationships with potential and modern students and alumni [2] and social media plays important role to assist

education institutes in managing these association [3]. However, the many survey places emphasis on how institutions are using social media to attract potential students rather than using the technology to build relationships with modern students [2, 4]. In this research a details survey on social media and its use in Higher Education is done.

II. LITERATURE REVIEW

Before the spread of Internet facility, institutions used to promote their education services on a basic platform that was purely reliant on budget. Institution with high budget could communicate massively their services mainly through TV advertisement or radio tinkle. However, institutions with a lower budget would have taken the options of banners, leaflets and publications in magazines or news papers [5, 6].

Many institute then started conduction entry level exams for admission process either offline using computers or papers. After the birth of Internet institution started conduction exams online and entry level interviews through video conferences to save the cost of learners and promoting institute services.

Now social media has extended the boundaries of education. In this digital era, educational institutions across at global level are no longer finding it difficult to market themselves to their target learners. The Internet made possible, educational institutions can spread or brand their self not only in the specific country but in a worldwide market [7].

In the recent year branding or marketing of higher education has completely changed due to online services. Institutions are taking the benefits of social media and digital platforms like Twitter, Facebook, YouTube, and podcasts to market their programs [3], while website user interface and services provides there are important in proving a decisive component in how institutions present themselves to prospective learners [8]. 95% percent of college uses at least one form of social media for admissions process [1].

There are various social media platforms but most popular are Facebook, Twitter, LinkedIn, Instagram, Snapchat, Pinterest and so on are used every day by millions of people across the world, including students, corporate people, academician etc. [9] In the recent survey, in a sample of 3000 students in US, 90% of students use Facebook, while 37% use Twitter for communication purpose. In one more study shows that about 65% of higher education students are Facebook users. This shows that Facebook is the most popular among the social networks for personal as well as educational purposes [10].

III. METHODOLOGY

The study was conducted with the main focus on use of social media as digital marketing media in higher education. The data collection is done through Google Form in an online mode among college students. The survey is conducted from students and teacher around city. For data collection questionnaire was developed to extract the opinions of the students and teachers for the use of social media in various activities they perform in academics or personal reason. The researcher validated the research tool through its pilot testing on 100 students from collected data. Convenient sampling method was adopted to manage the research tool i.e. questionnaire on 500 students. The response rate was 90.00% (as 450 responses complete in all respects were received).

IV. RESULT

The responses are collected automatically in Microsoft Excel application after submission of survey form by teachers and students. The collected response data were feed and analyzed in terms of percentage and presented in tabular as well as graphical form as given below.

Table with chart 1: Use of social media by students:

Use of social media by students

	Male	Female
Facebook	89	85
Twitter	65	55
Linkedin	45	48
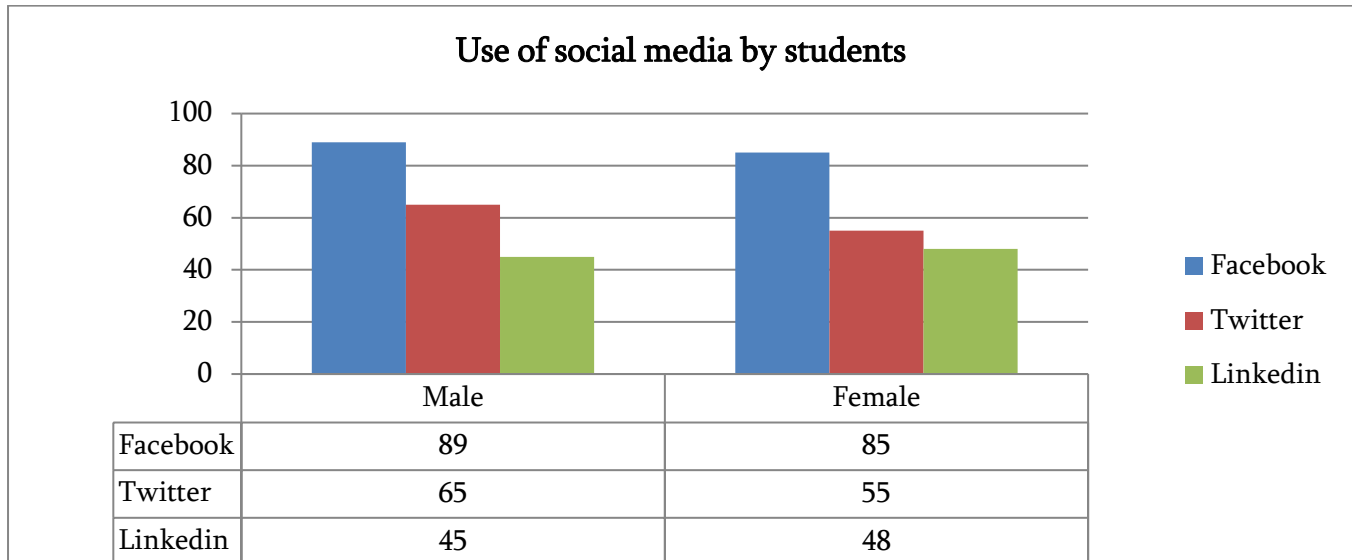
Chart 1 shows the liking of students to use social media tool for different purposes. According to the table 87% of the college students preferred to use Facebook, and 60% LinkedIn, whereas used 46.5% twitter.

Table with chart 2: Student use social media for different activities

Student using social media for various purpose

	Learning	Activity	Chatting	Sharing Information	Information finding	entertainment
Male	65	40	67	89	88	83
Female	80	65	76	82	93	78
Average	72.5	52.5	71.5	85.5	90.5	80.5
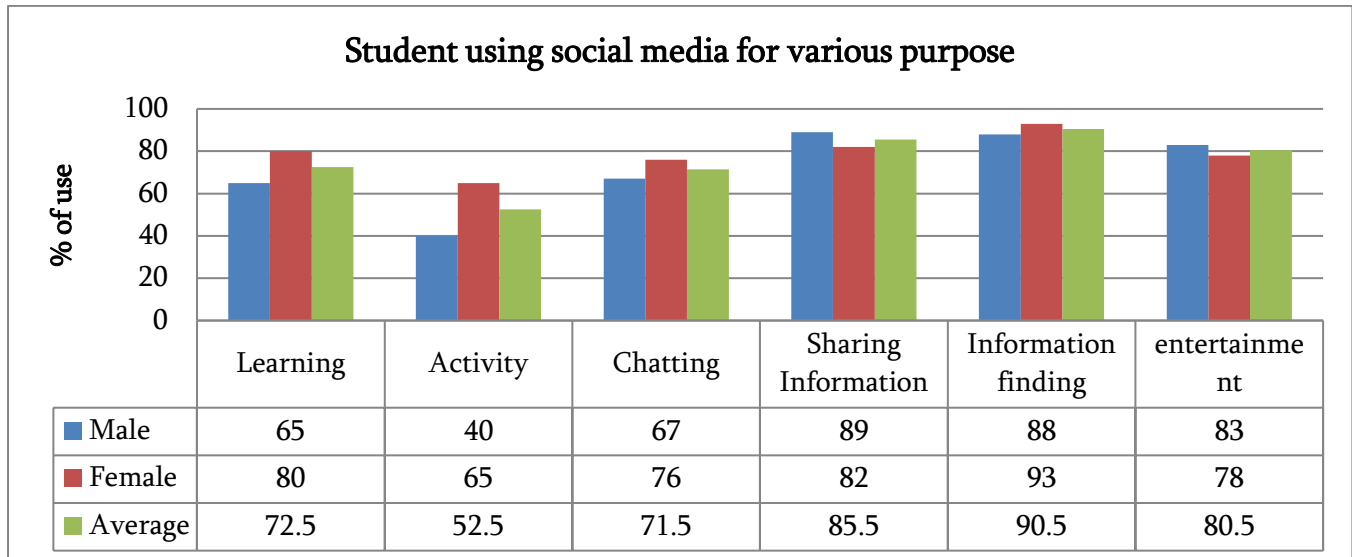
In table 2 researcher have collected data from student for various academic and personal use of social media. According to the data 90% of the users community used social media for posting scraps or sharing stories or other kind of information and 71.50% used for chatting with friends. However, for academic purpose of social media 72.5% of students affirmed that they use social media for sharing their learning experiences, notes finding and research related data collections, 52.5% shared academic activities over the media, 90% students use for finding current information related with their studies, competitive exams, educational developments/career opportunities and latest trends in the market. But there was another group of the students includes 80.5%, they like to entertain using social media.

Table with chart 3: Teacher use social media for different activities

Teacher use social media for different activities

	Learning	Knowledge sharing	Research	entertainment
■ Male	85	78	75	84
■ Female	92	67	64	70
■ Average	88.5	72.5	69.5	77

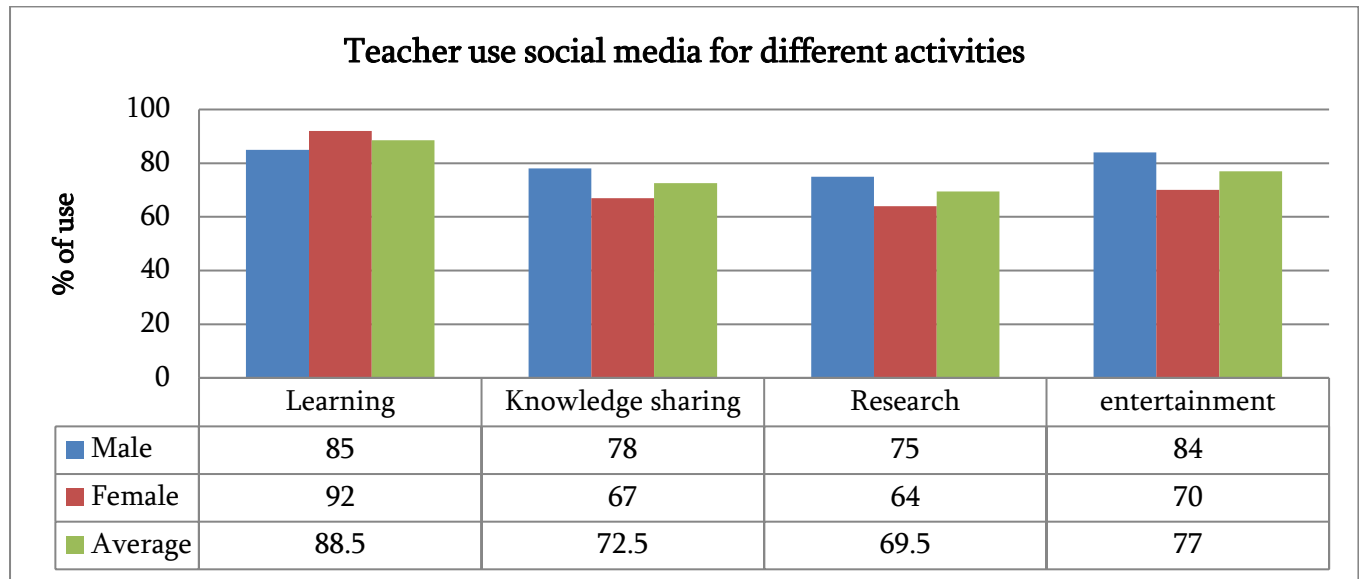Table cum graph 3 collected data from group of teachers to observe the use of social media among them. From the analysis it is observed that 88.5% teachers are using social media for learning purpose. 72.5% teacher use social media for sharing knowledge with students, friends and their relatives. For research point of 69.5% is used teachers and just for entertainment they use 77% social media tools.

V. CONCLUSION

The study discovered that students and teacher of college preferred Facebook as it is most popular media. The trend indicated that student used social media mostly for sharing information, finding information and entertainment as well. Teachers are also use social media for learning as well as entertainment. Still use of social media in Higher Education is at its infant stage due to the fact that it is a recent phenomenon but there is an amount of interest amongst practitioners and researchers in studying the issues related to social media and social media marketing. Social media continues to transform the method and practice of teaching that were traditionally confined to classrooms. The social media imposes lots of challenges in higher education but its importance cannot be ignored. With the application of social media, no students remain inactive absorbers of understanding the concept of subject but become co-producers and contributors. Now learning has become more of a social process and the use of social media strengthens that process. The use of social media, like in many other areas, is here to stay in higher education settings too.

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Cultivation Practices of Medicinal Plant : Phyllanthus Amarus Schum

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ABSTRACT

The resource pool of the medicinal plants were abundant in forest areas are dwindling fast due to anthropogenic pressure therefore the alternative means to generate more raw materials could be only through cultivation of medicinal plant in agriculture fields. National Medicinal plant board is working to promote cultivation under centrally sponsored scheme of National mission on medicinal plants since 2008-09. Medicinal plants are valuable natural resources. Unplanned development & overexploitation put many medicinal plants on way to endanger. Excess use of weedicide in agricultural fields affected many weeds sp. which were used for their medicinal properties. Phyllanthus amarus schum is one of the medicinal plant naturally occurring as weed. It is a broad spectrum medicinal plant that has received worldwide recognition (Etta, 2008)

Phyllanthus amarus has been used in the Ayurvedic system of medicine for over 2,000 years and referdto as Bhumyamalaki, which is widely used to treat liver disorders, Bladdr infections & kidney related disorders.

The plant of the genus Phyllanthus are widely dismibuted in most tropical & subrtropical countries and have long been used in traditional medicine to treat chroinic liver disease (Liu etal., 2003) The plant is found growing abundantly through out India. The plant has antiseptic, direticantiviral, ant diabetic, hypertensive and antipyretic properties and also used in the treatment of Jaundice, diarrhea, dysentery, wound, ulcers & Urogenital diseases. (Calixto eta, 1998; santos etal., 1995)

Cultivation ensure botanical identity, genetic improvement, quality and continuity in supply of raw materials to Pharma Industries and also promote Socio-economic growth of farmers. The present paper gives details regarding cultivation parameters, cultivation details, harvesting techniques, Marketing, Chemical Composition, Medicinal use and productivity. The study conducted at Pusad, Dist. Yavatmal, Maharashtra The cultivation cost required for phyllanthus amarus is low, no extra expenses on pesticides & fertilizers Hence beneficial for grower.

Keywords: Cultivation, Medicinal plants, Harvesting, Marketing.

I. INTRODUCTION

The plant is indigenous to South Africa but is found in all warm countries. In India prominently found as a weed in central and Southern India up to 1000 mt altitude.

It is a small annual herb known since the ancient period of Charak for its medicinal use. It grow up to 20-55cm consisting of root, stem, and leaf. The fresh juice of whole plant is found to be useful in various liver disorders. It belongs to family *Euphorbiaceae*. The plant is found growing abundantly throughout India mainly in the states of Maharashtra, Uttar Pradesh, Punjab, Bihar, Orissa, Andhra Pradesh and Some parts of Madhya Pradesh, Karnataka and Bengal etc Many times occurs as weed growing on fields or dump and waste soil.

The tradional uses of Phyllanthus amarus for kidney stones and gall bladder stones have been validated by clinical researsh where P. amarus extract was found to exhibit a potent & effective non-concentration dependent inhbilitory effect on calcium oxalate crystal formation, the building blocks of most kidney stones (Calxto, 2000) This may explain why it has long been used in traditional medicine as prevention against kidney stone formation (Compos and Schor., 1999) In study Phyllantus amarus has been found to be 94% successful in elimination stones (Maxwell, 1990)

Literature reivies shows that Phyllanthus amarus is generally employed to reduce pain, expel intestinal gas, to stimulate, promote digestion, as anti-helminthes to expel intestinal worms and acts as mild laxative.

II. MORPHOLOGICAL DESCRIPTION

Habitat –Terrestrial; Habit - Erect herbs or under shrubs 25-45 cm tall; Root – Tap root system, roots small, 2.6 –10cm long, nearly Straight, gradually tapering, with a number of fibrous secondary and tertiary roots, external surface light brown; fracture, short. Stem – Erect, smooth slender, glabrous; 20-60cm long, branching profuse towards upper region bearing 5-10 pairs of leaves, internode 1-3 cm long; odour, indistinct; taste- slightly bitter, greenish yellow, week stem; Leaves – Pinnately compound actually small simple leaves arranged in two files. rachis; alternate, opposite and decussate almost sessile, stipulate, oblong, entire; green colour, bitter–taste. Flowers–minute axillary, Redial, Stellate, male flowers are star shaped (2 mm wide size), fruit many smooth capsule, depressed, globose, scarcely lobed, triangular, Seeds very tiny (Cooke,1967;).

III. CULTIVATION PARAMETERS

i).   **Soil:** *Phyllanthus amarus* is adopted to wide variety of soil, preferably well drained, rich organic manure added and light textured soils are best for this crop. It also grows luxuriantly on sandy loam soil.
ii). **Climate:** *Phyllanthus amarus* is very susceptible to climatic conditions.
iii). **Temperature:** Very high temperature or very low temperature conditions are harmful to this crop. It grows well between 25-38°C.
iv). **Humidity:** 40-75% required
v).   **Rainfall:** Water logging conditions are harmful to corp. Rainfall in the range of 40-45 cm. thrives best.

IV. CULTIVATION DETAILS

i)   **Propagation:**
It is propagated by seeds and by broadcasting method as well as nursery raising. The seeds are very tiny hence mixed with sand and broadcasted for present practise.

Plate10: *Phyllanthus amaru*
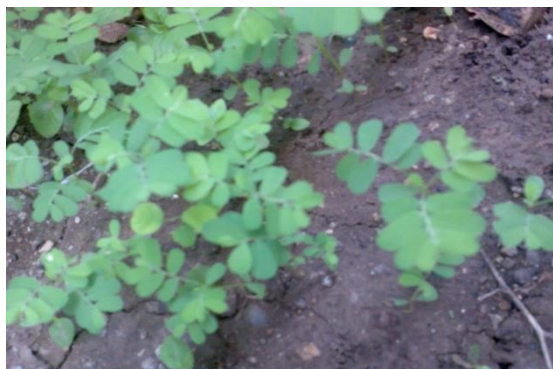
Plate-1: *Phyllanthus amarus* seedlings   Plate-2 : 2 months old crop
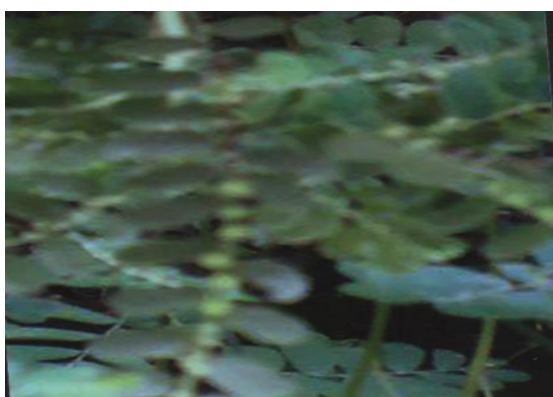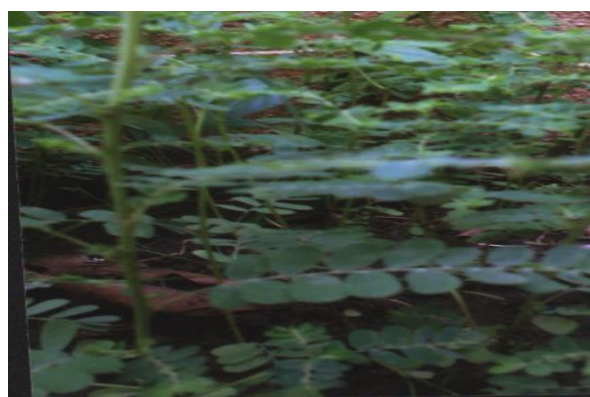
Plate-3: *Phyllanthus amarus* bearing fruits   Plate-4: Mature crop

ii) Seed rate and pretreatment :

4 kg / hectare of area no specific pretreatment of Speed is recommnded.

iii) Sowing:

Sowing is done after 2-3 rains when the soil consists little moisture and humus. For sowing the seeds are mixed with sand and broadcasted directly in field. After 4-5 days of sowing the seeds germinate. The plant is adaptive to climatic and soil conditions. Sowing was done on 6th,9th,1st,3rd of July in 2004 to 2007.

iv) Crop Duration:

The crop matures within three to four months. (80 to 90 days)

v) Irrigation:

For proper growth of this plant regular irrigation is necessary but avoid it if rainfall is frequent. In the conditions when rainfall is inadequate requires irrigation i.e. 6 to 8 irrigations at the interval of 4 to 6 days. It is very necessary to keep the land moist as it affect the crop and production.

vi) Weeding:

As it is a small herb, regular hand weeding at an interval of 15 to 20 days is preferred to keep the crop-weed-free promoting its healthy growth.

vii) Plant Protection:

No disease as pest of serious kind is reported to attack the crop.

viii)   Harvesting and Marketing:

The first harvesting carried in first week of September and the second in last week of December. The plants manure within 3 to 4 months. It has maximum active chemical ingredients at fruting period. They are usually harvested after rainy season is over, when the amount of green leaves is in abundance is the correct time for harvesting. Since the active constituent is present in leaves, higher leaf mass is expected during harvesting. For harvesting, sharp sickle is used. The field is again given 3-4 irrigations and plants are again allowed to grow and at final harvesting the whole plants are uprooted manually.

The collected whole plants are shuffled and the mud is separated, cleaned externally and later they are allowed to dry in sun light for1-2 days and afterwards in shade. After complete drying the plant raw material is preserved in polythene lined gunny bags at cool, well ventilated place (godwons)

V. OBSERVATIONS

The yield obtained are given in table 1. Kokate et.al. (2004) obtained yield of fresh herb per hectore was about 2-3 tonnes by application of FYM. Due to the application of organic manure the fresh yields obtained was satisfactory in every season has shown gradually increase in yields. The yields of *phyllanthus* was 1550.08, 1765.37, 2066.78 and 2669.59 kg/ha. obtained during the present study.

Table 1: Yield obtained of *Phyllanthus amarus.*

Sr. No.	Duration of crop	Yield Kg/quad.		Yield Kg/ha	
		T_1	T_2	T_1	T_2
1	June-Dec. 04	3.1	3.6	1334.79	1550.08
2	June-Dec. 05	3.3	4.1	1420.91	1765.37
3	June-Dec. 06	3.0	4.8	1291.73	2066.78
4	June-Dec. 07	3.2	6.2	1377.85	2669.59
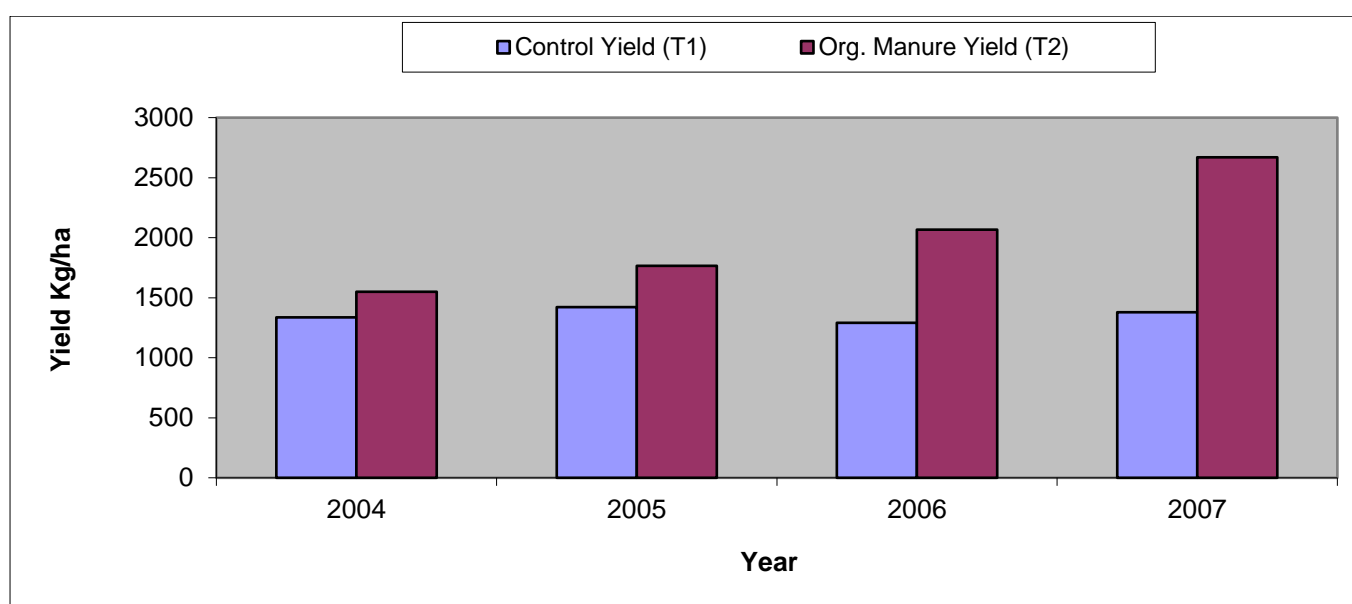
Graph 1.(a) : Productivity of *Phyllanthus amarus.*

VI. CHEMICAL CONSTITUENTS

The plant extract have been found to contain high levels of saponins, tannins, flavonoids & alkaloids (Fernand, 1998; Naaz 2007; Krithika and Verma 2009). Plants contain constitunts some tend to possers some level of toxicity have been reported (Santos etal., 1995; shaw etal 1997; kaplowitz, 1997)

The leaves, stem, root and seeds contains lignans as phyllanthin, hypophyllanthin, Leucodelphimidin, alkaloids, flavoroids as querceting, Astralagin, Quercitrin, Isoqercitrin and rutin. It also consists phyllanthine and hypophyllanthine.The complete herb contains alkaloids as Sicurinin, nirurin, norsicurinin, methoxysi- curinin; benzonoids-galic acid, corilagin, flavonoids- quercetin, quercitrin, iso-quercitrin, rutin, kaempferol-4-rhamnopyranoside, eriodictyol-7-rhamnopyranoside, In terpenoids- leupeol acitate, leupeol, tetracosenen, phyllanthusiin-D; culic tannin as amarulo- nes, amariin, geraniin, quercetin-3-0-glucoside are also present.

Medicinal use:

In a Brazilian resarches in the mid 1980's reported the alkaloid extract demostated smooth muscle relaxation specific to the urinary & biliary tract (Miller 1998, Calixo 1984) P. amarus ha been classifed among plants with a low potential for toxicity with an LD 50 averaging 2000 mg/kg/day (Krithika & Verma, 2009)

The complete herb is astringent, anorexic, antidropsical, antidiarrheal, antiseptic, bitter, cooling, carminative, diuretic, stomachic. The drug is used as hepatoprotective, 10-20ml. Of drug extracted in juice form is advised (Kokate, 2002). It is mainly used in treatment of viral hepatitis and various other liver disorders. It is taken in powder form also (4-6gms/day) for diuretic problems. It is used to treat Oedema. Externally used to relieve inflammation. It is a good appetizer. It is anti-hepatotoxic, antilithic, antihypertension, anti HIV and antihepatitis-B (Naik and Juvekar, 2003). It is effective on hyperacidity. It may reduce urinary calcium and inhabiting kidney stone (Nishiuira, et. al. 2004).

Market product:

Ayurvedic formulation: Brown colored Powder-Churna, Citraka haritak; Madhuyastyddi taila; Pippalyddighrta; Chyavanaprasa; Satavari- guda.

Patented product: Vimliv, Nirocil.

VII.CONCLUSION

Medicinal plants can be cultivated as alternative income source for farmar's along with traditional crops. In order to meet the growing demand for raw material medicinal plant cultivation practices must be promoted for socio economics upliftment of farmer cultivation cost is low so it benefits the grower. chemical fertilizers not wed only in used to ensure natural growth of plant & preserve it original chemical composition. Cultivation ensures botanical identity, genetic improvement, quality and continuity in supply of quality raw material to industries.

Recommendation :-

There should be an organised marketing system, network. The grower have to depend largely on the middlemen, who deprive the farmers of their legitimate share of revenue.

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Assessment of Water Quality Using Physico-Chemical Parameter from Lower Pus Dam Tahsil Mahagaon Dist- Yavtmal

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ABSTRACT

Water is one of the most important of all natural resources known on earth. It is important to all living things. The safety of drinking water is important for the health. The safety of drinking water is affected by various contaminants which included chemical and microbiological. Such contaminants cause serious health problems. Due to these contaminants quality of the Drinking Water becomes poor. Sometimes such poor quality water causes many diseases in the humans so that quality of the water must be tested for both the chemical as well as for the microbial contaminants. This study was aimed to estimate current status of physico-chemical characteristic of Lower pus dam tahsil Mahagaon Dist.Yavtmal , Maharashtra. During the study it was found that maximum number of physical and chemical parameter were within the desirable limit, as suggested by WHO.

Keywords: Physico-chemical parameters,TDS,Lower Pus Dam.

I.   INTRODUCTION

Increases in use of chemical fertilizer and pesticides in agriculture are due to industrialization which causes various aquatic environmental pollution and lead to depletion of water quality. It is the fact that most of the rural, towns and cities do not have access to safe drinking water despite investment from governing bodies and private organization in an effort to reduce pollution load and enhance quality of water[1-2]. The assessment of water quality parameters in and around Yavatmal district has not been undertaken previously. However there is also no systematic study on the overall quality of water in this region has so far been undertaken that would provide a qualitative and quantitative results indicating the suitability of water for human consumption & Agricultural purpose[3-4]. Water is one of the most important of all natural resources known on earth. It is important to all living organisms, ecological systems, human health, food production and economic development. The safety of drinking water is important for the health. The safety of drinking water is affected by various contaminants which included chemical and microbiological. Such contaminants cause serious health problems. Due to these contaminants quality of drinking water becomes poor. Sometimes such poor quality

water causes many diseases in the humans, so that quality of water must be tested for both the chemical as well as for the microbial contaminants[5]. Present study is focused on as such as dam of Mahagaon tahsil Yavatmal District, i.e. Lower pus dam Weni (Bk).The parameters studied are temperature, pH, alkalinity,total hardness, COD,TDS,DO,metals & conductivity.

II. MATERIALS AND METHODS

Study area:

Lower Pus Project ,(also called as Weni Project,) and Dam's Official Designation is "Lower Pus , D -0 2869" . Locally also known as " Weni Lake" / " Weni Talav" . Lower Pus Dam was constructed as part of irrigation projects by Government of Maharashtra in the year 1983 . Nearest city to dam is Mahagaon and the Dam is situated in Mahagaon Taluka of Yavatmal District of Maharashtra . It is built on and impounds Pus River ,. The dam is an Earth-fill Gravity Dam . Purpose of the dam is for irrigation .The length of The dam is divided in two portions by the Spillway , Left and Right . The length of the dam, including the spillway is 3346 m (10977.69 Feet) Left section is approximately 2500 m (8202.1 Feet) + Right section of approximately 650 m (2132.55 Feet) . While the height of the dam above lowest foundation is 28.0 m (91.86 Feet) . The Dam has a Spillway of Ogee type . Length of the spillway is 147 m (482.28 Feet).The Spillway has 10 Radial Type of spillway gates . Dam's catchment area is 128.2 Thousand Hectors. Maximum / Gross storage capacity is 81.16 MCM. Live storage capacity is 59.16 MCM. Now a days almost all the water bodies make for good picnic spots. Pus lake is also a popular Tourist attraction for its scenic beauty.

Figure 1: Map of the study area showing the different sampling stations.

Collection of sample:-

In order to determine the water quality index two stations were chosen for sample collection form the Reservoir during September (2021) in the first week . Water samples were collected in clean and dry

polyethene bottles of one litre capacity. We have collected two samples from different places. All the water samples, after measuring temperature on spot, were Immediately transported to the laboratory for analysis and stored in cool place away from light. In the present investigation we have studied the following parameters such as Temperature, pH, Alkalinity, Chloride, Total hardness, Total dissolved solids, Dissolved oxygen, and Chemical oxygen demand to study the quality of water. Standard methods were used for the Analysis of samples. Temperature was taken on spot while collected the sample. pH meter, make was used for determination of pH. Determination of chloride was done by a Mohr's method. The total hardness was determined titrimetrically by EDTA method. Alkalinity of water sample was estimated by titrating with standard sulphuric acid solution. Determination of total dissolved solids (TDS) was done gravimetric method. The Winkler method was adopted for determination of Dissolved Oxygen. Magnesium Measurment of Magnesium amount in water by Titrimetric method, Barium Measurment of barium amount in water Titrimetric method, Calcium Measurment of Calcium amount in water Titrimetric method.

III. RESULT & DISCUSSION

Report of lower pus dam analysis of water samples in September (2021).

Sr. No.	Parameter	Site1	Site2
1	Temperature °C	27.2°C	27.8°C
2	pH	7.3	7.4
3	Alkalinity mg/L	180	186
4	Electrical Conductivity (E.C.)mho/cm	850	840
5	Dissolved Oxygen (DO) mg/L	5.8	5.5
6	Total Hardness mg/L	188	192
7	Chemical Oxygen Demand (COD)mg/L	10	10.4
8	Chloride mg/L	78	74
9	TDS mg/L	380	385
10	Barium (ppm)	31	30
11	Calcium (ppm)	6	6.2
12	Magnesium (ppm)	3.5	3

pH

The pH of water is a measure of acidity or alkalinity. The pH is a logarithmic scale based on a measure of the free hydrogen ions in the water. The scale runs from 0 to 14, where 7 is considered neutral, 0 to 7 is acidic and 7 to 14 is alkaline. Because pH can be affected by dissolved minerals and chemicals, it is an important indicator of the change in water chemistry.

[1] . Total Dissolved Solids (TDS)

High concentrations of TDS may affect taste adversely and deteriorate plumbing and appliances. The EPA recommends that water containing more than 500 mg/l of dissolved solids not be used if other less mineralized supplies are available. However, water containing more than 500 mg/l of TDS is not dangerous to drink. Exclusive of most treated public water supplies, the Missouri River, a few freshwater lakes and scattered wells, very few water supplies in North Dakota contain less than the recommended 500mg/L concentration of total

dissolved solids. Many households in the state use drinking water supplies with concentrations up to 2,000 mg/l and greater. Treatment for household use is reverse osmosis.

[2] . Total Hardness

Hardness is the property that makes water form an insoluble curd with soap and primarily is due to the presence of calcium and magnesium. Very hard waters have no known adverse health effects and may be more palatable than soft waters. Hard water is primarily of concern because it requires more soap for effective cleaning; forms scum and curd; causes yellowing of fabrics; toughens vegetables cooked in the water; and forms scale in boilers, water heaters, pipes and cooking utensils. The hardness of high-quality water should not exceed 270 mg/l.

[3] . Calcium and Magnesium

Calcium and magnesium are the main contributors to water hardness. When water is heated, calcium breaks down and precipitates out of the solution, forming scale. Maximum limits have not been established for calcium. Magnesium concentrations greater than 125 ppm may have a laxative effect on some people. Magnesium levels can be controlled through distillation.

[4] . Chloride

High concentrations of chloride ions can cause water to have an objectionable salty taste and corrode hot-water plumbing systems. High-chloride waters have a laxative effect for some people. An upper limit of 250 mg/l has been set for chloride ions, although noticing the taste at this level is difficult, and even higher concentrations do not appear to cause adverse health effects. An increase in the normal chloride content of water may indicate possible pollution from human sewage, animal manure or industrial wastes.

IV. CONCLUSION

An evaluation of quality of water, report of observation table. It is clearly indicate that the dam water having all physicochemical parameters fall within tolerable limit for drinking purposes but after some purification process.

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Role of Library Professionals in Digital Era

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ABSTRACT

This paper explores the growing needs of information acquisition,processing, storage and dissemination, a large number of new technologies have been adopted and modified by library professionals in digital environment Hence todayLibrarian are known as Information Providers or knowledge officer. It's a refreshing change for library professionals So they need to improve their competences and learn ICT knowledge for their effective utilization to deliver high quality information service to the user community.

I. INTRODUCTION

A knowledge Resource centre is a powerhouse of an institution. Like mitochondria, a KRC Provides the required energy in the form of documents, (book, reports, thesis, CD-ROM, e-books etc.) and the library is one important component of an institute from an Educational point of view, Library Services and information diffusion go hand in hand.

A Library has different sections, i.e. acquisition, Circulation, Cataloguing and classification etc. The main purpose of having a library is not only the construction of repositories of documents but its determination of its users. Librarianship is a Profession, which is an ancient and honorableone. It is a blend of core professional expertise in three areas- Information, information Technology and Users. So we must advance, not in the infrastructure and other components of the library, but in our services, technology and resources.

The invention of world wide web has drastically changed the information environment in an unpredictable way. As a result, the role of librarian changed, who used new techniques to search information in the light of new technology and the requirement of users. Library professionals have to play different roles, and the definition of a library is not limited to books. The definition of the library and its functions is changing from traditional libraries.Which is merely the collection of books to automated libraries and now as electronic or digital libraries.

II. ROLE OF LIBRARY PROFESSIONALS

Now a days, so many number of documents is easily available for users. Day to Day the use of technology is increased. In Academic Library user are Researcher, Teacher, Students and working professionals. They need latest information regarding their domain, due to the cost of books, limitation of a time and space, and availability of resources, user gives priority to the knowledge Resource Centre, Every Resources centre having a good collection but because of dissemination of information user are unable to retrieve information for better

utilization of resources a library professionals need to develop various new techniques for searching the documents easily because the librarian is a mediatorof Information and user. They help to find their information, help how to accessing information, how to find books stocks, and how to use library OPAC from easily searching and fulfill their requirement. In ICT Environment the changing needs of users librarians are expected constantly Enhance their skill in the age of technological Era in order to improve productivity and to achieve objectives. So their roles are-

1. To provide intellectual access to information in any format
2. To evaluate available source of information
3. To organize and structure information
4. To ensure the preservation of information
5. To provide specialized staff to offer instruction and assistance in interpreting resources and access to resources
6. Economic impact

III. CHALLENGES OF LIBRARY PROFESSIONALS IN DIGITAL ENVIRONMENT

In the 21st Century everyone is going through many occupational changes to face the future information dissemination. Technology have transformed the role of not only Libraries but also professionals. Library professionals are facing pressure to become more efficient to deliver more effective services to face the further changing of innovation in the library world. Library professionals need to be confident and competent that they can prepare for new challenges, deal with emerging technologies manage change effectively and claim new professional roles. A well informed Competent and Creative.Library Professionals have to play multiple evolving roles in 21st Century.

A New digital libraries must have ability to provide the users electronic access to all relevant information of E-Learning services and integrate it on network access the world. The other important need will be the availability of Library premises with required Computers network facilities. The new challenges of library professionals is to develop new standards and skills for the Library profession for fulfill the user needs in a pro active way. In this E-Learning and E-Publishing Environment effective services and digital repositories are becoming a must. The most pressing issue and challenges that library and information science Professionals face to the resent digital Era to providing digital information services to the Knowledge are-

1) Availability of E-resources
2) Knowledge Sharing and
3) The transformation of the information.

Today library professionals have to play multiple evolving and Expanding role to face many challenges because information technology will continue change to easy the availability of information at fingertips of the users, and librarians have provide the best services to their stakeholders. Electronic information creator Challenges for the Library community at its very foundation phase moving to away from the traditional paper and print format i.e..

1) Printed Catalogue Verses online Catalogue. (Card Catalogue-OPAC-WEB OPAC- MULTY WEB OPAC.)
2) Reference service to online Reference service (Online Encyclopedia, dictionary etc.)
3) Circulation/ Distribution using online (Reservation, Issues and Return.)
4) Enquiry (Feedback- Chat-Mail, Mobile Chat).

IV. CONCLUSION

Information and Communication technology is developing day to day in all type of Libraries.   A Librarian should have knowledge to handle the technology which is being used in libraries. Various operations of Libraries. New information sources are available as a Librarian we accept technological changes and learn new things, because everyone is going digital transformation journey and Smart Solutions.   In this information digital Era, Easy access to information is an essential pre requisite. It is necessary to enormous needs of all its potential users

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Maintaining Physical Activity during the COVID-19 Crisis

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ABSTRACT

WHO defines Physical activity as any bodily movement produced by skeletal muscles that requires energy, expenditure Physical Activity refers to all movement including during leisure time, for transport to get to and from places or as part of a person's work. Both moderate and Vigorous-intensity physical Activity improve health.

COVID-19 Pandemic Presents many challenges to maintaining of physically active and healthy lifestyle. The closing of gyms, recreation centers, walking track Grounds and pools eliminates many of our favorite fitness options. The in ability to participate in Group bike rides roods races picklball, Tennis, golf outings recreation sports leagues and countless other activities has also taken away many of our favorite fitness and social outings so young and old people are most on important part of regular physical activity.

Countries and communities must take action to provide everyone with more opportunities to be active, in order to increase physical Activity.

I. INTRODUCTION

Regular physical activity is proven to help prevent and treat non-communicable diseases such as heart disease, stroke, diabetes and breast and Colon Cancer. It also helps to Prevent hypertension overweight and obesity and can improve mental health, quality of life and well being.

While on lockdown Physical activity needs to be maintained as it is extremely beneficial to body and mind it is important for controlling diabetes and high blood pressure Maintaining bone strength and Muscle tone through exercise is important especially as the regular outdoor activity is curtailed during the Covid-19 Pandemic Exercise also helps boost immunity reduces the risk to of mental health issues like depression. You can walk for short Periods such as 10 minutes at a time or practice Yoga routines or interval training depending on your age pre existing health Conditions and doctor's advice.

II. TYPES OF ACTIVITY

Aerobic Activity:-

Aerobic Activities make you breathe harder and make your heart and blood Vessels healthier these include :
❖ Walking

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- ❖ Dancing
- ❖ Swimming.
- ❖ Water aerobics
- ❖ Jogging and Running
- ❖ Aerobic Exercise classes.
- ❖ Bicycle riding (Stationary or on a Path)
- ❖ Some gardening activities, such as raking and pushing a lawn mower.
- ❖ Tennis
- ❖ Golfing (Without a cart)

Flexibility:-

Flexibility – enhancing activities ensure a good range or motion in the joints. loss of flexibility can be a Predisposing factor for physical issues, such as Pain Syndrames or balance disorders, Gender age and genetics may all influence range of motion flexibility exercises include.

- ❖ Stretching.
- ❖ Yoga
- ❖ Tai chior or Qi Gong
- ❖ Pilates

Muscle - Strengthening:-

Muscle strengthening activities build up your strength. These activities work all the different Parts of the body legs, hips, back, Chest, Stomach, shoulders and arms- and include.

- ❖ Heavy gardening (digging Shoveling)
- ❖ Lifting weights
- ❖ Push-ups on the Floor or against the wall.
- ❖ Sit ups.
- ❖ Working with resistance bounds long wide rubber strips that Stretch)
- ❖ Pilates.

Stretching Activity:-

Stretching keeps the muscles Flexible, Strong and healthy and we need that Flexibility to maintain a range of motion in the Joints without it the muscles Shorten and become Height. Then, when you call on the muscles for activity they are weak and unable to extend all the way.

These four types of exercise can improve out health and Physical ability muscle strength and boost our endurance.

Benefits of Regular Physical Activity

- ❖ Reduce your risk of a heart attack.
- ❖ Manage your weight better.
- ❖ Have a lower blood Cholesterol level
- ❖ Lower the risk type 2 diabetes and some cancers.
- ❖ Have lower blood pressure.

❖ have stronger bones muscles and Joints and lower risk of developing Osteoporosis.

❖ Lower your risk of falls.

❖ Improve your muscle strength and boost your endurance.

❖ Exercise delivers Oxygen and nutrients to your tissues and helps your cardio vascular system work more efficiently.

❖ When your heart and lung health improve your have more energy to tackle daily chores.

The impact of Covid-19 on Sports Physical Activity and well being and its effects on social development. The Covid-19 Pandemic has spread to almost all countries of the world Social and Physical distancing measures, lockdowns of businesses Schools and overall Social life which have become common place to Curtail the spread of the disease have also disrupted many regular aspects of life including sports and Physical activity. This policy brief high lights the challenges COVID-19 has poses to both the Sporting world and to physical activity and well being including for marginalized or vulnerable groups. It further Provides recommendations for Governments and other stakeholders as well as for the UN system to support the safe reopening of sporting events as well as to support Physical activity during the Pandemic and beyond.

The Impact of COVID-19 on sporting events and the implications for social development:-

Most major sporting events at International, regional and national levels have been cancelled or Post Poned from marathons, to football tournaments, althletics Championships to basketball games, hand ball to ice hockey, rugby, Cricket, Sailing, Skiing, Weightlifting, to wrestling and more. The Olympics 2 Para Olympics for the First time in the history of the modern games have been Post poned, and will be held in 2021.

The closure of education institutions around the words due to Covid-19 has also impacted the Sports education Sector, which is comprised of a brood, range of stakeholders, including national ministries and Local authorities, Public and Private education institution Sports organizations and athletes, NGOs and the business community, teachers, Scholars and coaches, Parents and first and foremost the Mostly young – learners.

While this community has been severely impacted by the current crisis. It can also be a key Contributor to solutions to contain and overcome it as well as in promoting rights and Values in times of social distancing.

The Impact of COVID-19 on Physical activity and Well – being:-

The Global outbreak of COVID-19 has resulted in closure of gyms, Stadiums, Pools, Dance and Fitness Studios Physiotherapy Centre, Parks and Play Grounds. Many individuals are therefore not able to actively participate in their regular individual or group Sporting or Physical activities outside of their homes.

The WHO recommends 150 Minutes of Moderate – intensity or 75 minutes of Vigorous – intensity Physical activity per Week. The benefits of such Periodic exercise are proven very helpful, especially in times of anxiety, Crisis and fear.

Lack of access to exercise and physical activity can also have mental health impacts, which can compound stress or anxiety. That many will experience in the face of isolation from normal social life Possible loss family or friends from the virus and Impact of the virus on one's economic wellbeing and access to nutrition will exacerbate these effects.

The global community has adopted rapidly by creating online content tailored to different people from free tutorials on social media to stretching, Meditation Yoga and dance classes in which the whole family can participate. Educational institutions are providing online learning resources for students to follow at home.

III. CONCLUSION

The Covid-19 Pandemic has had and will continue to have very considerable effects on the sporting world as well as on the physical and mental well being of people around and world.

Physical Activity needs to be main fained as it is extremely beneficial to body and mind. It is important for controlling diabetes and high blood pressure maintaining bone strength and muscle tone, through exercise is important especially as the regular outdoor activity is curtailed during the COVID-19 Pandemic Exercise also helps boost immunity reduces the risk of mental health issues like depression you can wal for short periods such as 10 minutes at a time or practice Yoga routines or interval training, depending on your age pre existing health Conditions and doctor's advice.

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An Efficient Security Mechanism Using Blockchain Technology

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ABSTRACT

Now a days there is large amount of information is available with the world and is stored in the databases and applications. These databases may be centralized or distributed depending on the need of application but the primary concern here is to store such a large amount of data or information efficiently and effectively. Thus there is also an important aspect that has to be kept in mind while dealing with such a large volume and vast amount of data that is how it can be access whenever that data or information is in a distributed database. However it is also a challenging task that these things can be conveniently done without any hurdles.

There is need to develop necessary operations and applications which can work over this situation. The most important aspect of this scenario which we are going to discuss here is the issue related to the security of such vital and crucial information in terms of the various methods and parameters. Thus the proposed system tries to provide the highest level of security to the very large amount of information with great efficiency in terms of block chain technology.

Keywords: Blockchain framework, information security. Databases.

I. INTRODUCTION

This mechanism discuss here in this context is very successful management and is of greater consumer value of the information which is present in the various types and formats in different kinds of applications.

The information present in the different types of applications can be in the form of structured information, unstructured information or semi structured records. Also these all types of information can be categorized on the basis of various constraints where it can be applied.

Moreover these all sort of information can be after the successful storage can be accessed from several sources and databases using the IOT, Sensors and contact network to network and also from mobile to mobile communication. The primary aspect which is very significant in achieving the highest level of security in perusing the essential sensitive data standards [2].

The data may be from the various domains like it may be from the details relating to hospitals or it may be client data biometric data financial data, confidential information and may be all types and sort of sensitive data. As the data is confidential and sensitive therefore any type of improper access to such type of data may lead to data lost from the application or the trust of any business may also lead to break in case of undetermined modification in the data or the misuse of data.

Therefore there is a great need to provide a high level of security constraints over accessing such a crucial data. In other words there has to be full proof security framework is essential to deal with all situations which tries to hamper the data to a great extent.

Hence in order to achieve all such security features for the information system a new and efficient system is proposed. This research focuses on the blockchain technologies to ensure the all sorts of critical data protection. This system of blockchain that is a sort of distributed database and that is also collection of cryptographic generated block of data. It also contains distributed ledger and consensus system and a proper infrastructure for smart contracts.

This study explains the new framework using the blockchain technology for the implementation of the information security using the various schemes for the retrieval and transfer of confidential data. This paper also discusses the different challenges and constraint specific scenario regarding the various needs specific applications for various parameters.

 The blockchain, named the greatest innovation since the invention of the Internet, its success in many ways draws interest. Through its reliable blockchain structure, it has raised the degree of preferably, which poses its differentiation by providing developments in many fields such as health, banking, public and business.

In addition, it has a ground breaking character with the function that excludes the central authority, unlike the classical systems. In terms of perceiving consumer habits, social media, which has become a part of everyday life, offers valuable evidence. Through its insecure framework, social media creates an unstable environment at any moment and can distribute data that can control people. A literature review proposed a solution to this dangerous setting. A blockchain-based architecture was suggested to secure the privacy of users, and the Distributed Partial Ledger   Management   Technique (DEPLEST) algorithm was used. This algorithm ensures that confidential user information is protected by using fewer resources in the classical blockchain than is necessary.

The paper is organized as follows:

Section I Introduction. Section II discusses Background. Section III discusses previous work. Section IV discusses existing methodologies. Section V discusses attributes and parameters and how these are affected on various architectures. Section VI is proposed method. Section VII is experimental tests carried out. Section VIII is outcome and result. Section IX is conclusion. Finally Section X is future scope of this analytical paper.

II. PREVIOUS WORK DONE

The blockchain framework in the health sector has been stressed, as in almost any sector, and different studies have been carried out. In a study conducted, solutions for protection, privacy and efficiency deficiencies were provided to body sensor networks used to track patient health information. A hybrid blockchain structure was given priority in this report, and openness and usability were taken into account and potential attacks were taken into account.[4]

A blockchain framework was built in another study in which patient health information was stored in a distributed way. A blockchain framework was built in another study in which patient health information was transmitted in a distributed way.[5] While the system presents the advantages of the traditional blockchain, it is seen that the new technology does not meet all the health system specifications.[6]

III. EXISTING METHODOLOGIES

The level of usage of IoT devices is growing day by day with the growth of the internet. With these rising products, the need for energy rises and the wasteful use of these resources is met at the same time. A blockchain-based algorithm using the safe method of sharing of resources (SMER) method was suggested in a study conducted to solve this problem. With its open, autonomous nature and stability, it is anticipated that it will be available in future voting systems.[7]

Blockchain was created with a sequential mining method using Multichain source codes in a study on this subject. Furthermore, by using the blind signature method, the secrecy of the identity of the elector was assured. Although the existing mechanism offers voting and counting protections, in the case of online elections, it will remain open to attacks. [6].

There are, however, certain deficiencies in the blockchain, as in any method. The need for a very large database, high power usage, and the existence of dispute concerns are examples of such shortcomings.

The performance of the blockchain structure has been discussed in this paper and the benefits and drawbacks it provides on the basis of the sector and application have beenexamined.

IV. ANALYSIS AND DISCUSSION

This research discusses different parameters and constraints related to the different scenarios and different aspect of the information security using the blockchain technology. The proposed method also ensures that the different drawback from the previous methods discussed earlier should be overcome using the new advanced technology and framework.

V. PROPOSED METHODOLOGY

There are different methods and parameters discussed in the previously designed methods are discussed here and have many features which are interesting to note their behavior and it is also very significant to note the relationship between the different parameters.

Blockchain technology is graded according to the features used and whether the participation of the network is subject to approval or not. There are 3 forms of blockchain, as can be seen from figure 1.

Users do not require approval from any authority in transparent blockchain schemes. Any method can be transparently tracked in this kind of framework. Examples of transparent blockchains include networks including Ethereum, Bitcoin, Litecoin, Monero.

Unique blockchains are networks approved completely by the authority. Who will engage in the network, mining activities and new transactions are subject to authorization. Although it appears to be contradictory to the logic of the blockchain in this arrangement, the operations conducted are isolated from the classical structures with the function of being viewed in a clear manner by each consumer.

In consortium blockchains, Network membership is not available to all and is based on a system of acceptance. This relates to networks formed between organizations coming together for such purposes.

The method is executed and job specifications are described in a closed manner. Therefore, no mechanisms of reconciliation are required. This helps transfers to be executed more rapidly [4].
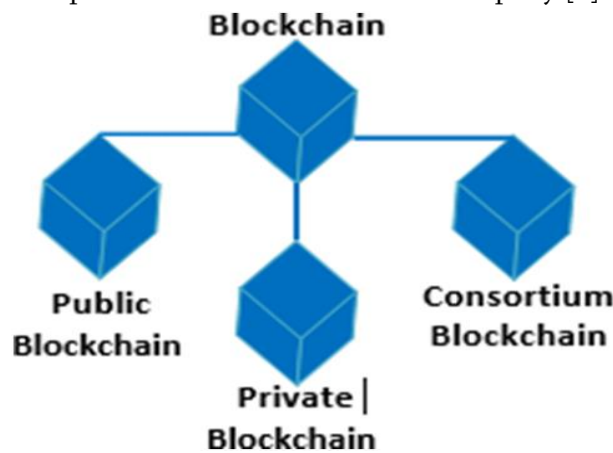

Fig 1: Block chain types

The Hash feature is a feature that takes text as an input and transforms it as an output to a special fixed-length string. These functions are rendered immutable by the uni- directionality of hash functions. In figure, a block diagram explaining this condition is shown.

The node applies to each network unit and has two types. One of them, Light node, is used by keeping block headers to validate the validity of transactions. Even, it is not obliged to obey the laws of consensus. It is the duty of the full node to hold all block information and to enforce the consensus rules.

Encryption is used in case of attack, to protect the blockchain. It is meant to guarantee the secrecy and dignity of the information. For this reason, there are two forms of encryption. There are, respectively, asymmetric and symmetric forms of encryption. A single key is used in symmetric switching, and the same key is used to encrypt and decrypt the data. There are two keys and a logical encryption of these keys in asymmetrical switching. Asymmetric encryption is more efficient than symmetric encryption in this regard.

In the blockchain method, the exchange refers to the movement of digital properties between the parties. The system-approved transactions are registered on the blocks and added to the blockchain. An example block diagram of this approach is given in Figure 2.
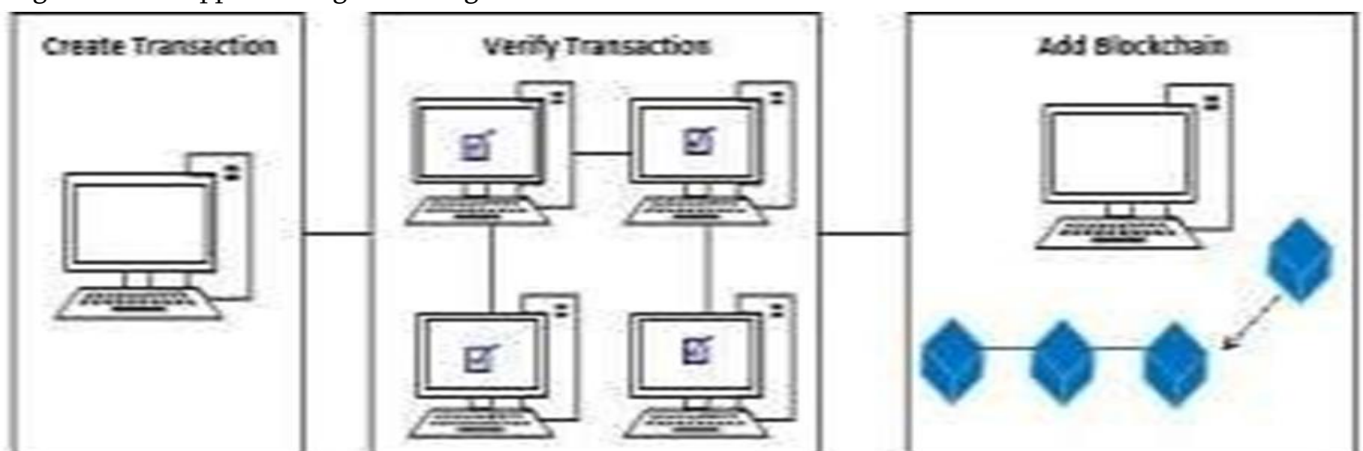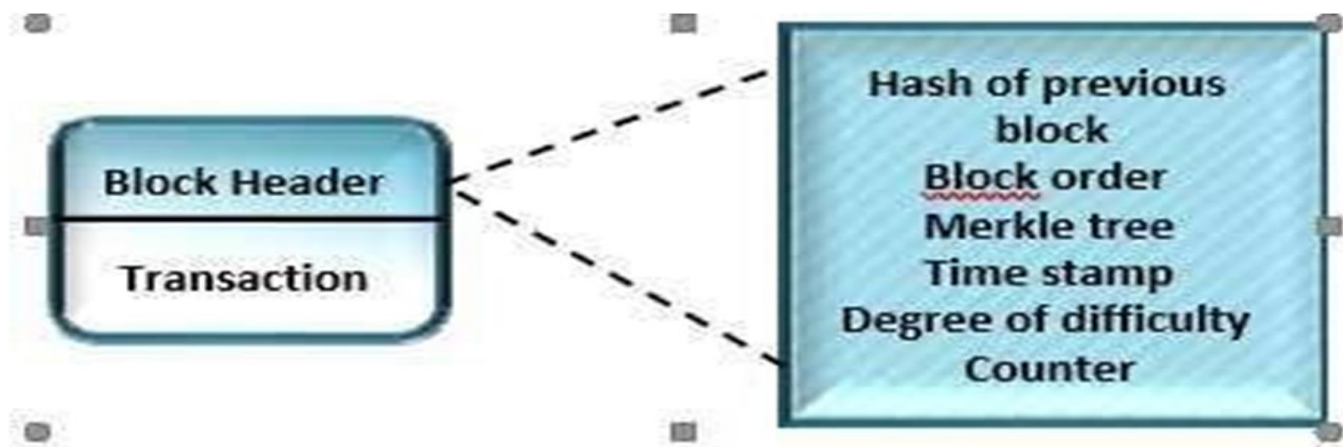

Fig2: Transaction step

Fig 3: Block chain node

Blockchain is an age that enhances an awesome manner to have huge-undertaking consequences such that it can now not genuinely change financial offerings, but also other commercial business and sectors. Billions of individuals and groups are served and trillions of dollars are transported every day around the previous worldwide financial facility.

Despite the fact that dressed up with a virtual presence, however, closely dependent and dependent on paper, there are different problems with that same age. Primary motivation brought price and delay as well as making it far less difficult to cripple it for theft and fraud. Blockchain and its expected advantages make it worthwhile, considering the monetary employer's aversion to trade. Not like conventional systems, Blockchain is dynamic enough to become a trend setter in a charged business scenario for deployment.

The greatest value it guarantees in a blockchain is that every celebration has a report that is kept in a database that everyone has to use. It is a ledger that is commonly exceeded by special users, thereby providing a shared database that is replicated to certain users and who can get access to it better because they have the correct entry for it.

VI. OUTCOME AND RESULTS

Any bank identified upon that blockchain network would just have to update the registry by exporting encrypted consumer data that allows the user's data to be secured. Each bank will have the same ledger with customer details and recent transactions when registered on this website. DLT would provide the customer with a total accountability model for sending money overseas along with consistent connectivity.

As any node present on the network verifies the transaction and saves the transaction history in the blockchain ledger, this will also minimize the time for the transaction to be processed. The double expense problem present in the centralized method would also disappear from this distributed ledger. On-chain settlement with the negligible cost of a contract is also given by this network.

VII. CONCLUSION

With its innovative features, Blockchain has drawn great interest. With its applicability, protection and versatility in almost every industry, it has undergone a rapid phase of growth. The framework of the blockchain brings foundational characteristics to the fields where they are implemented, such as accuracy,

tempo, interoperability and falsifiability. However, daunting challenges, such as the complete replacement of infrastructure by traditional structures, can also be met.

In this research, data on the design of the blockchain is presented and the circumstances found are analyzed on the basis of analysis.

VIII.   FUTURE SCOPE

It is expected that the research in this area and continuous development will eventually result in a several of utility of the proposed design. These strategies will also greatly increase the effectiveness and efficiency of the previous designs.

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Review on Challenges of Sentiment Analysis

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ABSTRACT

Now in this internet era everything is available in the form of websites, blogs, social networks, e-commerce etc. so there is a importance of reviews, opinions, feedbacks by users. These feedbacks generated by users plays important role for business, individuals, governments. Here comes the role of Sentiment Analysis on the basis of feedbacks given by users. But there are several challenges facing the sentiment analysis and its evaluation process.

In this paper presents different perspectives of challenges occurs while finding the accuracy and extract subjective information from text for sentiment analysis and defining its polarity.

Keywords: Sentiment Analysis,emotion analysis, social media, Sarcasm, Multilingual data, text mining, Machine Learning

I. INTRODUCTION

Nowadays with the increasinguse of the internet a lot of information is available on the web which is about the different products, movies, books,technologies etc. People express their views, opinions etc on the different products,services,books etc. on the web or social media.

The sentiment found within comments, feedbackor critiques provide useful indicators form anydifferent purposes. Sentiment Analysis is a taskunder natural language processing which findsorientation of a person opinion or feelings over anentitySentiment analysis is an ongoing research field. InSentiment analysis based on the sentiment value it is decidedwhether the sentence is positive, negative or neutral. Thishelps a lot when need to rely on people's opinion.But there several challenges for analyzing correct sentiment behind the feedback, opinion so it must to understand and found solution on these challenges of sentiment analysis.[1][2][3]

II. CHALLENGES OF SENTIMENT ANALYSIS

❖   **Sarcasm**

Problem

People use irony and sarcasm in casual conversations and memes on social media. The act of expressing negative sentiment using backhanded compliments can make it difficult for sentiment analysis tools to detect the true context of what the response is actually implying. This can often result in a higher volume of "positive" feedback that is actually negative.

Solution

A top-tier sentiment analysis API will be able to detect the context of the language used and everything else involved in creating actual sentiment when a person posts something. For this, the language dataset on which the sentiment analysis model has been trained, needs to not only be precise but also massive.[4]

❖   **Polarity**

Problem

Words such as "love" and "hate" are high on positive (+1) and negative (-1) scores in polarity. These are easy to understand. But there are in-between conjugations of words such as "not so bad" that can mean "average" and hence lie in mid-polarity. Sometimes phrases like these get left out, which dilutes the sentiment score.

Solution

Sentiment analysis tools can easily figure out these mid-polar phrases and words in order to give a holistic view of a comment. In this context, a topic-based sentiment analysis can give a well-rounded analysis, but with aspect-based sentiment analysis, one can get an in-depth view of many aspects within a comment.[8]

❖   **Idioms**

Problem

Machine learning programs don't necessarily understand a figure of speech. For example, an idiom like "not my cup of tea" will boggle the algorithm because it understands things in the literal sense. Hence, when an idiom is used in a comment or a review, the sentence can be misconstrued by the algorithm or even ignored. To overcome this problem a sentiment analysis platform needs to be trained in understanding idioms. When it comes to multiple languages, this problem becomes manifold.

Solution

The only way this challenge can be met with sentiment analysis accuracy is if the neural networks in an emotion mining API are trained to understand and interpret idioms. Idioms are mapped according to nouns that denote emotions like anger, joy, determination, success, etc. and then the models are trained accordingly. Suffice to say, only then can a tool for analyzing sentiment give accurate insights from such text.

❖   **Negations**

Problem

Negations, given by words such as not, never, cannot, were not, etc. can confuse the Machine Learning model. For example, a machine algorithm needs to understand that a phrase that says, "I can't not go to my class reunion", means that the person intends to go to the class reunion.

Solution

A sentiment analysis platform has to be trained to understand that double negatives outweigh each other and turn a sentence into a positive. This can only be done when there is enough corpus to train the algorithm and it

has the maximum number of negation words possible to make the optimum number of permutations and combinations.

❖   **Comparative sentences**

Problem

Comparative sentences can be tricky because they may not always give an opinion. Much of it has to be deduced. For example, when somebody writes, "the Galaxy S51is larger than the Apple iphone15", the sentence does not mention any negative or positive emotion but rather states a relative ordering in terms of the size of the two phones.

Solution

Sentiment analysis accuracy can be achieved in this case when a sentiment model can compare the extent to which an entity has one property to a greater or lesser extent than another property. And then tie that to a negative or positive sentiment. This is not an issue of simply having a corpus of negative or positive sentiment-specific words, but in training the artificial intelligence machine to actually pull together information from its knowledge graph and analyze the relationship between entities, words, and emotions.

❖   **Multilingual data**

Problem

All the problems listed above get compounded when a mix of languages are thrown in. Each language needs a unique part-of-speech tagger, lemmatizer, and grammatical constructs to understand negations. Because each language is unique, it cannot be translated into a base language like say, English, to extract insights. A simple example being, if an idiom "like a fish takes to water" is translated into say, German, the idiom would have lost its meaning.

Solution

The only way these sentiment analysis challenges for multilingual data can be overcome is the hard way. This means that the sentiment analysis model needs to have a uniquely trained platform and named entity recognition model for each language. There is no shortcut to this because the model needs to be trained in each language manually by data scientists. This is a time-consuming process that needs precision and diligence. But the results are worth it because it will give you the highest sentiment analysis accuracy scores as possible. [5][6][7]

❖   **Audio-visual data**

Problem

Videos are not the same as text data. The challenge is not only that videos need to be transcribed but that they may have captions that need to be analyzed for brand logos. Social media videos also come with comments in addition to the video data.

Solution

A sentiment analyzer can give accurate insights from your data if it extracts information from video content as easily as from text data. For this, it needs to have a video content analysis model that can break down videos to extract entities and glean insights about customer opinion, product insights, and brand logos.

❖   **Emojis**

Problem

The problem with social media content that is text-based, like Twitter, is that they are inundated with emojis. NLP tasks are trained to be language specific. While they can extract text from even images, emojis are a language in itself. Most emotion analysis solutions treat emojis like special characters that are removed from

the data during the process of text mining. But doing so means that companies will not receive holistic insights from the data.

Solution

To meet sentiment analysis challenges like this, a company needs to employ an emotion analyzer tool that can decode the language in emojis and not club them with special characters like commas, spaces or full stops. This in itself is a very advanced application where models like Repustate's are trained specifically for it. Data scientists first analyze whether people use emojis more frequently in positive or negative events, and then train the models to learn the correlation between words and different emojis. [8][9][10][17]

III. SENTIMENT CHALLENGES RELATED TO

❖   **Content-Related Challenges: Hashtags**

In the context of sentiment analysis,using emoticons such as :) and :(aspositive and negative labels, respectively,is one way of using distantsupervision. Hashtags are also widelyused for different machine learningtasks such as emotion identification. People use a plethora of hashtagsin their tweets about an election.Because of the dynamic nature of theelection domain, the quality, quantity,and freshness of labeled dataplay a vital role in creating a robustclassifier.

In election showed thathashtags were widely used for sarcasm, those hashtags as afeature for our classifier will decreaseaccuracy rather than increase it.

❖   **Content-Related Challenges: Links**

All existing techniques for tweet classifiersrely solely on tweet content andignore the content of the documentsthey point to through a URL. Those links arecrucial since without them, the tweetis often incomplete and inferring thesentiment is impossible or difficulteven for a human annotator.Therefore, we hypothesize thatincorporating the content, keywords,or title of the documents that a URLpoints to as a feature will increaseour performance. To the best of ourknowledge, there is no work on tweetclassification that expands tweetsbased on their URLs. However, linkexpansion has successfully beenapplied to other problems such astopical anomaly detection and distantsupervision.

❖   **Interpretation-Related Challenges: Sentiment Versus Emotion Analysis**

The study of sentiment has evolved tothe study of emotions, which has finergranularity. Positive, negative, andneutral sentiments can be expressedwith different emotions such as joyand love for positive polarity; anxietyand sadness for negative; and apathyfor neutral sentiment.

It is considered that emotion as a better criterionfor predicting people's actions, suchas voting, and usually there are significantemotional differences in thetweets that belong to the same polarity.[15]

❖   **Interpretation-Related Challenges: Vote versus Engagement Counting**

Most or all of the aforementionedchallenges affect the quality of oursentiment analysis approach. At the time of election, it is alsoimportant to correlate a user's onlinebehavior and opinion with that individual'sactual vote. First, the more a user tweets,the more reliably we can predict theuser's opinion. Second, highly activepeople are usually more influentialand more likely to actually vote inthe real world. That is why an electionmonitoring system should reportboth user-level normalized sentimentand tweet-level sentiment. The enduser analyzer must consider both factorsin prediction.

❖ **Trustworthiness-Related Challenges**

A social bot isa computer algorithm that automaticallygenerates content over socialmedia and tries to emulate and possiblychange public attitude. For thelast few years, social bots have inhabitedsocial media platforms. Similarto media reports,we also witnessbot wars between the two sides.

Research targeting pinpointingsources include use of supervisedstatistical models utilizing networkfeatures including retweets, mentions,and hashtag co-occurrence,20user features (such as language,geographical locations, account creationtime, and number of followersand followees), and timing features(such as content generation andconsumption, measuring tweet rate,and intertweet time distribution).Our effort to identify the sourcethat generates a tweet (checkingwhether or not it originates from anAPI) using a hybrid and empiricalapproach gave fairly good resultsas elsewhere. [11] [12]

IV. SOME OTHER TYPE OFSUBJECTIVITY DETECTION CHALLENGES CAN CONFUSE THE MODEL TRAINED FOR POSITIVE AND NEGATIVE CLASSIFICATION

1. The first challenge is that subjectivity detection itself is a subjective task, i.e., a piece of text may be neutral to some people but not to others.
2. The second challenge is improving the accuracy of subjectivity detection in short texts.
3. The third challenge is context dependency. Some words may be objective out of context but could assume subjectivity in a specific context or domain
4. The fourth challenge is reducing the computational cost of training features from a large vocabulary of words[13][14][15][16]

V. CONCLUSION

In this paper discussed the importance and effects of sentimentanalysis for decision making for individuals, company, organizations, government but there are several challenges in sentiment analysis and evaluation. These challenges become the obstacles for finding accurate, subjective analysis of given data. This paper presented moreover all type of challenges of sentiment analysis and also these area open for new researcher for further research in this field.

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Survey of Problems Faced by Remote Area Students in Online Learning Apps

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ABSTRACT

Intend of this survey study to find out difficulties of spreading online education in the rural part of India. In this, we studied the problems faced by the students in the village in an online application like Zoom, Google meet, team Link & Microsoft team. Rural students are facing a lot of difficulties in the online education system. With this in mind, we asked the students in the village about the difficulties they faced in getting online education. We created a questionnaire on Google Forms and sent those questionnaires to college students in the village. It was found that, the maximum student's used Zoom as well as Google meet application. Rural students do not have enough Internet data, network to get online education also there are no electronic devices like mobile, laptops etc.

Key words: - Learning Apps, Zoom, Google meet, Team link, Internet network, Rural.

I. INTRODUCTION

The Covid-19 pandemic has made digital learning an integral part of the educational landscape of India [1]. However, the spread of digital education has been hampered by the great divide between the haves and the have-nots. Many students are not provided with the high bandwidth or the strong internet connection that online courses require, and thus fail to catch up with their virtual classmates [2]: Their weak monitors make it hard to follow the Course Management System and their learning experience becomes problematic. Moreover, most of them live off campus and find it difficult to keep in tune with the technical requirements of the chosen course. Some of them don't even own computers and seek help in Learning Resource Centers for technical assistance. The only solution to this problem is knowing exactly what kind of technological support they will need for a certain course before enrolling in it, as well as properly equipping themselves for the course's successful completion.When it comes to Online Education or E-Learning, rural population is not completely equipped with utilities like fast internet, uninterrupted power supply and electronic devices [3]. There have been improvements regarding basic infrastructural facilities but many rural areas in India are still grappling with these challenges to make education completely digital or online.While we look at the domain of digital learning, it is imperative to consider the availability of the right devices to every student for accessing digital content. Not a lot of people in rural India have access to personal laptops or computers, and phone screens are not conducive to long learning hours. Also, data packs and their costs can be a big deterrent both for teachers as

well as learners, especially for live classes. Many students either don't have personal laptops/smartphones or they are available for a limited time. Hence, the learning remains restricted with the limited availability of technological devices .e- online applications for academic purposes are called online learning app. Such applications make use of an internet connection. An Online learning app can be accessed from a smartphone. It is a technology-based study tool that enables information sharing. It is commonly known as mobile apps for learning [4]. The purpose of this survey is to actual problem faced by student during the use of online meeting application.

II. MATERIAL &METHOD

Google forms are widely used to create surveys easily and quickly since they allow you to plan events, ask questions to your employees or clients and collect diverse type of information in a simple and efficient way. Google forms allow us to include different types of questions such as short answers, paragraphs, multiple selection, verification boxes, pull-down, linear scale, grid of several options, among others.

- It is a free online tool, that allows you to collect information easily and efficiently.
- With Google forms you can create surveys in few minutes to ask your clients or collaborators information about your products or service.
- To start using this tool, you only need a Google account, the same one you need to access Gmail, YouTube or Google Drive.
- The interface is very easy to use. Any user with an average Internet knowledge can create forms using this tool.
- The assistant is simple to use. The What-You-See-Is-What-You-Get interface makes it easy to drag and drop form elements and organize them based on actions or events.
- At the design level it is possible to choose between a palette of colours, as well as own images as a background.
- Google forms stores the feedback received so we can analyze it in detail.
- The forms are integrated with Google spreadsheets therefore we can access to a spreadsheet view of the collected data.
- The general configuration of forms or surveys allows you to collect the recipient's email address and limit the answers.
- For advanced users, the type of data that can be inserted into a field can be customized using regular expressions. This helps customize the form even more.
- Google forms allows us to see how the survey will look before sending it over to the recipients.
- We can send the form by email, integrate it into our website or send the link via social networks or any other means.
- With this tool, you can get unlimited questions and answers at no cost, while other survey tools require a payment depending on the number of questions and recipients.

Google forms can facilitate the contact with your customers or with your organization members and it is very helpful to gather information that might allow you to have a greater control of your company production and distribution processes. It can also help you to see and analyze your workers' performance.

III. RESULT &DISCUSSION

We collected information by using Google form of undergraduate & post graduate students from remote area of Maharashtra. We collected it in the form of questions about problems faced by students during online learning on various online learning meeting applications. Following are the questions had been asked in Google form.
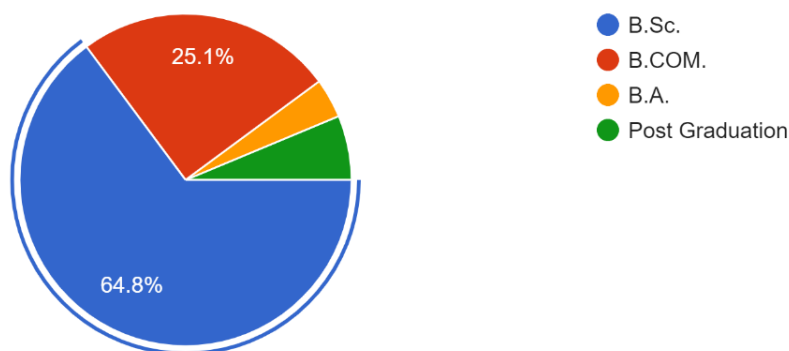
Class:-
287 responses

Fig.(1) Student stream wise responces

From fig(1) We got 287 responses from students of different villages in Maharashtra. It has 64.8 per cent response given by B.Sc students, 25.1% responces by B.Com, 10.1% responces by B.A. and Post Graduate students.

Q-1 Which online app have you used for online Learning.
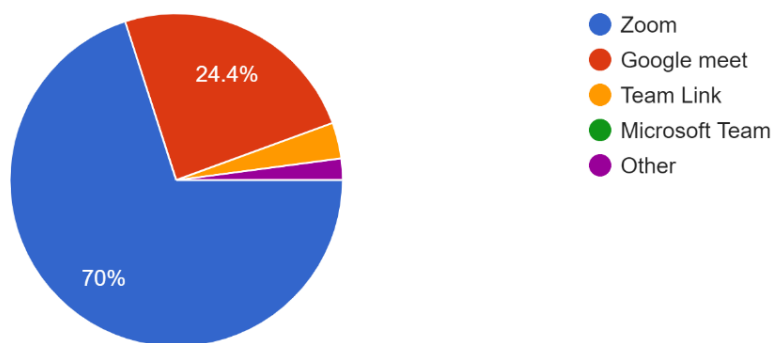287 responses

Fig. (2) % of online app. Used by Students.

From Fig (2) shows the percentage of online used by student from remote area. 70% student had used Zoom App, 24.4% Student used Google meet, 5.6% students used Microsoft team and other app.

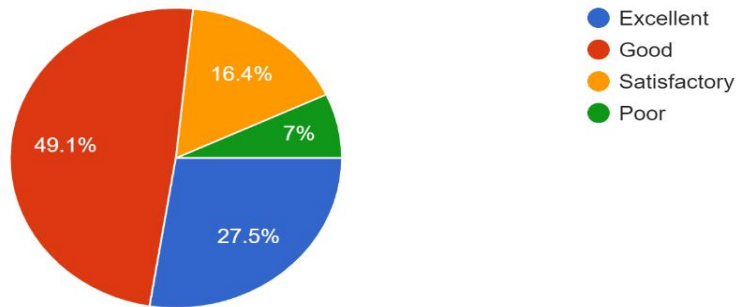Q-2 How was experience About the app.
287 responses

Fig.(3) Experience share by student about the app.

From fig(3) 49.1% of the students have good experience about the app. ,27.5% Student excellent experience , 16.4% Satisfactory, 7% poor.

Q-3 How was the experience about the Video clarity of the app.
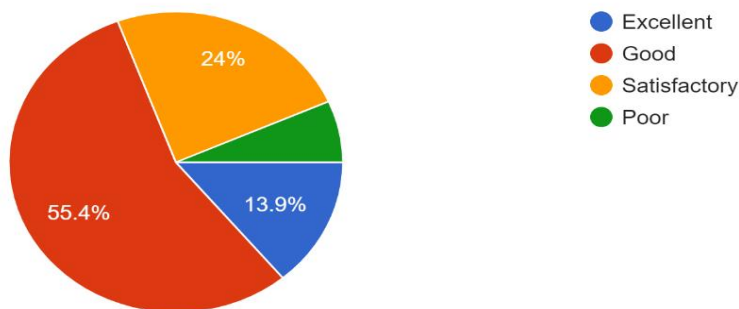287 responses

Fig. (4) Experience share by student about clarity

From fig(4) 55.4% of the students have good experience about the video clarity of app. ,13.9% Student excellent experience , 24% Satisfactory, 6.7 % poor.

Q-4 How was the experience about the Audio clarity of the app.
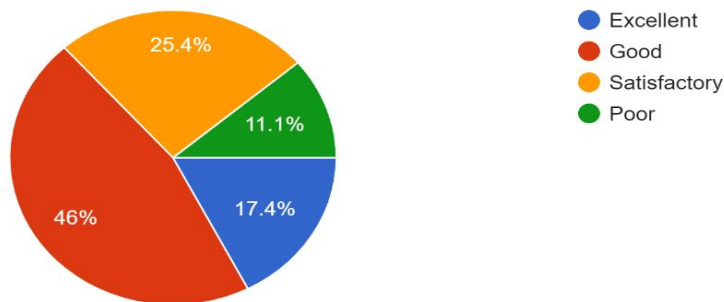287 responses

Fig. (5) Experience share by student about audio clarity.

From fig.(5) 46% of the students have good experience about the audio clarity of app. ,17.4% Student excellent experience , 25.4% Satisfactory, 11.1 % poor.

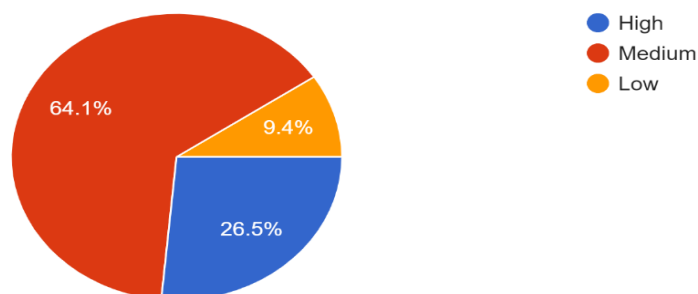Q-6 Internet Data consumption of the app.
287 responses

Fig (6) Internet data consumption.

From fig(7) 26.5 % of student says that internet data consumption is High, 64.1% of students says that the data consumption is medium, 9.4% of student says that the data consumption is low.
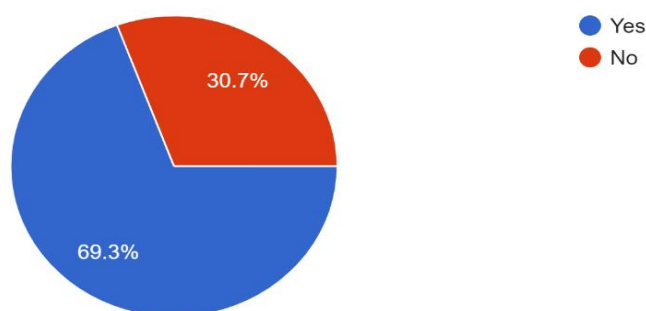
Q-6 Does this app easily accessible.
287 responses

Fig (7) about accessibility

From fig. (7) 69.3% says it was easily accessible and 30.7% says it does not easily accessible.
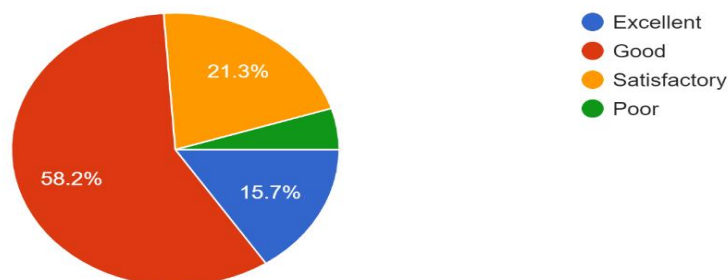
Q-7 Overall Experience about the app.
287 responses

Fig (8) Overall experience about the app.

From fig (8) 58.2 % of the students had Good experience,21.3% satisfactory,15.7% Excellent and remaining Poor experience.

We asked the students for their opinion on whether online education is good or offline, Here is the answer to the question whether online education is good or offline education is good.The Opinion of the students more and more students want offline education because the most of the students faced problem about network, insufficient mobile/computer/laptop devices.

IV. CONCLUSION

From collected data & their analysis, it observed that Maximum students from the rural area used Zoom as well as Google meet application.It was observed that most of the students in the villages had problems due to network problems and lack of electronic equipment. still there is no proper meeting application working at low mbps/kbps network for remote area. From this it can be concluded that an app running on a low network should be developed for rural students.

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Current Trends of Nanotechnology in Cancer Therapy : A Review

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ABSTRACT

Nanotechnology is one of the fastest developing areas in the 21st century. In diagnostics and therapeutics of various diseases, several different types of nanosystems are being used. Significant attention has also been given to nanotechnology to overcome the shortcomings of conventional anticancer therapy. Cancer nanotechnology is a comparatively recent interdisciplinary field of extensive research that links the fundamental sciences, like chemistry, biology, medicine, and engineering. In recent decades, several organic and inorganic nanomaterials have developed as pioneering tools for tumor diagnostics and therapeutics due to their novel features, including drug protection, solubilization effect, active/passive tumor targeting, controlled release of drugs, which lead to improved anticancer efficacy while minimizing the side effects. This review is an overview of nanomaterials' key characteristics, for example, size, surface characteristics, and tumor targeting. It also compiles the advances and prospects in applications of nanotechnology for anticancer therapy along with a brief overview of the preparation of different kinds of nanoparticles.

Keywords: Nanotechnology, Cancer, Drugs, Nanosystems, Nanomaterials, Nanoparticals

I. INTRODUCTION

Cancer is one of the primary diseases that threaten human lives. It is a number one cause of death worldwide, especially in developing nations, and is accountable for an estimated 9.6 million deaths in 2018, according to WHO (World Health Organisation). The modern therapeutic methods, including surgery, chemotherapy, and radiotherapy, are linked to high systemic toxicity, restricting their tolerability and clinical applicability. Lower specificity and sensitivity in recognizing precancerous conditions and initial malignancy with a low false-positive rate, failure to identify the tumor stage, and high costs also entail limited traditional cancer screening technology. Through various studies, it is becoming apparent that the low survival rate is due to the lack of adequate drug delivery systems. Recently, nanomaterials have gained considerable interest from researchers inquisitive about cancer therapeutics because of their versatile physical and chemical properties to facilitate the transport of the antitumor medication to oncogenic tissue while minimizing its concentration and toxicity in healthy tissue. Properties of nanoparticles (NPs) have rendered many nanoparticle-based therapeutic

applications into clinical trials within the last decade. Various inorganic and organic nanomaterials have appeared as innovative methods for tumor detection and treatment.

This review deals with the recent development and novel solution that made possible by the advent of nanotechnology with stress on therapeutic agent delivery, and tumor imaging, including inorganic nanomaterials, like carbon-based nanoparticles, magnetic NPs, gold NPs, and emerging organic nanomaterials, such as liposomes, polymeric micelles, polymeric nanoparticles, and dendrimers.

II. PROPERTIES OF NANOMATERIALS USED IN DRUG DELIVERY SYSTEM

- **Size**

Nanomaterials are small in size and are comparable to biological macromolecules like peptides, proteins, and nucleic acids. They usually have a diameter of tens of nanometers and are about a hundred times smaller than the size of one cancer cell. Nanomaterials show a more extensive intracellular absorption than micron-sized particles because of their small size and dimensional similarities to biomolecules and thus are ideal candidates for the delivery of cancer-targeted drugs[1,2]. Although conventional nanotechnology investigates particles between 1 and 100 nm in size, the development of nanoparticles with sizes from 100 to 200 nm has been identified as ideal for intravenous administration in the human body[3]. This size range prevents the active renal elimination (NP size <5 nm), the aggregation in the liver (NP size <50 nm) and spleen (NP size >200 nm) while retaining the ability to extravasate through the tumor fenestrae (NP size <200 nm)[4]. One of the advantages of nanomaterials is that their size can be tailored. The dimensions of NPs also influence circulation half-life and tumor aggregation[5].

- **Surface Properties**

Surface features can enhance NPs stability and increase their circulation in the blood, which then increases passive accumulation in oncogenic cells through the EPR (enhanced permeability and retention) effect5. Furthermore, surface properties can efficaciously affect the hydrophobic and electrostatic interactions between NPs and clearance by opsonization (enhanced attachment)[6].The hydrophilic surface of nanomaterials can preferably avoid the capture of macrophages. PEGylation, which refers to the process of covalent and non-covalent attachment or amalgamation of polyethylene glycol (PEG) or its derivatives to NPs, is one of the most favored approaches to effectively limit plasma proteins binding, interaction with opsonins, and clearance by the RES system[7,8].

- **TumourTargeting by Nanoparticles**

One of the benefits of nanotechnology for chemotherapeutics is selective tumor targeting, i.e., the potential to distinguish carcinogenic cells from healthy cells and selectively destroy the malignant cells. Generally, NPs can target the tumor cells either by two mechanisms-active and passive[9].

a) Passive Targeting.

This approach can efficiently improve drug bioavailability and efficacy: it uses the anatomical and functional discrepancies between healthy and tumor vasculature to transport the drug to a targeted site or might involve a localized transfer[10]. As apoptosis is suspended in malignant cells, they continue absorbing nutrients abnormally through the blood vessels and causing them wide and leaky around the cells incited by angiogenesis.Due to deformities in the basement membrane and reduced numbers of pericytes, leaky blood vessels are formed, which quickly proliferate endothelial cells[11]. Hence, molecules' permeability to pass through the vessel wall

into the interstitium surrounding tumor cells is increased.The pore sizes of leaky endothelial cells vary from 100 to 780 nm[12,13]. Thus,nanoparticles below this scale can easily move through pores. As a result, it helps to efflux the nanoparticles to cluster around the cancer cells[5,14]. Nanoparticles are often targeted to a distinct region of capillary endothelium to accumulate the drug within a particular organ and perforate the neoplastic cells by passive diffusion or convection.Lymphatic drainage imbalance facilitates the diffusion process. The tumor interstitium contains a collagen network and a gel-like fluid. The latter has strong interstitial pressures that oppose the molecules' internal flux. Consequently, drugs that enter the interstitial area in the tumor interstitium may have prolonged retention time. This characteristic is known as the enhanced permeability and retention (EPR) effect and aids tumor interstitial drug aggregation[15,16]. Nanoparticles can selectively accumulate by improved permeability and retention effect and then diffuse into cells[17]. The distinctive microenvironment of tumor cells varies from that of normal cells also contributes to passive targeting. Hyperproliferative, fast-growing melanoma cells have a high metabolic rate, but the limited supply of oxygen and nutrients is typically not sufficient for them to maintain this. Tumor cells, therefore, utilize glycolysis to gain additional energy and induce an acidic environment. The pH-sensitive liposomes are engineered to be physiologically stable at a pH of 7.4, but they degrade to release the active drug in target tissues where the pH is less than physiologic values, such as in the acidic environment of tumor cells. Also, tumor cells express and release unique enzymes that are involved in their movement and survival mechanisms[10].

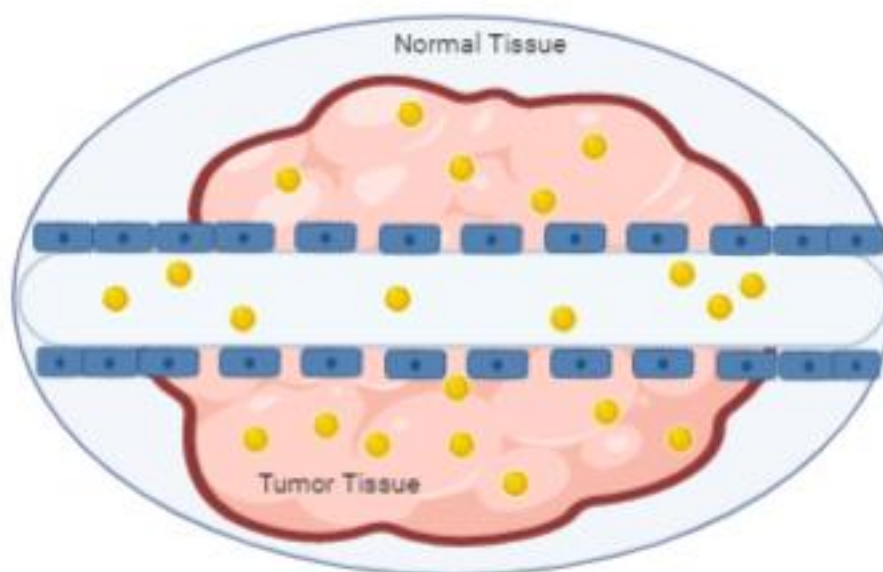Fig.1: Passive targeting by Enhanced Permeability and Retention (EPR).

b) Active Targeting.

The passive drug delivery systems employing a binary structure conjugate inevitably have intrinsic limitations to the degree of targeting specificity they will achieve. To overcome these limitations active targeting is encouraged[10]. In the case of active targeting, nanoparticles containing the chemotherapeutic agents are designed in such a way as they directly interact with the defective cells. Active targeting is predicated on molecular recognition[14,18]. Hence, the surface of the nanoparticles is modified to target the malignant cells. Usually, targeting agents are attached to the surface of nanoparticles for molecular recognition. Designed nanoparticles target the cancerous cells either by ligand-receptor interaction or antibody-antigen recognition[19,20]. The active targeting delivery system has three main components: (i) an apoptosis-inducing

agent (an anticancer drug), (ii) a targeting moiety-penetration enhancer, and (iii) a carrier. Particles containing chemotherapeutic agents are engulfed by phagocytes and rapidly removed by the reticuloendothelial system (RES). A range of strategies was developed to sustain the nanoparticles in the bloodstream one of which is the modification of the polymeric composition of the carrier. Nanoparticles are coated with hydrophilic polymers to avoid washout and remain in the bloodstream for a longer period that can sufficiently target cancerous cells[14]. Hydrophilic polymer coating on the nanoparticle surface repels plasma proteins and escapes from being opsonized and cleared. This is defined as a "cloud" effect[21,22]. Commonly employed hydrophilic polymers are polyethylene glycol (PEG), poloxamines, poloxamers, polysaccharides, and so forth[23,24]. Cancerous cells have some receptors that are overexpressed on their surface that make them distinguishing. Attachment of the complementary ligands on the surface of nanoparticles makes them able to target only the cancerous cells. Once the nanoparticles bind with the receptors, they rapidly undergo receptor-mediated endocytosis or phagocytosis by cells, resulting in cell internalization of the encapsulated drug[14]. A variety of chemical and biological molecules have been used to direct NPs to malignant cells expressing the molecular target receptor including monoclonal antibodies, small molecules, and nucleic acid aptamers[25–27].
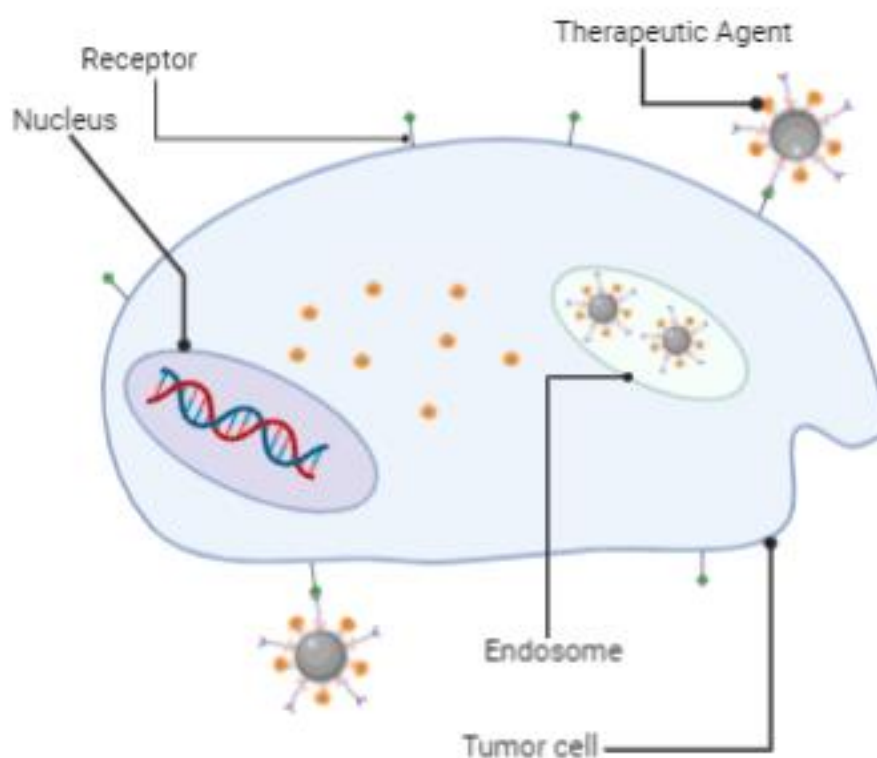
Fig.2: Active targeting.

III. ORGANIC NANOMATERIALS FOR CANCER THERAPY

a) Polymeric Miscelles

Polymeric micelles (PMs), are spherical, nano-sized colloidal particles with amphiphilic block copolymers i.e., hydrophobic core for water-insoluble and hydrophilic shell meant to hydrophilic drug molecules. The hydrophobic shell is equipped with PEG, which helps to stabilize the carriers and protect them from degradation by reducing unspecific interactions in vivo[28,29]. The hydrophobic core is made up of several natural or synthetic polymers, including polysaccharides, poly(ε-caprolactone) (PCL), poly(lactide) (PLA), and

poly(lactic-co-glycolic acid) (PLGA). The hydrophobicity gives an ideal medium to capture hydrophobic drugs, helping to solve their poor water solubility. The small size with narrow distribution likewise makes polymeric micelles perfect nano-drug delivery systems as it could avoid rapid renal excretion, helping to obtain a long circulation time[30,31]. As they could load and deliver drugs to the desired function site, improving the pharmacokinetics of the loaded drug and decrease non-specific toxicity, polymeric micelles have been broadly investigated as drug carriers in recent decades. The special properties of micelles are critical micelle concentration (CMC), cumulative number, size, and shape of the final structure. These properties are dependent on the polymer chains in copolymer blocks. Polymer micelles with lower CMC has a higher solubility for the loaded drug and higher micelle stability[32].

Since the natural pH gradient exists in the tumor microenvironment and intracellular endo/lysosome, pH-sensitive degradable micelles are recently emerging as a promising platform for antitumor drug delivery[33,34]. Recently, intracellularly acid-switchable micelles were prepared for accomplishing combinational therapy against drug-resistant tumors[35]. Furthermore, while modified with the nucleosome-specific monoclonal antibody, the micelles showed greatly enhanced endocytosis efficiency and antitumor efficacy.

Micelles are extremely efficient in DDS due to their high capability, drug loading variable, high stability in physiologic conditions, lower dissolution rate, more drug accumulation in the targeted place, and surface modifications. Two polymer micelles, called NK911 and NK105, have been acquainted with the medication showcase and contain doxorubicin and paclitaxel, individually[36,37].

b) Liposomes

Liposomes were first discovered by Alec D. Bangham in 1961. These are self-assembling NPs with closed membrane structures. They are concentric lipid bilayer vesicles in which aqueous phase is encapsulated by a membranous lipid bilayer mainly comprising of natural and/or synthetic phospholipids which constitutes both hydrophobic tail and hydrophilic polar head. The liposomes encapsulate the solvents freely floating in the inside[38].

Liposomes can be created from cholesterol and natural nontoxic phospholipids and can be synthesized by the sonication or extrusion method[39]. The polymer cores are then mixed with the lipids at adequate molar ratios to synthesize lipid-polymer hybrid nanoparticles by high-pressure homogenization, needle extrusion, or simply vortexing[38]. After vortexing, unilamellar liposomes are extruded under high pressure, which can be further purified by column chromatography or ultracentrifugation[5]. Many liposome-based nanoformulations of natural drugs likenux vomica, quercetin, and diospyrin have been manufactured and analyzed for their antitumor, anticancer, and antioxidant activities.

These structures are suitable for drug delivery as they have an amphiphilic and viable nature with easy surface modifications. For example, PEG (polyethylene glycol) modified liposome to deliver H_2O_2 and catalase (CAT) to relieve tumor hypoxia[40].Liposome/protamine/hyaluronic acid (LPH) is designed to carry nucleic acids via positive and negative charge interaction between protamine and nucleic acid[41].Besides, liposomes can effectively load various bioactive molecules, including enzymes and nucleic acids[42,43]. They have been proven to be beneficial for therapeutic compound stabilization, cellular and tissue uptake of therapeutic compounds, and bio-distribution of compounds to target sites in vivo[44,45]. For instance, Doxil, a PEGylated liposomal DOX, has been approved by the US Food and Drug Administration (FDA) for cancer therapy, as it could improve the plasma pharmacokinetics and tissue distribution[5].

Liposomes can also be functionalized with imaging contrast agents, providing combined diagnostic and therapeutic functions. Recently, a theranostic liposomal drug delivery system was prepared to realize a real-time image of bio-distribution by MRI and accomplish chemotherapy through the carried anticancer drug. Compared to commercial MRI contrast agent Omniscan®, this liposome showed a 36-fold higher T1 relaxation rate; moreover, its circulation time could reach 300 min in vivo[46].

c) Polymeric Nanoparticles

The most well-known NP drug carriers are polymers. Polymeric NPs are composed of either natural polymers like chitosan, gelatin, agarose, etc or synthetic polymers such as poly(ε-caprolactone) (PCL), poly (lactic-co-glycolic) acid (PLGA), polyvinyl alcohol (PVA), polyethylene glycol (PEG), etc[47]. Several methods are used for the synthesis of polymeric NPs, including emulsification and solvent evaporation/extraction[48], nanoprecipitation (solvent displacement)[49,50], supercritical antisolvent method[51], and salting-out[52,53].

Polymeric NPs display excellent pharmacokinetic properties, including drug load and drug stability, compared to polymeric micelles. They can improve the therapeutic effect of anticancer treatment through passive targeting via the EPR effect[5]. In these polymeric structures, drugs can be adsorbed on the surface or entrapped in the core of the polymeric matrix. The advantages of polymer NPs are their high stability and mass production. Polymer NPs contain vesicular (nanocapsules) and matrix systems (nanospheres)[18]. In nanocapsules, the drug is stored in a polymer cistern. However, in nanospheres, the drug disperses on the polymer matrix[54-56]. Abraxane is the first polymer nanodrug to be introduced into the pharmmaceuticalmarket in 2005. It contains NPs of paclitaxel drug, which is related to albumin. This formulation contains no chromophore electroluminescent (EL) compound. Chromophore-EL increases the solubility of paclitaxel[18]. It has been demonstrated that nanotechnology can overcome the limitations of the science of formulation.

Polymeric NPs loaded with imaging agents, namely, gadolinium complexes and magnetic NPs have been extensively explored to image cancer by magnetic resonance imaging (MRI). Typically, imaging agents were encapsulated into the core of the polymeric NPs[5].

d) Dendrimers

Dendrimers are monodisperse macromolecules with extremely branched tree-like structure and specific form and size. Their surface is often altered with chemical reactions and physical interventions[18]. They could load drugs and gene molecules through simple electrostatic interactions, encapsulations, and covalent conjugations. Dendrimers possess empty internal cavities and a remarkably higher density of surface functional group ($-NH_2$ or $-COOH$), which makes them suitable vectors for anticancer therapeutics. Furthermore, due to their exceptionally small size, dendritic carriers (1–15 nm), can be cleared from the blood through the kidneys, which can decrease their toxicity in vivo.

Drug molecules are attached to dendrimers in complex or capsule forms[37,57]. In the 70s, Fritz Vögtle and Donald Tomalia were the primary ones who attempted dendrimers synthesis and invented tree-like structures by conjugating the monomers to each other[58]. Vivagel® is the first dendrimer NP system that was introduced to the pharmaceutical market[18]. Due to its dendrimer structure, Vivagel® prevents the attachment of the virus to the host body[59,60].

Polyamidoamine(PAMAM) is the most extensively studied dendrimer as its surface contains a great number of amine groups, which could be used to conjugate various functional moieties. Moreover, the anticancer effect could be improved by the combined function of PTX and the dendrimer[5].

Dendrimers can be synthesised by the divergent and convergent synthesis approaches. In the former approach, the synthesis begins with the preparation of the core of the dendrimer, then the arms are attached to the core by adding building blocks in a step-by-step manner[61].While, the latter involves preassembly of the complete wedge-shaped branching units, which are coupled to the central core moiety in the final step[62].

The novel morphology of dendrimers makes them a promising candidate for diagnostic applications. For example, to accomplish in vitro and in vivo computed tomography (CT) imaging of cancer cells, an acetylated dendrimer to entrap gold NPs was introduced. Li et al. (2013) prepared multifunctional dendrimer-based gold NPs (AuNPs), as a dual-modality contrast agent, were prepared for in vitro and in vivo CT/MRI of breast cancer cells[63].
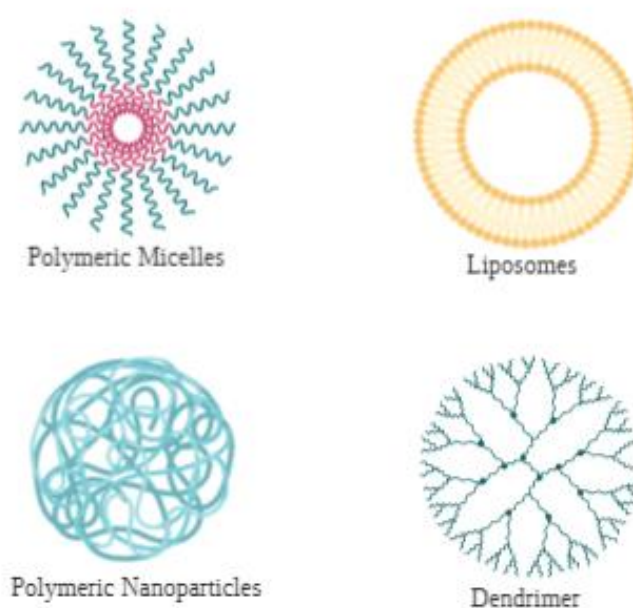

Fig.3: Few organic nanoparticles for drug delivery

IV. INORGANIC NANOMATERIALS FOR CANCER THERAPY

a) Gold Nanoparticles

AuNPs are one of the most exploited metal nanoparticles exhibiting intriguing features, such as size-related electronic, magnetic, and optical properties. Gold nanoparticles can be made using different chemical methods such as the Brust method, Martin method, and Turkevich method[64–66].

Au NPs are promising in cancer theranostics due to their superior synthesis, modification, and biocompatibility. Au NPs are often used for Photothermal therapy (PTT) due to their superior biocompatibility, simple Au-thiolbioconjugation chemistry for the attachment of desire molecules, a small diameter that enables tumor penetration, efficient light to heat conversion, and the ability to be tuned to absorb near infrared light, which penetrates tissue more deeply than other light wavelengths[67]. The localized surface plasmon resonance and multivalent coordination effects on the surface of the NP are ideal for photothermal imaging, therapy-controlled drug release, and targeted drug delivery[68]. However, Au NPs can convert NIR light into heat, which

can then be applied to a specific site for hyperthermia. Hence, utilizing the Au NPs as a photothermal agent can release heat which can ablate tumor cells directly[69].

It is observed that the cellular uptake of gold nanoparticles depends on surface functionalization, nature of the ligand, molecular weight, and grafting density[70]. It is also found that the cellular uptake rate depends on the aspect ratio of the gold nanoparticle. For instance, the cellular uptake rate of the rod-shaped gold nanoparticle was lower than that of the spherical-shaped[71]. Due to the high surface-to-volume ratio of gold nanoparticle, they are covered with a protective layer to lower down the very high reactivity of the nanoparticle. The protective layer is made up of a polymer such as anionic poly(acrylic acid), neutral poly(2,3-hydroxy-propylacrylamide), and thermoresponsive poly(N-isopropylacrylamide)[72]. He & C.L. Chow(2016) found that the presence of the layer did not affect the secondary electron yield from the nanoparticle[73].

Cytotoxicity of most Au NPs depends on various parameters such as size, cell type, tissue distribution, tissue absorption, and penetration capacity. It was reported that small Au NPs (4–5 nm) have higher toxicity potential than large particles (18–20 nm)[74]. Research showed that Polyethylene Glycol-coated Au NPs had a transfection efficiency and cell uptake greater than 45% with low cellular toxicity, and can be used as a DNA and drug delivery system[75]. Thus, PEG is used as a common coating material on Au NPs to reduce NP interaction with biological specimens. PEGylation also extends their blood circulation time by lowering their removal by the reticuloendothelial system (RES)[76,77]. Moreover, PEG represented an ideal linker for different targeting ligands, i.e., tumor necrosis factor α and galactose[78,79]. Moreover, AuNPsare an alternative for the delivery of nucleic acids to improve gene therapy ensuring both low environmental degradation and protection against nucleases as well as facilitating cell entry[80].Au NPs are effective radiosensitizers in medical applications such as drug delivery and cancer therapy. In biomedical and cancer therapy applications, Au NPs can act as a contrast agent and dose enhancer in image-guided nanoparticle-enhanced radiotherapy using kilovoltage cone-beam computed tomography[81,82].

b) Carbon based Nanomaterials
i). Carbon Nanotubes

The carbon nanotubes were formerly described by Iijima in 1991[83]and are the most examined carbon-based nanomaterials. The carbon nanotubes are cylindrical tubes of sp^2 graphite sheets with diameters within the nanoscale, which can be organized in single-walled or multi-walled carbon nanotubes[84,85]. These materials are usually synthesized using methodologies based on arc discharge or chemical vapor deposition of graphite[86]. The electronic and optical properties of these nanomaterials depend on the diameter and the relative orientation of the graphene basic hexagons with respect to the axis tube[87–89]. They are used as nanomedicine for cellular imaging and are also promising drug carriers for targeted drug delivery in cancer therapies[90]. They emit heat on absorbing photons from the near-infrared (NIR) light, suggesting their potential use in the thermal ablation of tumors within the range of NIR[90–92]. Marangon and colleagues (2016) observed that the multi-walled carbon nanotubes could induce the photothermal ablation of SKOV3 cancer cells, only 10% of SKOV3 cells remained viable after NIR laserirradiation[93]. The cytotoxic effect of nanotubes was further enhanced by combining them with themtetrahydroxyphenylchlorin. The novel properties of CNTs allow them to be used as multifunctional therapeutic agents for cancer treatment. Harrison and Resasco in 2013 provided a method using modified CNTs for detecting and destroying cancer tumors[94].

However, their potential toxicity can be a major hurdle for any further application. Therefore, extensive efforts are needed to investigate the nanotoxicology of CNT to assess the potential risk they may hold[90,92].

ii). Graphene

The graphene is the building block of other graphite materials, such as 3D graphite, carbon nanotubes, and fullerenes[95]. This material exhibits a honeycomb lattice formed by a single-atom-thick layer of sp² hybridized carbon atoms and can be classified according to the oxygen content, number of layers in the sheet, or their chemical composition[96]. Graphene possesses brilliant optical and chemical properties[97]. The graphene oxide (GO) and reduced graphene oxide have been one of the most explored for biomedical applications among different graphene materials.

GO, an oxygenated derivative of graphene can be formed using the Brodie,Staudenmaier, Hummers, and improved Hummers' methods[98,99]. It can be used as a photothermal agent for efficient PTT owing to its intrinsically high NIR absorbance with satisfactory therapeutic outcomes. The reduction of GO can lead to dramatically enhanced NIR absorbance since chemical reduction can reestablish a portion of π conjugation[100]. Dai and co-workers proved that reduced nano-GO (nRGO) with significantly increased NIR optical absorption could be used as a highly efficient PTT agent against cancer[101].

Graphene and GO with extremely large specific surface areas could interact with different biomolecules and have substantial potential in biosensing, gene transfection, drug delivery, and cancer treatment. Delocalized p-electrons on the graphene plane allow the binding of aromatic drug molecules via π-π stacking. By conjugating targeting ligands to functionalized GO, targeted drug delivery to specific types of cancer cells can be achieved. Utilizing the photothermal effect, GO and its derivatives have also been used as nanocarriers for combined PTT chemotherapy[100]. For example, PEGylatednano-GO with DOX loaded on the surface has been shown to achieve combined cancer therapy[102]. Compared with chemotherapy alone or PTT alone, the synergetic treatment showed much higher therapeutic efficacy towards cancer. Recently,Toomeh et al., have studied the selective enhanced cytotoxicity effect of radiotherapy in combination with graphene oxide nanoflakes in cancer stem cells that lowers the risk of cancer recurrence[103]. GO and its derivatives can also be used for biomedical imaging. Dai and co-workers found that GO exhibited fluorescence from the visible to NIR range and used GO for cellular imaging[102].

However, autofluorescent interference of biological tissues affects the visible fluorescence of GO, resulting in limited applications in biomedical imaging. To overcome this problem external NIR fluorescent dyes have been used to label GO for efficient in vitro and in vivo imaging. Radiolabeling based nuclear imaging has prominent advantages, including superior sensitivity and anability to quantitatively analyze whole-body images compared with fluorescent labeling and imaging[100].

Although the current research progress isdistinguished, yet only a few nanocomposites have been assessed at the animal level, and nanocomposites have not been used in the clinic. Therefore, more efforts are still needed to address issues related to the biodegradation, excretion, andpotential long-term toxicity of graphene.

c) Magnetic Nanoparticles

Magnetic nanoparticles have been developed by employing nickel, cobalt, Prussian blue, and gadolinium, but magnetic iron oxide (usually maghemiteγ-Fe_2O_3 or magnetite Fe_3O_4) NPs remain the most widely researched MNP-based cancer theranostics due to their low systemic toxicity and strong MRI contrast properties.

These nanomaterials can be synthesized by various methods such as co-precipitation of salts with stabilizing polymer, thermal decomposition, hydrothermal and solvo-thermal synthesis, sonochemistry, and reverse microemulsion.MNPs generally consist of a magnetic core-shell and a polymer coating[104].Ficai et al showed that

the properties of the magnetite are changed completely by the presence of the shell, making it suitable for a wide range of medical and non-medical applications[105].

MNPs act as capable (MRI) agents due to their increased magnetization upon application of an outer magnetic field along with excellent T_2/T_2^* relaxation abilities[106–108]. Consequently, MNPs are widely utilized in several cancer theranostics applications including MRI imaging, biosensors, bioseparations, theranostics, delivery, magnetic hyperthermia, photodynamic therapy, and photothermal ablation therapy.

Superparamagnetic nanoparticles, iron oxide magnetic nanoparticles with particle sizes of about 20 nm do not keep any magnetism after removal of the magnetic field, hence, may be used in vivo[109]. Superparamagnetic nanoparticles can be used as contrast agents for magnetic resonance imaging (MRI), in cancer thermal therapy, and can concentrate on target sites through an external magnetic field. Vigor and his colleagues demonstrated that superparamagnetic iron oxide nanoparticles (SPIONs) could be used to target and image cancer cells when functionalized with recombinant single-chain Fv antibody fragments (scFv)[110].

Although they have been exploited in many fields such as imaging techniques, biosensors and bioseparations, drug transport, drug and gene delivery, etc. yet, no single MNPs formulation has been approved for cancer therapeutic use until today due to their toxicity because of the excessive release of iron ions[90].
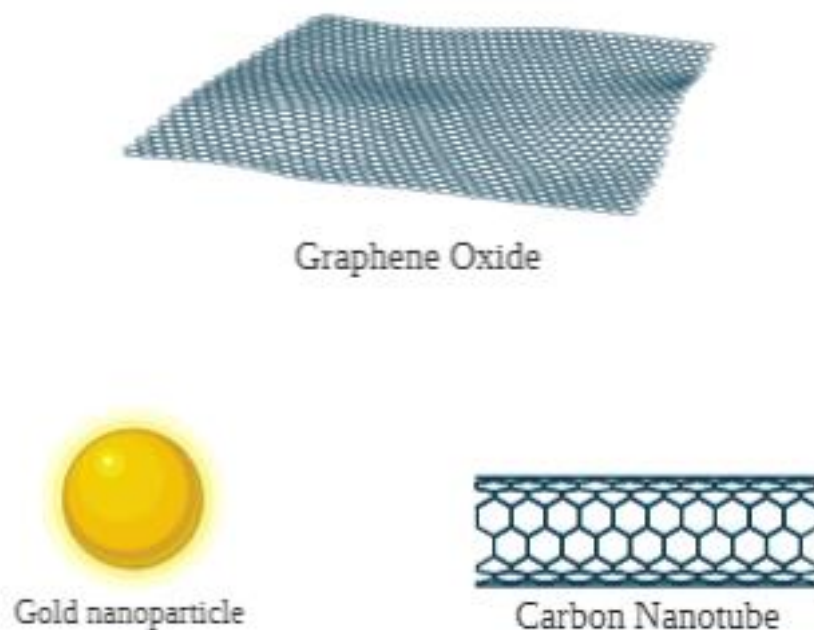
Fig.4: Few inorganic nanoparticles for drug delivery

V. CONCLUSION

Various kinds of NPs with diverse configurations have been developed with the advancement of nanotechnology. They are acknowledged to be a significant step toward enhancing the function of particles. Nanoparticles with a small size can penetrate tumor vasculature through EPR. Besides, functionalization with hydrophilic polymers offers a long circulation half-life and prolonged tumor tissue exposure to chemotherapeutic agents. Nanoparticles may be used as vectors for cytotoxic drugs to enhance pharmacokinetics and biodistribution, reducing undesirable side effects dramatically. They are used as polymer, lipid, metal, ceramic, and so forth carriers in drug deliveries.

These nanoparticles can also be transformed with biochemical and chemical moieties, which bind precisely to the targeted tissues for better confinement of the tumor tissues' treatment. NPs can also be used in the diagnosis and treatment of diseases and biomedical imaging. Exploiting nanotechnology will offer more ways to target several tumor molecules concurrently and develop efficient therapeutic strategies.

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Studies on Complexation of β-naptholazo dye and Pb2+ metal ion Spectrophotometricaly

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ABSTRACT

Complexing ability of Pb2+ metal ion with β- naptholazo dyeis established.The stoichiometry between M: L is 1:1 and effect of pH on complextion study have been established. IR spectra provide the complexing nature between the metal and ligand.

Keywords: Azo dye, Pb2+ metalion, I.R. spectra.

I. INTRODUCTION

to Azo dyes are an important class of organic compounds having at least a conjugated chromophoreazo (–N=N–) group and the largest and most versatileclass of dyes. Owing to its wide application in various fields it becomes research of interest. Azo dyes havenumber of uses such as dyeing of textile fiber and coloring of differentmaterials, and biological-medical studies,for plastics, andadvanced applications in organic synthesis [1-4]. Azo dyes consider significant analytical reagents for the micro-estimation of metal ions. Among the dyes azo dyes play vital role in the complexation studies and reported the number of commercial dyes[5-7]. In present paper we have studied the complexing ability of Pb^{2+} metal ion with azo dye. As Pb^{2+} metal have toxic effect on environment it is important to trace out the lead ion from various sources.
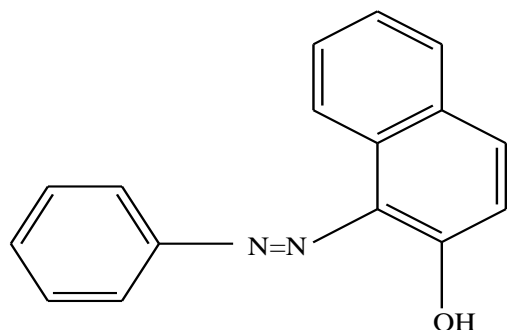

Fig.1.β-naptholazo dye

II. EXPERIMENTAL

Instrumentation

UV-Vis spectra were recorded on a (Bioera Single beam UV-Visible Spectrophotometer. The FT-IR spectra were obtained using IR spectrometer of Shimadzu make, with samples prepared as KBr discs

Synthesis of complex:

The salt of PbNO₃ 0.44gm were dissolved in 10ml ofethanol, and added 0.5g of azo dye to 20ml anethanol solution, in 1:1 molar ratio. This reactingmixture was stirred for a while and mixture washeated under reflux for three hours, during thisperiod, the precipitation was completed from, andcollected by filtration, then washed with ethanol, anddried under vacuum for 4 hours. The complex wascharacterized by IR spectra.

UV-Visible Study of ligand and its complex:

The complexation study of β-naptholazo dye ($5{\times}10^{-5}$M) and Pb^{2+} ($5{\times}10^{-6}$M) metal was studied and it was observed (Fig.1) that the ligand shows the maximum absorbance at 240 nm,which is responsible for π -π*. Upon addition of metal ion solution there is slight increase in absorbance suggest the complexation.

Fig. 2.UV-Visible Study of ligand and its complex

Effect of pH on Complexation:

The effect of pH on complexation has been studied for the dye andPb²⁺ metal ion by varying the pH from 1 to 7. From the graph (Fig.3) itwas observed that the effect of pH has pronounced effect on complex formation. As pH increases there is slight increase in absorption of complex at pH 5 there is sharp enhancement of absorption. Further increased in pH there is decreases the absorption of complex.

Fig.3.Effect of pH on Complexation

Stoichiometry of the Complex:

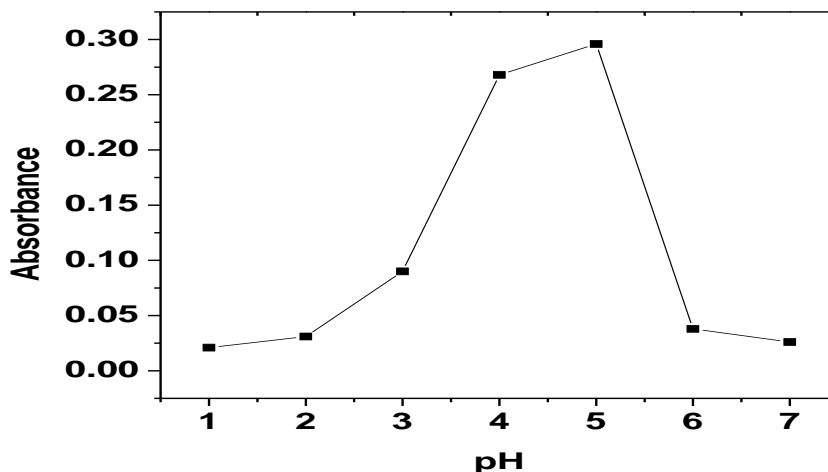The Jobs method is used to determine the stoichiometry ofAzo dye-Pb^{2+} complex. The solutions of azo dye andPb^{2+} were mixed in different mole ratios keeping the sum of dye and metal ion concentration constant and the absorbance were measured at 240 nm of wavelength. The plot of absorbance versus mole fractions is shown in (Fig 4). The maximum absorption was observed for the mole ratio of 0.5, therefore it indicates the reaction stoichiometry between azo dye and Pb^{2+}is 1:1.
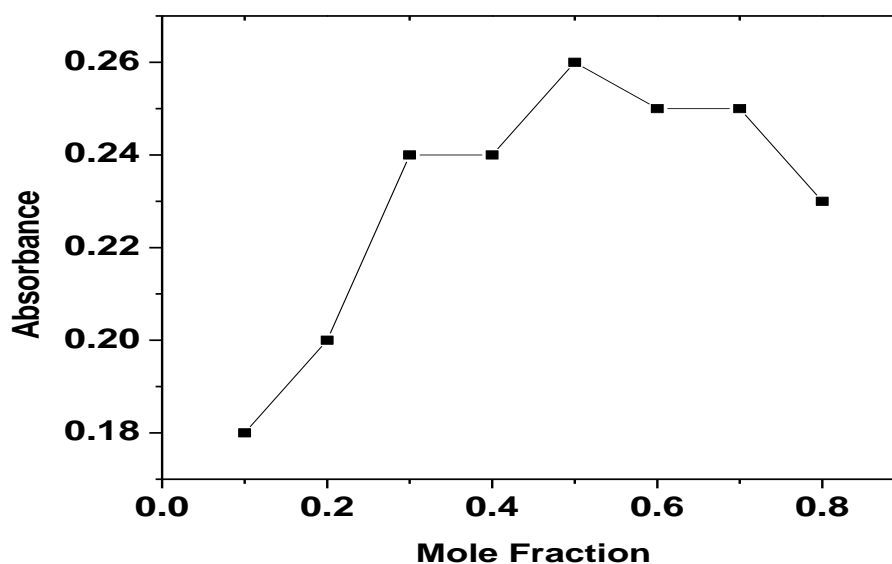

Fig.4. Stoichiometry of the complex

IR Study:

The IR spectroscopic analyses were studied and it helps to interpret the possible mode of interaction between azo dye and Pb^{2+} metal ion. A strong band at 3050 cm^{-1} which belongs to phenolic –OH group of azo dye which

shifted to 3033cm^{-1} supports the complex formation. The band assigned for -N=N- were at 1365cm^{-1} which is shifted to 1322cm^{-1}. The stretching frequency attributed to C-N vibration decreases to 1145cm^{-1} in complex is shifted to 1143cm^{-1}.

Fig. 5. (a) IR Spectra of β-naptholazo dye

Fig.5.(b) IR spectra of Complex

III. CONCLUSION

In conclusion, We have reported the complexing ability of Pb^{2+} with β- naptholazo dye.The stoichiometrybetween M:Lfound1:1. Effect of pH influenced the complex formation and at pH-5 complex shows maximum absorbance. The decreasing stretching frequency in the IR shift values of –OH and –N=N- functional group of ligand confirmed the complexing nature.

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Densites, Refractive Indices of Substituted Azomethine in Different Percent of Various Solvents

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ABSTRACT

Molecular interaction such as solute-solute, solute-solvent and solvent-solvent interactions in the substituted azomethine drug in the different percentage of organic solvent has been pointed out. In the present work refractive index and the densities of the substituted azomethine in different percent of various organic solvents were reported. The data thus helps to determines Molar refraction (Rm) and polarizability constant (α) of some different substituted azomethine in binary mixture. Observations showed that the molar refraction and polarizability constant of substituted azomethine drugs increases with increase in percent composition of organic solvents.

Keyword: Substituted azomethine, molar refraction (Rm), polarizability constant (α), refractometry. refractive index.

I. INTRODUCTION

Refractive index of a liquid is very important property, which gives ideas about geometry and structure of molecule .The refractive index (n) of the medium is the ratio of the velocity of light in vacuum to that in the medium. Its value depends upon the temperature and the wavelength of light used. Generally, the D-line of sodium is used for standard measurements. The refractive index is the ratio of angle of incident to the angle of refraction. . Measurement of refractive index shows very interesting applications in pharmaceutical, chemical, agriculture, food, oil and beverage industries.

Many searcher have reported the refractive indices in mixed solvents[1-4]. The properties of liquid such as viscosity, refractive index and ultrasonic velocity of binary mixtures are studied by many workers [5-8]. Refractrometric Study of S-trizinothiocarbamides in Dioxane-water was also reported. [9]. The viscometric, refractometric and interferometric measurements are very important in medicinal and drug chemistry role [10-12]. Oswal et al[13] have studied dielectric constants and refractive indices of binary mixtures. Dadhichi et al [14] have investigated the measurement of viscosity, refractivity index and metal ligand stability constant of substituted benzofurones in different solvents. Refractive indices of binary, ternary liquid solutions and solutions of biologically important compounds have been studied [15–21].

II. MATERIAL & METHOD

In the present investigation, refractive indices of liquid mixtures were measured with the help of Abbe's refractometer, specially designed to measure the refractive indices of the small quantities of the transparent liquid by direct reading. The ligands of which physical parameters is to be explore are synthesized by using reported protocol.. The solutions of ligand in different percent composition of binary mixtures were prepared by weight. All the weighing were made on one pan digital balance (petit balance AD_50B) with an accuracy of (±0.001)gm.. The densities of solutions were determined by a precalibrated bicapillary pyknometer (± 0.1%). The constant temperature of the prism box is maintained by circulating water from thermostat at (27± 0.1)0C.

Calculation :

The molar refraction of solvent and solution are determined by using Lorentz- Lorentz equation.
The molar refraction of different solvent, mixtures are determined from-
RDMF-W = X1R1 + X2R2 (1)
where , R1 and R2 are molar refractions of DMF and water respectively.
The molar refraction of solutions of ligand in DMF-water mixtures are determined from-

( ) {[ ]} ………. (2)
( )

where, n is the refractive index of solution,X1 is mole fraction of DMF, X2 is mole fraction of water and X3 is mole fraction of solute, M1, M2 and M3 are molecular weights of DMF, water and solute respectively. 'd' is the density of solution.
The molar refraction of ligand is calculated as –
Rlig = Rmix - RDMF – w (3)
The polarizability constant ( ) of ligand is calculated from following relation-
Rlig = 4/3 No ………. (4) where, No is Avogadro's number.

III. RESULT AND DISCUSSION

Table 1: Values of Molar Refraction of different composition of solvents.

% of Solvent Mixture	Molar polarization Rm		
	DMSO	Dioxane	Ethanol
20%	15.0946	14.2357	19.1123
40%	14.2355	13.1155	18.5736
60%	12.7632	10.0759	15.0522
80%	10.8125	08.2301	12.7245
100%	5.7311	4.5711	7.0932
70%	10.2257	9.0325	14.0327

Table 2: The values of refractive index (n) and density(d) of 0.01M solution of ligand in different composition of DMSO, Dioxane and Ethanol solvent at 300K

% of Solvent Mixture	Molar polarization Rm			Density (d) gm/cm3		
	DMSO	Dioxane	Ethanol	DMSO	Dioxane	Ethanol
Ligand L1						
20%	66.8917	57.6362	70.0866	1.0111	1.0051	1.0241
40%	78.0626	65.8380	81.6871	1.0187	1.0150	1.0277
60%	83.3022	70.8890	89.7373	1.0209	1.0166	1.0310
80%	91.9491	74.7821	95.5928	1.0255	1.0176	1.0339
100%	95.4783	79.5399	102.2347	1.0294	1.0213	1.0362
70%	84.7519	72.7507	92.1235	1.01923	1.01695	1.0321
Ligand L 2						
20%	79.5989	68.7954	86.9939	1.0063	1.0027	1.0072
40%	92.5314	78.7384	100.6731	1.0145	1.0131	1.0176
60	99.3297	86.0426	109.0522	1.0181	1.0150	1.0237
80%	106.918	89.0521	117.4013	1.0291	1.0284	1.0278

100%	113.875	95.1013	123.6669	1.0297	1.0293	1.0313
70%	100.543	87.0155	114.1021	1.0195	1.0195	1.0257
Ligand L3						
20%	78.7969	67.8873	86.3531	1.0065	1.0042	1.0093
40%	92.1047	77.8228	101.4648	1.0095	1.0087	1.0130
60%	99.6751	86.2908	109.8987	1.0105	1.0090	1.0231
80%	105.5152	90.0569	116.3226	1.0205	1.0197	1.0267
100%	111.9973	95.5152	121.7805	1.0223	1.0203	1.0310
70%	101.2123	88.3011	113.6372	1.0168	1.0147	1.0253
Ligand 4						
20%	94.9043	82.6679	102.5996	0.9999	0.9987	1.0119
40%	111.3823	94.0953	120.6784	1.0163	1.0150	1.0195
60%	119.3205	102.8379	130.2451	1.0211	1.0199	1.0232
80%	126.4496	107.7419	138.7619	1.0283	1.0256	1.0276

100%	133.2916	113.1568	146.5556			
				1.0299	1.0257	1.0357
70%	123.0016	104.4509	134.2415	1.0235	1.0221	1.0255

Table 3: The values of Molar refraction (Rm), polarizability constant (α) of 0.01M solution of ligand in different composition of DMSO, Methanol and Acetone solvent at 300K.

% of Solvent Mixture	Molar refraction (Rm) x103 cm3/mole			polarizability constant (α) x10-23 cm3		
Ligand L1						
	DMSO	Dioxane	Ethanol	DMSO	Dioxane	Ethanol
20%	66.8917	57.6362	70.0866	2.3237	2.2856	2.7794
40%	78.0626	65.8380	81.6871	2.6975	2.6109	3.2394
60%	83.3022	70.8890	89.7373	2.8732	2.8112	3.5587
80%	91.9491	74.7821	95.5928	2.9955	2.9657	3.7909
100%	95.4783	79.5399	102.2347	3.1945	3.1543	4.0543
70%	84.7519	72.7507	92.1235	2.9511	2.9019	3.6751
Ligand L2						
20%	79.5989	68.7954	86.9939	2.8327	2.7282	3.4499
40%	92.5314	78.7384	100.6731	3.1923	3.1225	3.9923

60%	99.3297	86.0426	109.0522	3.4812	3.4121	4.3246
80%	106.9179	89.0521	117.4013	3.5985	3.5315	4.6557
100%	113.8750	95.1013	123.6669	3.8618	3.7714	4.9042
70%	100.543	87.0155	114.1021	3.5534	3.4528	4.4836
Ligand L3						
20%	78.7969	67.8873	86.3531	2.7357	2.6922	3.4245
40%	92.1047	77.8228	101.4648	3.1845	3.0861	4.0237
60%	99.6751	86.2908	109.8987	3.5193	3.4220	4.3582
80%	105.5152	90.0569	116.3226	3.6327	3.5713	4.6129
100%	111.9973	95.5152	121.7805	3.8125	3.7878	4.8294
70%	101.2123	88.3011	113.6372	3.5579	3.4911	4.5109
Ligand L4						
20%	94.9043	82.6679	102.5996	3.3115	3.2783	4.0687
40%	111.3823	94.0953	120.6784	3.7542	3.7315	4.7875
60%	119.3205	102.8379	130.2451	4.1528	4.0782	5.1651

80%	126.4496	107.7419	138.7619	4.3272	4.2727	5.5028
100%	133.2916	113.1567	146.5556	4.5545	4.4874	5.8119
70%	123.0016	104.4509	134.2415	4.2275	4.1543	5.3415

Graphical representation of molar polarization (Rm) of all ligand at 0.01M verses concentration in different percentage of DMSO solvent

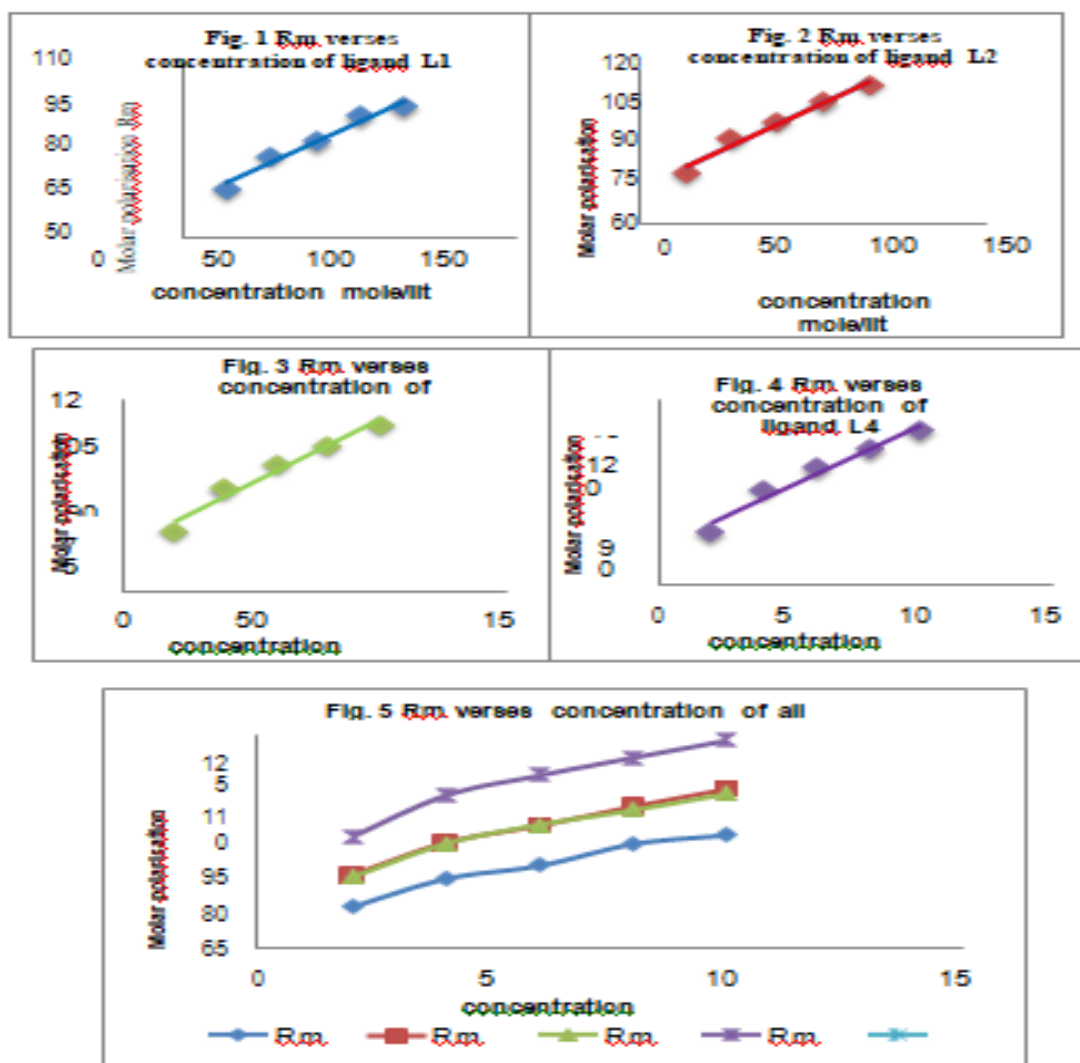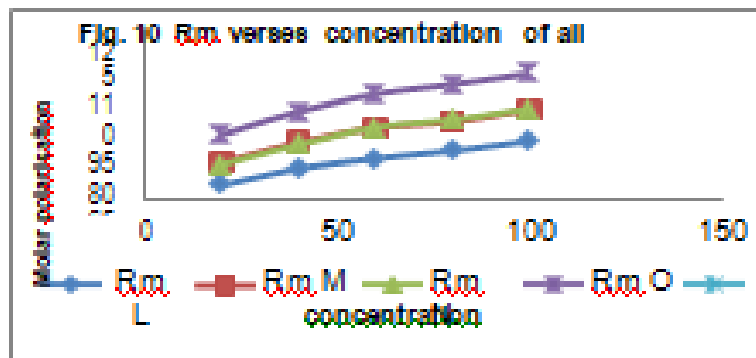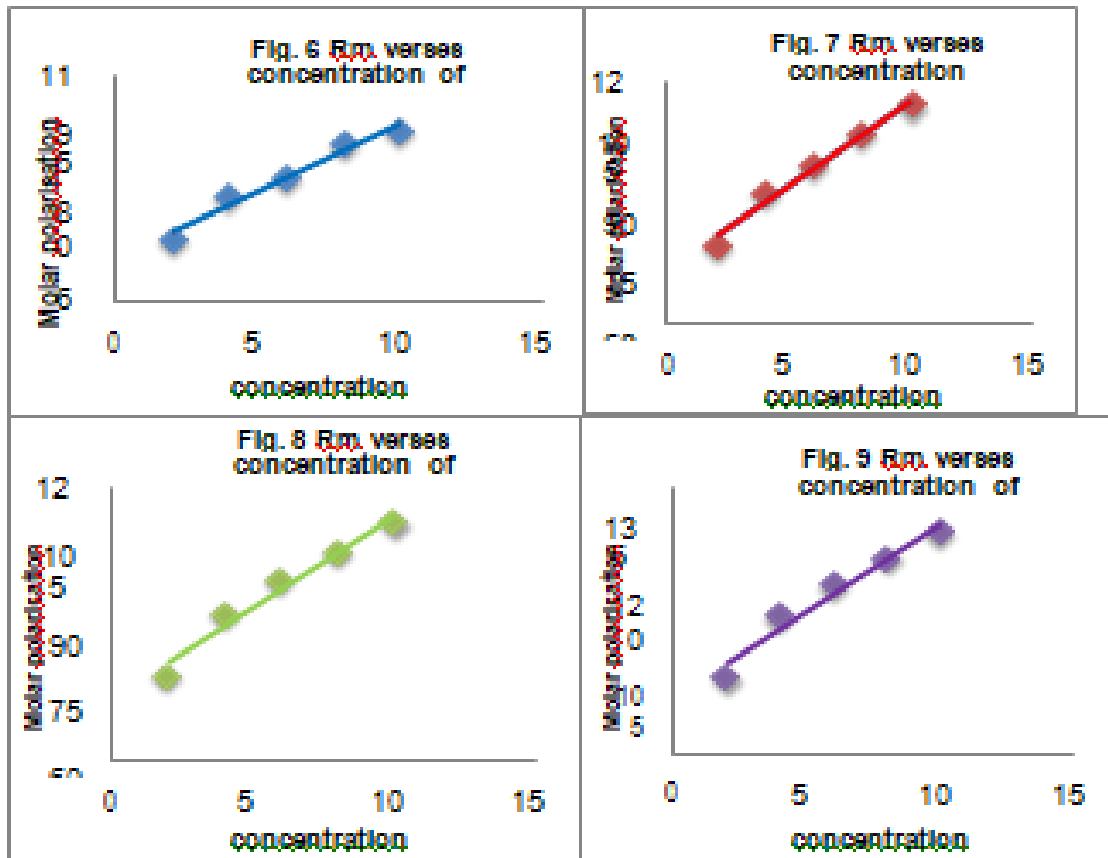Fig. 1 Rm verses concentration of ligand L1

Graphical representation of molar polarization (Rm) of all ligand at 0.01M verses concentration in different percentage of 1,4 Dioxane solvent

Graphical representation of molar polarization (Rm) of all ligand at 0.01M verses concentration in different percentage of Ethanol solvent

Fig. 11 Rm verses concentration of

Fig. 12 Rm verses concentration of

Fig. 13 Rm verses concentration of ligand L3

Fig. 14 Rm verses concentration of ligand L4
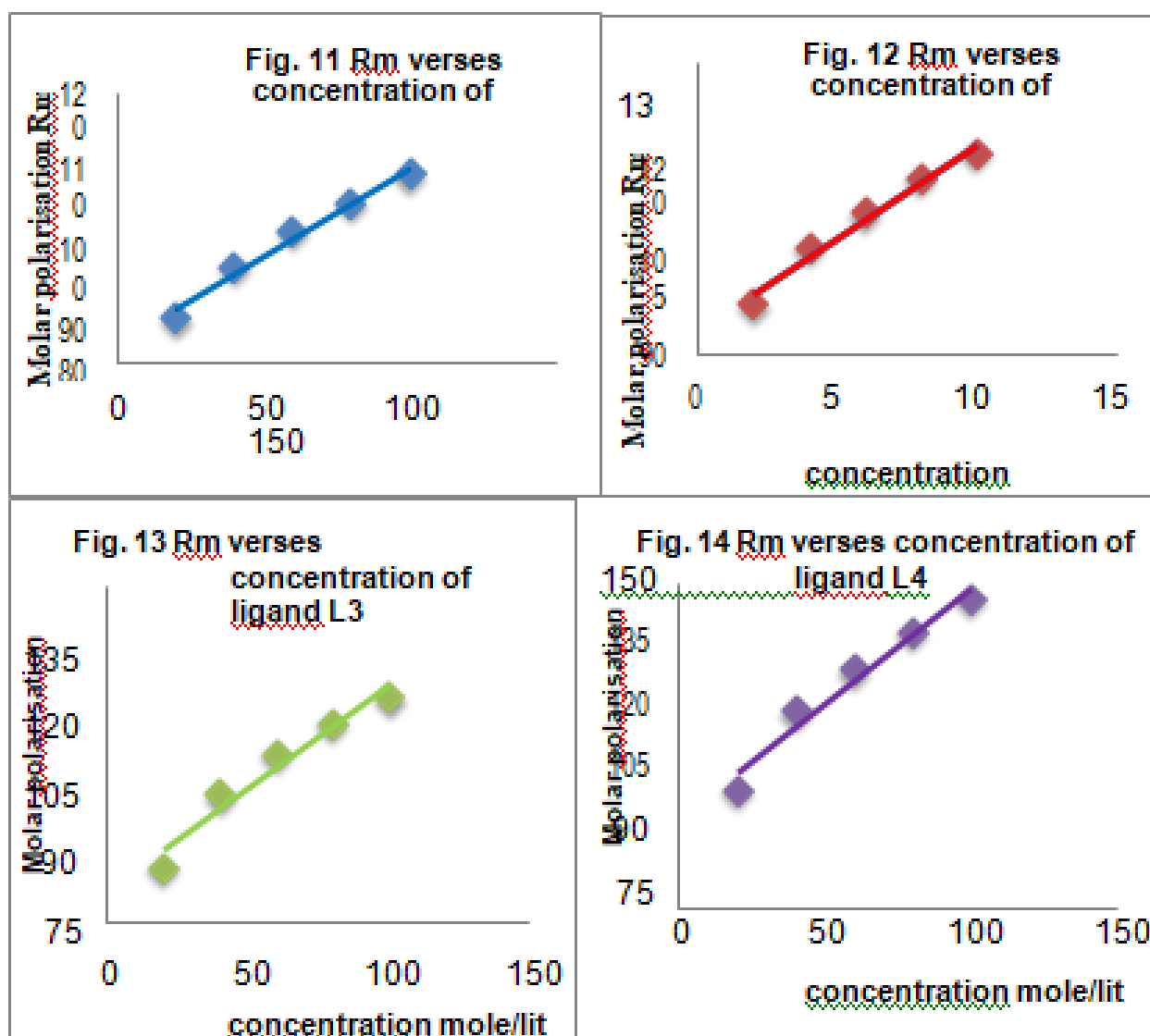
The value of molar refraction of different percent composition in binary mixture are shown in table-1. From the data it is observed that value of molar refraction goes on increasing with the decrease in amount of water in percent composition. Comparatively molar refraction of DMSO is greater than acetone and methanol this is due to more value of dipole moment of DMSO.

Table-2 shows the comparative data of refractive indices and densities of DMSO, acetone and methanol in different percent composition with water. From this, it is observe that, refractive index and density increases with the increase in percent composition of organic solvent. Graphical representation between molar refraction and percent composition of DMSO, methanol and acetone shows linear relationship. (Fig.1-5 DMSO, fig.6-10 methanol, fig.11- 15 acetone) Those solvent having more value of dipole moment shows greater refractive index and density, also there is same trend in case of ligand used. Ligand having more dipole moment shows greater value of refractive index and less value of density.

Table-3 shows the comparative data of molar refraction and polarizability constant. These parameter provide important information about structural orientation of ligand in solution. From this it is observed that, molar refraction and polarizability constant in methanol is higher than DMSO and acetone. The trend regarding

increasing value of molar refraction and polarizability constant is methanol > DMSO > acetone. From this observation it is concluded that, methanol has strong hydrogen bonding, which make solution more viscous which is responsible for more bending of light towards normal. In case of DMSO, it has more value of molar refraction and polarizability constant than acetone because it has more dipole moment.

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Library Information Services In the Digital Age

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ABSTRACT

Library information services are a key component in libraries since the traditional times. Their important role is progressively becoming a live of the library's contribution to the transformation and development of a society and also the nation at large. The employment of data Communication Technologies (ICTs) has caused a change within the users' perception from what's being hosted in the library to however and once services are rendered to meet their requests. Consequently, libraries are getting slighter for the fabric they collect or house. Instead, their importance is being measured in regard to the fulfillment of the users' requests. The transfer of documents from publishers and their hosting "just in case" some users need is replaced by the delivery of documents from publishers "just in time" to meet the user's However, this transformation has posed a challenge in the field of library information services: to cope with the ever-accelerating complexity of information, to differentiate useful information from erroneous information, and to meet the growing expectations of library This paper will discuss the available technological opportunities that can be used by the library information services in addressing such challenges.

Key words: ICT, Library Services, Library Transformation

I. INTRODUCTION

The literature on library and information science/services indicates that Libraries started off as store houses, wherever books were additional preserved than utilized and bibliotheca acted like theme type of custodians and their interaction with users were minimal, for instance solely in locating books and serving users, then there was a shift as a results of data communication technology. At most, if a user asked for a book, then the service that will be offered by the so referred to as librarian was to pass on the book and leave the user alone. From the traditional times to present we have a tendency to note that this trend in services has hugely modified to due information technology. Libraries play different roles for various people. To some, a library may be a place to browse books; be furnished this news from up-to-date newspapers; to try and do research; an area to access or share information in response to a selected need; etcetera currently days, libraries and librarians play a very important role in providing access to information, organizing it, and serving to users to seek out the data they need. Consequently, information services have become a key component for libraries. This user's interest is to urge the data in would like inside a given timeframe. For instance the timeframe for a

MD making ready for an operation before getting into a theater is far shorter and demanding than that of a lecturer preparing for future lecture. Though the present users will get access to the Brobdingnagian amount of data on the net and on-line databases, the role of library information services has no wherever reduced. the number and variety of the ever-increasing information on the Internet and in on-line databases is one amongst the main attributes to the increased role of library information service the shortage of data organization on the web; the stress of users who need faster and clear answers in response to their information needs; technological ability deficiency among some information seekers to expeditiously and effectively look for the proper information; are among the few causes that have raised the requirement for information services quite before in during this paper l discuss the out there technological opportunities which will be utilized by the library information services in addressing the challenges brought about by the ever-increasing complexness of data wants within the digital.

II. MEANS OF ICT

In keeping with Hamelin, "ICT are those technologies that change the handling of information and facilitate totally different styles of It embrace capturing technologies for example camcorders storage technologies, CD-ROMs, process technologies e.g. application software, communication technologies for e.g. native space Networks and show technologies like pc Monitor. Data and communication technology is that the set of technological tools and resources accustomed communicate and to create, disseminate, store and manage.

Advantages of Functions ICT Based Mostly Library Services

Typically computers in library have been accustomed change the subsequent functions.
- ✓ Acquisition and budget
- ✓ Cataloguing and short loans
- ✓ Circulation Serial control
- ✓ OPAC etcetera The ICT product and services are useful for the
- ✓ It saves the time of service suppliers
- ✓ It takes little house to avoid wasting the data.
- ✓ It save the energy and resources
- ✓ It helps to regulate the information
- ✓ Due to ICT librarians will provide additional information in time. Since the Fifties use of ICT in libraries has essentially citron through four stage, equivalent to the main reasons for automating.
- ✓ Improving the potency of internal operations.
- ✓ Improving access to native library resources.
- ✓ Providing access to resources outside the library.
- ✓ Interoperability of data system.

This Trends

Library is Brobdingnagian store house of information. Emergence of web and communication technology (ICT) libraries has been exploit totally different approaches of a similar and mode of service is changed.

Remodeling the Data into Digital Contents

Throughout the classical period, distinction was drawn between libraries, archives and museums. The chief task of all sections of those establishments was the gathering and preservation of documents. The library departments sorted the collection of the written word, whether or not on clay tablets, as within the Babylonian empire or on papyrus rolls, as in Egypt. However currently the condition has been change. During this digital age, the overwhelming majority of recently created data is digital. Moving from a hand-on, real-life learning expertise of substance to a digital version of it presents several fascinating challenges betting on what the goals are, many models are possible.

Digital archives

Digital technologies serve progressively to integrate information resources. Numerical text, image, voice and video data have so far resided in alternative print or analog media for storage and transmission. Transmission objects and hyperlinks in the world the vast Internet represents a series of new types of information and new forms of knowledge within the digital that collect old information and rework its use.

Advantages of Digital Archives

Flexibility of digital material.

Digital files are tremendously useful so as not to waste the place.

Saves a lot of users' time searching for information.

Easy access to data and content.

Based on ICT, mostly Users Services

Thanks to the explosion of information, information begins in electronic format. Users are advent. Students of analysis today want information not only in hard copies, but they also need it in electronic form. PRN users, many libraries are adopting electronic habits. They also victimize the web, intranet, extranet, and alternative technologies to preserve and distribute data. Currently, ICTs are used in various fields of library activity to enhance user satisfaction. It offers many benefits to the users.

- ✓ ICT provides unlimited information from different sources.
- ✓ Provides information easily and quickly.
- ✓ Evaluated the change in format and the mix of knowledge from different sources.
- ✓ ICT provides remote access to users. With the help of ICT, libraries are providing users with various services based mainly on ICT.

Which are given below.

Web 2.0

Web 2.0 is the term that provides to explain a second generation of the world the wide Internet that aims at the power of people to collaborate and share data online. Web 2.0 essentially refers to the transition from static websites with hypertext markup language to an additional dynamic web that is more organized and relies on offering web applications to users. The alternative enhanced practicality of web 2.0 includes open communication with an emphasis on web-based user communities and a more open exchange of information.

Over time, web 2.0 has been used more as a promotional term than as a computer science-based term. Blogs, wikis, and web services are considered elements of web 2.0.

Web access to OPACs: - With the help of the web-based Online Public Access Catalog (OPAC), users will discover how to use a universal access client, the online browser.

Online Instructions: - Online browsers are for librarians to implement online based library or list usage schedulers. Provides online tutorials on finding online resources and virtual tours of library collections.

Electronic Document Delivery: - ICT-based services have become useful for libraries to deliver copies of journals and alternative documents in digital format mainly in portable document format (PDF) to library users.

Web 2.0 tools associated with degreed applications

Web 2.0 tools are

Wikis: - it is a powerful content management system. It allows anyone to add a new article or revise an existing article through an internet browser. it is a perfect one for students and researchers and support workers for cooperative work allowing focus and content. Wikis are knowledge management tools. These are general knowledge repositories.

Flickr: - it is a social network for showing photos with the help of Flickr users who will work along the photo comes and use each other's tags to find new photos Flickr allows users to help organize , share and discuss photos.

Podcast: - Podcast like broadcast is a series of digital media files that are distributed to victimization syndication feeds on the net for playback on transportable media players and computers.

III. IMPACT OF ICT ON LIBRARIES AND LIBRARIES ICT

Has brought about significant changes in library services. Today's extremely refined data technology to facilitate the storage of huge amounts of knowledge or information in one during a in an extremely in a terribly very compact space. Data technologies promise rapid retrieval of information from storage and have revolutionized our understanding of the functions of a standard library and contemporary information center. ICT are dynamic the various aspects of libraries and also the information profession. The benefits of ICT are leading to digital sources of information and the substitution of digital media and becoming the dominant type of information storage and retrieval. Now it has become easy to access digital information resources without any restrictions, such as times and day of the week, a kind of physical library. ICT implements the foundations of librarianship and knowledge science that were given by Dr S. R. Ranganathan, the daddy of librarianship and knowledge science.

IV. CONCLUSION

ICTs have brought new changes to the information world. IT and new technologies have revolutionized the knowledge society. It has changed the way people think and the way they interact. It has affected the lives of everyone in every area. Most of the world's population is shifting from techno-illiteratetotechno-literate. Whereas it is not libraries and ICT knowledge centers that cannot take a step. Within the ICT world, professions have jointly adopted new technologies to develop all fields.

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A Virtual Study Meeting during the COVID – 19 Pandemic Systems for the New Age: Video Conferencing as a Mode of Communication

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ABSTRACT

Educational institutions (schools, colleges, and universities) in India are currently based only on traditional methods of learning, that is, they follow the traditional set up of face-to-face lectures in a classroom. The aim of the study is to analyses the opportunities and challenges of emergency remote teaching based on experiences of the COVID-19 pandemic.The sudden outbreak of a deadly disease called Covid-19 caused by a Corona Virus (SARS-CoV-2) shook the entire world. The World Health Organization declared it as a pandemic.Thissituationchallengedtheeducationsystemacrosstheworldandforcededucatorstoshift to an online mode of teaching overnight.This is work &study focuses on the Students, Teachers, Business Person & any other person on the impact is good, the bad and the ugly of using videoconferencing for work-related meetings during the COVID-19 pandemic.Three were tied to camera and microphone issues, two involved eating and meeting management issues.The article includes the importance of online learning and Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of e-learning modes in the time of crisis. The social challenges are mainly related to the lack of human interaction between teachers and students as well as among the latter, the lack of physical spaces at home to receive lessons and the lack of support of parents who are frequently working remotely in the same spaces.

KEYWORDS Education, Online Learning, Technological Challenges, Virtual Meeting, Videoconferencing.

I.   INTRODUCTION

The deadly and infectious disease Corona Virus also known as Covid19 has deeply affected the global economy. Thistragedyhasalsoshakenuptheeducationsector,andthisfearislikelytoresonateacross the education sector globally. The Covid-19 pandemic outbreak forced many schools and colleges to remain closedtemporarily.Variousschools,colleges,anduniversities shave discontinuedin-personteaching.Aspertheassessmentoftheresearchers,itisuncertaintogetbackto normalteachinganytimesoon. Associaldistancingispreeminentatthisstage,thiswillhavenegative effects on learning opportunities. Educational

units   are   struggling   to   find   options   to   deal   with   this   challengingsituation. Thesecircumstancesmakeusrealizethatscenarioplanningisanurgentneedfor academicinstitutions[1].

Ministries of education in different countries have recommended or made it mandatory to implement online learning at all school levels in various countries. This decision has also been supported by UNESCO [1], which has declared that online learning can help stop the spread of the virus by avoiding direct interactions between people.UNESCO [3] has additionally provided a list of free educational platforms and resources that can be used for online learning according to the needs of each educational institution, providing social care and interaction during school closures. Current trends toward globalization and the functional integration of dispersed economic activities, an increased number of multiunit companies, and more project teamwork have made the ability to transmit information between external business partners and within multiunit companies essential for enterprises in the postindustrial knowledge economy [4].India's apex regulatory body of higher education, UGC, has taken the present educational scenario very seriously and put some efforts proactively to resolve the deadlock of completing courses and examinations in on-going semesters as well as issued circular regarding the academic calendar after the recommendations of one of the committees constituted by UGC itself. It has also become mandatory for all the universities in India to complete the 25% syllabus through online teaching mode and 75% face-to-face interaction[5].

II. LITERATURE REVIEW

- **Online Learning & E-Learning**

The author of [6] describes online learning can be termed as a tool that can make the teaching–learning process more student-centered, more innovative, and even more flexible. Online learning is defined as "learning experiences in synchronous or asynchronous environments using different devices (e.g., mobile phones, laptops, etc.) with internet access. In these environments, students can be anywhere (independent) to learn and interact with instructors and other students".

In [7] authors have thoroughlyreviewsamidst this deadly virus spread such online platforms are needed where

a)   video conferencing with at least 40 to 50 students is possible,

b)   Discussions with students can be done to keep classes organic,

c)   Internet connections are good,

d)   Lectures are accessible in mobile phones also and not just laptops,

e)   Possibility of watching already recorded lectures,

f)   Instant feedback from students can be achieved and assignments can be taken.

In [8-9] authors have designed and implemented during the school closures, existing inequalities connected to different socioeconomic situations have increased mainly due to the following reasons:

i.   Lack of resources, including access to educational technologies and the Internet,

ii.   Lack of physical spaces to carry out home-based learning among families from poorer backgrounds,

iii. Who lack the basic skills to support their children, especially regarding secondary education.

There is a requirement of a quick shift to online learning mode; therefore, the products by Google can be really useful under such problematic situations [7]; they are

- Gmail,
- Google Forms,

- Calendars
- G-Drive
- Google Hangouts
- Google Jam board and Drawings,
- Google Classroom
- Open Board Software (not a Google product, helps in recording meetings in the form of files).

These tools can successfully be used as an alternative for face-to-face classes

III. METHODOLOGY

In order to analyses experiences, opportunities, open challenges and lessons learned regarding online learning during the COVID-19 emergency, a qualitative method was used based on a the step consisted of an online discussion forum. This forum was organized to include researchers, professors and enterprises mainly from European countries and from Lebanon with expertise in information and communications technology (ICT), social science and education. The discussion enabled the participants to discuss and compare their experiences, primarily related to the COVID-19 pandemic.

The problems associated with online learning and possible solutions were also identified based on previous studies. The SWOC analysis was conducted to understand various strengths, weaknesses, opportunities, and challenges associated with online mode of learning during this critical situation. This study is completely based on the secondary data. A systematic review was done in detail for the collected literature,Secondary sources of data used are

- Journals
- Reports,
- Search Engines
- Company Websites & Scholarly Articles
- Research Papers

Following table-1 is portrays the details of the varied modes of online teaching-learning modes being used by the teachers and students during the lockdown period of COVID-19 outbreak[10]

Table 1. Showing different modes of online teaching modes used by the teachers and students.

S.N.	Modes of online teaching-learning modes	% of teachers using online teaching modes	% of students using online learning modes
1.	Google Classroom	32	20
2.	Zoom/ Cisco WebEx/ Google Meet/ Skype	45	15
3.	Webinar	25	35
4.	YouTube Videos	50	28
5.	YouTube/ Facebook Streaming	6	18
6.	WhatsApp/ Telegram	100	100
7.	Telephonic Conversation	87	23
8.	Email	100	100
9.	SwayamPrabha educational DTH channels/Zonet Cable TV	11	27

Interestingly, despite having a variety of digital modes of teaching-learning, almost all the teachers and students both were using WhatsApp/ Telegram and Email for educational interactions, submission of assignments, clarification of doubts and conducting class tests. There were 32% of teachers using Google classroom and 45% teachers using Zoom/Cisco WebEx/Google Meet/Skype platform for taking online classes, but the recipient students were found only 20% and 15% respectively. Twenty-five percent of teachers conducted Webinars as online teaching while 35% of students were attended University's webinars and outside the University's webinars for enriching themselves widely as an online mode of learning. There were 50% of teachers recorded their lectures on YouTube as teaching through web mode, whereas 28% of students watched presentations and recorded videos of all sources on YouTube.

YouTube and Facebook streaming as a means of virtual classes taken by the teachers found significantly very low with 6%, whereas 18% of students admittedly found using these online platforms for learning. Eighty-seven percent of teachers were found using telephonic conversation for educationally get connected with their students in relation to giving and receiving information. Still, students tend to feel hesitant to call their teachers, and the percentage found only 23. Some teachers(34%) showed an ardent interest in the pursuit of using the new technological tool of online teaching such as SwayamPrabha educational DTH channels/Zonet Cable TV with 11% only but students were found a little bit impressive 27% using this digital tool for online learning.

Fundamental questions of teachers & students

1. How is the education sector responding to COVID-19?
2. What does this mean for the future of learning?
3. What is the challenges of online learning?
4. Online learning is effective?
5. Why a changing education imperative?
6. The importance of disseminating knowledge is highlighted through COVID-19?

The following three question are mainly used tolled that teachers & students

1. How do I know if online education is right a way of learning?
2. Maintain Relationships. Trusting relationships between teachers and students are the bedrock of successful learning?
3. Keep Learning Active. Online learning can easily lend itself to more passive forms of learning like watching videos and listening to lectures?

IV. ANALYSIS OF ONLINE LEARNING

This pandemic may accelerate some changes in educational models based on the pros and cons of the technology used for learning purposes. Thomas and Rogers [18], starting from their experiences of online learning during the pandemic emergency, have observed that school-provided IT systems are frequently too expensive, cumbersome and quickly go out of date.

Table 2. summarizes some key obstacles to the effective use of online learning identified in the literature.

Table 2. Open challenges of online learning.

OPEN CHALLENGES		REFERENCES
TECHNOLOGICAL CHALLENGES	Access to infrastructure such as technological devices and an Internet connection.	[8], [9], [11]
PEDAGOGICAL CHALLENGES	Teachers' lack of skills in using technology. Need for training and guidelines for teachers and students.	[12], [13]
	Need for teaching materials in the form of interactive multimedia (images, animations, educational games) to engage and maintain students' motivation.	[11], [12], [13]
	Lack of student feedback and evaluation system.	
SOCIAL CHALLENGES	Lack of suitable home learning environment to study and parents' support.	[8], [9]

Free online platforms that support live-video communication

There are many live-video communication platforms are available in web, but some of the free online platforms are as listed below which can be used by learners of all categories [14]:

- **Zoom –** Cloud platform for video and audio conferencing, collaboration, chat and webinars.
- **Google Meet –** Video calls integrated with other Google's G-Suite tools. Video meeting recordings, Screen sharing, Join calls using Google Calendar
- **Facebook Live-** is a great fit for businesses, influencers, or individuals who are looking to broadcast demos, videos, or showcase their company culture while streaming live, followers on Facebook can comment and chat live, schedule videos ahead of time to gain excitement.
- **YouTube Live-**is a platform for demonstrating a product with live interaction, hosting an educational session to teach audience with screen sharing or using a whiteboard, having features with Location tags and advanced scheduling.

V. MERITS & DEMERITS OF ONLINE LEARNING DURING LOCKDOWN

Table 3. Merits& Demerits of online learning.

Merits	Demerits
Online Learning encourages more productive use of time which keep individuals safe from pandemic situation like spread of Covid-19.	Not all students have the necessary knowledge, skills and resources to keep themselves safe online. Spending more time on virtual platforms can leave students vulnerable to online sexual exploitation.
It has greater access to experts/specialists (nationally and internationally) and learners can access 24/7 at their own pace and time. It allows geographical reach even to rural or remote locations.	Learners from low-income families and disadvantaged groups are the more likely to suffer during online learning as they may not afford high-speed internet connection and required technical gadgets. It widens gap between privileged and unprivileged learners
It is a cost-effective technology which is quite affordable and enhances communication between educators and students. One educator can teach various virtual classes simultaneously which reduces travelling to various places. It can accommodate more learners at a particular time.	It may lead to laziness with some students being at their home and may lack self-discipline. The atmosphere of a face-to-face meeting is lost. Interpersonal relationship between students and teachers or between students may hamper.
Very useful to some emergency service personnel like police, doctor and nurses etc. who are unable to spare a specific time to learn during lockdown can use the online recordings and pursue their education.	The security of personal data may be compromise as one can hack the digital devices without latest software updates and antivirus programs.

VI. SUGGESTIONS

Some useful steps for smooth functioning of Online Learning are as suggested below:

1. Online platforms with enhanced safety and safeguarding measures, especially for virtual learning tools should be ensured. The devices must have the latest software updates and antivirus programs otherwise the security of personal data may be compromised as one can hack the digital devices.
2. High speed internet connectivity should be ensured in order to improve smooth access for all including learners of disadvantaged groups and low-income families.
3. All should follow the new guidelines released by UNICEF and partners to keep kids safe during online classes.
4. Schools should monitor good online behaviors of students while conducting online classes.
5. Parents should ensure that students' devices have the latest software updates and antivirus programs. They should work with students to establish rules for how, when, and where the internet can be used. They should also speak to their students on how and with whom they are communicating online.
6. Social networking platforms should enhance online platforms with more safety measures, especially while using virtual learning tools.
7. Government should take necessary steps to train all stakeholders of education on online learning platform to tackle such crisis of lockdown during any pandemics. Government should create awareness on online education with safety measures for children and take measures to create awareness on cyber security.

8. Online learning is not affordable for all including the poor and disadvantaged groups of the society. So necessary steps should be taken by Government/educational institutions to minimize this gap between privileged and unprivileged learners.

9. Learners and educators must be familiar with Web-based interactions such as email, discussion boards and chat rooms before joining online classes.

VII.CONCLUSION

Online Learning is the most common method of distance learning today. During the lockdown period for Covid-19, online learning is the best platform to keep learners/educators engaged and safe by maintaining social distancing. Govt. of India has initiated different online learning platforms to continue educational activities during lockdown period which are also been recognized by UNESCO and World Bank. Online Learning method utilizes various applications of the internet to distribute classroom materials and help learners and educators interact with one another. Using the various technologies available for Online Learning, educators can provide a more interactive distance learning experience by delivering real-time, synchronous video conferencing. Online learning is considered as future learning process and this platform has a potential of overall change in pedagogy of teaching learning in the modern world.

The results of the analysis of the online discussion forum with international experts, the data from ISTAT and statements of opinion leaders in Italy have revealed several technological, pedagogical and social challenges, additionally confirmed by the reference literature. Reliable network infrastructure needs to be developed. Teachers, students and parents must have connectivity that allows them to be able to take lessons remotely even when other people in the same house are doing other online activities. In fact, the results of the online discussion forum underlined that the intensive use of networks during the pandemic crisis has produced connection failures in several countries, including Estonia, which is technologically advanced. One suggestion of experts was to develop 5G.

The use of intelligent technologies for remote teaching, like artificial intelligence, needs to be reinforced to encourage personalized, inclusive and participatory online learning paths. This can open up new possibilities and provide added value to online learning, as long as it is integrated with the pedagogical methodologies used by teachers. In fact, in this study a need to personalize learning and make it more effective emerged.

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Synthesis, Characterization and Antibacterial Study of Schiff Base of 5-Nitrosalicylaldehyde with 4, 6-Dinitro-2-Aminobenzothiazole and Their Transition Metal Ion Complexes

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ABSTRACT

A compound 4,6-Dintro-2-aminobenzothiazole was reacted with 5-Nitrosalicylaldehyde under acidic condition. The novel imine product was synthesized by condensation method and their metal Ligand complexes were prepared by reflux the metal ion salt with Schiff base. The synthesized compounds were elucidated by UV-Vis, H1 NMR, and IR spectroscopic techniques. The prepared compound (Ligand) and metal ion complexes were screened against the Gram +Ve and Gram –Ve bacteria.

Key-words: 4, 6-Dintro-2-aminobenzothiazole, 5-Nitrosalicylaldehyde, Schiff bases, Transition Metal- Ligand complexes, Antibacterial Activity.

I. INTRODUCTION

Synthesis and antimicrobial activity of 2-aminobenzothiazole and its derivatives is reported [1]. Further, their other pharmacological activities such as anticancer, antiulcer, antihistaminic, anti-inflammatory activity and analgesic activities also reported [2-6]. It was envisaged that the compounds containing these moieties in their molecular frame work might show enhanced biological activity. Increasing physiological importance of oxygen donor organic compounds and active role played by coordination certain metal ions to them is of interest towards use in synthesizing and studying structural aspects of metal complexes with some oxygen, sulphur and nitrogen donor ligands. The aromatic benzothiazole nucleus is associated with a variety of antihistamine activity, pharmacological actions such as fungicidal and leishmanicidesactivities.In the present study we have reported the synthesis of ligand (E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol from 4, 6-dinitrobenzothiazole-2-amine and 5-Nitrosalicylaldehyde.The transition metal ions complexes prepared along with ligand. Ligands & metal ion complexes then proceeds for antibacterial screening.

II. MATERIALS AND METHODS

Synthesis of Schiff base (E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino) methyl)-4-nitrophenol (Ligand):

A mixture of 4, 6-Dintro-2-aminobenzothiazole (0.01 mol)&5-Nitrosalicylaldehyde (0.01 mol) were refluxed for 3-4 hrs under acidic condition. The resultant crimson precipitate was filtered out and recrystallized with ethanol. The schematic route of synthesis of Ligand is shown below in figure 2.1.
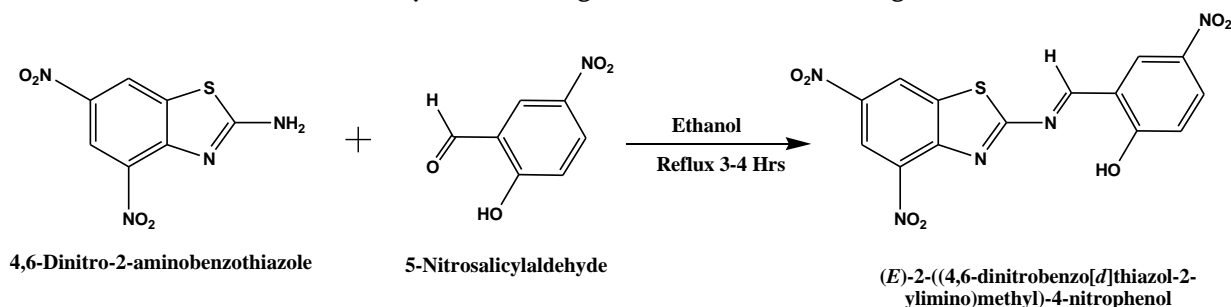

4,6-Dinitro-2-aminobenzothiazole   **5-Nitrosalicylaldehyde**   **(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol**

Figure 2.1: Synthesis of Schiff base from 4, 6-Dintro-2-aminobenzothiazole & 5-Nitrosalicylaldehyde

Preparation of complexes:

All the matal complexes were prepared by refluxing the ethanolic solution of the transition metal ion salts (Stannous acetate, Cadmium acetate, Nickel acetate, Copper acetate, and Zinc acetate) and ligand for one hour. The 2:1 ratio of ligand to metal is maintained throughout all the experiments. The obtained crystalline colored precipitates upon cooling the solutions at room temperature were filtered off, washed with distilled water and recrystallized from ethanol.

(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol   **Metal Acetate**

Reflux 6-8 Hrs | **Ethanol**

Acetic Acid

(Metal-Lignd complex)

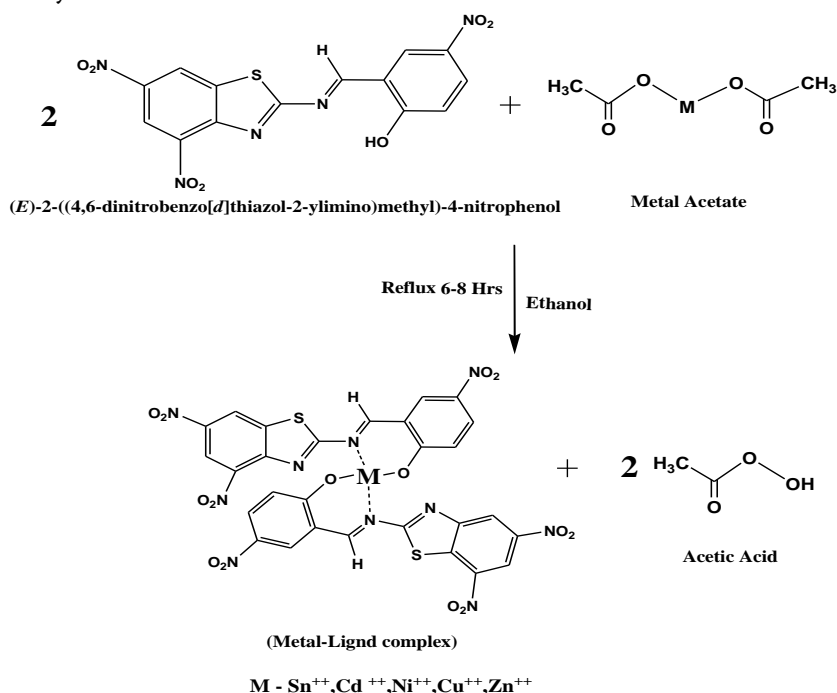**M - Sn^{++},Cd $^{++}$,Ni^{++},Cu^{++},Zn^{++}**

Figure 2.2: Synthesis of Transition metal ion complexes from (E)-2-((4, 6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol and Transition metal acetates (II).

III. INSTRUMENTATION

FT-IR spectra in the range, 4000-200 cm^{-1}, were recorded on 8300 Shimadzu Spectrophotometer, UV-visible spectra were measured by using Shimadzu 160 spectrophotometer in the range 200-1000 nm. The magnetic susceptibility values of the prepared complexes were obtained at room temperature using Magnetic Susceptibility on Bruker Magnet B.M.6, The ^{1}H nuclear magnetic resonance spectra were recorded on a BRUKER ADVANCED II 400 MHz spectrometer in DMSO as a solvent, relative to the internal standard Tetramethylsilane (TMS). Melting points were recorded on a Tanco Laboratory melting point apparatus.

Schiff base (E)-2-((4, 6-dinitrobenzo[d]thiazol-2-ylimino) methyl)-4-nitrophenol (L):
Solid, mp 190ºC, **UV-Vis (λmax) in ethanol:** 310 nm, **(IR) υmax (KBr/cm^{-1}):** 3450 (Ar-O-H),3141.56 (Ar-H), 1523 (C=N), 1244.85(C-N), 1244.17 (C-S), 1529.12 and 1345.30 (NO$_2$). **^{1}H-NMR (δ-ppm):** 5.00 (s, 1H, Ar-O-H), 7.10 (d, 1H, Ar-H), 8.22 (d,1H, adjacent to NO$_2$), 8.74 (s, Ar-H, adjacent to NO$_2$), 8.10 (s, 1H, N=C-H), 9.10 (s, 1H, Ar-H),9.50 (s, 1H, Ar-H, adjacent to NO$_2$).

Bis-(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenolStannous (II)Complex (ML1):
Solid, mp 175ºC, **UV-Vis (λmax) in ethanol:** 283 nm, **(IR) υmax (KBr/cm^{-1}):** 3150.63 (Ar-H), 1530 (C=N), 1248.66 (C-N), 1230.15 (C-S), 1530.78 and 1350.12 (NO$_2$), 720 (Sn-O)**^{1}H-NMR (δ-ppm):** 7.00 (d, 1H, Ar-H), 8.15 (d, 1H, adjacent to NO$_2$), 8.66 (s, Ar-H, adjacent to NO$_2$), 8.00 (s, 1H, N=C-H), 9.00 (s, 1H, Ar-H), 9.40 (s, 1H, Ar-H, adjacent to NO$_2$).

Bis-(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol cadmium(II) Complex (ML2):
Solid, mp 190ºC, **UV-Vis (λmax) in ethanol:**278 nm, **(IR) υmax (KBr/cm^{-1}):** 3132.12 (Ar-H), 1540 (C=N), 1242.74(C-N), 1225.11 (C-S), 1535.55 and 1345.32 (NO$_2$), 710 (Cd-O)**^{1}H-NMR (δ-ppm):** 7.15 (d, 1H, Ar-H), 8.20 (d, 1H, adjacent to NO$_2$), 8.46 (s, Ar-H, adjacent to NO$_2$), 8.15 (s, 1H, N=C-H), 9.20 (s, 1H, Ar-H), 9.55 (s, 1H, Ar-H, adjacent to NO$_2$).

Bis-(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenol Nickel (II) Complex (ML3):
Solid, mp 185ºC **UV-Vis (λmax) in ethanol:** 266 nm, **(IR) υmax (KBr/cm^{-1}):** 3163.14 (Ar-H), 1560 (C=N), 1260.10(C-N), 1230.45 (C-S), 1529.53 and 1348.63 (NO$_2$), 700 (Ni-O)**^{1}H-NMR (δ-ppm):** 7.18 (d, 1H, Ar-H), 8.25 (d, 1H, adjacent to NO$_2$), 8.60 (s, Ar-H, adjacent to NO$_2$), 8.10 (s, 1H, N=C-H), 9.10 (s, 1H, Ar-H), 9.45 (s, 1H, Ar-H, adjacent to NO$_2$).

Bis-(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenolCopper(II) Complex (ML4):
Solid, mp 195ºC **UV-Vis (λmax) in ethanol:** 288 nm, **(IR) υmax (KBr/cm^{-1}):** 3170.26 (Ar-H), 1548 (C=N), 1258.56(C-N), 1238.89 (C-S), 1524.86 and 1353.27 (NO$_2$), 730 (Cu-O)**^{1}H-NMR (δ-ppm):** 7.20 (d, 1H, Ar-H), 8.30 (d, 1H, adjacent to NO$_2$), 8.45 (s, Ar-H, adjacent to NO$_2$), 8.00 (s, 1H, N=C-H), 9.25 (s, 1H, Ar-H), 9.80 (s, 1H, Ar-H, adjacent to NO$_2$).

Bis-(E)-2-((4,6-dinitrobenzo[d]thiazol-2-ylimino)methyl)-4-nitrophenolZinc(II)Complex (ML5):
Solid, mp 182ºC **UV-Vis (λmax) in ethanol:** 290 nm, **(IR) υmax (KBr/cm^{-1}):** 3150.41 (Ar-H), 1535 (C=N), 1262.52(C-N), 1240.90 (C-S), 1530.69 and 1350.78 (NO$_2$), 715 (Zn-O)**^{1}H-NMR (δ-ppm):** 7.30 (d, 1H, Ar-H), 8.40

(d, 1H, adjacent to NO$_2$), 8.50 (s, Ar-H, adjacent to NO$_2$), 8.10 (s, 1H, N=C-H), 9.30 (s, 1H, Ar-H), 9.70 (s, 1H, Ar-H, adjacent to NO$_2$).

IV. PHARMACOLOGY

Antibacterial activity

The compounds were screened for their antibacterial activity using disc diffusion method. The bacterial organisms used included both gram positive and gram negative strains like Staphylococcus aureus, Escherichia coli, Streptococcus pyogens, Salmonella enteric Serparatyphi, S.entricasertyphi and Micrococcus luteus.

For antibacterial susceptibility testing, the sterile disc of 6 mm diameter (SD067, HiMedia, and Mumbai) was loaded with 20µl of title compound solution (1000 µg/ml) in DMF. The discs were then placed at centre on the Mueller-Hinton agar seeded with bacterial inoculums approximately 106 CFU/ ml, incubated at 37° C for 24 hrs and growth inhibition zone formed around disc was measured. Test was done in triplicate and mean value was considered as inhibition zone. Solvents were used as controls and showed no inhibitions in preliminary studies. All the synthesized complexes exhibited moderate to good activity against the test organisms. The activity of complexes of Nickel and Zinc showed excellent activity against all organisms.

Table: Antibacterial Activity

Compound	Gram negative bacteria			Gram positive bacteria		
	S.typhi	Salmonella typhi	E.Coli	Streptococcus pyrogens	Micrococcus luteus	S.aureus
L	-	-	+	-	++	-
ML 1	+	+	+	-	-	+
ML 2	-	+	+	++	-	-
ML 3	++	++	+	+++	++	+
ML 4	+	+	-	+	+++	+

Ligand (L), Cd complex (ML1),   Cu complex (ML2),   Ni complex (ML3),   Zn complex (ML4); +++ = Zone size 16-22 mm;   ++ = Zone size 9-15 mm;   + = Zone size 6-8 mm; —   = No inhibition.

V. CONCLUSION

The ligand 4, 6-Dintrobenzothiazole-2-amine was successfully synthesized by condensation method. The ligand was treated to different metal salts to afford the corresponding transition metal ion (II) complexes. Among ligands and metal ligand complexes Nickel and Zinc complexes shows best activity against the all bacteria where as other complexes and ligand shows moderate activity.

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Prevalence and Risk Factor of Soil-Transmitted Helminthes Infection among Z.P School Children's In Sarasvativadi, Taluka Deola of Nashik District, (M.S), India

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ABSTRACT

The study was designed to find out the prevalence and risk factors of soil-transmitted helminthes infection among Z.P school children's in Sarasvativadi, Deola taluka of Nashik district, Maharashtra, India. This school was randomly selected from Deola taluka and all the children's (n=30) of selected school were included in the study. Faecal samples were collected and examined by Kato-Katz techniques. Health related behavior data were obtained from the parents using interviewer questionnaire. Prevalence of soil transmitted helminths was found to be 14 (46.66%) in this study.

This study emphasizes the need for improved sanitation and better living condition for school-age children in rural area.

Key words- Prevalence, Soil -transmitted Helminthes, school children, Sarasvativadi.

I. INTRODUCTION

Soil transmitted helminthiasis is one of the major causes of public health problems in developing countries, particularly in tropical regions. World Health Organization has estimated that *Ascaris lumbricoides, Ancylostoma duodenale* and *Trichuris trichiura* infect 2.5 billion, 1.5 billion and 1.0 billion people worldwide (WHO, 1997). Low socio-economic state and poor sanitation coupled with low educational rates of parents are the main causes influencing the transmission and distribution of the infection. The morbidity of STH infections is greatest among children of school age and may have an adverse effect on growth (Nematian et al., 2008). STH are a common problem in India due to poor socio-economic conditions, unhygienic environment and poor knowledge regarding health (Pawlowski, 1985). High prevalence of intestinal parasitic infestation was observed (46.66%) in Z.P school children from Sarasvatiwadi of Deola.

II. MATERIALS AND METHODS

The study was conducted in the rural area of Sarasvatiwadi Z.P School Childrens, Deola, District-Nashik, Maharashtra, India during January 2016 to December 2016.This school was randomly selected from Deola taluka. All the selected students (30) of school were included in this study.

Data collection: An interviewer structured questionnaire was composed of the following components:-

 a) Socio economic and demographic data.

 b) Health practices towards prevention of soil transmitted helminths..

Collection and examination of faecal samples:

The school students were educated on the causes of intestinal helminthic infections and thereafter a wide mouth corked sterile bottles with labeled (ID) were given for the collection of their stool samples at home and structured questionnaires were distributed for the collection of demographic information such name, age, sex, type of toilet facility used, and number of individuals in the house, parents occupation, foot were habits, pet/domestic animals reared, regularity of deworming etc.

The school children's were taught how to collect stool samples with the help of their teachers. The stool samples were properly labeled and were carried in a cold box filled with Ice packs and transported to the Nidan laboratory, Deola for analysis. All the slides were read by a pathologist.

III. RESULTS

A total of 30 school children from the 14 had soil transmitted helminths infection. Prevalence of intestinal helminthes of the 14 stool samples contained ova of soil transmitted helminthes using Kato-Katz method.

Twelve (12) children were positive for *A. lumbricoides*, whereas 02 children were positive for *T. trichiura* respectively. There is significant difference in the overall prevalence rates of STH (Table-1)

Table-1: Prevalence of soil-transmitted helminths (STH) in Z.P School Children of Sarasvatiwdi, Taluka Deola of Nashik districts

| Parsite	14 (46.66%)
A. lumbricoides	12 (40)
T.Tichura	02 (6.66)

Table-1: Prevalence of STH
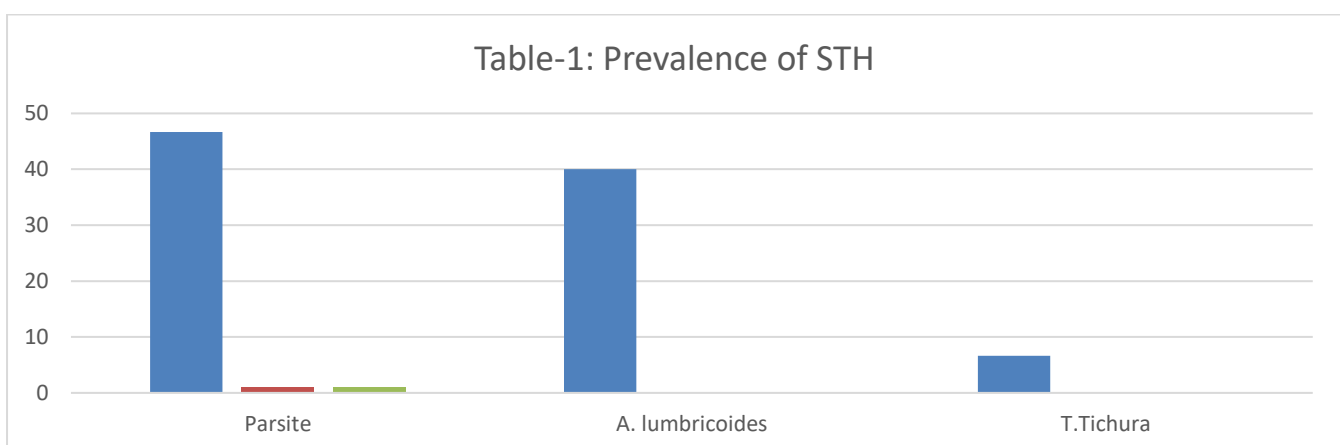
Demographic data of the parents:

More than half of the fathers19 (63.3%) and mother 27 (90%) studied up to H.S.C and 11 (36.6%) father and 03 (10%) mother studied up to graduate. 16 (53.3%) father and 16 (53.3%) mother occupation was worker, 11 (36.6) father and 11 (36.6%) mother was farmer, 02 (6.6%) father and 02 (6.6%) was mother as working in private and 03 (10%) mother was housewife.(Table 2).

Table 2: Educational and occupational status of parents of Z.P school children from Deola.

Variable	Category	Response (N=30)	
		Father	Mother
Educational Level	Up to class 5 to 12 (H.S.C)	19	27
	Graduate	11	03
Occupation	Worker	16	16
	Farmer	11	11
	Unemployed / Housewife Private shop/ Teacher/Clerk	02	03
		01	00
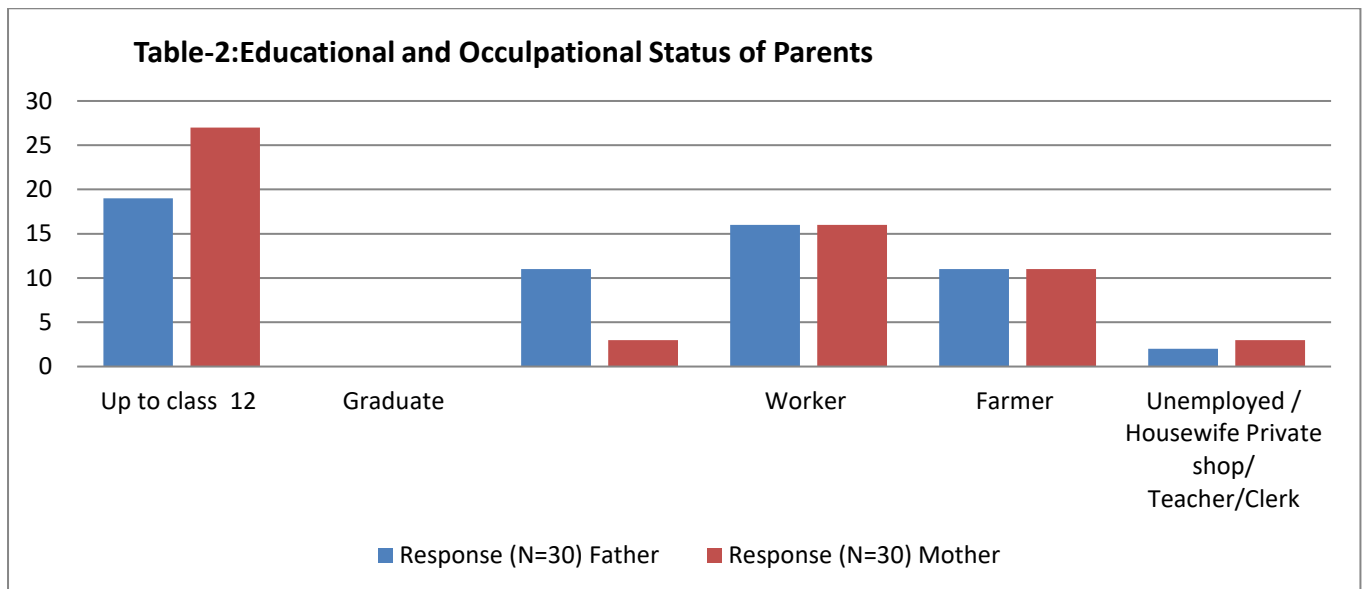
Thirty three (33.3%) parents stated that they were aware of worm infestation. Twenty six parents (26%) stated that they used to clean their children after defecation. Among them, few (30%) always and majority (43.3%) sometimes washed their hands with soap and water after cleaning. An almost equal proportion of children used water sealed toilet (30%) and open air (56.6%) for defecation. Twenty three (23.3%) children always and (36.6%) children sometimes used foot ware when they go out. (**Table 2**).

Table 3: Hygienic habits useful in preventing STH.

Variable	Category	Response % (N=30)
Washing hands with soap and water after cleaning the defecated child	Always	08
	Some times	09
	Never	13
Toilet facility	Water sealed toilet	09
	Open air defecation	17

	other	07
Wearing slippers while going out	Always	07
	Some times	11
	Never	12

IV. DISCUSSION

Intestinal parasitic infestations are endemic worldwide and a major public health problem in developing countries (Shakya et al., 2009). Many studies have been carried out in India (Paul et al., 1999), Pakistan (Ahmad Khan et al., 2004) and elsewhere in the world regarding intestinal helminthiasis. In and around Maharashtra the prevalence of intestinal parasitic infestation was reported as 90.8% (Hiware C.J et. al 2012).

But, according to our study carried out in 2016, a 63.33% prevalence of STH was observed in Z.P School children's in Deola. Regarding the educational level, majority of the parents studied up to H.S.C (fathers -63.3% and mothers – 90%). This educational level could have lead to a poor awareness level of worm infestations.

Studies carried out in Nepal (Gyawali et al., 2009) and in Pakistan (Ahmad Khan et al., 2004) have proved that the prevalence of intestinal helminthiasis was high among people going to the open fields for defecation. In this study, only 30% of respondents used water sealed toilet and 56.6% used open places for the defecation. Though almost amount of children used water sealed toilet and open place defecation, there were difference in the prevalence was observed in this study. However, the usage of toilets and foot ware may be nullified by the high usage of antihelminthic prophylaxis.

This study shows the higher prevalence rate of intestinal helminths infestation was observed in the group with hand washing practices after defecation (Gyawali et al., 2009). In our study, 26% of the parents stated that they cleaned their children after defecation. Among them, the majority always (43.3%) and a few (30%) sometimes washed their hands with soap and water after cleaning. This may be one of the factors which could attributed towards reducing the prevalence of intestinal helminthiasis, in addition to the main factor i.e., frequent antihelminthic prophylaxis.

As mentioned in the previous study carried out in Nigeria (Houmsou et al., 2010), there was an association between wearing footwear and reductions of intestinal parasitic infestation. In this study, (23.3%) school children always and (36.6%) children sometimes wore footwear when they went out. This foot wearing habit also has little impact on the prevalence of the intestinal nematodes. But, the impact of wearing foot ware could have been masked by the frequent antihelminthic prophylaxis.

V. ACKNOWLEDGMENTS

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Change in Nutritive Value of Cabbage after Infection of Colletotrichum Dematium (Pers.) Grove

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ABSTRACT

Cabbage, Brassica oleracea is a leafy green vegetable. Maharashtra solely produce4.21lakh Metric ton 5% of total cabbage produced in India (NHB 2013) [1]. It mostly consumed by peoples of all over the world. It is very nutritive and consumed raw as salad or cooked as vegetable.

Colletotrichum dematium is a saprophytic as well as parasite in nature. It grows as parasite on many plants, cabbage is one of them. occur worldwide, grow in temperate regions. It grows luxuriously in temperate regions; the post-harvest condition is mostly responsible for severity of disease. Severely diseased cabbage is not look good and nutrients content also changes, it is perfectly unsuitable for consumption.

Keywords: Cabbage, Colletotrichum, Nutrient and Disease

I. INTRODUCTION

The cabbage is most popular and widely consumed leafy vegetable in world. it is consumed uncooked in salad and cooked in variety of dishes. its popularity is due to its adaptability to a wide range of climate and soil types. Cabbage is believed to be evolved from a wild form native to Europe, growing along the coast of North Sea, the English Channel and Mediterranean Tim Lambert (2017) [2].

China is the largest producer of cabbage (33.4 million of tonnes, followed by India 9.0 million of tonnes and Russia 3.5 million of tonnes (FAOSTAT of the United Nations2014) [3].

In India west Bengal shares 24% of total production of cabbage, Odisha 135, Bihar 8%, Gujarat 7% Assam 7%, Maharashtra 7 %, and Madhya Pradesh 7% etc. (NHB database 2014) [4].

II. METHODS AND MATERIAL

1. Collection of samples

Sample of diseased cabbage were collected from the various regions of Maharashtra (India). For this purpose, total Maharashtra was divided into 5 different zones i.e., Khandesh, Konkan, Vidarbha, Western ghat and Marathwada. From these five zones diseased and healthy cabbage were collected. Samples were sealed in clean

sterile plastic bag and later stored in cooling apparatus. Labelling of each sample is done on the site of collection. (James B. et al., 2010) [5].

2.   Identification of pathogen related to disease

The collected sample were placed in moisture chamber to enhance the growth of fungi associated with it. Potato dextrose agar medium is used for culture practice, $28^{o}C \pm 2$ is suitable temperature for growth.

After luxurious growth of fungi wet mounting in Aniline cotton blue stain provide the detailed structure of hyphae and conidia under microscope. Acervulli are easily visible under low power resolution, but conidia are seen in high resolution. Setae are the peculiar character of Colletotrichum, they are dark in colour. Conidia are hyaline, aseptate, falcate, fusiform, and tapered at both ends. Size of conidia ranges from 19 to 25 μm in length and 2.5 to 3.5 μm in diameter.

Setae are dark coloured 50 to 200 μm in length, septa are ranges from 1 to 3 in number. Acervulli are 500 μm in length and 370 μm in width.

All characters of setae conidia and accervulli suggest the pathogen is *Colletotrichum dematium* **(Pers.) Grove.,** Kyungseok Park & Choong-Hoe Kim (2001) [6].

3.   Test for pathogenicity

Spraying water containing conidia on healthy cabbage in field condition confirm the pathogenic nature of *Colletotrichum dematium*.

4.   Nutrient analysis of sample

Diseased and healthy sample collected from same site were analysed for nutrient content in it. For this purpose, standard protocols were strictly followed they are Carbohydrate was estimated by Anthron reagent (Hedge, J E and Hofreiter, B. T., 1962) [7] method, described by S. Sadasivam and A. Manickam, (2004) [8]. Nelson-Somogyi (1944) [9] and Somogyi (1952) [10] method were used to estimate Simple sugars or reducing sugars in vegetable. Total Protein Estimation by Lowry's Method (Lawry et al., 1951) [11]. Amino acids are estimated using method described by Hyman Rosen, 1957 [12]. Bligh and Dyer (1959) [13] procedure of extraction of lipids from plant material is by using Chloroform, Methanol and water is more suitable method than others (Breil, C. *et al.*, 2017) [14].Estimation of chlorophyll pigment were carried by using the method given by Arnon (1949) [15,16].Fibres estimated using procedure described by Murray Randall in 1977[17].Water content and dry matter were calculated using protocol of Ruck, 1969[18]. And finally Ascorbic acid estimation or Vitamin C estimation were carried by using Hughes, D. E., 1983[19].

5.   Comparison for change in content

To study impact of pathogen on the content of nutrient, it's very essential to compare the content in diseased sample and healthy one. Here % change in content were calculated for comparison purpose.

III. OBSERVATIONS

Nutrient content in healthy & diseased sample as well as their comparison is stated in table1.

TABLE-I Nutrient content in Healthy and Diseased vegetable and % alteration of content BY *COLLETOTRICHUM DEMATIUM*

Table I: Nutrient content in Healthy and Diseased vegetable and % alteration of content by *Colletotrichum dematium*

Sr. no.	Nutrients	Content in 100gram Healthy material	Content in 100gram diseased vegetable	% Alteration due to disease
1.	Water content	89.3 Grams	86.1 Grams	-3.583
2.	Total carbohydrate	6.0 Grams	3.4 Grams	-43.333
3.	Reducing sugar	3.4 Grams	1.20 Grams	-64.705
4.	Fibre	2.5 Grams	2.1Grams	-16
5.	Protein	1.5 Grams	1.6 Grams	6.667
6.	Amino acids	1.6Grams	1.8 Grams	12.5
7.	Lipids	0.1 Grams	00 Grams	-100
8.	Vitamin C	37mg	00mg	-100
9.	Chlorophyll content(total)	24mg	00 mg	-100
10.	Dry matter	10.7 Grams	13.9 Grams	29.906

IV. RESULTS AND CONCLUSION

Colletotrichum dematium causing anthracnose disease on Cabbage in field as well as in post-harvest condition. Pathogen retard the nutritive values of the vegetable and, it's demand in market, this clearly explain the economic importance of the disease. In this the nutrient whose level increases are protein (6.667 %) and free amino acids (12.5 %). The percentage concentration of total carbohydrate (43.333 %), reducing sugar (64.705 %), fibre (16 %) is found to be decreases after disease development. While the lipids, vitamin C and chlorophyll is fully absent in diseased sample. (Graph 1)
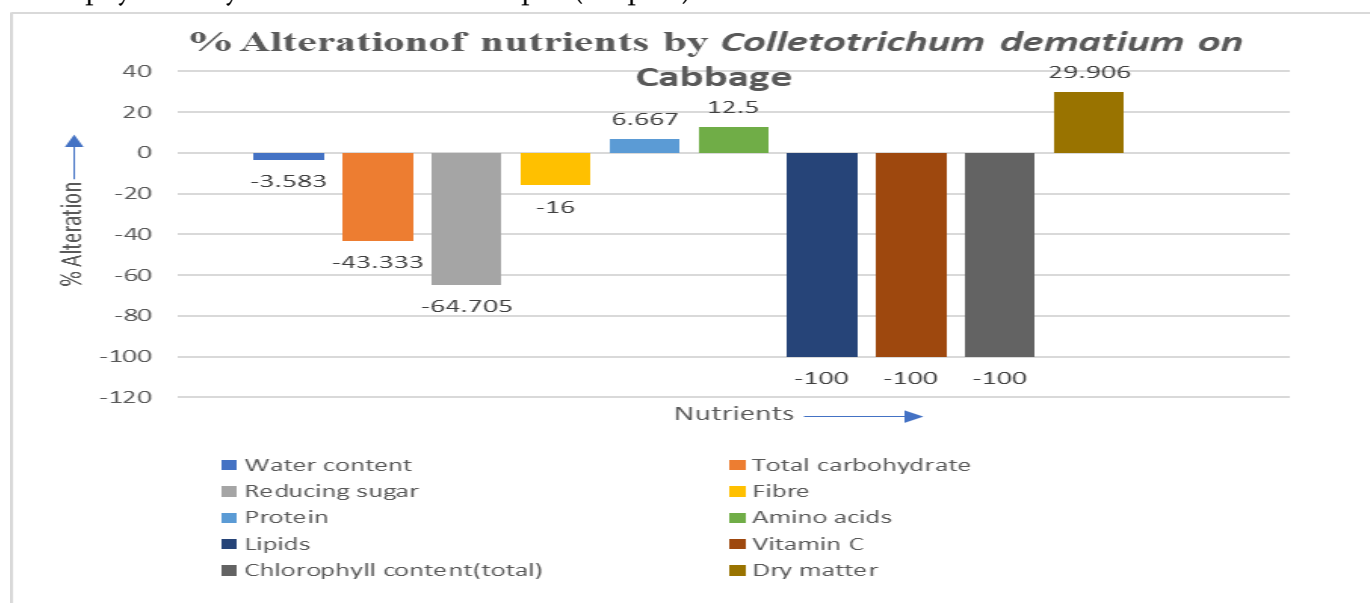

Figure 1: Graphical representation of result of nutrient change in content of vegetable Cabbage after Anthracnose disease caused by *Colletotrichum dematium.*
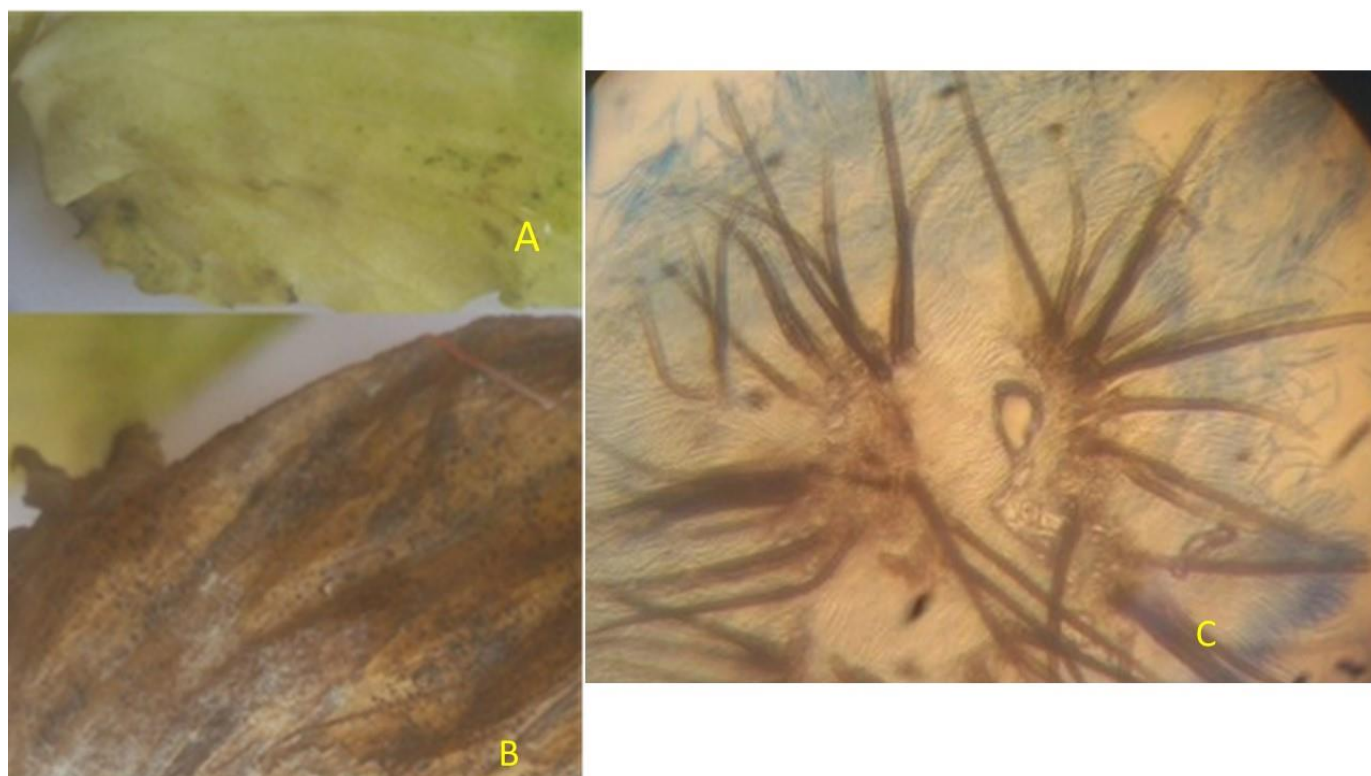
Figure 2: *Colletotrichum dematium* on Cabbage- (before inoculation -A and after three days of incubation- B), and C- Acervulli under high resolution showing Setae and conidia.

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Pharmocognostic & Floristic Survey of SPM College Nandura (Rly) Campus Area

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ABSTRACT

Floristic studies has recently received much attention. Namdura has rich biodiversity including many Angiosperms. However in the last few years due to industrialization and urbanization many plants have been cut down and many exotic species have been planted. In the present study floristic explorations were made to college campus with the aim of collecting and identifying flora, Pharmacognastic studyof plants occurring in this campus.

The current piece of work is a focus on the flora of our college-campus at Nandura Dist. Buldana. The word "Flora" refers to the plants occurring within a given region as well as to the publication of scientific descriptions of those plants. A Flora may contain anything from a simple list of the plants occurring in an area to a very detailed account of those plants. Nandura Tahsil is situated along Satpuda mountain ranges. Our college campus has various trees, some are wild, some are forest herbs, some are flowering, some are aromatic some are shrubs. The plants belongs to different families like Mimosae, Amaranthaceae, Acanthaceae, Rutaceae, Liliaceae, Apocyanaceae, Meliaceae, Graminae, Bomcaceae, Cruciferae, Crassulaceae Luguminosae, Caeselpiniacea e, Myrtaceae, Cannabidaceae, Cappridaceae, Meliaceae, Umbelliferae, Solanaceae, Compositae, Verbenaceae, Boraginaceae, Euphorbiaceae, Zinziberaceae, Poaceae, Convolvulaceae, Poaceae, Amyryllidaceae   etc and Labiatae families. Aromatic plants are a special kind of plants used for their aroma and flavor. *Ocimum americanum, Latana camara, Hyptis* plants in our college campus, are wild and they are well-known for their aromatic smell and are also used for medicinal purposes. Aromatic compounds are present in these plants i.e. in the root, wood, bark, foliage; flower, fruit, and seed etc. Many of them are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. Some aromatic plants in our college campus like *Ocimum, Latana, Hyptis* are highly aromatic plants.

Key words: Floristic Diversity, Field surveys, Pharmacognastic study, SPM College Campus, Nandura.

I. INTRODUCTION

The current piece of work is a focus on flora of our college campus at Nandura Dist. Buldana The word "flora" refers to the plants occurring within a given region as well as to the publication of scientific descriptions of

those plants. A Flora may contain anything from a simple list of the plants occurring in an area to a very detailed account of those plants. Nandura Tahsil is situated along the Satpuda mountain ranges. Our college campus has various trees, some of them are wild, some forest herbs, some flowering, some aromatic and some are shrubs. The plants that produce aromatic substances are used in making perfumes, in pharmaceutical and liquor industries. These plants belongs to different families such as, Annonaceae, Myrtaceae Moringaceae,, Ulmaceae, Meliceae, Tecomaceae, Nyctaginaceae, Annonaceae, Rutaceae, Caesalpiniaceae ,Fabaceae, Rutaceae, Palmae, Rubiaceae, Lythraceae, Caesalpiniaceae, Euphorbiaceae,, Moraceae, Oleaceae, Cupressaceae, Cycadaceae, Cactaceae, Amaryllidaceae,, Nymphaeaceae Lauraceae, Umbelliferae, Solanaceae, Zinziberaceae, Poaceae,Ranunculaceae,Myrtaceae, Malvaceae, Rubiaceae, Bignoniceae, Sapotaceae, Rosaceae, Sterculaceae and Labiatae. Aromatic plants are special kind of plants used for their aroma and flavor. The plants like, Ocimum americanum, Latana camara, Hyptis in our college campus are wild and are well known for their aromatic smell and are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. Aromatic compounds are found in plants i.e. in the root, wood, bark, foliage; flower, fruit, and seed etc. Many of them are also used for medicinal purposes. We have around hundred type different plants in our college Campus. They belongs to different groups like, Dicotyledon, Monocotyledon and aquatic plant. Urban green spaces are of great importance in cities, because of the multiple ecosystem services they provide and may exist in the form of domestic, public or botanical gardens, unused fields. Thus, the aim of the present study was to understand the changes in the flora over more than five decades since the publication of the first study. For this, we assessed the total current specie"s richness in the campus and compared it with the results. Also a detailed unified inventory of all the vascular plants that are recorded till date in the campus is provided with notes about historical status, rarity, and ecological remarks.

II. STUDY AREA

The study area is Shri Pundlik Maharaj Mahavidyalaya, Nandura Dist. Buldana , Shri Shivaji Education Society Amravati"s, Amravati. This college was founded in 1983, which only comprised the main building at that time. The study area was isolated from the main city and sustained stunted scrub vegetation at that time, which is evident from archival photographs and literature. Shri Pundlik Maharaj Mahavidyalaya, Nandura Dist. Buldana Dist. Amravati, in Maharashtra, India (with a 2-acre area . The campus can be divided into three sections: the main campus which consists of main building and is surrounded by tall trees having maximum age upto seven to eight years. The second section is Office that lies towards the South side of the main campus. The original vegetation type of Nandura is dry and deciduous. The type of soil here is black soil having some bolders in the plains.

III. METHODOLOGY

The entire work was undertaken from September 2019 to February 2021. Floristic studies were carried out in the Shri Pundlik Maharaj College campus during 2019-2021 A detailed survey of study area was done and information of plant species was recorded. All plants were identified under the expert in taxonomy. All habitats of the study area were surveyed carefully. Plant collection was carried out by standard method (Jain and Rao, 1977); Shah, 1978; Duthi,1960; Gamble, 1915; Hains,1921-1924; Cook, 1903; Hooker,1872-1897; Naik, 1998)

and according to other taxonomic literature This assessment was done for all vascular plants including Gymnosperms as well as Pteridophytes. Lower cryptogams including algae and fungi were not assessed, but a brief literature review is presented here for reference.
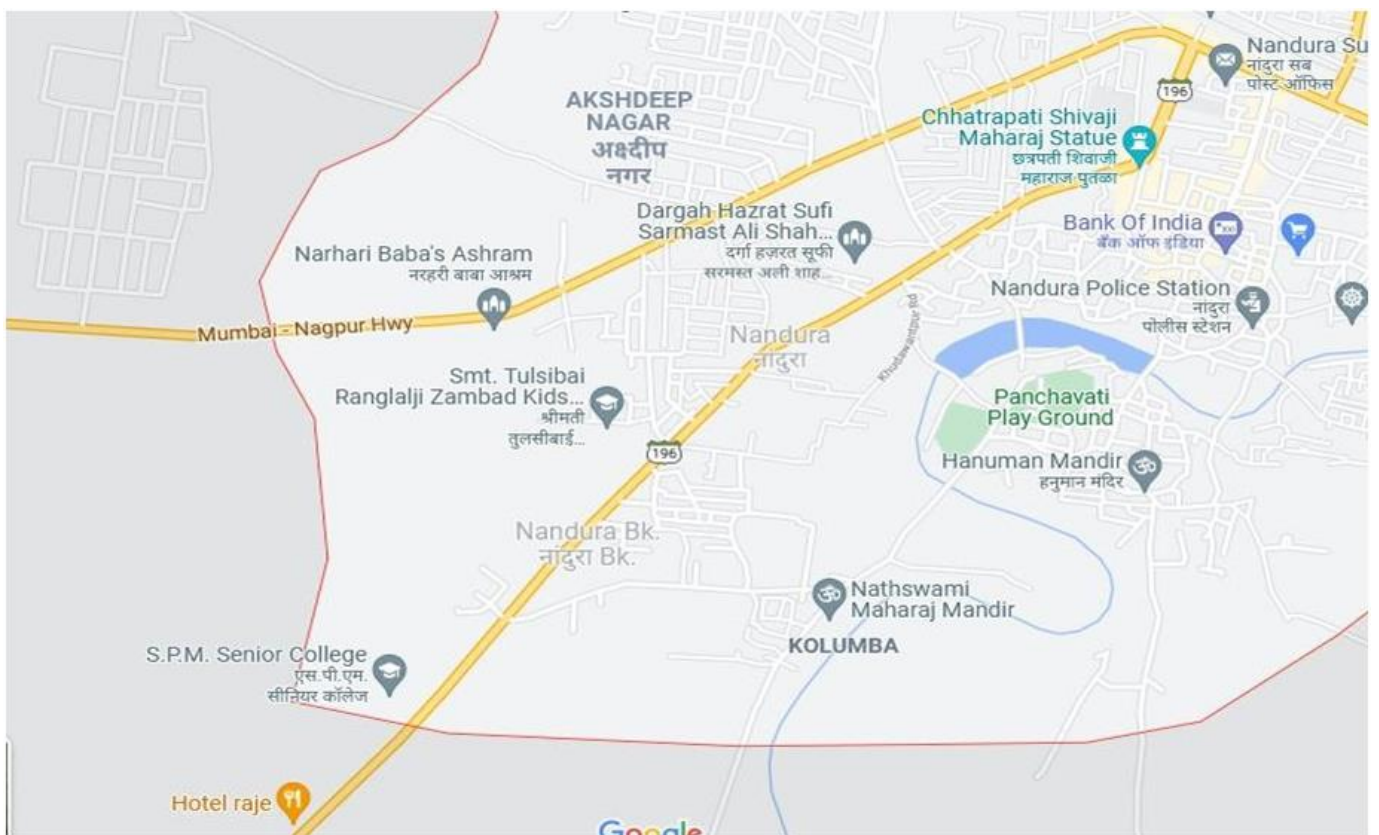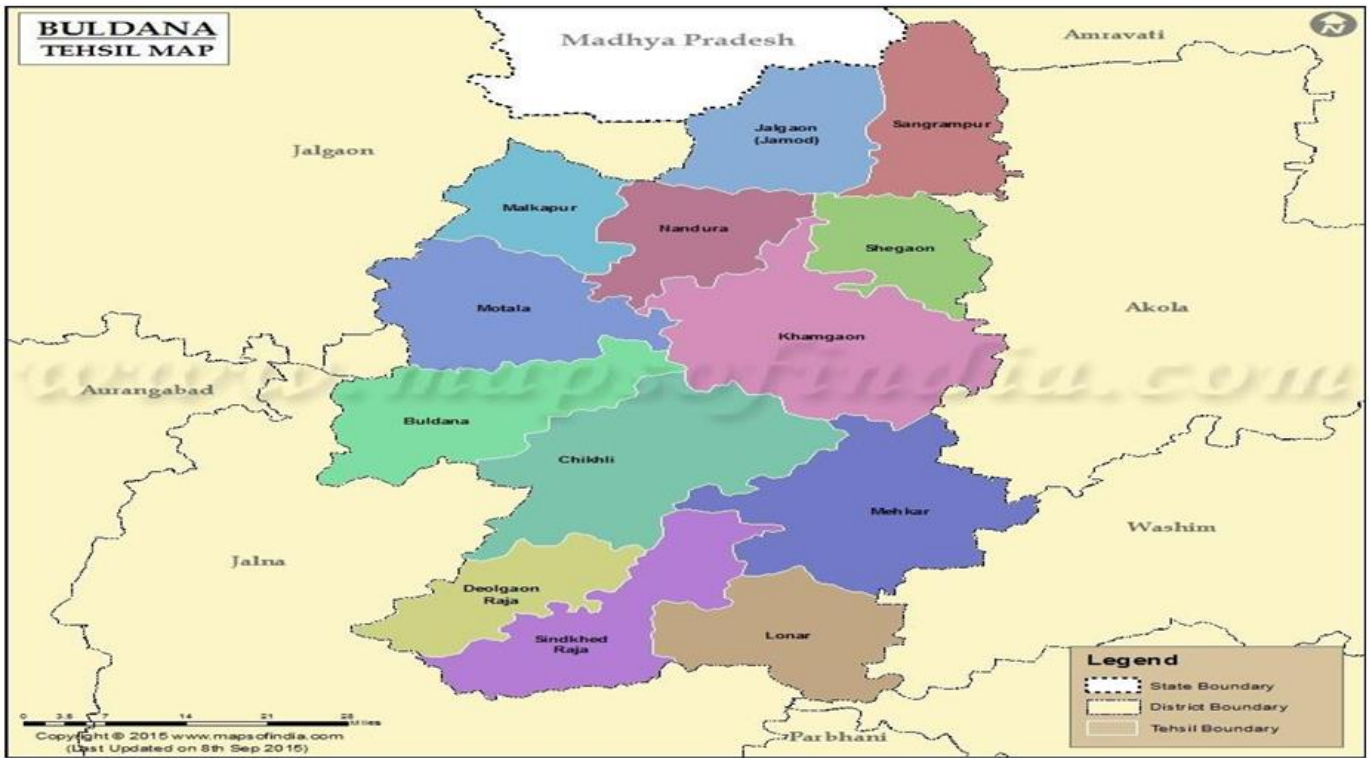
Shri Pundlik Maharaj Mahavidyalaya, Nandura Dist. Buldana

IV. RESULT & DISCUSSION

RESULT & DISCUSSION

An extensive plant survey was carried out in the Shri Pundlik Maharaj Mahavidyalaya, Nandura Dist. Buldana in 2019-2021. During this survey, more than 150 plants were recorded. 104 plants among them were identified and it was found that there are 100 Angiosperm plants having 67 species-107 genera and 65 families belonging to dicotyledonous, while 20 species-20 genera and 4 families belonging to monocotyledons (Table-1). Due to various factors such as changing environmental Conditions, biotic factors, destruction of habitat, biotic factors, destruction of habitat some plant species are facing threats for their existence. Conservation of the flora is one of the vital segments in natural resource management. The study area shows rich Floristic diversity in respect to the distribution of species, genera and families of both dicotyledonous and monocotyledons. Table 1 indicates a list of flowering plants which were found in campus area. Before few decades, campus area was floristically very rich with diverse habitat. But due to various factors, the vegetation of the campus has faced rapid destructions of habitat of the plants. It was found that Lamiaceae, Leguminosae and Poaceae are the dominating dicotyledonous and monocotyledonous families respectively and an inventory of all the species recorded is provided here. A comparative species composition account of the analysis of plants recorded in this study was done according to method suggested by Vartak (1958a) and it is provided in Fig.4. However, the results may not be comparable in the true sense as the methodology followed by the earlier researchers might not be exactly replicated and the present findings are rather baseline broader-level indicative changes and minor intricacies might need to be amended in the near future.
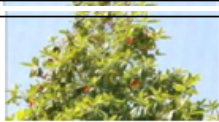
Table: Botanical and Common Names, Families, Distribution and Use of Plants

Sr. No.	Botanical Name	Common Name	Name of Family	Traditional Uses of Plants	Photo
1.	*Acacia arabicae* Willd.	Kikar	*Mimosaceae*	Used for making furniture's, tanning, dyeing fabrics yellow, stem yields gum while seeds are fermented with dates to give beverages.	
2.	*Acacia concinna* Willd.	Sikakai	*Mimosaceae*	Used in natural shampoos or hair powders, saponins from the plant's pods have been traditionally used as a detergent.	
3.	*Acacia farnesiana* (L.) Willd.	Ghand Babul	*Mimosaceae*	Flowers are a source of essential oil used in perfumery.	
4.	*Achyranthus asper* L.	Chirchita	*Amaranthaceae*	Pulmonary affections cough asthma and skin diseases.	
5.	*Adhatoda vasica* Nees.	Adusa	*Acanthaceae*	A decoction of the leaves is expectorant, and is used to relieve bronchitis.	

6.	*Aegle marmelos* L.	Bael Patter	*Rutaceae*	A decoction of the leaves is a febrifuge and expectorant and is particularly used for asthmatic complaints. Also used to treat acute bronchitis, fever and dysentery.	
7.	*Albizia lebbeck* Benth	Siris	*Mimosaceae*	The bark is used to treat boils and the leaves and seeds to treat diseases of the eyes.	
8.	*Aloe vera* L.	Gawar Patha	*Liliaceae*	The active principle is aloin which is used to treat intestinal worms, to encourage menstruation and as a cathartic.	
9.	*Alstonia scholaris* R.Br.	Chitvan	*Apocynaceae*	The dried bark has been used since ancient times as a tonic and to treat intestinal complaints, including worms.	
10.	*Anthocephalus cadamba* Miq.	Kadam	*Rubiaceae*	The bark is used as a tonic and reduces fever.	
11.	*Asparagus racemosus* Willd.	Satawari	*Liliaceae*	The roots are applied to relieve irritations. They are also used to treat dysentery, and are diuretic.	
12.	*Astercantha longifolia* Nees.	Talamkhana	*Acanthaceae*	Decoction of root is diuretic; seeds are given in gonorrhoea, and with milk sugar in spermatorrhoea.	
13.	*Azadirachta indica* (A.) Juss.	Neem	*Meliaceae*	Non-drying oil is extracted from the seeds. It is used for soap-making and to treat skin diseases, locally. The bark and leaf extracts are used as a tonic, and to reduce fevers.	
14.	*Bambusa spinosa* Roxb.	Bans	*Gramineae*	Boiled young shoots eaten locally as a vegetable. Wood used for general construction work.	
15.	*Bombax malabaricum* D.C.	Semul	*Bombacaceae*	The wood is a source of cellulose, resin; root and bark are used as an emetic. The gum is demulcent and used to treat diarrhea.	

16.	*Brassicae campestris* L.	Sarson	*Cruciferae*	The oil (Ravinson Oil), extracted from the seeds. It is used locally as a luminant, Lubricant, and in the manufacture of soap.	
17.	*Bryophyllum calycinum* Salisb.	Patherchat	*Crassulaceae*	Leaves are useful in vitiated conditions of *pitta* and *vata*, haematemesis, haemorrhoids, menorrhagia, cuts and wounds, discolouration of the skin, boils, sloughing ulcers, burns, scalds, corn, diarrhoea, dysentery, vomiting and acute inflammations.	
18.	*Butea monospermum* Roxb.	Dhak	*Leguminosae*	A decoction of flowers and leaves is used as diuretic, astringent and aphorodisiac.	
19.	*Caesalpinia bonducella* F.	Kamju	*Caesalpiniaceae*	In India seeds are mixed with black pepper to make a tonic and to reduce fevers. A tonic is also made from the bark.	
20.	*Callistemon lanceolatus* D.C.	Bottle Brush	*Myrtaceae*	Leaves are a Tea substitute and have a delightfully refreshing flavour, tan dye is obtained from the leaves.	
21.	*Calotropis procera* Br.	Ak	*Asclepidaceae*	The root bark is used to treat leprosy in India.	
22.	*Cannavis sativa* L.	Bhang	*Cannabidaceae*	Fibres used for cordage, sailcloth and caulking boat, seeds used in manufacture of paints, varnishes and soap, drug (bhang, hashish, ganja and marihuana) is produced. Its use is illegal in many countries.	
23.	*Capparis decidua* Roth	Karil	*Capparidaceae*	Fruits eaten locally.	
24.	*Carissa carandu* L.	Kraundha	*Apocynaceae*	The red, plum-like berries are eaten locally and made into jellies and preserves.	
25.	*Cassia fistula* L.	Amaltash	*Leguminosae*	The pulp of pods is used as a laxative.	

26.	*Cassia nodusa* Ham.	Gulabi Amaltash	*Caesalpiniaceae*	The wood is used for posts and tool handles while roots are used as soap for washing clothes.	
27.	*Cassia siama* Vahl.	Siama	*Caesalpiniaceae*	The wood is used for heavy construction work, mine props and as a fuel.	
28.	*Casuarinae equisetifolia* L.	Chok/ Jhau	*Casuarinaceae*	Wood is used for roof shingles and posting.	
29.	*Cedrela toona* Roxb.	Toon	*Meliaceae*	Flowers are source of a red and yellow dye, wood is used for furniture, house building, tea chests, oil casks and cigar box.	
30.	*Ceiba pentandra* Benth	Kapok Tree	*Bombraceae*	The fibres are insect repellent; gum is laxative and used in bowel complaints, juice from its roots is a cure for diabetes.	
31.	*Centella asiatica* Urb.	Brahmi	*Umbelliferae*	It is one of the constituents of the Indian summer drink thandaayyee, sharp memory.	
32.	*Cestrum nocturnum* L.	Rat-ki-Rani	*Solanaceae*	An infusion of the plant is used as an antispasmodic in the treatment of epilepsy.	
33.	*Chrysanthemum coronarium* L.	Guldawadhi	*Compositae*	The young seedlings are cooked as a vegetable in China and Japan.	
34.	*Citrus limon* Burmann	Nimbu	*Rutaceae*	Fruits are good source of Vitamin C and B_1, carotene, Juice used for drinks, also a commercial source of citric acid. Lemon oil is used in perfumery, flavouring foods, flavouring liqueurs.	
35.	*Clerodendron inerme* Gaertn.	Lanjai	*Verbenaceae*	Used as blood purifier.	
36.	*Cordia oblique* Wild	Losara	*Boraginaceae*	Fruits are demulcient, expectorant and useful in bronchial affections and in irritation of urinary passages.	
37.	*Crinum defixum* L.	Sukhdarshan	*Amaryllidaceae*	Juice from the leaves is used to relieve ear-ache.	

38.	*Curcuma domastica* L.	Haldi	*Zingiberaceae*	Rhizome is a source of yellow dye. In India and Far East the juice is used for treating stomach complaints, bruises; fumes from the burning rhizome relieve colds and catarrh, and a paste of the rhizome accelerates the formation of scabs caused by smallpox and chickenpox.	
39.	*Cuscuta reflexa* L.	Amar Bel	*Convolvulaceae*	Seeds are carminative and anthelmatic; plant used externally against itch, internally in protracted fevers; Infusion of the plant is used to wash sores.	
40.	*Cymbopogon citratus* Spreng.	Lemon grass	*Poaceae*	Used as a medical herb and in perfumes, consumed as a tea.	
41.	*Delphinium ajacis* L.	Larkspur	*Ranunculaceae*	A tincture of the dried ripe seeds is used medicinally as a parasiticide.	
42.	*Elaeocarpus ganitrus* Roxb.	Rudraksh	*Elaeocarpaceae*	Bark and leaves used to treat inflammation of the gums.	
43.	*Emblica officinalis* Gaertn.	Anwla	*Euphorbiaceae*	Fruits used in jellies and preserves, eaten raw, bark used for tanning.	
44.	*Eugenia jambolana* Lam	Jamoha	*Myrtaceae*	Seeds are diuretic and are used to reduce the blood sugar in cases of diabetes.	
45.	*Evolvullus alsinoides* L.	Shankh Pushpi	*Convolvulaceae*	Used to treat fever and cough, traditionally used for its psychotropic and nootropic properties, memory-enhancing properties and anti-inflammatory and neuroprotective properties in the brain.	
46.	*Ficus bengalensis* L.	Bargad	*Moraceae*	Tree is sacred to Hindu, latex used to heal cracks in the feet.	
47.	*Ficus glomerata* Roxb.	Gular	*Moraceae*	Fruits are eaten locally and a bird lime is made from the latex.	

48.	*Ficus religiosa* L.	Pipal	*Moraceae*	Tree is scared to Hindu & Buddhists.	
49.	*Ficus rumphi* Blume	Pilkan	*Moraceae*	Fruits are eaten locally.	
50.	*Hibiscus-rosa-sinensis* L.	Gurhal	*Malvaceae*	Bark used in China to control menstruation, a decoction of the roots is used to treat sore eyes.	
51.	*Ixora fulgens* Roxb.	Ixora	*Rubiaceae*	Used by local people as a treatment against toothache.	
52.	*Jacranda mimosaef alia* D.Don.	Nili Gulmohar	*Bignoniaceae*	The wood is used in general carpentry.	
53.	*Jatropha curcus* L.	Safed Arand	*Euphorbiceae*	Seeds yield Curcus Oil used medicinally as a strong purgative.	
54.	*Lagerstroemia flos-reginae* Retz.	Janul	*Lythraceae*	The wood is insect resistant and used for house building, flooring, bridges and railways sleepers.	
55.	*Lantana camera* L.	Ghaneri	*Verbenaceae*	A decoction of the leaves is used locally as a tonic and stimulant.	
56.	*Lantana macrophylae* Mart.	Ghaneri	*Verbenaceae*	A decoction of leaves is used in Brazil to treat rheumatism and the fruits are used to make a tonic.	
57.	*Lathyrus odoratus* L.	Sweet Pea	*Leguminosae*	An essential oil is extracted from flowers and used in perfumery.	
58.	*Lawsonia alba* L.	Mahendi	*Lythraceae*	The bark used to treat jaundice and nervous complaints, flowers yield a scented oil, dried leaves yield a green powder used to dye hair, palm and nails orange brown (Henna) and to dye horses coats and fabric.	
59.	*Madhuca indica* Gmel	Mahua	*Sapotaceae*	Flower is edible and is a food item for tribals, used to make syrup for medicinal purposes, fermented to produce the alcoholic drink *mahuwa*, country liquor.	

60.	*Melia azadirachta* L.	Neem	*Meliaceae*	Non-drying oil is extracted from the seeds. It is used for soap-making and to treat skin diseases, locally. The bark and leaf extracts are used as a tonic, and to reduce fevers.	
61.	*Mentha arvensis* L.	Pudina	*Labiatae*	Oil used in pharmaceutical, toothpastes.	
62.	*Mentha piperata* L.	Pippermint	*Labiatae*	Oil and dried leaves are used medicinally to treat stomach complaints and as a stimulant.	
63.	*Mimosa hamata* Willd.	Aill	*Mimosaceae*	Tonic, in urinary complaints, glandular swelings, blood-purifier.	
64.	*Monstera deliciosa* Liebm.	Amarphal	*Araceae*	Fruits are pulped and used to make drinks and ices.	
65.	*Moringa oleifera* L.	Soanihna	*Moringaceae*	Used as vegetables, bark control diabetes, a natural anthelmintic and possible adjuvant.	
66.	*Mucuna pruriens* L. DC4	Kaunch	*Fabaceae*	Seeds used for treating intestinal gas, diarrhea, cough, rheumatic disorder, muscular pain, diabetes, menstrual pain and tuberculosis.	
67.	*Murraya koenigii* Kurz.	Kadi Pata	*Rutaceae*	A decoction of the bark leaves and root is used locally as a tonic.	
68.	*Musa paradisiacal* L.	Kela	*Musaceae*	The high starch content of the fruits, flour from the fruit is an excellent invalid food.	
69.	*Nerium indicum* Mill.	Red Kaner	*Apocynaceae*	A poultice of the root is used against ringworm, to induce abortion and for suicide; flowers are used for perfume and produce good honey.	

70.	*Nerium oleander* L.	White Kaner	*Apocynaceae*	The roots are used in criminal poisoning and to exterminate rats.	
71.	*Nicotiana tabacum* L.	Tamakhu	*Solanaceae*	The cured and dried leaves are used to make tobacco, snuff ans a source of nicotine for the manufacture of insecticides and nicotine sulphate.	
72.	*Nychtenthus arbor-tristis* L.	Har Sringar	*Verbenaceae*	The leaves yield a bright yellow dye.	
73.	*Ocimum basilicum* L.	Ban Tulsi	*Labiatae*	The plant is cultivated for the essential oil used in perfumery, soap making, to flavour liqueurs and sauces.	
74.	*Ocimum sanctum* L.	Tulsi	*Labiatae*	The plant is sacred to the Hindus and is grown in front of temples; the leaves are used as a condiment.	
75.	*Onosoma echinoids* L.	Inderjo	*Boraginaceae*	The roots yield a red dye (Orsanette) used in India to dye fats and wool, in place of Alkanna.	
76.	*Piper longum* L.	Piper	*Piperaceae*	Friuts are used as a condiment; roots are used as a diuretic.	
77.	*Phoenix dactylifera* L.	Khajur	*Palmae*	Grown primarily for fruits but the leaves used for thatching and fuel; stem for house-building. Fruits are fermented to make beverages. In temperate countries they are used in jams, cakes and confectionery.	
78.	*Physalis minima* L.	Papotan	*Solanaceae*	The fruits are eaten as a vegetable.	
79.	*Plumbago zeylanica* L.	Chitrak	*Plumbaginaceae*	Paste of roots and leaves used to treat skin complaints.	
80.	*Plumeria alba* L.	Champa	*Apocynaceae*	The heart of the wood is part of a traditional medical preparation taken as a vermifuge or as a laxative.	

81.	*Pongamia pinnata* L. Mirr.	Papri	*Papilionaceae*	The oil is used in Asia to treat skin diseases and for burning, also used to make candles and soap.	
82.	*Prunus amygdalus* Batsch.	Badam	*Rosaceae*	Eaten on its own, raw or toasted, oil is good for application to the skin as an emollient, and has been traditionally used by massage therapists to lubricate the skin during a massage session.	
83.	*Psidium guajava* L.	Amrood	*Myrtaceae*	Used in jellies and preserves, fruits is a good source of vitamin C	
84.	*Pterocarpus santalinus* L.	Lal Chandan	*Fabaceae*	In Hinduism, wood has been traditionally used as a sacred wood and also used for treating digestive tract problems, fluid retention, and coughs; and for "blood purification."	
85.	*Pterospermum acerifolium* Willd.	Kanak Champa	*Sterculiaceae*	Used locally for bridge- building, boats, house- building.	
86.	*Rauvolfia serpentine* L. Benth.	Sarp Gandha	*Apocynaceae*	Roots are used in the relief of hypertension by reducing blood pressure and as sedative.	
87.	*Ricinus communis* L.	Arand	*Euphorbiaceae*	Castor oil is extracted, medicinally used as a laxative.	
88.	*Rosa damascena* Mill.	Gulab	*Rosaceae*	The oil extracted from flowers is used in perfumery and for flavouring.	
89.	*Salvadora persica* Garc.	Jal/ Pillu	*Salvadoraceae*	The fruits and bark are bitter and are used in local medicines	

90.	*Sida cordifolia* L.	Kanghi	*Malvaceae*	The Hindus use a decoction of the roots to treat stomach complaints, asthma and heart conditions.	
91.	*Solanum nigrum* L.	Makoi	*Solanaceae*	Fruits eaten in pies, shoots and leaves used as vegetable.	
92.	*Stevia rebaudiana* Bertoni.	Madhu-pattha	*Asteraceae*	The plant is a possible sugar substitute.	
93.	*Strebelus asper* Lour.	Sohra	*Moraceae*	A decoction of the bark is used in India to treat dysentery, diarrhea and fevers.	
94.	*Syzygium cumini* L. Skeels	Jamun	*Myrtaceae*	Seed is also used to control diabetes, digestive ailments, the leaves and bark are used for controlling blood pressure.	
95.	*Tagetes erecta* L.	Gendha	*Compositae*	The flowers are used as source of yellow dye; decoction of flowers and leaves is used to treat intestinal worms, stomach upsets and to control menstruation.	

Table-1: List of Flowering plants at Botanical Garden Study area.

Sr.no.	Botanical name of plants	Family	Common name	Numbers
1.	*Acacia nilotica*	*Mimosaceae*	Babhul	02
2.	*Adhatoda vasica* Nees.	*Acanthaceae*	Adulasa	02
3.	*Aegle marmelos* L.	*Rutaceae*	Bael Patter	04
4.	*Aloe vera*	*Liliaceae*	Korphad	30
5.	*Alstonia scholaris*	Apocynaceae	Saptaparni	01
6.	*Annona squamosa*	Annonaceae	Sitaphal	02
7.	*Asparagus desiflorus*	*Asparagaceae*	Foxtail	02
8.	*Asparagus racemosus*	Liliaceae	Shatavari	02
9.	*Azadircahta indica*	Meliceae	Neem	01
10.	*Bambusa sapinosa* Roxb.	Graminae	Bamboo	04
11.	*Bougainvelia spectabilis*	Nyctaginaceae	Boganvel	09
12.	*Calotropis procera*	*Ascliapdaceae*	Rui	06
13.	*Casuarina equisetifolia*	*Casuarinaceae*	Chok, Jhau Saru	02
14.	*Chamaedorea microspadix*	*Aracaceae*	Bamboo Palm	04
15.	*Citrus limon*	Rutaceae	Nimbu	05
16.	*Citrus reticulate*	Rutaceae	Nimbu	03
17.	*Codiaeum variegatum*	*Euphorbiaceae*	Croton	02
18.	*Crinum asiaticum*	Amaryllidaceae	Lily	01
19.	*Cycas revoluta*	*Cycadaceae*	King Sago	04
20.	*Cycus revolute*	Cycadaceae	Pahadi Supari	02
21.	*Dracaena margin*	*Asparagaceae*	Madagaskar Dragon Tree	02

22.	*Duranta goldiana*	*Verbenaceae*	Mehandi Green	2100
23.	*Duranta repens*	*Verbenaceae*	Mehandi Brown	06
24.	*Emblica officinalis*	*Euphorbiaceae*	Amla	04
25.	*Eugenia jambolana*	*Myrtaceae*	Jambhul	04
26.	*Ficus bengalensis*	Moraceae	Vad	04
27.	*Ficus benjamina*	*Moraceae*	Pukar	50
28.	*Ficus glomerata*	*Moraceae*	Umbar	01
29.	*Ficus religiosa*	*Moraceae*	Pimpal	04
30.	Hibiscus rosa sinensis	*Malvaceae*	Jaswand	05
31.	*Ixora fulgens*	*Rubiaceae*	Ixora	04
32.	*Jasminum sambac*	Oleaceae	Jai	10
33.	*Lawsonia innermis*	Lythraceae	Mehandi	25
34.	*Mentha arvensis*	*Labiatae*	Pudina	01
35.	*Moringa oleifera*	Moringaceae	Shevga	02
36.	*Murraya koenigii*	Rutaceae	Kadipatta	02
37.	*Nerium indicum*	Apocynaceae	Kanher P	02
38.	*Nerium oleander*	Apocynaceae	KanherW	02
39.	*Nychtenthus arbor-tristis*	*Verbenaceae*	Parijatak	01
40.	*Nyctanthus arbor-tristis*	Nyctaginaae	Parijatak	01
41.	*Nymphea odorata*	Nymphaeaceae	Kamal	01
42.	*Opuntia engelmannii*	Cactaceae	Nivdung	01
43.	*Pandanus amaryllifolius*	*Pandanaceae*	Rampay	04
44.	*Peltophorum ferrugineum*	Caesalpiniaceae	Gulmohar	02
45.	*Plumeria alba*	Apocynaceae	Chapha	01
46.	*Plumeria alba*	*Apocynaceae*	Chapha	06
47.	*Polyalthia longifolia*	Annonaceae	Karanj	05
48.	*Pongamia pinnata*	Fabaceae	Karanj	01
49.	*Portulaca grandiflora*	Chinopodiaceae	10 „O‟ Clock	20
50.	*Prunus amygdalus*	*Rosaceae*	Badam	02
51.	*Psidium guajava*	Myrtaceae	Peru	02
52.	*Rosa damascena*	*Rosaceae*	Rose	10
53.	*Scindapsus aureus*	*Arraceae*	Money Plant	05

54.	*Tabernaemontana divericata*	Apocyanaceae	Sadaphuli	02
55.	*Tamarindus indica*	Fabaceae	Chinch	01
56.	*Thuja occidentalis*	Cupressaceae	Vidya	12
57.	*Thuja occidentalis*	*Cupressaceae*	Morpankhi	150
58.	*Tradescantia spathacea*	*Commelinaceae*	Moses	10

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Acoustically Study of Internal Pressure and Gibbs Free Energy on Binary Liquid Mixture of 7-Hydroxy-4-Phenyl-2H-Chromen-2-One in Acetone-Water, DMF-Water DMSO-Water at 308.15K

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ABSTRACT

Due to the vast pharmacological activity of Coumarins derivatives the viscosity, ultrasonic velocity and density of 7-hydroxy-4-phenyl-2H-chromed-2-one has been measured in 70:30 (v/v) Acetone–water, 70:30 (v/v) NNDMF-water and 70:30 (v/v) DMSO-water with different concentration of 7-hydroxy-4-phenyl-2H-chromene-2-one at temperature 308.15K.To know the various interaction with the various Thermo acoustical parameters internal pressure, Gibb's free energy was calculated from experimental data of ultrasonic velocity, viscosity, and densities. The changes in values of this parameter with the change concentration of solute represent the different types of interaction like solute-solvent interaction, solvent-solvent, and dipole-dipole interactions present in the solutions.

Keyword:- 7-hydroxy-4-phenyl-2H-chromen-2-one, Acetone, DMF, DMSO, internal pressure, Gibb's free energy.

I. INTRODUCTION

Coumarins and chromones are ubiquitous and have relevant pharmacological activities such as anti-inflammatory, antioxidant, cardio protective, and antimicrobial properties[1,2]. The majority of the large numbers of drugs being introduced in pharmacopeias every year are heterocyclic compounds.
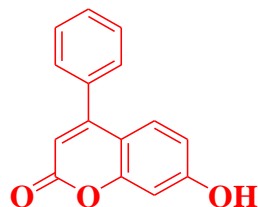
7-hydroxy-4-phenyl-2*H*-chromen-2-one

The knowledge of viscosities, densities, ultrasonic velocities, and various acoustical parameters are useful for the studies of thermo acoustical properties of a system. The study of molecular interaction in liquid shows valuable information regarding the internal structure, molecular association, complex formation, internal pressure. The studies of the solution properties of a liquid solution of polar and non-polar components have great applications in industrial and technological process[3]. The literature survey [4-7] reveals the many researchers who give attention to the study of ultrasonic velocity measurement and the study of acoustical properties. Due to these vast applications of 7-hydroxy-4-phenyl-2H-chromen-2-one make our interest in an investigation of its acoustical parameters. The measured values of ultrasonic velocity, internal pressure, Gibb's free energy gives idea regarding types of interaction present in the 7-hydroxy-4-phenyl-2H-chromen-2-one -70:30 (v/v) Acetone –water,7-hydroxy-4-phenyl-2H-chromen-2-one-70:30 (v/v) NNDMF-water and 7-hydroxy-4-phenyl-2H-chromen-2-one -70:30 (v/v) DMSO-water solutions.

II. MATERIALS AND METHODS

The compound 7-hydroxy-4-phenyl-2H-chromen-2-one synthesize by known method[8]. The densities of Ethanol, Acetone, DMF, and 8,10-dinitro-7H-benzo[c] carbazole solution were measured by using a specific gravity bottle, and the viscosity was measured using Ostwald's viscometer. The ultrasonic velocities of pure components and their mixture were measured by ultrasonic interferometer (Mittal enterprises, model F-81s) at 2 MHz having accuracy ±1 ms–1 in velocity.

Theory:-

Given acoustical parameters are calculated by using various equations.

Ultrasonic velocity (u)

$$(u) = v\lambda \quad \text{...} \quad (1)$$

Where, u-ultrasonic velocity, λ-wavelength.

Internal pressure (Πi)

$$(\Pi i) = bRT \, (k\eta/U)^{1/2} \, (\rho^{2/3}/M^{7/6}) \quad \text{.............................} \quad (2)$$

Where, b is the cubic packing factor which is assumed to be 2 in liquid systems. K = 4.28 x 109 and is independent to the nature of liquid. R is gas constant. η is the viscosity and ρ is the density of solution, M-molecular weight (M is the molar mass of the solute) of solute.

Gibb's free energy (ΔG)

$$(\Delta G) = R.T.Ln \, (KT\tau/h) \quad \text{...} \quad (3)$$

Where, $k = 1.23 \times 10^{-23}$, $h = 6.626 \times 10^{-34}$, R is the gas constant, T is the absolute temperature & (τ) is the Relaxation time.

III. RESULTS AND DISCUSSION

The experimentally determined values of density(ρ) and ultrasonic velocities (u) and viscosity (η) for 7-hydroxy-4-phenyl-2H-chromen-2-one- 70% Acetone, 7-hydroxy-4-phenyl-2H-chromen-2-one-70%NNDMF and 7-hydroxy-4-phenyl-2H-chromen-2-one-70% DMSO solutions measured at 318.5K are given in Table 1.At a constant temperature From fig.1 it is observed that increase in the concentration of 7-hydroxy-4-phenyl-2H-chromen-2-one with an increase ultrasonic velocity (u), also fig 2 and 3 indicates an increase of density and viscosity an increase in the concentration of solute at a constant temperature. An increase in concentration

allows for a closer approach of solvent and solute molecules and a stronger association between solute and solvent molecules. This leads to a decrease in the volume and an increase in the density of the solution[9]. The increased values of viscosity and ultrasonic velocity indicate molecular association in the experimental systems, which are possible due to the presence of hydroxyl group solute structure notably; velocities of lower value are less molecular interaction. It may be due to breaking of molecular clusters, presence of dipole-dipole interaction, solute-solvent interactions, solvent- solvent interactions, and presence of hydrogen bonding between the solute molecule and water molecule solvents.

The internal pressure (πi) is the cohesive force, which is a result of the strength of attraction and force of repulsion between solute and solvent molecules of the solution. It is evident from fig 4 and Table-which internal pressure values increase with the increase of solute concentration for all the experimental systems. Further πi with attentiveness indicates an increase in intermolecular interactions due to the forming of aggregates of solvent molecules around the solute, which affects the structural arrangement of the solution system. Indicated may also accredit to the presence of solute-solvent interactions and hydrogen bonding[10]. Gibb's free energy (ΔG) decreases with an increase in the concentration of solute and a decrease at high temperatures [fig-5].decline of Gibb's free energy indicates the need for a longer time for the co-operative process to take place or for the rearrangement of molecules in the mixture. Stipulate the restricted flow of the ternary mixture compared with the behavior of pure components.
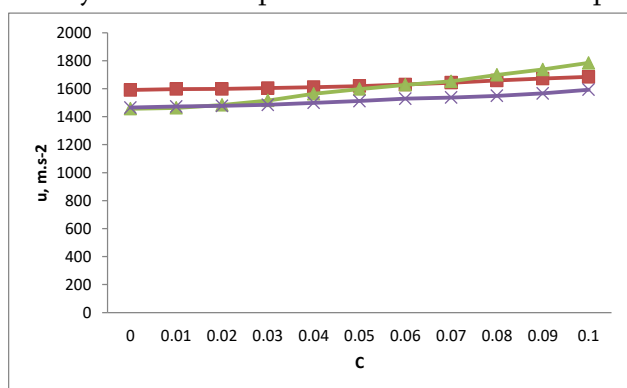
Figure1. Ultrasonic velocity (u) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70%NNDMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one – DMSO (×), at 308.15K.

Figure 2. Density (ρ) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one-70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70%NNDMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one – DMSO (×), at 308.15K.

Figure 3. Viscosity (ŋ) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO (×),at 308.15K.

Table 1. Experimental values of ultrasonic velocity, density and viscosity of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone, 7-hydroxy-4-phenyl-2H-chromen-2one – 70% DMF and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO solutions at temperatures 308.15K.

C	u, m.s^{-2}			(ρ) kg.m^{-3}			(η) 10^{-3} N.s.m^{-2}		
	7O% Ac+L	70% NNDMF+L	70% DMSO+L	7O% Ac+L	70% NNDMF+L	70% DMSO+L	7O% Ac+L	70% NNDMF+L	70% DMSO+L
0	1590.1	1456.2	1464.5	0.801	0.954	1.048	1.185	1.643	1.822
0.01	1596.9	1462.3	1472.2	0.802	0.962	1.055	1.311	1.658	1.841
0.02	1598.3	1483.7	1476.9	0.816	0.976	1.059	1.352	1.678	1.852
0.03	1604.4	1515.6	1484.3	0.818	0.989	1.073	1.417	1.695	1.867
0.04	1610.5	1563.1	1498.6	0.824	0.998	1.094	1.483	1.724	1.876
0.05	1618.6	1596.9	1512.1	0.836	1.017	1.122	1.523	1.738	1.882
0.06	1630.1	1627.2	1528.5	0.859	1.032	1.145	1.585	1.756	1.896
0.07	1642.7	1652.8	1536.7	0.868	1.048	1.157	1.603	1.764	1.907
0.08	1658.3	1698.4	1548.6	0.898	1.067	1.168	1.762	1.789	1.923
0.09	1672.1	1736.8	1566.4	0.904	1.087	1.182	1.819	1.802	1.945
0.1	1684.6	1784.3	1592.8	0.909	1.105	1.191	1.898	1.835	1.961

Table 2. Gibb's free energy(ΔG), internal pressure (πi) of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone ,7-hydroxy-4-phenyl-2H-chromen-2one – 70%NNDMF and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO solutions at different concentration(c) and at temperature 308.15K.

C	(πi)10–6 Pa			(ΔG)(x 10-20 k.J.mol-1)		
	7O% Ac+L	70%NNDMF+L	70%DMSO+L	7O% Ac+L	70%NNDMF+L	70%DMSO+L
0	133.075	183.979	205.683	0.125	0.1258	0.1258
0.01	139.789	185.461	207.128	0.1249	0.1257	0.1257
0.02	143.542	187.018	207.939	0.1248	0.1256	0.1257
0.03	146.912	187.622	210.09	0.1247	0.1254	0.1256
0.04	150.742	187.452	212.314	0.1244	0.1252	0.1255
0.05	153.855	188.565	215.299	0.1243	0.1249	0.1253
0.06	159.256	189.608	217.863	0.1243	0.1248	0.1252
0.07	160.655	190.506	219.431	0.1241	0.1246	0.1251
0.08	171.481	191.538	220.89	0.1239	0.1243	0.125
0.09	174.284	192.464	222.646	0.1238	0.1241	0.1249
0.1	178.02	193.725	222.823	0.1234	0.1239	0.1248

(Uncertainties in isnotropic internal pressure 1×10^{-6} Pa, Gibb's free energy 0.01 x 10^{-20} k.J.mol^{-1}).

Figure 4 Internal pressure (Лi) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70%NNDMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one – DMSO (×), at 308.15K

Figure 5 Gibb's free energy (ΔG) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70%NNDMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one –70%DMSO (×), at 308.15K

IV. CONCLUSION

In the present article, the densities, ultrasonic velocities, viscosity, and thermodynamical parameters at temperatures, 308.15K over the entire range of composition of 7-hydroxy-4-phenyl-2H-chromen-2one in 70% Acetone, 70%NNDMF and 70% DMSO has been scope. From these measured physical property data, internal pressure, Gibb's free energy intend and used to found the solute-solvent, solvent-solvent interaction, and hydrogen bonding. From the above investigation, it is the effect that 7-hydroxy 4-phenyl-2H-chromen-2one shows absorbing interactive behavior with solvents like Acetone, DMF, and DMSO.

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Thermo Acoustical Study of 7-Hydroxy-4-Phenyl-2H-Chromen-2-One in Acetone-Water, DMF-Water and DMSO-Water at 308.15K

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ABSTRACT

Due to the vast pharmacological activity of Coumarins derivatives the viscosity, ultrasonic velocity and density of 7-hydroxy-4-phenyl-2H-chromen-2-one has been measured in 70:30 (v/v) Acetone–water, 70:30 (v/v) DMF-water and 70:30 (v/v) DMSO-water with different concentration of 7-hydroxy-4-phenyl-2H-chromen-2-one at temperature 308.15K.To know the various interaction the various thermo acoustical parameter like free volume, isentropic compressibility, Relative association, acoustic impedance are calculated from experimental data of ultrasonic velocity, viscosity, and densities. The changes in values of this parameter with change concentration of solute represent the different types of interaction such as solute-solvent interaction, solvent-solvent and dipole-dipole interactions present in the solutions.

Keyword: 7-hydroxy-4-phenyl-2H-chromen-2-one, Acetone, DMF, DMSO, thermo acoustical parameter.

I. INTRODUCTION

Coumarins and chromones are ubiquitous and have relevant pharmacological activities such as anti-inflammatory, antioxidant, cardio protective, and antimicrobial properties[1,2]. The majority of the large numbers of drugs being introduced in pharmacopeias every year are heterocyclic compounds.
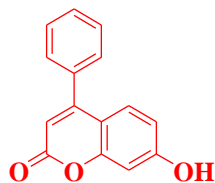
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The knowledge of viscosities, densities, ultrasonic velocities, and various acoustical parameters are useful for the studies of thermo acoustical properties of a system. The study of molecular interaction in liquid gives valuable information about the internal structure, molecular association, complex formation, internal pressure.

The studies of the solution properties of a liquid solution of polar and non-polar components have great applications in industrial and technological process[3]. The literature survey[4, 5,6]. Reveals the many researchers give attention to the study of ultrasonic velocity measurement and the study of acoustical properties.

II. MATERIALS AND METHODS

The solvents i.e. Acetone, DMF, and DMSO used in this investigation were of AR grade and use without purification (Sigma-Aldrich 99% purity). The compound 7-hydroxy-4-phenyl-2H-chromen-2 one synthesize by known method[7]. The ultrasonic velocities of Coumarins derivative solutions of different concentrations were measured by ultrasonic interferometer (Mittal enterprises, model F-81s) at 2 MHz having accuracy ±1 m·s–1 in velocity. The densities and Viscosity of experimental solutions were measures by using digital density meter (Anton Paar DMA 35 of accuracy ± 0.001) and Ostwald's viscometer.

III. THEORY

Given acoustical parameters are calculated by using various equations.

$$\text{Ultrasonic velocity } (u) = v\lambda \qquad\text{……………….………………… ……… (1)}$$

Where, U is the ultrasonic velocity, λ is the wavelength.

$$\text{Isentropic compressibility } (\beta s) = 1/\rho u^2 \quad\text{……………….…………………..…… (2)}$$

Where, ρ is density, u is the speed of sound.

$$\text{Intermolecular free length } (Lf) = K\, \beta s 1/2 \text{ …………...……….……………… (3)}$$

Where, K-is the temperature-dependent constant called Jacobson constant[8]and is equal to 2.095×10^{-6}.

$$\text{Acoustic impedance } (Z) = u\rho \qquad\text{……...……….…………… … (4)}$$

Where, u-ultrasonic velocity, ρ- density.

$$\text{Relative association } (R_A) = (\rho/\rho_o)\ (u_o/u)\ 1/3 \text{ ……...……….…………… …… (5)}$$

Where, ρ_o, ρ are the densities and u_0 u are the ultrasonic velocities of the solvent and the solution.

IV. RESULTS AND DISCUSSION
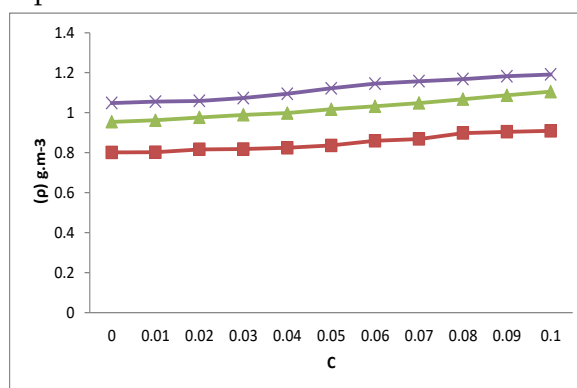
The experimentally determined values of density(ρ) and ultrasonic velocities (u) and viscosity (η) for 7-hydroxy-4-phenyl-2H-chromen-2-one- 70% Acetone, 7-hydroxy-4-phenyl-2H-chromen-2-one-70% DMF and 7-hydroxy-4-phenyl-2H-chromen-2-one-70% DMSO solutions measured at 318.5K are given in Table 1.From fig 1 it is observed that ultrasonic velocity (u) increases with an increase in the concentration of 7-hydroxy-4-phenyl-2H-chromen-2-one at a constant temperature, also fig 2 and 3 indicates an increase of density (ρ) and viscosity (η) with an increase in the concentration of solute at a constant temperature. An increase in concentration allows for a closer approach of solvent and solute molecules and a stronger association between solute and solvent molecules. This leads to a decrease in the volume and an increase in the density of the solution[9]. The increased values of viscosity (η) and ultrasonic velocity (u) indicates molecular association in the experimental systems, which is possible due to the presence of hydroxyl group solute structure, it is notable that molecular interactions are less at lower values of velocities[10]. It may be due to breaking of molecular clusters, presence of dipole-dipole interaction, solute-solvent interactions, solvent- solvent interactions, and presence of hydrogen bonding between the solute molecule and water molecule solvents.
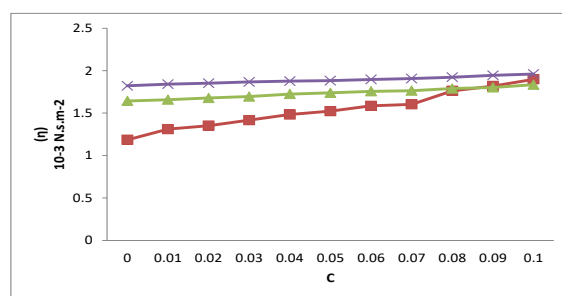
Figure1. Ultrasonic velocity (u) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one – DMSO (×), at 308.15K

Figure2. Density (ρ) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one– 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO (×), at 308.15K.
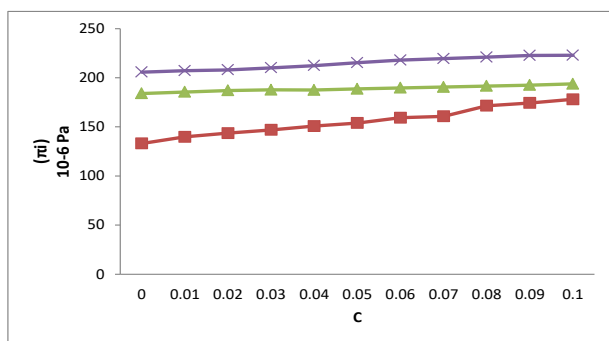
Table 1. Experimental values of ultrasonic velocity, density and viscosity of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone, 7-hydroxy-4-phenyl-2H-chromen-2one – 70% m DMF and 7-hydroxy-4-phenyl-2H-chromen-2one – DMSO solutions at temperatures 308.15K.

C	u, m.s^{-2}			(ρ) kg.m^{-3}			(η) 10^{-3} N.s.m^{-2}		
	70% Ac+L	70% DMF+L	70% DMSO+L	70% Ac+L	70% DMF+L	70% DMSO+L	70% Ac+L	70% DMF+L	70% DMSO+L
0	1590.1	1456.2	1464.5	0.801	0.954	1.048	1.185	1.643	1.822
0.01	1596.9	1462.3	1472.2	0.802	0.962	1.055	1.311	1.658	1.841
0.02	1598.3	1483.7	1476.9	0.816	0.976	1.059	1.352	1.678	1.852
0.03	1604.4	1515.6	1484.3	0.818	0.989	1.073	1.417	1.695	1.867
0.04	1610.5	1563.1	1498.6	0.824	0.998	1.094	1.483	1.724	1.876
0.05	1618.6	1596.9	1512.1	0.836	1.017	1.122	1.523	1.738	1.882
0.06	1630.1	1627.2	1528.5	0.859	1.032	1.145	1.585	1.756	1.896
0.07	1642.7	1652.8	1536.7	0.868	1.048	1.157	1.603	1.764	1.907
0.08	1658.3	1698.4	1548.6	0.898	1.067	1.168	1.762	1.789	1.923
0.09	1672.1	1736.8	1566.4	0.904	1.087	1.182	1.819	1.802	1.945
0.1	1684.6	1784.3	1592.8	0.909	1.105	1.191	1.898	1.835	1.961

Table 2. Isentropic compressibility, linear free length, acoustic impedance, relative free length, sound velocity number, free volume, relaxation time and available volume of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone, 7-hydroxy-4-phenyl-2H-chromen-2one-70% DMF and 7-hydroxy-4-phenyl-2H-chromen-2one-DMSO solutions at different concentration and at temperature 308.15K.

C	βs	Lf,	Z	RA

	10^{-10}, $m^2.N^{-1}$	A^0	10^{-3} kg.$m^2$$s^1$	
70%Acetone+7-hydroxy-4-phenyl-2H-chromen 2one				
0	3.955	4.1425	1273.67	-
0.01	3.9214	4.1248	1280.873	1.014149
0.02	3.9145	4.1212	1304.373	1.034568
0.03	3.8848	4.1055	1313.041	1.049024
0.04	3.8554	4.09	1328.179	1.068818
0.05	3.8169	4.0695	1353.473	1.100827
0.06	3.7633	4.0408	1400.582	1.155394
0.07	3.7058	4.0098	1427.013	1.194782
0.08	3.6364	3.9721	1490.148	1.271627
0.09	3.5766	3.9393	1506.395	1.312349
0.1	3.5237	3.9101	1532.649	1.349424
70% NNDMF+7-hydroxy-4-phenyl-2Hchromen2one				
0	4.9432	4.6312	1389.215	
0.01	4.8612	4.5926	1406.733	1.021111
0.02	4.6543	4.4938	1448.091	1.082123
0.03	4.4018	4.3702	1498.928	1.168796
0.04	4.101	4.2182	1559.974	1.293836
0.05	3.8558	4.0902	1624.047	1.405862
0.06	3.6596	3.9848	1679.27	1.509354
0.07	3.493	3.893	1732.134	1.606241
0.08	3.249	3.7546	1812.193	1.774487
0.09	3.0498	3.6376	1887.902	1.933159
0.1	2.8425	3.5118	1971.652	2.130858

70% DMSO+7-hydroxy-4-phenyl-2H-chromen-2one				
0	4.4489	4.3935	1534.796	
0.01	4.3733	4.356	1553.171	1.022642
0.02	4.3291	4.3339	1564.037	1.036382
0.03	4.2301	4.2841	1592.654	1.065946
0.04	4.0701	4.2023	1639.468	1.118523
0.05	3.898	4.1125	1696.576	1.178433
0.06	3.7382	4.0273	1750.133	1.242145
0.07	3.66	3.985	1777.962	1.275473
0.08	3.57	3.9357	1808.765	1.317744
0.09	3.448	3.8678	1851.485	1.380054

Uncertainties in isentropic compressibility (βs) 0.01×10^{-10}, $m^2.N^{-1}$, Linear free length (L_F) $0.001A_0$, Acoustic impedance (z) velocity 1×10^{-3}, $kg.m^2$, Relative association (R_A) 0.010.

From fig 4 and table 2 it is found that isentropic compressibility (βs) decreases with an increase in the concentration of solution it is since surrounded molecules experience electrostatic field[11]. These decrease values of compressibility indicate that there is an increase in molecular association with an increase in solute concentration, as new species form due to the molecular association become compact and less compressible. These also suggest that the compressibility of the solvent is greater than that of the solution. The increase in isentropic compressibility also indicates a change in the conformation orientation of the solute molecules in solution, leading to weaker inter-molecular interaction. This is attributed to the steric requirement of arranging an increasing number of large molecules. In this situation, the steric factor takes predominance over intermolecular interactions. An increase in isentropic compressibility indicates a change in the orientation of the solvent molecules.
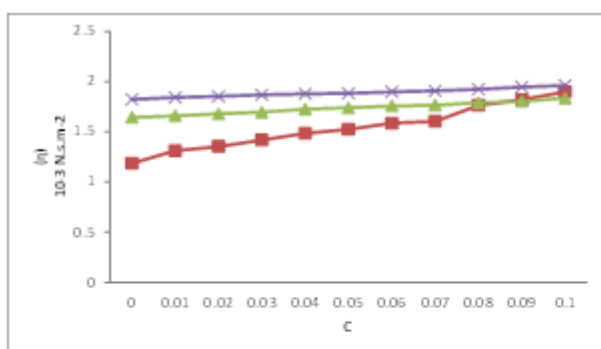
Figure 3. Viscosity (η) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO (×),at 308.15K.
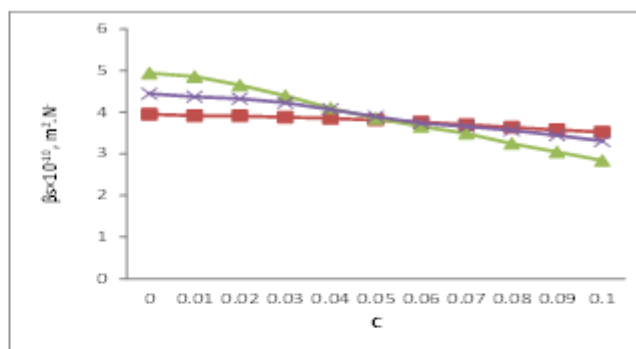
Figure 4. Isentropic compressibility (βs) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one – 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one –DMSO (×), at 308.15K.

The decreasing value of intermolecular free length (Lf) indicates closer packing[12] which is evident from fig 5. The intermolecular free length on the mixing of solute to the solvent is responsible for the variation of the ultrasonic velocity of the same solution. Based on a model for sound propagation given by Trying and Kincaid[13] free length decreases with an increase of ultrasonic velocity. Variation in free length indicates variation in the molecular forces in the mixture, which depends on the experimental density as well as the temperature of the mixture. Intermolecular free length (Lf) is the distance between the surfaces of the neighboring molecules and indicates a significant interaction between solute–solvent as well as dipole-dipole interaction[14] in 7-hydroxy-4-phenyl-2H-chromen-2-one-70%Acetone,7-hydroxy-4-phenyl-2H-chromen-2-one-70%NNDMF and 7-hydroxy-4-phenyl-2H-chromen-2-one-70% DMSO solutions[15].

When the ultrasonic wave propagates through a solution, some parts of it moves through the medium, and the remaining part of the ultrasonic wave gets reflected by the solute[16] it indicates that solutes will restrict the free flow of an ultrasonic wave. The property that decreases this shortening or astern movement of ultrasonic waves is known as acoustic impedance (Z). The specific acoustic impedance is dependent on both the concentration and temperature of the solution. As the internal pressure and cohesive energy[17] increases with solute concentration, strong dipole-dipole and solute-solvent interaction occur between 7-hydroxy-4-phenyl-2H-chromen-2-one which is solute Acetone, DMF, and DMSO which are solvents which is evident from fig 6. Hence, an increase in specific acoustic impedance is due to a rise in instantaneous pressure occurs on any

molecule in the given experimental system with traveling of a sound wave. The linear variation in acoustic impedance with concentration confirms the presence of a molecular association between the solute-solvent molecules, also increasing trends of impedance further support the possibility of molecular interaction between the solute-solvent.
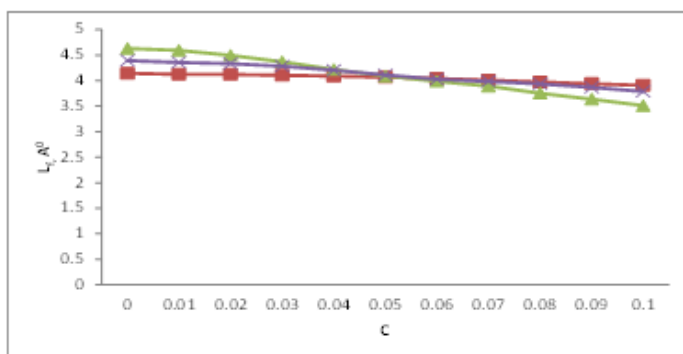
Figure 5. Linear free length (Lf) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one − 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one −DMSO (×),at 308.15K.
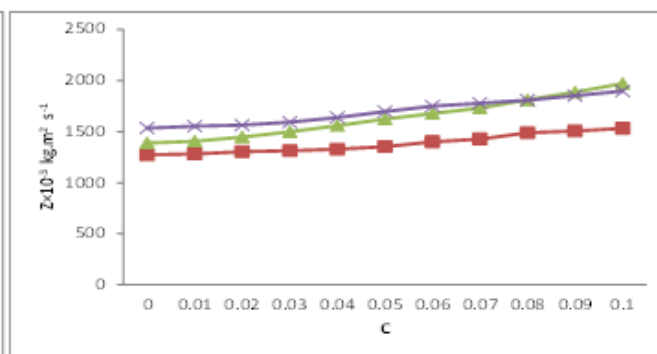
Figure 6. Acoustic impedance (z) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one − 70% DMF (▲)and 7-hydroxy-4-phenyl-2H-chromen-2one −DMSO (×), at 308.15.

An increase in relative association (RA) with an increase in the concentration of 7-hydroxy-4-phenyl 2H-chromen-2-one indicates the presence of solute-solvent interaction, solvent-solvent interaction, and hydrogen bonding which is evident from fig 7.
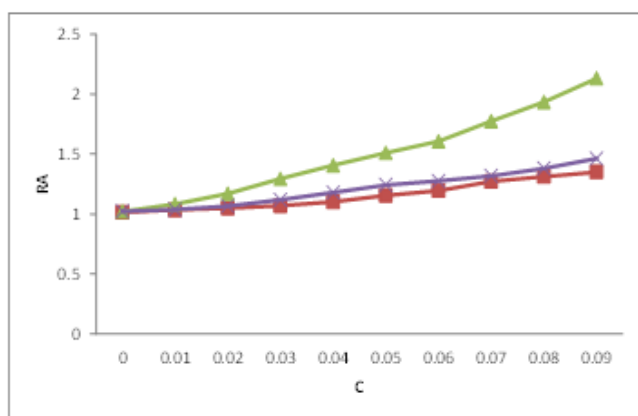
Figure 7. Relative association (RA) plotted against concentration of 7-hydroxy-4-phenyl-2H-chromen-2one -70% Acetone (■),7-hydroxy-4-phenyl-2H-chromen-2one − 70% DMF (▲) and 7-hydroxy-4-phenyl-2H-chromen-2one −DMSO (×), at 308.15K.

V. CONCLUSION

In the present article, the densities, ultrasonic velocities, viscosity, and thermo dynamical parameters at temperatures, 308.15K over the entire range of composition of 7-hydroxy-4-phenyl-2H-chromen-2one in 70% Acetone, 70% DMF and 70% DMSO have been measured. From these measured physical property data, isentropic compressibility, linear free length, acoustic impedance are calculated and used to found the solute-solvent, solvent-solvent interaction, and hydrogen bonding. From the above investigation it is found that 7-hydroxy-4-phenyl-2H-chromen-2one shows interesting interactive behavior with solvents like Acetone, DMF and DMSO.

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Relationships between Algal Taxa and Physico-Chemical Characteristics of Kapshi Lake, Kapshi Dist. Akola (M.S)

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ABSTRACT

A study of algae flora was performed on 3 samples collected from 3 different sites of every month during June 2012 to May 2014 of Kapshi Lake in order to evidence the relationships between algae assemblages and physico-chemical parameters of the sphere. A total of40 algae species were identified, the most represented class being *Chlorophyceae* (16 Species), *Cyanophyceae* 8 species) *Bacillariophyceae* (3 species), followed by the *Characeae (*2species) and finally Eugleno*phyceae* (1 species). Physicochemical analysis of water samples suggest evidences of organic pollution related to anthropogenic activities, running waters being less affected than stagnant ones. This organic pollution is inferred from highest values of TDS and conductivity. The Correspondence Analysis (CA) displayed four groups of algae on the two first axes. On axis 1 the discriminating factor is the current, because running water sites are opposed to stagnant water ones. Unfortunately measured values of water current are not available to precise that hypothesis, our interpretations in this paper are based on relative data. The second axis reveals the opposition between oligotrophic and eutrophic waters, and could be considered as a gradient of organic pollution. The species *Navicula*, *Nostoc* sp., *Amphora* sp., *Pinnularia* sp. and *Lyngbya* sp. are associated to low values of TDS and conductivity while *Closterium* sp*., Euglena* sp. thrive better in high polluted waters*.* The distribution of these algae identified as indicators of high organic pollution, evidenced a spatial variability of organic pollution in accordance with thewater physicochemical parameters monitored. This variability is probably modulated by the presence in the sampling sites of macrophytes that are efficient in removing pollutants.

Key words: Kapshi Lake, algae, Physico-chemical. Organic pollution.

I.   INTRODUCTION

The present study has been undertaken in Kapshi lake, Kapshi situated in Akola district, Maharashtra State, India. The main objective of this study is to relationships between algal taxa and physico-chemical characteristics of Kapshi lake. During the whole study period, a total of 40 algal species belonging to 5 different families were found distributed in the lake. A few studies of algae exist in Kapshi lake, most of which are focused on the inventory of algae taxa in Kapshi Lake in relation with their physicochemical characteristics. The trophic status of Kapshi lake was evidenced through the detailed study of the of algae flora. Algae have

been intensively studied in other regions of the world for several reasons. Because of their rapid growth and the ability of most taxa to flourish in specific aquatic conditions, they are used in inferring water quality, organic pollution, acidification, and salinity. Moreover, diatoms (Bacillariophyceae) can be conserved in fossil sediment thanks to their siliceous cell wall; hence they represent an important tool to retrace paleo limnological changes and infer past climates. This pioneer work in the Kapshi lake intends to make an inventory of algae taxa that develop in lake.

II. STUDY SITE

Kapshi Lake is one of the oldest lake in Akola district, situated about 20 km from the district place and existing since the British regime. The lake is one of major drinking water source in the area. The people in the vicinity are also using the lake water for agriculture purposes, household acts, fishing, and other necessary things like washing of animals, clothing etc. Therefore, it is essential to know the water quality parameters to avoid the major hazardous conditions and health hazards. Keeping all this in view, the present investigation was planned to analyze various physiochemical parameters of Kapshi lake with special reference to the algal diversity of the lake.

Fig.1.Map of Kapshi Lake Dist. Akola, Maharashtra

Fig:- 2 Google Map of Kapshi Lake, Kapshi.

III. MATERIAL AND METHODS

Algal Analysis

Three water samples from three sites of lake were collected seasonally for the phytoplanktonic analysis. The collected samples were preserved in Lugols solution with acetic acid. The samples were allowed to settle down for 5-6 days and then proceed for analysis. The slides for phytoplankton analysis were done using dilution methods for better screening. The slides were stained and identified under compound microscope. The photography was done using photo micrographic camera attached to microscope. The identification of the phytoplankton was done using standard reference (Hutchinson, 1957, Renolds, 1980, Saha, 2004 and Kumar et.al., 2005).

Physico-Chemical Parameters of Water

Environmental parameters of water were measured in 3 sampling locations presumably representative of the study area. These physicochemical parameters of water include: Conductivity, Total dissolved solids (TDS), pH, turbidity, color, and temperature. In the open water sites water depth was also estimated. Total dissolved solids (TDS) and conductivity were measured using the TDS/Conductivity meter. The pH was measured using a pH/Temperature controller. The turbidity and apparent color of water were measured using a Calorimeter, and expressed in Formazin Turbidity Units respectively.

Statistical analysis

The correspondence analysis (CA) was used to identify in the algae flora data the dominant pattern of variation. The data set submitted to CAcomprises samples in columns and genera in rows. The technique consists of plotting points (individuals or variables, here samples or species) in a space of n-1 dimension (where n is the number of variables). This method allows visualizing the pattern of multidimensional distribution; in fact this technique extracts continuous orthogonal axes (thus uncorrelated) of variation from variables abundance. The first extracted axes are those of maximum variability. Each axis, considered as hypothetical gradient ofenvironmental variable is subsequently interpreted in the light of measured environmental variable and the observed flora.

IV. RESULTS

Water characteristics

Table 1 presents the summary of the data statistics (minimum, maximum, mean and standard error) of the water physicochemical parameters. It shows that pH range of lake slightly alkaline. The range of pH in three water samples from lake was between pH 7.95 to 8.44 for the year 2012-14 respectively. It was noted that the pH of water samples does not showed any significant difference in average. However, slight change might be seen over the period. The might be due the effect of temperature change and reaction of the organic physical received by water bodies during preceding period of rain fall. The temperature range from 23.1°C to 30.1°C. The lowest temperature was recorded in January – February and highest in the month of May. From June onward, the temperature drops to February. The various observed in the temperature of three sampling site indicates slight difference. The average of water temperature of all three sampling size in both the year was 26.59°C to 27.38°C.The TDS of site 1 ranged from 138 to 235; site 2- 132 to 318; site 3- 132 to 217 mg/L during 2012-2013 respectively. And 146-236; 147-310; 145-222mg/L during 2013-14 for site 1, 2 & 3 respectively. It

was observed that the TDS showed collective impact of all Physico- chemical parameters. The lowest percent of transparency was recorded during July (82.5%site-1); August-September (94%site-2) and June-July (90.5%site-3) during 2012-13. Similar trend was observed during 2013-14. The highest percent of transparency was noted during January to April and again start decreases from May onward for both 2012-13 and 2013-14.The range of total alkalinity in water samples of site 1 was 10-109 and 15-122 mg/L during 2012-13 and 2013-14 respectively, in case of site-2, 12- 132 and 18-146mg/Land in samples of site-3, 12-135 and 17-112mg/L during 2012-13 and 2013-14 respectively. It was found to be lowest in the month of September and high during February-March of the assessment year 2013-14.

Table 1- Summery statistic of the measured environmental variables (Minimum, maximum, Mean, and Standard Error) (For pH , Temperature, TDS, Total alkalinity, Transparency n=2)

Variables	Minimum	Maximum	Mean	Standard Error
pH	7.7	9.0	8.35	0.65
Temperature oC	23.1oCoC	30.1oC	26.6oC	3.5
Transparency%	82.5	95.5	89.0	6.5
TDS mg/L	132.0	289.0	210.5	78.51
Total Alkalinity mg/L	12	135	73.5	61.50

Algal analysis

A total of 40 algal species were encountered in the 3 samples studied. Algae were well preserved; chloroplasts were present in all the cells observed, their color depending on their taxonomic group (Figure 4). The state of preservation of algal cells indicates that these organisms were alive at the moment of their collection; this implies that they are able to thrivein such physicochemical conditions. Figure 3. Pie chart represents the distribution of the 40 species in different classes of algae. The class Chlorophyacae member reported 16 members were Actinastrum hantzschi, Chlorella vulgaris, Cosmarium sp., Coelastrum microsporium, Hydrodictyon reticulatum, Lyngbya sp. Microspora amoena, Oedogonium sp., Pediastrum duplex, Scenedesmus sp., Spirogyra sp., Tetraedron regulare and Zygnema sp., it was followed by Cyanophyceae and about eight different members were identified. The members identified were Anabeana sp., Arthrospira sp., Chroococcus turgidis, Merismopedia tenuissim, Microcystis aeruginosa, Nostoc commune, Oscillatoria proboscida and Rapidopsia sp. It was followed by Bacillariophyceae, two members of Characeae and one of Euglenophyceae. It was also noted that sampling site 1 & 2 has more number of algal members diversity than sampling site 3 of the lake. It was also found that the seasonal variation and anthropulogical changes also effect the occurrence and abundance of the algal community.
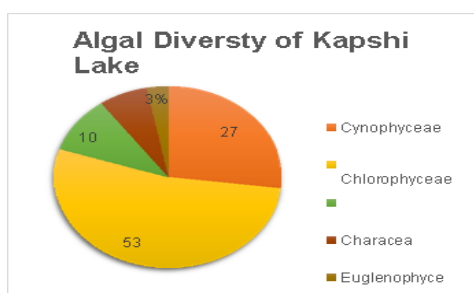
Fig. 3 Pie Chart of Algal Diversity
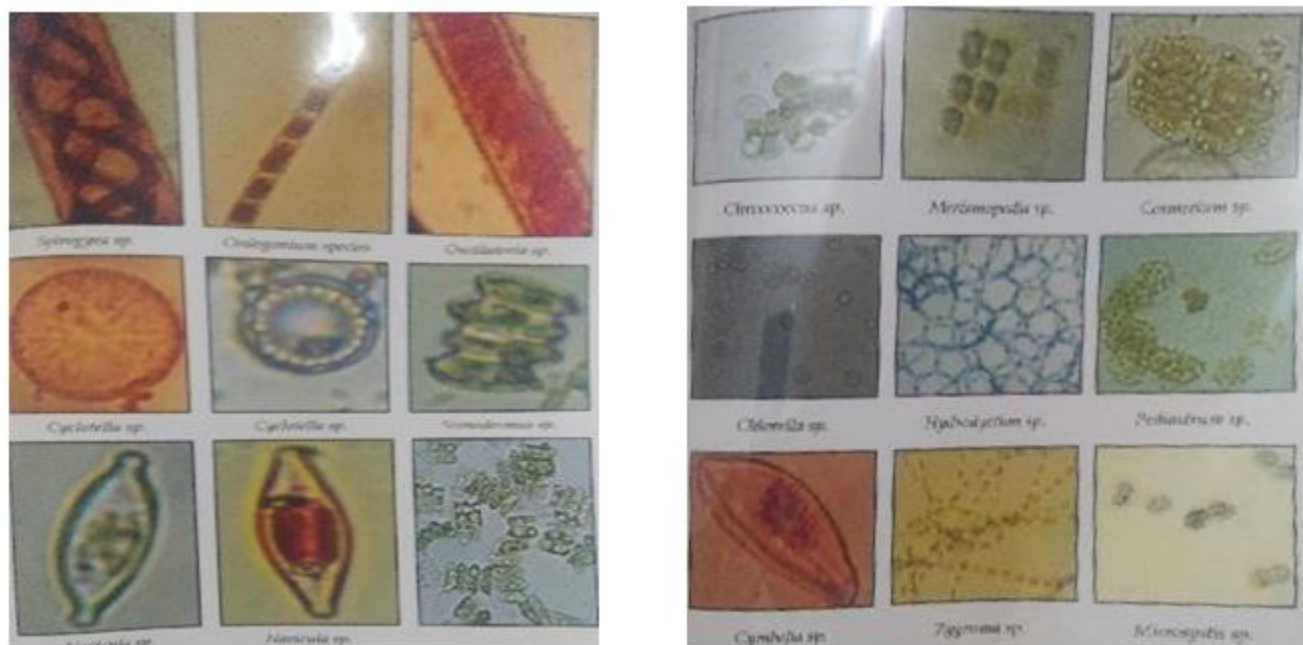
Fig. 4:- Selected Algae species identified in the Kapshi Lake

V. DISCUSSION

In the present investigation physico-chemical parameters like temperature of water, turbidity, transparency, pH, Total dissolved solids, Total alkalinity and their monthly and seasonal variations in water samples from different sampling sites are noted during 2012-14.

It was found that, the temperature of Kapshi lake water range from 23.1oC to 30.1oC. The lowest temperature was recorded in January- February and highest in the month of May. From June onwards, the temperature drops to February. The various observed in the temperature of 3 sampling sites indicates slight difference. The pH is one of the most important physico-chemical parameters, it play vital role in designing the role of water bodies in environment and its management. The pH range in the water samples of Kapshi Lake was analyzed. It was observed that, the pH range of lake was slightly alkaline. However slightly change might be seen over the period. This might be due to the effect of temperature change and reaction of the organic material received by water bodies during preceding period of rain fall.

The algal biodiversity of Kapshi Lake was investigated during 2012-14. In all 40 different algal members belonging to 5 different family are noted during study. It was found that about 50% of diatomaceous flora of the lake is composed of Chlorophyceae members. The availability of algal community was found to be affected by the seasonal Physico-chemical parameters. Thus, Kapshi lake showed that the values of Physico- chemical parameters slightly on higher side reaching or exceeding the permissible limit. The anthropogenic activities showed their impact in the form of deposition of organic materials and salts. This may leads probably dangerous situation for the biotic components of the lake. This may be the ultimate reason for the degradation of the lake in future.

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Cloud Computing in Digital Library

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ABSTRACT

Cloud computing is the essence of future computing needs that has emerged to be a savior for library professionals. It is an emerging technology characterized by an element of novelty where the research community has recently embarked. There has been drastic shift in the trinity of libraries: books which have become electronic, user which prefers web resources than print and the staff which has become cybrarian. In this changed library landscape there is need to shift our competencies for the challenges offered by IT. Availability of independent computing components on demand like cloud as CPU, Storage in cloud has removed the web of IT and librarians can focus on their mission and services

KEYWORDS: Cloud computing, Literature review, Libraries, Cloud computing in libraries

I. INTRODUCTION

Cloud computing can transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impact Cloud computing has become a major topic of discussion and debate for any business or organization which relies on technology. Anyone connected to the Internet is probably using some type of cloud computing on a regular basis. Whether they are using Google's Gmail, organizing phOtos on Flickr bi- searching the Web with Bing they are engaged in cloud computing. As Geoffrey Moore points out, the interesting thing about cloud computing is it did not start as a technology. for the business enterprise, but was driven by the public with services like Facebook and Flickr.i Over the last few years businesses have started to see the value of cloud computing causing it to become a major technology solution for businesses and organizations around the world. Looking across the information and broader technology landscape, it is not difficult to find success stories of switching to cloud computing, disaster stories, and a great deal of debate about what cloud computing is, or isn't. The purpose of this article is to look specifically at how cloud computing can be employed by libraries and what needs to he considered before moving into a cloud computing solution.

II. WHAT IS CLOUD COMPUTING?

First there must be a definition of cloud computing for this discussion. The Gartner Group defines cloud computing as "a style of computing in which massively scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies. This into essentially four different types of cloud

computing: infrastructure, platform, applications and services. To put this in more concrete terms, examples of each can be:

Table No.1

Type	What it is	Examples
Infrastructure	Buying space/time on external servers	Amazon A3 Bungee
Platform	An existing software platform to build your own application on	Facebook
Applications	Software applications accessed with a Web browser	Google Docs Salesforce.Com
Service	Ready to use service accessed with a Web browser	ADPMint.Com

Type What it is Examples Infrastructure Buying space / time on external servers Amazon A3 Bungee Platform An existing software platform to build your own applications on Facebook Applications Software applications accessed with a Webbrowser Google Docs Salesforce.com Services Ready to use services accessed with a Webbrowser ADP Mint. Corn Table 1 illustrates why there are varying definitions of cloud computing. many cloud services actually incorporate two or more of these types. For example, Google Does provides infrastructure as well as applications. But what does this new style of computing mean for libraries?

III. HOW IS CLOUD COMPUTING DIFFERENT?

For much of the past 25 years, software development and system engineering has centered primarily on the personal computer. The PC era was characterized by monolithic, proprietary operating systems and programs that had long development times and release cycles. In that environment, the design of software was isolated and all attention focused on a single application. With cloud computing, hardware and functionality traditionally installed and run in a local environment is now performed on the network, in the Internet cloud. In essence, the Internet cloud becomes the development platform and the operating system to which programmers write reusable, constantly updated software components that are delivered over the network and that can be embedded or loosely coupled with other Web applications. Libraries have been using some cloud computing services for over a decade. Online databases are accessed as cloud applications. Large union catalogs can also be defined as cloud applications. However, a look outside libraries is warranted to better understand the value proposition of cloud computing. What can cloud computing solutions do for libraries? So turning to cloud computing and libraries, are their real problems that can be solved? The answer is yes. The library community can apply the concept of cloud computing to amplify the power of cooperation and to build a significant, unified presence on the Web. This approach to computing can help libraries save time and money while simplifying workflows. A brief list of potential areas of improvement could include:

1. Most library computer systems are built on pre-Web technology
2. Systems distributed across the Net using pre-Web technology are harder and more costly to integrate
3. Libraries store and maintain much of the same data hundreds and thousands of times
4. With library data scatter across distributed systems the library's Web presence is weakened 5. With libraries running independent systems collaboration between libraries is made difficult and expensive
5. Information seekers work in common Web environments and distributed systems make it difficult to get the library into their workflow

6. Many systems are only used to 10% of their capacity. Combining systems into a cloud environment reduces the carbon footprints, making libraries greener These improvements can be grouped into three basic areas: technology, data and community. Each offers some general and some unique opportunities for libraries. Looking first at the technology that most current library systems employ several benefits of cloud computing solutions surface.

IV. MODELS OF CLOUD COMPUTING

Models are mental or pictorial representation of an event or phenomenon. Generally models are employed to study such phenomenon which cannot be seen or felt. Scholars have also used models to study cloud computing.

The Cloud Computing model constitutes three service delivery and three deployment models.

The service delivery models are:

- Private cloud: a cloud platform is dedicated for specific organization,
- Community cloud: In community cloud model, the cloud infrastructure Is shared by several organizations and supports a specific community that has shared concerns.
- Public cloud available to public users to register and use the available infrastructure; and
- Hybrid cloud: a private cloud that can extend to use resources in public clouds.

THE DEPLOYMENT MODELS ARE: Software as a Service (SaaS): In SaaS, customers are renting complete applications instead of purchasing and installing the applications or software on their computers. SaaS provider hosts the applications and makes the applications available over the network. SaaS applications are multi-tenant applications which means that the applications are shared to multiple customers . However the applications are logically unique for each customer. It is the responsibilities of the provider to secure customers information in SaaS . Several examples of SaaS applications are online word processing tools and web content delivery services. Companies that offer SaaS services include Google and Salesforce.com.

Platform as a Service (PaaS) : Consumers purchase access to the platforms, enabling them to deploy their own software and applications in the cloud. The operating systems and network access are not managed by the consumer, and there might be constraints as to which applications can be deployed. To run required service a special platform or application infrastructure is also being provided to the clients where clients can build their web based applications. Client does not require to know programming language, database management systems, etc. to run applications. Windows Azure, Google App Engine and Force.com can be few of good examples of PaaS.

Infrastructure as a Service (IaaS) : IaaS service offers virtual machines as well as other abstracted hardware and operating system over the network. By renting IaaS service, the customers can use the latest infrastructure technology and they do not have to concern with updating the technology. Contrast to SaaS and PaaS, customers of IaaS are mainly responsible for securing the leased infrastructure. Companies that offer this service include Go Grid, Fiexiscaie, and Amazon.

USE OF CLOUD COMPUTING IN DIGITAL LIBRARIES:

Data : Bibliographic, Digital, Administrative, License, Access and Preservation

Content : Collections, subscriptions, print, publishing

Services : Library as Place, Content Access, Content Creation, Instruction, Research, Preservation

Experience : Research, Study, Support, Peer based Collaboration, Information Technology Exploration

APPLICATIONS OF CLOUD COMPUTING IN DIGITAL LIBRARIES:

1. Building Digital Library/Repositories
2. Searching Library Data
3. Website Hosting
4. Searching Scholarly Content
5. File Storage
6. Building Community Power
7. Library Automation

V. CONCLUSION

Libraries have the opportunity to improve their services and relevance in today's information society. Cloud computing is one avenue for this move into the future. It can bring several benefits for libraries and give them a different future. The cooperative effect of libraries using the same, shared hardware, services and data—rather than hosting hardware and software on behalf of individual libraries—can result in lowering the total costs of managing library collections and enhancing the both library user's experience and library staff workflows. While local library systems served an important purpose earlier in library automation they now represent a tremendous duplication of effort.

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Check List of Snakes Rescued from Kalamb Dist. Yavatmal Maharashtra with Important Records of Albino Cobra, Indian Egg Eater, Silver Braminus Worm Snakes

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ABSTRACT

In India presence of snakes are very common for people as a result, farmers are frequently recognized to admire certain species of snakes for predatory nature. The conflict between snakes and human's is one of the major examples of human-animal conflict in India today. The largest number of deaths due to animals in India is caused by snakebites. So the present work was carried out to know the assemblage of Snakes with respect to their diversity in around the outskirt of Kalamb. The survey was conducted during September 2020 to August 2021, Snakes were observed sometime rescues mostly from Residential area, back yard or front yard, Garden, trees, ground of farm, beneath stones and in curled and dry leaves along with fencing of farms. Total 25 species were rescued on call during the survey which includes 5 venomous 3 Semi venomous and 17 Non venomous snakes.

Key words: Biological control, Diversity, Non-Venomous, Semi venomous, Snakes

I. INTRODUCTION

Snakes are included in the class Reptilia and order Squamata. Listed in the suborders Serpentes, The primary noticeable study on snakes was carried out by D'Abreu (1928), snakes are distributed universally except Antarctica, and on the majority smaller land masses; exceptions include a few great islands, such as Ireland, Iceland, Greenland, and the islands of NewZealand, in addition to various small islands of the Atlantic and central Pacific oceans.(Roland Bauchot, 1994).

Currently 3900 snake's species belonging to 520 genera from 20 families were reported. (*Reptile-database.org*. Retrieved 7 March 2021). Generally snakes ranges in size from the small, 10.4 cm-long (4.1 in) Barbados thread snake (Hedges SB 2008) to the reticulated python of 6.95 meters (22.8 ft) in length. The fossil species Titanoboa cerrejonensis (Fredriksson, G. M. 2005). was 12.8 meters (42 ft) long (Herrera FA, et al. 2009) Snakes are thought to have evolved from either burrowing or aquatic lizards, perhaps during

the Jurassic period, with the earliest known fossils dating to between 143 and 167 Ma ago. (*Perkins S 2015). And (Caldwell MW,et al 2015)*

All most all snakes are firmly predatory and carnivorous, feed on tiny animals including lizards, frogs, other snakes, small mammals, birds, eggs, fish, snails, worms, and insects. (Hsiang AY et al 2015) and (Mehrtens JM. 1987)

Normally Snakes do not quarry on humans, except anxious or hurt, most snakes favor to keep away from get in touch with and will not assault humans. But there is little exception of huge snake that kills by coiling round its prey and asphyxiating it; no venomous snakes are not a dangerous to humans. Generally Non venomous snakes is harmless; their teeth are not modified for imposing or force a deep stab wound, but quite grabbing and asset, while the chance of infection and tissue damage is there in the bite of a non venomous snake, venomous snakes at hand extreme greater risk to humans. (Mehrtens JM. 1987).

Snakes are important predators in the agroecosystem, but close encounters can be uncomfortable – and potentially lethal. According to herpetologist and venom expert Professor Bryan Fry University of Queensland the majority of bites occur when people are annoying to kill a snake "or show off.

In India, studies about the population and abundance of the snakes assemblage in agricultural crops are very rare and few but some basic studies were carried out these studies were not yet identified all the fauna hence this research paper is an attempt to study the fauna associated with Outskirt area of Kalamb , conducted during the month of August to December 2020 and the efforts were made to study diversity and richness among area around Kalamb, Dist.Yavatmal, Maharashtra , India.

II. MATERIAL AND METHODS

- STUDY AREA:-

Fig 1.:- Satellite Image of Study area where recued snakes were uesd to released

The area selected for study snakes is rich with biodiversity of various flora and fauna with well and dense forestry area. Kalamb (about 78.55 E, 20.28 N) is a village in Yavatmal district of Maharashtra state in India. Kalamb is an administrative center of a Taluka (sub-district) also called Kalamb. The Taluka has a population of about 96 thousand and has over 140 villages. It is famous today for its temple devoted to the Hindu god Ganesha. The temple is known as Shree Chintamani Temple, based on another name for Ganesh that emphasizes the belief that praying to him can remove worries ('Chinta' means worry in Sanskrit and in local

dialect). It is one of the 21 Kshetras of Ganesh throughout India. An annual fair of Shree Chintamani is held here in the month of February. The temperature in the area ranges from 32.0°C to 38.0°C. The region receives an annual rainfall of 289.7 mm to 510.9mm during the monsoon between June and September. The relative humidityvaries from 25%-59.

- **Methods:-**

A group of ten rescuers responds to phone calls warning them of snake sightings in the neighborhood. Approximately 10-15 calls per day. The snakes are caught using steel hooks and a canvas bag (Bagging Method). People are being educated about the value of snakes in the ecology at the rescue centre. When a snake protected under Schedule I of the Indian Wildlife Protection Act 1972 is caught, it is given an appropriate 'Panchnama' and released in the presence of forest officials. Otherwise, the snake moved to the adjoining Durg Forest right away At least 5 to 10 kilometers outside of the city borders.

- **Statistical analysis:-**

Shannon Wiener Diversity Index **H = - SUM [(Pi)* In (pi)] E = H/H max**

Where,

SUM = Summation Pi = number of individuals of species I/ Total number of species

S = Number of species or species richness H max = Maximum diversity possible

E = Evenness = H/H max

The samples of 6 families with 25 species are 02, 02, 01, 15, 03, 02 the Shannon Wiener diversity index and Evenness for these sample values are,

Shannon Wiener diversity index and Evenness i

Sum = 554

Sample Values (S) = 554 number of species (N) = 25

H max = ln(N) = ln(25) **= 3.21** Evenness = H/Hmax = **2.8769/3.21=**

Shannon diversity index (H) **= 2.87**, Evenness = **0.89**

Sr. No	Family	Species Abundance	Pi value	In pi	Pi *In pi
1.	**I) Typhlopidae** Common worm Snake	12	0.0216	-3.8350	-0.0828
2	Beaked worm snake	18	0.0324	-3.4295	-0.1111
3	**II) Boidae** Common sand boa	17	0.0306	-3.4867	-0.1066
4	Red sand boa	32	0.0577	-2.8524	-0.1645
5	**III) Pythonidae** Indian rock python	8	0.0144	-4.2405	-0.0611
6	**IV) Colubridae** Trinket snake	22	0.0397	-3.2264	-0.1280
7	Common rat snake	59	0.1064	-2.2405	-0.2383
8	Common bronzeback snake	8	0.0144	-4.2405	-0.0610
9	Checkered keelback	60	0.1083	-2.2228	-0.2407
10	Buff's Stripped keelback	17	0.0306	-3.4867	-0.1066
11	Green keelback	28	0.0505	-2.9857	-0.1507
12	Common kukari	24	0.0433	-3.1396	-0.1359

13	Common wolf snake	31	0.0559	-2.8841	-0.1612
14	Barred wolf snake	6	0.0108	-4.5282	-0.0489
15	Yellow spotted wolf snake	2	0.0036	-5.6268	-0.0202
16	Dumeril's black headed snake	2	0.0036	-5.6268	-0.0202
17	Stout sand snake	11	0.0198	-3.9220	-0.0776
18	Common cat snake	14	0.0252	-3.6809	-0.0927
19	Banded racer	22	0.0397	-3.2264	-0.1280
20	Indian egg eater	6	0.0108	-4.5282	-0.0489
	V) Elapidae		0.1137	-2.1741	-0.2471
21	Indian Cobra	63			
22	Common Indian krait	39	0.0703	-2.6549	-0.1866
	Slender coral snake		0.0036	-5.6268	-0.0020
23		2			
24	**VI) viperidae.**	44	0.0794	-2.5332	-0.2011
	Russel's viper				
25	Saw scaled viper	7	0.0126	-4.3740	-0.0551
	SUM	**554**	**0.9989**		**-2.8769**

Table 1 :- Family wise distribution of snakes

III. OBSERVATIONS

Poisonous	
1. Cobra,	*Naja Naja*
2. krait	*Bungarus caeruleus*
3. Russell's viper,	*Daboia russelii*
4. Saw scaled viper,	*Echis*
5. Slender coral snake,	*Calliophis melanurus*
Semi poisonous	
6. Stout Sand Snake,	*Psammophis longifrons*
7. Indian egg eater,	*Elachistodon westermanni*
8. Common cat snake,	*Boiga trigonata*
Non Poisonous	
9. Common worm snakes	*Indotyphlops braminus*
10. Beaked worm snake	*Myriopholis macrorhyncha*
11. Common earth boa	*Eryxinae*
12. Red sand boa	*Eryx johnii*
13. Indian rock python	*Python molurus*
14. Trinket snake	*Coelognathus helena*
15. Common Rat snake	*Ptyas mucosa*
16. Common bronzeback snake	*Dendrelaphis tristis*
17. Checkred keelback	Xenochrophis piscator
18. Buff stripped keelback	Amphiesma stolatum
19. Green keelback	*Rhabdophis plumbicolor*
20. Common kukari	*Oligodon arnensis*
21. Common wolf snake	*Lycodon*
22. Barred wolf snake	*Lycodon striatus*
23. Yellow spotted wolf snake	*Lycodon flavomaculatus*
24. Dumerils black headed snake	*Sibynophis subpunctatus*
25. Banded racer	*Argyrogena fasciolata*

Table 2:- Comparison amongst Poisonous to Nonpoisonous

Distribution of Snakes

	1	2	3	4	5	6	7	8	9	10	11	12
■ Family	0		0			0		0	0		0	
■ Genus	2		13			3		1	2		2	
■ Species	2		15			3		1	2		2	
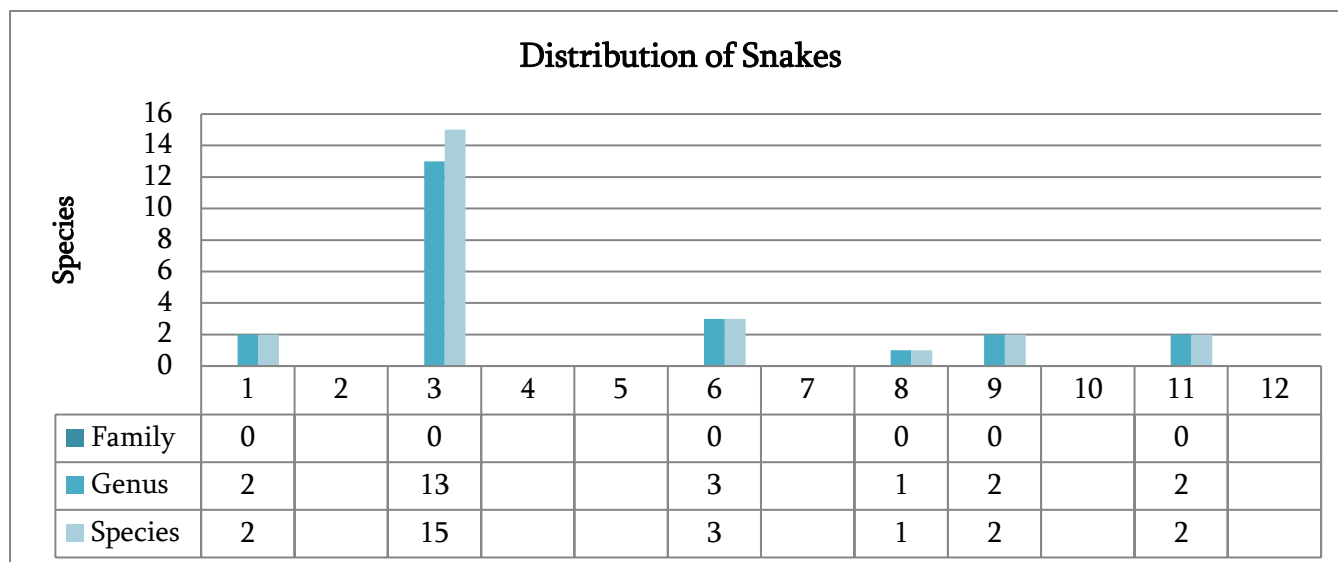
Fig:- 1 Species against Genus

IV. DISCUSSION AND RESULT

A grand total of 554 snakes of 25 species belonging to 6 families were rescued from all around the Kalamb City Including houses, front yard and back yard, farms, gardens, trees, Open areas and from wells, including 5 Poisonous species belonging to *Elapidae*&ViperidaeFamilies. Colubridae Semi poisonous andTyphlopidae,Boidae, Pythonidae, Colubridae are non poisonous. The highest diversity of snakes was recorded for Cloubridae family magnificently with 15 species (Table 1). Followed by Elapidae03 , Bionidae and Typhopidae and viparidae02 from each families respectively.And only one from Pythonidae.

Total abundance from Elapidae, Indian Spectacle cobra found to be 63 with the 2 species of rare *Albino Cobra* (First Record of *albino naja naja* from dist. Yavatmal). While from Typhlopidae family Common worm snake (*Indotyphlops braminus*) was recorded firstly from same region. It indicates that the Kalamb and the adjacent region provide healthy habitats for snakes and more efforts are required for exploration of snakes from Kalamb region.

V. ACKNOWLEDGMENTS

VI. OBSERVATION PLATES

Family - Typhlopidae

Plate 1

Indotyphlops braminus

Myriopholis macrorhyncha

Family - Boidae

Erycinae sp .

Eryx johniia

Family - Pythonidae

Plate 2

Python molurus

Family - Colubridae

Coelognathus helena

Ptyas mucosa

Family - Colubridae

Plate 3

Dendrelaphis tristis

Xenochrophis piscator

Amphiesma stolatum

Rhabdophis plumbicolor

Family - Colubridae

Plate 4

Oligodon arnensis

Lycodon

Lycodon striatus

Lycodon flavomaculatus

Family - Colubridae

Plate 5

Psammophis longifrons

Sibynophis subpunctatus

Family - Elapidae

Plate 6

Naja Naja

Bungarus caeruleus

Calliophis melanurus

Family - Viperidae

Plate 7

Daboia russelii

Echis

First Record from Kalamb

Plate 8

Naja Naja (Albino)

Indotyphlops braminus

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Social Support for Post COVID-19 and Mental Health Recovery- Review

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ABSTRACT

Social support really plays a core function- managing medium in welfare and gruelling task to deal with Corona extremity. Social distancing and face masking are the major precautionary measures for reducing the spread of COVID-19. In the recent covid-19 epidemic situations during lockdowns the world has experienced the great significance of the social support and healthy relationships for mental peace. In this paper, social support is considered Psychological First Aid and skills for Psychological Recovery, to inform people to change their typical ways of connectedness, access to technology during isolation andpost-isolation. Hence the future generation needs to be socially connected, and to maintain their social support effectively and efficiently developing confidence among the society to face such extreme challenges to humanity.

Keywords: COVID-19, isolation, mental health, social support

I.   INTRODUCTION

A viruscan affect multitudinous organs and can affect in multitudinous long- term health problems. On the other hand, the stress and anxiety during a pandemic has significantly changed the lifestyle of people. The marketable counteraccusations of restrictions are maybe most egregious.

After viral infection various types of damage do in multiple body organs and can lead to multiple long lasting problems. The mental and physical health of people has significantly changed the life during pandemic. The commercial concerns of restrictions are most apparent (International Monetary Fund, 2020), but the mental and cultural difficulties are largely unknown — specifically, how the isolation and loneliness resulting from physical restrictions will affect the larger population and their mental well- being. In a methodical review of general social isolation and loneliness, Leigh-Hunt and associates (2017) gave opinion on the access to anyone at any time posed extremely severe challenges to the critical structure services due to vulnerabilities at various levels in the networks.

According to KathirvelN. (2020), people endured symptoms immediatelyafter the quarantine period like emotional disturbance, tetchiness, wakefulness, fatigues, frazzle, anxiety, depression andpost-disturbing stress. The long term impact is sizable and wide interspersing including anxiety, wrathfulness, depression,post-traumatic stress symptoms, muscle weakness, behavioural changes and sleep problems (Ahmed *et al;*2020,Daher

et al;2020,Garrigues *et al*;2020,Xiong *et al*;,2021). These physiological symptoms can last from several months up to three years after the quarantine period (Brooks *et al*;, 2020).

The inflexibility of COVID 19 was related to the inflexibility and frequence of internal health symptoms (16) with anxiety and PTSD being significantly more frequent in cases admitted to the ICU compared to wards (Garrigues*et al*;,2020,Tornasoni *et al;,2021*,De Lorenzo *et al;.2020*,Halpin *et al;*,2021).

Social distancing could conceivably lead to substantial increases in loneliness, anxiety, depression and substance abuse (Galea*et al;,* 2020).

Prolonged social isolation can lead to social withdrawal, aphenomenon known as Hikikomori, which may further be exacerbated by the profitable and social extremity of the pandemic. Although Covid-19 affiliated social isolation appears to be analogous to Hikikomori, there are differences between the two conditions as Covid-19 social insulation is assessed by governments and also stems from the individualities' avoidance behaviour due to the fear of infection (Kato *et al*;, 2020).

For COVID-19 pendemic, the effect on internal health is seen t0 be veritably long lasting (Galea*et al*;, 2020). Mental health disturbance is seen to rise during thepost-pandemic time. In preventative methods, not only hand washing, the primary precautionary method of the epidemic includes physical restrictions and social distancing (which helps toreduce further unwanted spread of infection), cquarantine (which help to reduce implicit spread), or insulation (almost resist the spread; Centers for Disease Control & Prevention, 2020. It's important to understand the surface level effects whether depression, fear attacks and loneliness are the most common outgrowth of bad mental and psychical health(Kathirvel,2020).

II. MENTAL HEALTH ISSUES AFTER COVID-19 RECOVERY

In cases in which hospitalization is needed following the pandemic COVID-19, confusion is common during the acute stage of the illness. According to Shanbehzadeh (2021), fatigue is the one of the most common musculoskeletal symptom reported inpost-COVID. The data on long term psychiatric complications in these group of cases, although not yet completely known, may be similar to former nimbus contagion pandemics, severe acute respiratory (SARS) and Middle East Respiratory Syndrome (MERS) with amplified cases anxiety, depression, stress , and trauma.

After the discharge the most common symptoms seen in patients after suffering from the virus includes are mostly mental related.

Neurocognitive impairment including disabled attention, attention, memory, and internal processing speed one year was observed in maturity of cases with severe acute respiratory torture pattern. Substantial reductions in quality of life were observed in cases with severe acute respiratory pattern and dragged mechanical ventilation after discharge from intensive care unit compared to admissions for other reasons (Rogers *et al*;, 2020).

Greater Psychological impact was observed in females post-COVID-19, with a2.2-to2.5-fold advanced odds of developing psychiatric morbidity (Chen *et al;*,2020,Mei liz*et al*;,2020,De Lorenzo *et al;.*2020). Comorbidities (arterial hypertension, coronary roadway complaint, and diabetes mellitus) weren't related to a advanced prevalence of mental health problems (Mei liz*et al*;,2020,,De Lorenzo *et al*;,2020;).

III. PSYCHOLOGICAL HEALTH IMPACT ON FRONTLINE HEALTHCARE PROFESSIONALS (HCP)

Psychological symptoms including anxiety, depression, wakefulness are current in over to 60 among physicians, nurses and medical residers during Covid-19 epidemic (Que*et al;,* 2020), which are likely to persist for several times. HCP who worked in respiratory drug during the SARS outbreak in 2003 had patient and significantly lesser position of psychlogical symptoms including anxiety, depression andpost-traumatic stress symptoms a time latterly (McAlonan*etal.,* 2007).

Post-traumatic stress symptoms were reported by 11% – 73% of HCP during epidemic or epidemic outbreaks that lasted in over to 10 – 40 after 1 – 3 times (Preti*et al;,* 2020).

IV. POST COVID-19 PROFITABLE RECESSION, SOCIAL INEQUALITIES AND IMPACT ON INTERNAL HEALTH

World Bank has prognosticated steep global economical recession since decades following the COVID-19 epidemic. This may negatively impact on internal health especially of the vulnerable groups.

Profitable recession has been associated with increases in the cerebral torture, anxiety, depression, substance abuse diseases, and self-murder and suicidal thoughts. Severance, insecure job situation, lower socio-profitable status, andpre-existing psychiatric problems feel to be the determinants of post-profitable recession internal health issues (Frasquilho*etal.,* 2016).

V. STIGMA RELATED TO COVID-19 EPIDEMIC

According to Bagacchi,2020) Smirch against HCP and survivorsof the COVID-19 infection has redounded in importunity, stereotyping, demarcation, social insulation, and in some cases physical violence. Stigmatised individualities may witness emotional disturbance, anxiety, depression and emotional disturbance (Centers for Disease Control and Prevention, 2020).

VI. CONCLUSION

This review highlights about the importance of mental health in the deviated condition of COVID-19 pandemic and its impact that might last upto several years .Mental health is a real problem and early help or assistance is really important for the person suffering from mental issues. Some of the ways include doing regular meditation, spending quality time with family and friends ,a proper proffesional help and support. Easily available and budget friendly assessment should be given to the people in need .The subject of mental health is still looked down and ignored just because they are not visible problems to the eyes. Awareness should be created among the people about the mental problems and that they are real and not less than any physical health problem. This approach might tremendously help to   reduce the   economic, cultural and clinical health problems, and prevent long-term worse effects.

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Temperature and Thermal Stress Problem of Hollow Cylinder on a Certain Steady-State

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ABSTRACT

In this paper, an attempt has been made to solve the problem of thermo elasticity and determine the unknown temperature, displacement and stress components. In this problem the zero temperature is maintained on the lower surface and third kind boundary condition is maintained on lower and upper surface. The governing heat conduction has been solved by using finite Hankel transform technique unknown temperature found on the lower surface of the hollow cylinder. The results are obtained in series form in terms of Bessel's functions and have been computed numerically and illustrated graphically.

Key words: Steady- state, Thermoelastic problem, Hankel transform, Hollow cylinder.

I. INTRODUCTION

In 1967, Lord and Shulman [7] introduced the theory of generalized thermoelasticity with one relaxation time for an isotropic body. This theory corrects the unrealistic conclusions of the older theories (the uncoupled and the coupled theories of thermoelasticity) that heat waves travel with infinite speeds. In 1972 Green and Lindsay [1] developed the theory of generalized thermoelasticity with two relaxation times, based on a generalized inequality of thermodynamics. In this theory both the equations of motion and of heat conduction are hyperbolic. The heat conduction law is the same as Fourier's law when the system has a centre of symmetry. Among the contributions to this theory are the works in [8, 9].

In view of some experimental evidence available in favour of finiteness of heat propagation speed, generalized thermoelasticity theories are considered to be more realistic than the conventional theory in dealing with practical problems involving very large heat fluxes at short intervals, like those occurring in laser units and energy channels [2].

Two dimensional transient problems for a thick annular disc in thermoelasticity studied by (Dange et al., 2009). An inverse temperature field of theory of thermal stresses investigated by (Grysaet al; 1981) while A note of quasi –static thermal stresses in steady state thick annular disc and an inverse quasti-static thermal stresses in thick annular disc are studied by (Gaikwad et al; 201s0).

In this paper, in the first problem, an attempt is made to determine the unknown temperature, displacement and stress functions on curved surfaces, where an arbitrary heat is applied on the lower surface (z = -h) and

maintained zero on upper surface (z = h) . The governing heat conduction equation has been solved by using Hankel transform technique. The results are obtained in series form in terms of Bessel's functions and illustrated graphically.

This paper contains a new and novel contribution of thermal stresses in an annular disc under steady state. The above results were obtained under a steady state field. The results presented here are useful in engineering problems particularly in the determination of the state of strain in an annular disc constituting foundations of containers for hard gases or liquids, in the foundations for furnaces etc.

II. STATEMENT OF PROBLEM

Consider an annular disc of thickness 2h occupying the space $D: a \leq r \leq b, -h \leq z \leq h.$

The thermoelastic displacement function as in (Nowacki; 1962) is governed by poison's equation

$\nabla^2 U = (1+v)a_t T$ (2.1)

with $U_r = 0$ at $r = a$ and $r = b$ (2.2)

where

$$\nabla^2 = \frac{\partial^2}{\partial r^2} + \frac{1}{r}\frac{\partial}{\partial r}$$

v and a_t are the Poisson's ratio and the linear coefficient of thermal expansion of the material of the disc and T is the temperature of the disc satisfying the differential equation

$\frac{\partial^2 T}{\partial r^2} + \frac{1}{r}\frac{\partial T}{\partial r} + \frac{\partial^2 T}{\partial z^2} = 0$ (2.3)

subject to the boundary conditions

$T(r,z) = 0$ at $r = a, -h \leq z \leq h$ (2.4)

$T(r,z) = 0$ at $r = b, -h \leq z \leq h$ (2.5)

$\frac{\partial T}{\partial z} - k_1 T = g(r)$, at $z = -h, a \leq r \leq b$ (2.6)

$\frac{\partial T}{\partial z} + k_2 T = 0$, at $z = h, a \leq r \leq b$ (2.7)

where k_1 and k_2 are the radiation constants on the two plane surfaces.

The stress functions σ_{rr} and $\sigma_{\theta\theta}$ are given by,

$\sigma_{rr} = -2\mu\frac{1}{r}\frac{\partial U}{\partial r}$ (2.8)

$\sigma_{\theta\theta} = -2\mu\frac{\partial^2 U}{\partial r^2}$ (2.9)

where μ is the Lame's constant, while each of the stress functions σ_{rz}, σ_{zz} and $\sigma_{\theta z}$ are zero within the disc in the plane state of stress.

The equations (2.1) to (2.9) constitute the mathematical formulation of the problem under consideration.

III. SOLUTION OF PROBLEM

On applying the finite Hankel transform defined in (Sneddon; 1972) to Eq. (2.3), one obtain

$$\frac{d^2\overline{T}}{dz^2} - \xi_n^2\overline{T} = 0$$

(3.1)

where $\overline{T}$ is the Hankel transform of T.

On applying Eq. (3.1) under the conditions given in Eq. (2.6) and Eq. (2.7), one obtains

$$\overline{T} = \sum_{n=1}^{\infty} \overline{f}(\xi_n) \left[\frac{\xi_n \cosh\left[\xi_n(z+h)\right] + k_2 \sinh\left[\xi_n(z+h)\right]}{\left(\xi_n^2 + k_1 k_2\right)\sinh(2\xi_n h) + \xi_n(k_1 + k_2)\cosh(2\xi_n h)} \right]$$

(3.2)

On applying the inverse Hankel transform to Eq. (3.2), one obtain the expression for the temperature as

$$T(r,z) = \sum_{n=1}^{\infty} \underline{f}(\xi_n)[J_0(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_0(r\xi_n)]$$

$$\times \left[\frac{\xi_n cosh[\xi_n(z+h)] - k_2 sinh[\xi_n(z+h)]}{(\xi_n^2 + k_1 k_2)sinh(2\xi_n h) + \xi_n(k_1+k_2)cosh(2\xi_n h)} \right]$$

(3.3)

where $\underline{f}(\xi_n) = \int_a^b f(r)r[J_0(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_0(r\xi_n)]$ (3.4)

Equation (3.3) is the desired solution of the given problem.

DETERMINATION OF THERMOELASTIC DISPLACEMENT

Substituting the value T(r, z) from Eq. (3.3) in Eq. (2.1) one obtains the thermoelastic displacement function U(r, z) as,

$$U(r,z) = -(1+v)a_t \sum_{n=1}^{\infty} \left(\frac{\underline{f}(\xi_n)}{\xi_n^2}\right)[J_0(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_0(r\xi_n)]$$

$$\times \left[\frac{\xi_n cosh[\xi_n(z+h)] - k_2 sinh[\xi_n(z+h)]}{(\xi_n^2 + k_1 k_2)sinh(2\xi_n h) + \xi_n(k_1+k_2)cosh(2\xi_n h)} \right]$$

(3.5)

DETERMINATION OF STRESSES

Using Eq. (3.5) in Eq. (2.8) and Eq. (2.9), one obtains the stress functions σ_{rr} and $\sigma_{\theta\theta}$ as,

$$\sigma_{rr} = -\frac{2\mu}{r}(1+v)a_t \sum_{n=1}^{\infty} \left(\frac{\underline{f}(\xi_n)}{\xi_n}\right)[J_1(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_1(r\xi_n)]$$

$$\times \left[\frac{\xi_n cosh[\xi_n(z+h)] - k_2 sinh[\xi_n(z+h)]}{(\xi_n^2 + k_1 k_2)sinh(2\xi_n h) + \xi_n(k_1+k_2)cosh(2\xi_n h)} \right]$$

(3.6)

$$\sigma_{\theta\theta} = -2\mu(1+v)a_t \sum_{n=1}^{\infty} \underline{f}(\xi_n)[J_1'(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_1'(r\xi_n)]$$

$$\times \left[\frac{\xi_n cosh[\xi_n(z+h)] - sinh[\xi_n(z+h)]}{(\xi_n^2 + k_1 k_2)sinh(2\xi_n h) + \xi_n(k_1+k_2)cosh(2\xi_n h)} \right]$$

(3.7)

SPECIAL CASE AND NUMERICAL RESULTS

Set

$f(r) = (r+a)(r+b)e^h$, $\alpha = (1 - a - b)$ in (3.3) one obtains

$$\frac{T(r,z)}{\alpha} = \sum_{n=1}^{\infty} e^h\big(G_0(b\xi_n) - J_0(b\xi_n)\big)\{\frac{b^2}{\xi_n^2}\left[2J_0(b\xi_n) + \left(b\xi_n - \frac{4}{b\xi_n}\right)J_1(b\xi_n)\right]$$

$$- \frac{a^2}{\xi_n^2}\left[2J_0(a\xi_n) - \left(a\xi_n - \frac{4}{b\xi_n}\right)J_1(a\xi_n)\right] + \frac{ab}{(1-a-b)}[bJ_1(b\xi_n)$$

$$- aJ_1(a\xi_n)]\}[J_0(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_0(r\xi_n)]$$

$$\times \left[\frac{\xi_n cosh[\xi_n(z+h)] - k_2 sinh[\xi_n(z+h)]}{(\xi_n^2 + k_1 k_2)sinh(2\xi_n h) + \xi_n(k_1+k_2)cosh(2\xi_n h)} \right]$$

(3.8)

The numerical calculation have been carried out for steel (SN 50 C) plate with parameters $a = 1m$, $b = 2m$, $h = 0.5m$. thermal diffusivity $k = 15.9 \times 10^{-6}(m^2 s^{-1})$ and poisons ratio $v = 0.281$, while $\xi_1 = 5.95$, $\xi_2 = 7.23$, $\xi_3 = 9.45$, $\xi_4 = 11.52$, $\xi_5 = 13.79$ being the positive roots of transcendental equation $[J_0(r\xi_n)G_0(b\xi_n) - J_0(b\xi_n)G_0(r\xi_n)] = 0$ as in (Ozisik;1968).

IV. DISCUSSION

In this paper, equation (3.8) have been calculated and shown graphically by using MATLAB, and the conclusion is as under:

Initially the temperature of the Hollow cylinder has been determined by using the conditions given in both the problems and applying finite Hankel transform technique and its inverse.

Thus the value of stress function of the material of annular disc is found using temperature T, linear coefficients of the thermal expansion a_t, and Poisson's ratio of the material. Finally, the displacement component has been arrived at using the stress function; and lastly, the stress component in terms of U has been found. Now, thermal diffusivity and thermal conductivity are two important thermal properties that enter the differential equation of heat conduction. Therefore accuracy of the value chosen for these properties affects the accuracy of the results in heat conduction problems.

In first problem of a certain steady-state problems of temperature and thermal stresses of an hollow cylinder , the condition that has been given kept at zero on the curved surfaces and third kind boundary condition is maintained on the lower surfaces and while temperature of the cylinder has been kept at zero on the upper boundary surface.
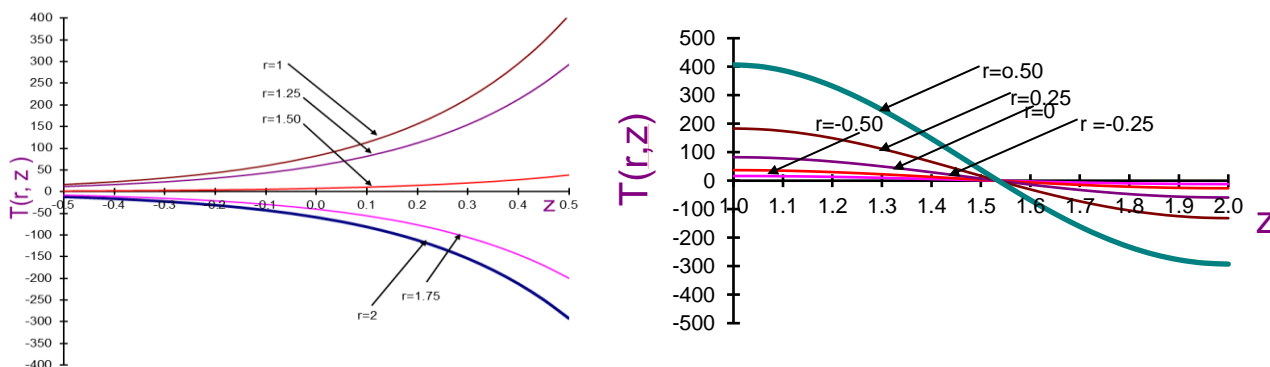
Fig1. The temperature distribution T(r, z)in axial directionFig2. The temperature distribution T(r, z)in axial direction

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Impact of Machine Learning in Traditional Web Caching Replacement Techniques

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ABSTRACT

WWW has become an essential tool for accessing information and interaction among people on the globe. It provides a wide range of Internet-based services including shopping, banking, entertainment, education, governance, etc. WWW traffic has been increasing rapidly due to web applications on every web site. The fast growth of online applications is making network traffic congested and increase serve load which delays response, thereby annoying the web user. Caching the popular web objects, is an efficient solution to the latency problem which bring documents closer to the web users. Traditional techniques such as LRU, LFU, SIZE, GD-Size and GDSF are used to enhance the performance of web system. This paper discusses the impact of machine learning techniques like Support Vector Machine (SVM) and Naïve Bayes (NB), Decision Tree (DT) along with traditional algorithms in reducing the user perceived latency and in improving the Hit Ratio (HR) and Byte Hit Ratio (BHR).

Keyword:- Internet, WWW, Web caching, Machine learning.

I. INTRODUCTION

The World Wide Web contains huge amount of information almost on every subject such as education, environment, defense, business, sports, medical science, banking, shopping etc. Increasing popularity of WWW has introduced new issues such as Internet traffic, bandwidth consumption thereby leading to latency in service being provided by the application servers. Due to technological advances this huge traffic can lead to significant delays in accessing objects on the web.

Caching of objects in the WWW is widely used technique to reduce network traffic, latency and server load. Caching stores the copies of objects relatively closer to the user. Caching plays a important role to increase the performance of web sites. Caching techniques such as Least-Recently-Used (LRU), Least frequently used (LFU), Greedy-Dual-Size (GDS) and Greedy-Dual-Size-Frequency (GDSF).etc are available to caching the objects.. These caching policies do not perform well in every situation of caching the web object.

Machine learning techniques are used along with traditional policies to enhance the Performances of Web proxy caching techniques. Support Vector Machine or SVM algorithm is a simple and powerful Supervised Machine Learning technique used for building both regression and classification models.

The web objects can be cached at various places at WWW: at the client browser at or near the server (reverse proxy) to reduce the server load, or at a proxy server. When the cache is full and the proxy needs to cache a new object, it has to decide which object to evict from the cache to accommodate the new object. The techniques used for the removal decision is referred to as the replacementpolicy. Traditional caching policies, such as LFU, LRU, SIZE, GDSF, etc. for memory systems does not perform well when applied to WWW traffic for the following reasons:

- Most of caches deal with fixed-size pages in memory system, so the size of the page does not play any role in the replacement policy.
- The cost of missed Web objects from original servers depends on several factors, such as distance, bandwidth between the proxy and the original servers and the size of the web object.
- Web objects areregularly updated, which means that it is very important to consider the web object expiration period at replacement instances. In memory systems, pages are not generally associated with expiration period.
- Web object popularity needs to be considered in any Web caching policy to optimize a desired performance metric but it has not been considered in memory system.

II. WEB PROXY CACHING

Web caching is one of the most successful solutions for improving the performance of Web-based systems. In Web caching, the popular Web objects that are likely to be used in the near future are stored on devices closer to the Web user such as client's machine or proxy server. Thus, Web caching has three attractive advantages to Web users. Web caching decreases user perceived latency, reduces network bandwidthusage and reduces load on the origin servers. [1,2] Typically, a Web cache is located in a browser, proxy server and/or origin server as shown in Fig. 1. The browser cache is located in the client machine. At the origin server, Web pages can be stored in a server-side cache for reducing the redundant computations and the server load.

The proxy cache is found in the proxy server, which is located between the client machines and origin server. It works on the same principle as the browser cache, but on a much larger scale. Unlike the browser cache which deals with only a single user, the proxy server serves hundreds or thousands of users in the same way. As shown in Fig. 1, when a request is received, the proxy server checks its cache. If the object is available, the proxy server sends the object to the client. If the object is not available, or it has expired, the proxy server will request the object fromthe origin server and send it to the client. The requested object will be stored in the proxy's local cache for future requests.

Web proxy caching is widely utilized by computer networkadministrators, technology providers, and businesses to reduce both user delays and Internet congestion [3,4]
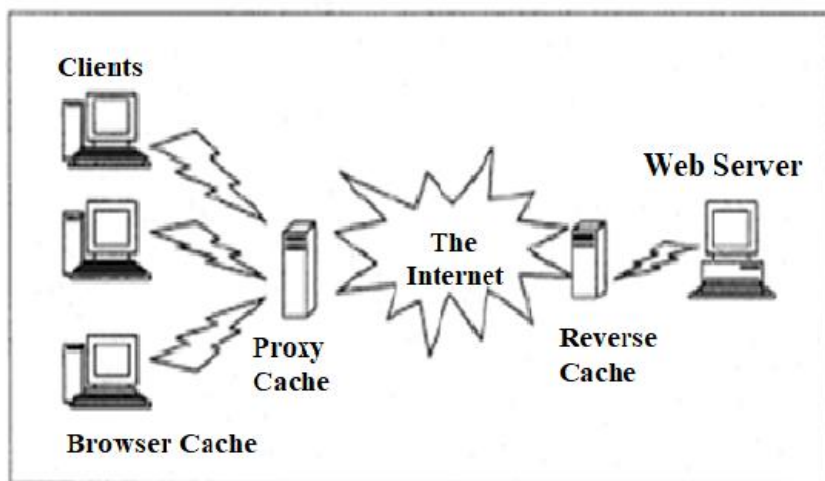
Fig 1: Locations of web object caching

3.1 Cache Replacement Techniques:

Cache replacement policies plays an important role in improving Web Caching algorithms. Following are the traditional cache replacement algorithm

S.No	Cache Replacement Policies	Description
1	LRU	The least recently used objects are removed first.
2	LFU	The least frequently used are removed first.
3	SIZE	Big objects are removed first.
4	GD-Size	With key value being assigned to each object and lowest key value is replaced.
5	GDSF	Extension of GDS by integrating the frequency factor.

Table 1: Traditional Cache Replacement

3.2 Performance Measures:

There are standard metrics available for measuring the efficiency and the performance of the web caching algorithms.

Hit Ratio (HR):-Percentage of requests that can be satisfied by the cache.

Byte Hit Ratio (BHR):-Number of bytes stratified by the cache as a fraction of total bytes requested by the user.

$$HR = \frac{\sum_{i=1}^{N} \delta}{N} \quad OR$$

Cache hit ratio = [Cache Hits / (Cache Hits + Cache Misses)] x 100 %

$$BHR = \frac{\sum_{i=1}^{N} bi\delta i}{\sum_{i=1}^{N} bi}$$

Many researches have made on traditional cache replacement algorithms and results showed a considerable improvement in performance of the web server. Using sample dataset various algorithms like ngram,GDSF, GD-Size, LRU and LFU are tested for efficiency using HR and BHR parameters. The output depends on Cache

Size and volume of training dataset. Most of the researches proved that GDSF and LRU are showing considerable improvement.

III. MACHINE LEARNING

Machine learning is a rising technology which supports computers to learn automatically from past data. Machine learning uses different algorithms for building mathematicalmodels and making predictions using historical data or information.Now a days, it is used for various tasks such as image recognition, speech recognition, medical diagnosis,email filtering,stock markettrading, Facebook auto-tagging,self-driving cars, product recommendation, traffic predictions, online fraud detection etc.

Machine Learning enables to recognize patterns on the basis of existing algorithms and data sets and to develop adequate solution. The machine learning algorithmused the previous examples as inputs, analyzes them, and outputs abstract patterns or rules. Thus, the machine learning mechanisms form the basis for adaptive systems.[1]

Web log files gives the information about the behavior of user.With the help of log data, machine learning algorithms build a mathematical model that helps in making predictions or decisions without being explicitly programmed.Machine learning techniques are used to implement the aforesaid objectives. Now a day's research is going on to combine traditional cache replacement policies with machine learning techniques which may be called as hybrid techniques. This paper discusses the effect of hybrid techniques in enhancing the performance of the web server. Naïve Bayes, Decision Tree and Support Vector Machine are the three machine learning techniques were taken into consideration and their impact on enhancing the performance were discussed here.

4.1 Naïve Bayes: -

It is a simple, effective and commonly-used, machine learning classifier. Naive Bayes is a classification algorithm for binary and multi-class classification problems. The technique is easiest to understand when described using binary or categorical input values.It is called *Naive Bayes* because the calculation of the probabilities for each hypothesis are simplified to make their calculation tractable. Rather than attempting to calculate the values of each attribute value P(d1, d2, d3|h), they are assumed to be conditionally independent given the target value and calculated as P(d1|h) * P(d2|H) and so on. This is a very strong assumption that is most unlikely in real data, i.e. that the attributes do not interact. However approach performs surprisingly well on data where this assumption does not hold [5].

- Naïve Bayes algorithm is a supervised learning algorithm, which is based on Bayes theorem and used for solving classification problems.
- It is mainly used in *text classification* that includes a high-dimensional training dataset.
- Naïve Bayes Classifier is one of the simple and most effective Classification algorithms which helps in building the fast machine learning models that can make quick predictions.
- It is a probabilistic classifier, which means it predicts on the basis of the probability of an object.
- Examples of Naïve Bayes Algorithm are spam filtration, Sentimental analysis, and classifying articles.

4.2 Support Vector Machine: -

Support Vector Machine (SVM) is a supervised machine learning algorithm which can be used for both classification and regression challenges. It performs classification more accurately and faster than other

algorithms. These machine learning algorithms have a wide range of applications such as text classification, Web page classification and bioinformatics application. Hence SVM can be used to produce promising solution for web proxy caching.

In SVM, each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper plane that differentiate the two classes very well. Support Vectors are simply the co-ordinates of individual observation. Support Vector Machine is a frontier which best segregates the two classes (hyper-plane/ line) as shown in Fig.1 below. Support vector machine or SVM algorithm is based on the concept of „decision planes‟, where hyper planes are used to classify a set of given objects. Pictorial examples of support vector machine algorithm in Fig.2 shows that two sets of data. These datasets can be separated easily with the help of a line, called a decision boundary. There can be several decision boundaries that can divide the data points without any errors. The nearest points from the optimal decision boundary that maximize the distance are called support vectors.[6,7]
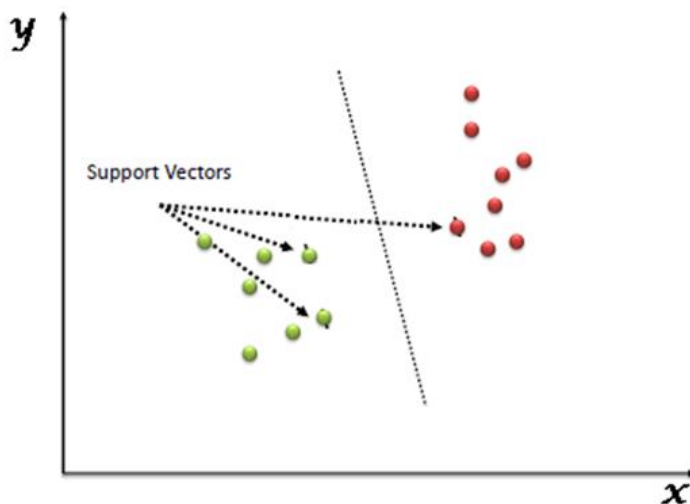
Fig. 2 – SVM-Segregated Hyper plane

4.3 Decision Tree:-

Decision Tree methodology is a supervisedmachine learning technique that can be commonly used for both classification and regression problems, but it is mostly used for solving Classification problems. Decision Tree is a classifier, where internal nodes represent the features of a dataset, branches represent the decision rules and each leaf node represents the outcome.Decision tree, consist of two nodes, such as the Decision Node and Leaf Node. Decision nodes are used for taking decision and have many branches, whereas Leaf nodes are used for the output of those decisions and do not contain any extra branches.The decisions or the test are made on the basis of features of the particular dataset [8]. It is a graphical representation for getting all the possible solutions to a problem/decision based on given conditions. Decision tree is similar to a tree, it starts with the root node, which expands on further branches and constructs a tree-like structure.The CART (Classification and Regression Tree) algorithm is used to build a tree.A decision tree simply asks a question, and based on the answer Yes or No, it further split the tree into sub trees. Diagram explains the general structure of a decision tree as follows
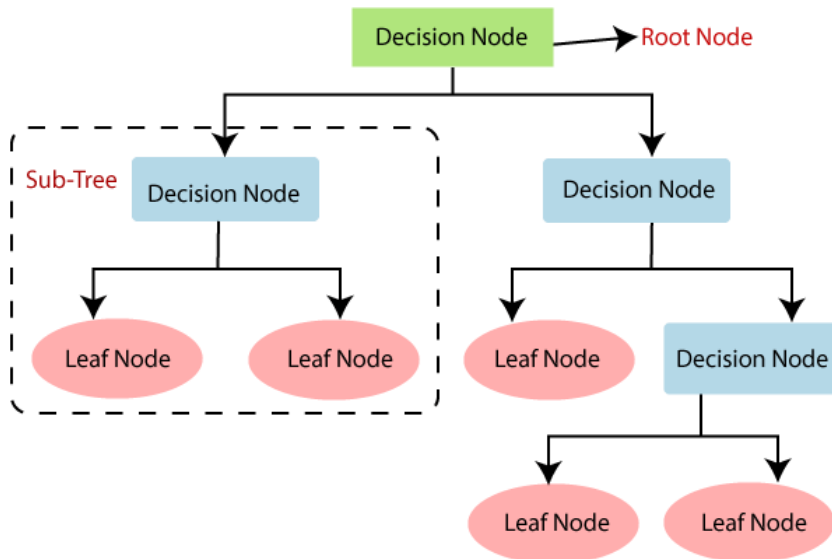
Fig 3. Decision Tree

IV. IMPROVING WEB CACHING WITH MACHINE LEARNING ALGORITHMS

The aforesaid Machine Learning techniques are used in combination with the traditional caching techniques to enhance the performance. These techniques are belonging to the category of supervised learning. In supervised learning the knowledge is acquired from the available data set to extract the data pattern. First we develop the machine learning model of the respective technique. Then we train and test the model. We split the available dataset into two parts, namely training-data-set and testing data set.A supervised learning model analyzes the training data and produces a new knowledge, which is then used for predicting new information. The perfectly trained model will be able to correctly determine the class labels for unseen instances.

In each case a trained classifier has been designed first and then training data set is used as a model to select the appropriate web object from the remaining data set for cache replacement. In case of all these three techniques a hybrid model is used i.e. by combining respective machine learning technique with traditional caching algorithms. The performances of each techniques is analyzed against the metrics Hit Ratio(HR) and Byte Hit Ratio(BHR). On overall analysis of the three cases the following interesting results are found which can be found more useful for enhancing the performance of the web Server and proxy server.

- Machine learning techniques when combined with traditional cache replacement algorithms, the performance is considerably improved.
- Cache Size plays an important role in enhancing the performance. The results are found noticeable in case of medium sized caches as compared to smallor very large sized cache.

V. CONCLUSION AND FUTURE SCOPE

The use of Machine Learning techniques has become a prominent research in most of the fields like Business, Manufacturing, Financial analysis, Education, Sports, etc. Web performance also is not an exception. The use of web applications in every field and social networking has been increased considerably in recent days. This puts a lot of loads on Internet resources, particularly the band width. There are the limitations in increasing the bandwidth to certain level. So it is important to find new techniques to reduce the traffic of the net.

Web caching helps reduce in the traffic to certain extent. But traditional Cache techniques to have their own limitations. The performance of web caching techniques can be enhanced with the help of Machine Learning techniques. In this paper we tried to enhance performance of traditions web caching techniquesby combining them with Machine learning techniques namely Decision Tree, Support Vector Machine and Naïve Bayes inreducing the access latency. Results show the considerable improvement in the web access time.

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Studies on Some Ethno Medicinal Plants In and Around Pusad Tahsil, Dist. Yavatmal

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ABSTRACT

Since the beginning of human civilization, medicinal and aromatic plants have been used by mankind for its therapeutic value. Nature has been a source of medicinal agents for thousands of year and one impressive number of modern drugs has been isolated from natural sources. Pusad is a city in the Yavatmal district located in vidarbha region of Maharashtra state of India. It is named after the pusriver its ancient name was "pushpawanti". In the area like Pusad Tahsil variety of medicinal plant and aromatic plants are found.Somemedicinal and aromatic plants Studied *Curcuma longa.*L. *Azadiracta indica*L. *Eucalyptus globus*L. *Tridax procumbance* L. *Withania somnifera*L.Dunal, *Ocimum sanctum* L. *Emblica officinalis* L. About 25 plants species belonging to about 21families were studied.Themedicinalplanthascontributeda rich help to human beings,therefore there is a necessity to conserve the medicinal plants.

Key words- Ethno Medicinal, floweringplants, Pusad, medicinal herb Aromatic Plants, Ayurveda

I. INTRODUCTION

Botany is the branch of Biology which deals with the study of plants including their structureproperties and biochemical processes. Also included are plants life that gives us oxygen, foodsupplies and many other necessities. Botany is branch of Biologywhich is study of livingorganism since plant life is so fundamental to human survival, people have been studying plantlifeso lifefrombeginning of recorded time.

Plant taxonomy is the science that finds, identities, describes classification and names of plants.Thus making it one of the main branches of taxonomy is closely allied to plant systematic andthere is no sharp boundary between the two. Taxonomy or systematic is the study description onvariation among organism in order to come out with a classification systems plant growth habit,leaf arrangement and shape of flowers and fruit characteristics. Importance of plant taxonomy toarrange element or true of plant into a more systematic manner;   so   that   they   can   be

betterunderstoodandcouldbeusedeasilyandmoreeffectivelyrelationship(Phylogeneticancestryandorigin of plants) to indicate the distribution and habitat of plants on the earth and their benefits.Ever since ancient time in search for secure for their diseases. The people looked for drugs innature.Thebeginningofthemedicineplantusewasinstinctive,as incasewithanimal.

Botanists and plant explores have helped in chronicling for us the significance of biologicaldiversity, yet we seldom thanks the green plants. When we go to bed each night for being theprimarysourceoffoodandenergyintheworld.Iftheprocessofphotosynthesisdidnotexist,wealso would not exist on this planet Earth. Besides from plants value as sources of food, herbalmedicines and drugs and many of the raw materials of industries, plants are important to many inmanyother ways.

Angiospermsarecommonlycalledfloweringplants.Thefloweringplantsarebelievedinvolvedfrom a now extinct group of gymnosperms. They appear in the fossil record in abundance duringcretaceous period, about 120 million years ago Angiosperms, like other vascular plants, containchlorophyllsaandbandbeta-caroteneandhavemegaphylls,stomataandacuticleimpervioustowater. The modern forms have a more highly involved vascular system than is found in othergroupsAbout2,35,000differentspeciesofangiospermsareknown,whichdominatedthetropicaland temperate regions of the world. Occupying well over 90 percent of Earth vegetative surfacewith only very minor exceptions. The angiosperms include not only the plants with conspicuousflowersbutalsomostofthetalltreeslikeEucalyptusglabulus,Coccsnuciferaetc.Thecactusand coconut; all the corn, Wheat, rice and other grains and grasses that are staples of the human dietsand the basis of agricultural economy all over the world. These tremendously diverse plants areclassified in two large sub-groups monocotyledons and dicotyledonous. Those plants having twocotyledons are known as monocotyledons when the plants having more than one cotyledon areknownasdicotyledonous.

Morphology is basic fundamental branch of botany which is define as "The branch of botanywhichdealswiththestudyofformsandfeaturesofdifferentplantsorgansi.e.roots,stems,leaves,flowers, seeds and fruits". External morphology includes study of external characters of plantsorganswhileinternalmorphologydealswithstudyofinternalstructuresoftheseorgans,whichisalso called as anatomy or histology. When changes are occurred in environment, also changesoccurrence in climate conditions the plant life in which diversity will be take place. On the basisofdiversity in planthabitsareoccurred.

II. STUDY AREA

Pusad is a city in the Yavatmal district located in vidarbha region of Maharashtra state of India. It is named after the pusriver its ancient name was "pushpawanti"

In 1950 when the constitution of India come 9into effect, pusad as part of the central provinces and Berar was merged with the newly formed state of Madhya Pradesh. In 1956 under pressure from Marathi irredentists the Berar and Nagpur divisions were transferred to Bombay State. In 1960 the Bombay state was partitioned into Maharashtra and Gujrat. There is an going vidarbha region as well as a separate movement to demand upgrade of pusad's status from taluka to district.

Vasantrao Naik a Grassroots Banjara leader who was born in Gahuli village of pusad remains the longest serving chief minister of Maharashtra from 1963 to 1975.

Pusad is a Tahsil/Block (CD) in the Yavatmal District of Maharashtra. According to census 2011 information the sub – district code of pusad block is 04085.

Total area of pusad is 1,173 km2 including 1,163 54km2 rural area and 9.51km2 urban area. Pusad has population of 3,41,186 peoples. There 72,40 houses in the sub-district. There are about 183 villages in pusad block. Marathi is a local language in pusad. Also people speak Gormati or Banjari, Gondi, Hindi, Sindhi and Marwadi. The yield of the crop is dependent of the type of soil and proper cultivation. Three types are found i.e. black soil, sandy and red soil. The soil characterization was carried out with respect to particle size distribution bulk density, maximum water holding capacity available water capacity hydraulic conductivity exchange capacity yavatmal district is the region of western vidarbha the part of Maharashtra. In the district and hence in pusad the main crops are cotton Soyabean ,Jawari, Bajari and Toor ect.

The essential nutrients required for proper growth of plants is supplied. The essential nutrients required for proper growth of plant is supplied of soil. Pusad tahsil is rich in floral biodiversity with tremendous medicinal potential. This is due to certain changes in physical features and soil texture. Pusad is surround by dense forest area like Singad with many different species like Teak, Bomboo, Shisam, Ritha, Behada etc. The forest plays vital role in our life and economy of tribal rural people.

III. REVIEW OF LITERATURE

Since the beginning of human civilization, medicinal and aromatic plants have been used bymankind for its therapeutic value. Nature has been a source of medicinal agents for thousands ofyearandoneimpressivenumberofmoderndrugshasbeenisolatedfromnaturalsource.Manyofthis isolation were based on the uses of the agents in traditional medicine. The plant basedtraditional medicine system continues to play an essential role in health care with about 80% oftheworldsinhabitantsrelayingmainly ontraditionalmedicinesfortheirprimaryhealthcare.Thehistory of medicine in Indian can be traced to the vedic period. The Rig veda perhaos the oldestrepository of human knowledge written about 4500-1600 BC claims about 99 medicinal plantsand Sama veda 100 plants. Antharnvana veda deals with 288 plants almost all having medicinalingredients used to curedeadly disease.

The medicinal plants are the local heritage with global importance Humans are endowed with arich wealth of medicinal plants. The various medicinal plants are found all over in India. Themedicinal herb can be a good alternative for many disease and conditions growing interest inhealthandwellness,alternativemedicinearebecomingincreasinglypopularworldwide.

Dikshit 1999 there are about 8000 medicinal plants listed in different classical and moderntext on medicinal plants. About 960 medicinal plants are in active use in all India. Around2000speciesaredocumented inIndian systems of medicinelikeAyurveda.

Kosambi 1962. In the dense forest area, nature is so kind that for thousands of years it hasbeenpossiblefortheirtribaltoliveincomparativeeasybysimplyhuntingandfoodgathering.

Jain and Sinha 1988. The tribal's and local communities have accurate knowledge of wildfoodresourcesdueto theirlong association with nature.

Leman 2008. An estimated 4,00,000 tones of MAPs are traded annually and more than 70percent of the plant species used in herbal medicines, cosmetic and other plant based productareharvested fromthewildand thedemand for themisgloballyincreasing

Leswar and Widjata 1992. One of the critical problems of the developing countries like Indiaandothercountriesareitsgeometricalincreaseinhumanpopulationexplosionwillhave negative impact on our economic, social policies and would simultaneously misbalance oursocio economic infrastructure. Thus the

control of human fertility in sense of its limitation isthemostimportantandurgentallbiosocialandmedicalproblems.Sotocontrolfertilitydrugsin the forms of hormones and other compound have been developed. To avoid the inevitableadvanceeffectofdrugspreparedfromchemicalsources,indigenousplantsaregivenpreferencewhich is also cheap, easilyavailableandharmless.

Murugan et al 2000. Many plants have fertility regulating properties. Recently continuousefforts are ongoing top develop antifertility products from plants. Plants based contraceptivemeasures such as crud plants extracts with scientifically proven efficacy could be beneficialand appreciable to the poor population of country. Indeed extensive researches are beingcarried out a evaluate the putative abortifacient and other antifertility activities of differentplants as wellas traditionallyused folkcontraceptiveallovertheworlds.

John1981:Antifertilityagentspreventthefertilitybinterferinginvariousnormalreproductivemechanisms in both male and females. The ideal contraceptive agents are one which posses100%efficacy,reversibilityofaction,freefromsideeffects andeasytouseas medicine.

Overwalle2006:Plantsprimarilyusedfortheirmedicinaloraromaticpropertiesinpharmacyorperfumeryaredefinedas medicinalandaromaticplants inthEuropeanunion.

Kala 2004: Forests have played keyroles in the lives of people living in both mountain andlowlandareasbysupplyingfreshwaterandoxygenaswellasprovidingadiversityofvaluableforest.Productsfor food and medicine.

KIT 2004. The cosmetic industries are increasing using natural ingredient in their productsandthesenaturalingredientsincludeextractofseveralmedicinalplants.

Raven 1998. India and China are two of the largest countries in Asia which have the richestarrays of registeredand relatively wellknown medicinalplants.

Kala 2006. The Indian subcontinents is well known for itsdiversity of forestproducts andthe age-old health care traditions, there is an urgent need to establish these traditional valuesin both the national and international perceptive realizing the ongoing developmental trendsintraditionalknowledge.

Mayers 1991 and Lacuna: Richman 2002 apart from health care, medicinal plants is mainlythealternateincomegeneratingsourceof underprivilegedcommunities.

Singhetal1979andOlsenandLarsen2003.Theglobalizationofherbalmedicinealongwithuncontrolled exploitative practice and lack of concerted conservation efforts. Now threatenthecountry'smedicinalplants.

SinghandHajr,1996.ThenorthernpartofIndiapossessesagreatdiversityofmedicinalplantsbecause of the royal Himalayan range. So far about 8000 species of angiosperms 44 speciesofgymnospermsand600species ofperidophytes havebeenreportedinIndianHimalaya.

Sefanou et. Al, 2014: The herbaceous plants are an integral component of everyday life andcultureinallovertheworldforcenturies.Theseplantsareusedinpharmaceuticals,cosmetic,cookingandrecentyear sinfoodtechnologyasantioxidants.TheGreekfflorais richinnativeherbaceous plants and climatic and soil conditions are prevailing with the possibility of theircultivation.

Friedman & Adler 2007. World health organization (WHO) estimated that 70-80% of thepopulationlivinginAfrica,Indiaandotherdevelopingnationsdependontraditionalhealthcaresystemsfor primary valued by early humans.

IV. METHODS AND MATERIALS

In the area like Pusad Tahsil variety of medicinal plant and aromatic plants are found. When Iwas studying for my project. I came to know that the plants are divided in to medicinal andaromatic plant. I found all three type of plant some of them are easy to identify and classify. Thesome plants pictures were collected from various places from college premises, college botanicalgarden, forest department, nursery, street, Bhavani temple Public Park and corners of PusadTahsilofVidarbhaliesinMaharashtra.TheVidarbhahaveagreatwealthofmedicinalplants andtraditionalmedicinalknowledge.Medicinalplantshaveplayedanimportantroleofprimaryhealthcaresystemamong thelocalpeopleof Vidarbharegion.

The data was collected through secondary sources mainly from the website of Government ofMaharashtrastatemedicineplantandforestdepartmentofMaharashtra.References fromresearchpaperin PusadTahsilof YavatmalDistrict.

The plants were studied from August 2019 to March 2020. The photographs which are capturedby the digital camera, phones. The habit flower, leaf, fruit stem. Inflorescence of photograph iscapture.Theplantswerecollectedseasonwiseandthecollectionofphotographwastakenwithintheplantslistarearran gedaccordingtoBenthamandHookersystemofclassification.Afterusingvarious books (references), research paper, journals collected large record of medicinal andaromatic plant in Pusad tahasil. The record use of medicinal and aromatic plant (vernacularsname,oilmentstreatedpartused.Modesofpreparationandingredients)thetraditional knowledgeabounthteplantsforcuringdiseasewascollectedfromtraditionalhealersandelderlymenwho participateaherbaltherapy.

Ialsomadecontactswithmyprofessorsofmycollege,theyguidemeforidentifyandcharacterizing of different species. They also suggested me many source to get information forspecies. During my project many villagers also gave me important significant information aboutmedicinaland aromaticplants.

ThedatawascollectedthroughfloraofAmravatidistrictwithspecialreferencetothedistributionof tree species by M.A. flora of Maharashtra state Dicotyledon. Volume- I (BSI) by N.P. SinghandS.Karthikeyan,floraofMaharashtrastateDicotylendonVolume-II(BSI)byN.P.Singh,P. V. Laksminarsimha.

V. OBSERVATIONS

List of Medicinal and Aromatic Plants Studied

Sr. No.	Botanical Name	Common Name	Family	Herbarium no.
1	*Curcuma longa.*L.	Turmeric	Zingiberaceae	ASC 12
2	*Hibiscus rosasinesi*L.	Chinarose(E),Jaswand,Gudhal	Malvaceae	ASC18
3	*CitruslemonBurm*.F.	Lemon,Nimbu	Rutaceae	ASC42
4	*Azadiractaindica*L.	Neem,Margo,Nimbh	Meliaceae	ASC45
5	*Acacianilotica*L.	Babhul,Babul	Fabaceae	ASC29
6	*Rosaindica*L.	Rose,Gulab	Rosaceae	ASC33
7	*Eucalyptusglobus*L.	Nilgiri	Myrtaceae	ASC41
8	*Passifloraindica*L.	Krushnakamal	Passifloraceae	ASC22
9	*Corianclrumsativum*L.	Coriander,Dhaniya,Sambhar	Apiaceae	ASC05

10	*Anthocephaluschinesis*(Lamk)A.Rich	Kadamb,Burflower	Rubiaceae	ASC08
11	*TridaxProcumbance*L.	Tridax daisy, Gharma,Kambarmodi	Asteraceae	ASC10
12	*Tagetspatula*L.	AfrivanMarigold,Genda,Zendu	Asteraceae	ASC31
13	*Catharanthusreseus* Don.	Periwinkle,Sadabahar,Sadaphuli	Apocynaceae	ASC29
14	*Plumerinrubra*L.	Chafa	Apocynaceae	ASC52
15	*WithaniaSomnifera*L.Dunal	Ashwagandha	Solanaceae	ASC64
16	*Adathodavasica*L.	Adosa,Adulsa	Acanthaceae	ASC49
17	*Lantnacamera*L.	Haldikunku	Verbenaceae	ASC47
18	*Ocimumsanctum* L.	Tulsi,Tulas,Holybasil	Lamiaceae	ASC38
19	*Menthaarvensis*L.	Punclina,Mint	Lamiaceae	ASC63
20	*Boerhaviadiffusa*L.	Survari,Punarnav	Nyctaginaceae	ASC59
21	*Emblicaofficinalis*L.	Goosebeery,Amla,Awala	Euphoebiaceae	ASC44
22	*Polyanthusteberosa*	Nishigandha	Amaryllidaceae	ASC03
23	*Aloevera* L.	Aloevera,Korfal,Gheekumari	Liliaceae	ASC08
24	*Asparagusracemosus*Wild	Shatavari,Shatamuli	Liliaceae	ASC11
25	*Cocosnucifera*L.	Narial,Naral,Coconut	Arecaceae	ASC67
26	*Terminaliabellirica*(Gaerth) Roxb	Behda,Bahera	Combretaceae	ASC56

VI. RESULT

A total number about 25 plants species belonging to about 21families were studied inprojectwork.Theplants wereoffourdifferenthabits likeherb,shrub,treeandclimber.Theplantspartwhichwasuseforstudy work islikestem,leaf,flowers.Plantsdistributed in aboutfamilies including varied numbers of their members. Maximumnumber includedinthe family Apocynaceae ,Malvaceae , Asteraceae,Liliaceae,Lamiaceaewhererestofthefamilies includes singlespecies intheproject.From this study work it is observed that the medicinal plants are used for variousdiseases right from common cold to the dreaded diseases like variety of cancers. Thevarietiesnowgrowncommerciallyforthehealthandmoisturizingbenefitfoundinsideitsleaves. The leaves of the Ocimum sanctum belongs to family Lamiaceae have beentraditionallyusedforcough,cold,asthmaandbronchitisetc.Thereseveralmanydrugsmedicinal plants all over the Pusad tahsil. Most of the plants are known as utilized bydoctorand ayurvedicaids.

Themedicinalvalueofdrugisduetopresenceofsomechemicalssubstanceintheplanttissue. The most important substance like alkaloids. Carbon compound, hydrogen,essential oils, resin, tannin, gumsetc. The present communication provide a totalnumberofspeciesofmedicinalplantsbelongstodifferentfamilywhichhavebeenifmedicinallyimportantoccurringinPusad tahsil.Themedicinalplants listed inPusadtehsil recordedthatnumberifplantscommonlyusedgenerallypractice.Nowthereconservation is necessary for future generation lastly medicinal plant great values inhumanlife. On this project I have discussed medicinal plants. There are large number of medicinal plant aregrowonEarth but here only 25 plantsdiscussed.Some

plantsaremedicinalandsome plant are aromatic which show medicinal properties. The aromatic plants are special kind ofusedfor theiraromaandflavoursmanyof them arealso formedicinal purposes.

VII.CONCLUSION

Fromthisstudyithasconcludedthatthroughvariousharmfuldiseasesarenotcurablebutwecan manage   and prevent, it by using medicinal plants.   The plants which we have mentioned arehelpfulina treatmentandmanagementofharmfuldiseases.Themedicinalplanthascontributeda   rich   help   to   human beings.Plant extracts and their bioactive ingredients present in them areresponsible for anticancer activities have to be screened for their valuable information. TheAzadirachta indica show anticancer property. The Oleanoic acid isolated from Lantana camerawas screenedfor anticancer activity againstatumour.

Medicinal herb can be a good alternative for many diseases and conditions. They are low costandtent have to have   fever   side   effect   however   herbal   medicine   can   still   have   unwanted healtheffectsspecialwhenusedinacombinationwithotherdrugs.Therefore   medicinal   and   aromatic   plants areveryusefulandeconomical.

People   are   aware   about   medicinal   plants   and   they   know   their   uses.According   to themmedicinalplantsarebestandmedicinalplantsshowfastrelievingproperties.Evenafterknowingaboutthebenefits ofthemedicinalplantstheystillpreferantibioticsastheysaid"whowillwastetime in collecting and preparing these medicinal plants for medicinal uses". Our ancestors dependent on medicinal herbs from brushing to any diseases which they were suffering from andthey believed that medicinal herbs could cure anything. Theplantshaveprovidedhuman beingswithmanyoftheiressentialneedsincludinglifesaving pharmaceutical drugs. Recently   the   World   Health   Organization   estimated   that   80% peopleworldwiderelyonherbalmedicines.Thedemandformedicinalplantsissaidtobeincreasingyearafteryear. Thisnecessitiestheconservation of biodiversity.

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Morphotaxonomic Studies of Diversity of Genus Panicum of Family Poaceae of Nagpur Division, Maharashtra

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ABSTRACT

Nagpur division is the part of vidarbha it includes about 6 districts. Survey of grasses biodiversity of study area conducted during 2014-2018, reported 168 species belonging to 70 genera. *Panicum*is the second largest genus of study area. It has 9 species which belong to subfamily panicoideae. The aim of our study is morphotaxonomic revision of family poaceae and details of macro and micro morphology of some important grasses.

Key words – Vidharba, Biodiversity, Grasses, Morphology

I. INTRODUCTION

Grasses are most beautiful group of monocotyledonous plants. As grasses do not like shade, they are not usually abundant within the forest. But in open places they grow very well and sometimes whole tracts become grasslands.

Grasses are important for entire ecosystem. Tiger is the king of forest ecosystem. If we want to save tiger, we have to save the grasses because tigers are indirectly dependents on grasses for their food. Robinson writes "Grass is king" it rules and governs the world, without it the earth would be a barren waste.

In the early days when the population was much limited and when limited land was under cultivation much of it was covered with plenty of green grasses. So the farmers paid no attention to the grasses. But now population has increased, open land is decreased very much and cattles have increased in number hence farmers have to pay more attentation to grasses. The present destruction of grasses is mainly due to overgrazing, increasing agricultural practices, over use of herbicides, open coal field mines, formation of big dams, road widening, clean agricultural practices and trampling by men and cattles. Grazing needs to be inhibited in certain areas and also reduce the use of herbicides. Sugarcane is main source of sugar. A high proportion of the most fertile and productive soil were developed under a vegetative covers of grasses. Root, rhizome and other part of grasses are good soil builders and effective soil stabilizers. Most of the birds and animals depend upon grassland habitat for food, shelter and normal completion of their life cycles Gould (1968).

Despite utmost importance of grasses to human beings, the study on grasses continues to be a neglected subject. This is mainly because of the feeling that it is a difficult group for identification, the leaves and branches of

grasses are very much similar, Small floral organs, special terminology and variation in the structure of spikelet and inflorescence. "*Grasses of Burma, Ceylon, India and Pakistan*" studiedby Bor (1960) is the main standard reference work on Indian grasses.

II. STUDY AREA

Nagpur division is the largest part of esternVidarbha includes about 6 districts i.e. Nagpur, Wardha, Gondiya, Bhandara, Chandrapur and Gadchiroli. It is the estern part of Vidarbha and has an expanse of 51,336 sq.km. It is surrounded by Madhya Pradesh to it's north, Andhra Pradesh to it's south, Chattisgarh to the east side, and Yavatmal and Amravati to it's west. There are many rivers and their tributries crisscrossing the entire area. Major rivers in Nagpur division are Wainganga, Godavari, Indravati, Pranhita, Wardha, Sipna, Kanhan, Pench , Bor, Vena, etc. Tippagarh hills in Gadchiroli, Ramtek hills in Nagpur are some of hilly regions of Nagpur division. Bor ,Navegaonbandh, Itiyadoh, Gosikhurda are some of the major dams in the region. Whereas Bhandara district is fondly called as 'district of lakes'. Chandrapur is the most polluted city in study area. Adjoining areas of Chandrapur, Wani and Warora has become barren wasteland because of open coal mines; these are amongst highly polluted areas in the country, soil of these areas has become compact, hard and saline, it has lost it's fertility. Gadchiroli district has highest forest i.e. 78% in Maharashtra.

III. REVIEW OF EARLIER WORK

The monumental work of Bor.(1953) on "*Grasses of Burma,Ceylon, India and Pakistan*"(excluding Bambusiae) published about 50 years ago has changed this scenario and created interest on the study of grasses. This resulted in publication of several books on grasses and the latest addition is "*Flora of Tamil Nadu-Grasses*" by Altaf and Nair (2009) that deals with 447 species (excluding Bamboos).

Patunkar(1980) studied "*Grasses of Marathwada*" region has also published a book "*Grasses of Marathwada*".

Recently, Potdar(2012) has published "*Grasses of Maharashtra*", the book is an outcome of exploration and detailed studies conducted on documents of grass diversity of Maharashtra for last 20 years. During this period 415 species belonging to 125 genera have been described. There are above 10,000-11,000 species belonging to 700 genera in the world (Clayton and Renvoize, 1989 and Watson and Dallwitz, 1992) in India there are more than 1200 species belonging to 268 genera (Karthikeyan*et al.*, 1989, and Moulk 1997).Nagpur division of Vidarbha represents the area that is rich in forest cover,Purekar (1985) reported 188 species belonging to 82 genera from Nagpur District, while 100 species belonging to 57 genera from Wardha district were reported by Acharya (1985),130 species were reported from Gadchiroli and Chandrapur district Patil (1991), 118 species from Gondia district Kahalkar (2009) and 220 species belonging 94 genera from Gadchiroli district by Govekar.

IV. MATERIAL AND METHODS

Plan of Work

1. Study of Habitat

In every season the selected areas were explored systematically. Grass covered sites were targeted for study. Grasses were collected from different habitats like irrigated fields, unirrigated fields, open grasslands, forest, and bunds of field, bank of rivers, wastelands, rice fields and rocky places.

2. Sample collection and preservation-

During excursion specimens of grasses were collected and field number is given to each specimen. Field observations were noted down in field diary. After collection the samples are critically studied in laboratory . Then it is dried properly, poisoned by using 2% Mercury Chloride and mounted using conventional methods. For critical cases BSI (Pune) was consulted to match the specimens.

3. Identification-

The identification was confirmed by using floras like flora of British India(Hooker 1872-1897), Flora of Bombay Presidency (Cook 1958), Flora of Marathwada (Naik 1998), Flora of Maharashtra(Almeida,1990), Grasses of Maharashtra (Potdar, Salunkhe and Yadav, 2012) Grasses of Marathawada (Patunkar,1980). Specimens were observed under Sterioscopic binocular microscope.

Artificial keys were provided for genera and species. Population variations are critically studied. Latest nomenclature are given in detail for proper taxonomic level. Each grass specimen description was supported by a note on distribution and herbarium specimen number. Genera and species are arranged alphabetically. Floristic analysis was done to get clear picture of grass biodiversity. Grass species are arranged according to N.L. Bor. All the specimens were deposited in the herbarium of S.S.S.K.R.InnaniMahavidyalaya, Karanja(Lad), Dist-Washim.(M.S.)

4. Observations

Species of *Panicum* and habitat,

Distribution: A=Abundant, C=Common, F=Frequent, O=Occasional, R=Rare.

1.	*Panicumantidotale* Retz.	Shade	O	SST209
2.	*Panicummiliaceum* L.	Bunds of Paddy fields	O	SST147
3.	*Panicumnotatum* Retz.	Hill slope	O	SST602
4.	*Panicumpaspaloides* Pers.	Fields	O	SST407
5	*Panicumphoiniclados* Naik&Patunkar	Paddy fields	O	SST90
6	*Panicumpsilopodium* Trin. Var. coloratum Hook.f.	Open Forest	C	SST176
7	*Panicumrepens* L.	Open places	C	SST359
8	*Panicumtrypheron* Schult.	Open places	C	SST217
9.	*Panicumwalense* Mez	Fields	O	SST21

1a. Lower glume upto 1.5mm long.   *P. walense*
1b.Lower glume more than 1.5mm long   2
2a. Lower glume orbicular or rounded   3
2b.Lower glumeacute, acuminate or cuspidate   5
3a.Panicle compact   *P.notatum*
3b.Panicle effuse   4
4a.Spikelets greenish   *P.psilopodium*
4b.Spikelets whitish   *P.repens*
5a.Spikelets 4-6mm long   *P.miliaceum*
5b.Spikelets1-3mm long   6
6a.Culms greenish   *P.antidotale*

6b.Culms not greenish   7

7a.Lower glume acute   *P.phoiniclados*

7b. Lower glume acuminate   *P. trypheron*

V. CONCLUSION

Present survey is the outcome of exploration tours conducted to document the grass diversity of study area from 2014-2018 and visited different areas of Nagpur division in different seasons. During this period over 900 specimens were collected from the study area. During the study 168 species belonging to 70 genera were collected.

Out of 70 genera *Eragrostis*is the largest genus belonging to sub-family pooideae. The 45 species collected from study area were found to be monotypic whereas 17 species were bitypic. In Nagpur pure patches of Aristada, *Chrysopogon, Apluda, Ischaemum, Dinebra, Themeda, Andropogon, Ophiuros, Rottboellia, Heteropogon, Dicanthium, Cynodon, Saccharum, Vetiveria*were observed.

Though grasses are herbaceous in nature, but are tough in texture so it is easy to prepare herbarium speciman. Some of the beautiful grasses are *Paspalumscorbiculatum, Thelepogonelegans, Mnesithealaevis, Mnesitheagranularis, Chrysopogonfulvus, Ischaemumrugosum, Vetiveriazizanioids,.*

Nagpur division being the area of wildlife sanctuaries grasses has vital importance in maintaining the diversity of animals in this area. In remote areas undisturbed grasslands are observed. Some dominant genera are Apluda ,*Aristada, Dicanthium, Cynodon, Dinebra, Eragrostis, Ischaemum, Rottboellia, Heteropogon, Ophiuros, Setaria.* In Bhandara districts *Arundodonax* and*Vetiveriazizanioides* are found frequently. The wild species of *Sorghum* are frequent in Nagpur district. *Dicanthiumfiliculme* is found restricted to Chargaon and Nagpur forest area whereas *Coix* is found abundant in Gadchiroli.

Some grasses have underground rhizomes i.e. *Ischaemumpilosum ,Cynodondactylon, Saccharumspontaneum*whichcannot be eradicated hence the productivity of crops decreases*. Cynodon* is the first class fodder grass present throughout study area. It is palatable and resistant to grazing and trampling because of underground rhizomes. *Dactylocteniumaegyptium ,Chrysopogonfulvus* are other palatable species of grasses. *Cymbopogon martini,Vetiveriazizanioides, Saccharumspontaneum*and*Cynodondactylon*are the medicinal grasses. Hollow internodes of *Arundodonax*are used formaking pens and musical pipes by locals. The forest areas shortlisted for the study are of mixed dry deciduous type with teak as dominant species.

Saccharumspontaneum, Vetiveriazizanioides, Phragmitesvallatorius, Arundodonax present along the sides of rivers and stream which reduce the pressure of flood.

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Development and Validation of Stability Indicating RP-HPLC Method for the Estimation of Levetiracetam by Forced Degradation Studies

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ABSTRACT

Literature survey reveals the availability of various analytical methods for the analysis of Levetiracetam in biological samples by RP-HPLC. And there is no spectrophotometric method is available for estimation of Levetiracetam in bulk and pharmaceutical dosage form. There are few RP-HPLC methods are in simultaneous estimation available for this Levetiracetam. Hence there is a need to develop spectrophotmetric and RP-HPLC method for the estimation of Levetiracetam in bulk and pharmaceutical dosage form.

The present a novel developed analytical method for utilizing the Methanol: OPA: Distilled Water (80:10:10) on a Hi Q Sil C-18 (250×4.6mm, 5.0μm)column by using a flow rate 0.7 mL/min where an excellent resolution with sharp peaks of Levetiracetam was obtained.

The UV method employed was absorption maxima method having absorbance measurement at 221 nm.Retention time was found to be 2.7 min for Levetiracetam. Linearity was observed in the concentration range of 10-90μg/ml (r^2 = 0.9999) for UV spectrophotometry and RP-HPLC. Levetiracetam solutions were exposed to acid and alkali hydrolysis, oxidation by hydrogen peroxide, neutral hydrolysis and photo degradation. Statistical analysis proves that the method is repeatable, selective and accurate for the estimation of Levetiracetam.The methods were successfully validated as per ICH guidelines in terms of precision, robustness and recovery.The methodcan be used in pharmaceutical industries for routine analysis of drugs in pharmaceutical dosage forms.

Keywords: Levetiracetam, Method development, Validation, UV-spectrophotometry, RP-HPLC, force degradation, Levetiracetam and ICH guidelines.

I. INTRODUCTION

Levetiracetam is for the treatment of treat epilepsy. Chemically it is (2R)-2-(2-oxopyrrolidin-1-yl) butanamide. The drug binds to synaptic vesicle glycoprotein, SV2A, and inhibits pre synaptic calcium channels and reducing neurotransmitter release and acting as a neuromodulator.

Levetiracetam is a drug within t pyrrolidine class that is used to treat various types of seizures stemming from epileptic disorders. It was first approved for use in the United States in 1999 and is structurally and mechanistically unrelated to other anti-epileptic drugs (AEDs). Levetiracetam possesses a wide therapeutic index and little-to-no potential to produce, or be subject to, pharmacokinetic interactions these characteristics make it a desirable choice over other AEDs, a class of drugs notorious for having generally narrow therapeutic indexes and a propensity for involvement in drug interactions.
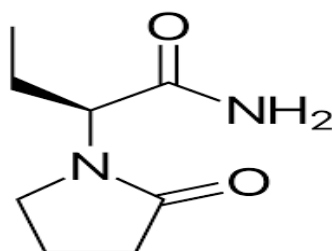
Fig. 1: Structure of Levetiracetam

II. MATERIALS AND METHODS

Levetiracetam was obtained as a gift sample from Aurobindo Pharma.and as such without further purification. All chemicals and reagents used were spectrophotometric and HPLC grade. The solvent used methanol was of AR grade.

Reagents: Methanol, Water, 1N HCl, 1N NaOH, 6% H_2O_2, OPA.

Instrumentation

Absorbance measurements were made on UV-visible spectrophotometer Jasco (Japan) V-730 with band width of 1.5 and 1mm quartz cell was used as sample holder. In addition electronic balance, micropipette and sonicator were used in this study. For weighing electronic balance belonging to Metller Toledo model ME204 was used. It had a working range of 0.1 miligrams to 100 grams of substance.

The RP-HPLC system (Jasco HPLC) consisted of quaternary gradient pump with manual injection facility. The capacity of loop was 20 μl. The detector consisted of a PDA operated at whole wavelength range. The software used was ChromNAV. The column used was Hi Q sil C-18 (250mm×4.6mm, 5μm). Absorbance measurements were made on PDA detector. The pH meter used was of electronic. For an IR spectrum of drug sample was recorded in KBr pellets on Shimadzu IR Affinity-1.

Preparation of mobile phase

90 ml Methanol mixed with 10 ml of Water. The solution was degrassed in an ultrasonic sonicator for 15 minutes and filtered through 0.45 μm whatmann's filter paper under vaccum.

Preparation of Standard stock and Working solutions

Standard stock solutions of Levetiracetam was prepared by dissolving 100 mg of drug in 100 ml of methanol to get standard stock solution of 1000 μg/ml by sonication for 15 min. From the standard stock solution, 1 ml was

further diluted to 10 ml with mobile phase to get 100 μg/ml solution of Levetiracetam. Further dilutions were made from that to reach a concentration range of 10-90 μg/ml for Levetiracetam.

Selection of wavelength detection

Levetiracetamstandard solution of 10 ppm was scanned at 200-400 nm and UV spectrum was recorded. The observation of spectrum of standard solution, λmax of 221 nm was taken to develop the proposed method. UV-spectrum of Levetiracetam is shown in figure 2.

Chromatographic conditions

Parameter	Condition
Mobile phase	Methanol:OPA: Distilled Water (80:10:10 v/v)
Diluent	Methanol
Column	Hi Q sil C_{18} Column (250mm×4.6mm,5μm)
Column temperature	24°C
Wavelength	220 nm
Injection volume	20 μl
Flow rate	0.7 ml/min
Run time	10 min

Validation of the Proposed Method

The proposed analytical method was comprehensively validated by the guidelines put forward by the ICH. The validation was in accordance with the ICH guidelines Q2A and Q2B, by following the FDA guidance and also as per USP.

System suitability

System suitability tests are a fundamental part of liquid chromatographic method. It ensures that the system is working properly. Parameters such as number of theoretical plates, retention time, and tailing factor were evaluated by system suitability.

Linearity and Range

The standard solutions were prepared by dilution of the stock solution with methanol to reach a concentration range 10-90 μg/ml for Levetiracetam. Nine different concentrations were prepared and linearity graph was plotted for absorbance vs. concentration. The linearity data was analyzed statistically for regression coefficient and statistical significance. The linear correlation coefficient of concentration was found to be 0.9999. The result for linearity of drug is shown in table no.

Accuracy

The accuracy of the method was established by spiking pre-analyzed sample with known amounts of the corresponding drug at three different levels i.e, 80%, 100% and 120% of the drug in tablet. At each level, three determinations were performed. The in-house formulation having 1000 μg/ml concentration of Levetiracetam was diluted with methanol. From 1000 μg/ml stock solution (20μg/ml) was spiked with 16, 20 and 24μg/ml of standard drug solution (1000 μg/ml), separately to get three levels viz. 80%, 100% and 120%respectively to estimate % recovery.

Precision

Intraday precision was determined by analyzing 20, 60, 90 µg/ml concentration of drug three times on the same day with specific time interval. Similarly inter-day precision was determined by analyzing 20, 60, 90 µg/ml concentration of drug three times on three consecutive days. Precision was expressed as % relative standard deviation values.

Robustness

Each factor selected to examine were changed at three levels (-1, 0, 1). One factor at the time was changed to estimate the effect of solution. Robustness of the method was done at concentration level of 20µg/ml for Levetiracetam. One factor was changed at one time to estimate the effect on chromatogram.

Limit of detection (LOD) and limit of quantification (LOQ)

Known concentration (10-90 µg/ml) was prepared. Calibration curves were plotted for each set. LOD and LOQ were calculated using the regression equation and following formula as:

LOD = 3.3* SD/S

LOQ = 10* SD/S

Where,

SD is standard deviation of y- intercept of the calibration curves

S is slope of calibration curves.

Estimation of the In-house tablet formulation:

The tablets of Levetiracetam are not available in Indian market; hence in-house tablet was prepared. The tablet was prepared by using 5 mg of Levetiracetam and 10 mg of lactose. The quantity of each ingredient was calculated & weighed for 20 tablets. Twenty tablets of Levetiracetam were weighed and the average weight was calculated. Quantity equivalent to 10 mg and volume make up to 100 ml. The resulting solution was then filtered using 0.45µ Whatmann filter paper. The original stock solution was further diluted to get sample solution of drug concentration of 20 µg/ml Levetiracetam. A 20 µl volume of sample solution was injected into UV-visible spectroscopy, six times, under the conditions described above. The absorbance for the drug was measured at 220 nm and concentrations in the samples were determined using UV-visible spectroscopy system under the same conditions using linear regression equation.

Degradation study

Stress degradation studies were carried under conditions of acid, base, neutral hydrolysis, oxidation and photolysis. For each study, two samples were prepared (Blank and of Levetiracetam). The blank solution subjected to stress in the same manner as the drug solution. Dry heat and photolytic degradation was carried out in solid state.

Alkaline hydrolysis

5 ml working standard solution of Levetiracetam (2000 µg/ml) was mixed with 5 ml of 1 N methanolicNaOH. The solution was kept for 24 hr in dark place. The resulting solution was neutralized and 2ml was diluted with mobile phase to 10 ml and was injected (20 µg/ml).

Acidic hydrolysis

5 ml working standard solution of Levetiracetam (2000 µg/ml) was mixed with 5 ml of 1 N HCl. The solution was kept for 24 hr in dark place. The resulting solution was neutralized and 2 ml was diluted with mobile phase to 10 ml and was injected (20 µg/ml).

Oxidation

5 ml working standard solution of Levetiracetam (2000 μg/ml) was mixed with 5 ml of 6% H_2O_2 solution. The solution was kept for 24 hr in dark place. The resulting solution was neutralized and 2 ml was diluted with mobile phase to 10 ml and was injected (20 μg/ml).

Neutral hydrolysis

5 ml working standard solution of Levetiracetam (2000 μg/ml) was mixed with 5 ml of distilled water. The solution was kept for 24 hr in dark place. The resulting solution was neutralized and 2 ml was diluted with mobile phase to 10 ml and was injected (20 μg/ml).

Photo-degradation studies:

Photolytic studies were carried out by exposure of drug to sunlight for 24 hr at room temperature. Sample was withdrawn after exposure and processed as per standard solution preparation procedure to get 20 μg/ml as final concentration and was injected.

Degradation under dry heat

Dry heat studies were performed by keeping drug sample in oven (60°C) for a period of 24 hr. Sample was withdrawn after 24 hour and processed as per standard solution preparation procedure mentioned under 1.5 to get 20 μg/ml as final concentration and were injected.

III. RESULTS AND DISCUSSION

HPLC method development

As per the ICH guidelines the method was developed and validated properly. Linearity was observed over a concentration range of 10 to 90 μg/ml. The mobile phase consisting of Methanol:OPA: Distilled Water (80:10:10 v/v) with 0.7 ml/min in as flow rate was optimized as it was found to give best system suitability parameters.

System suitability

The system suitability was performed by injecting standard solution of Levetiracetam. The system suitability parameters were satisfactory and the theoretical plates were obtained above 2000. Tailing factor was found below 2. % RSD also found below 2%. Shown in figure 3, and table no. 1.
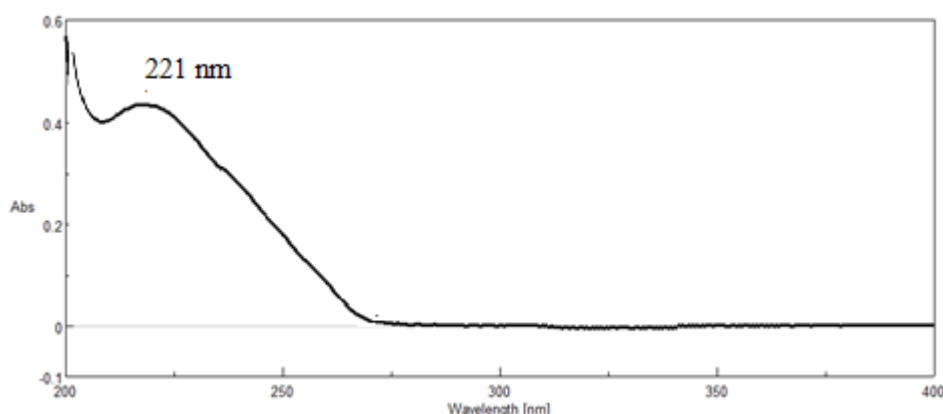
Fig. 2: UV spectrum of Levetiracetam in methanol
(10 μg/ml)
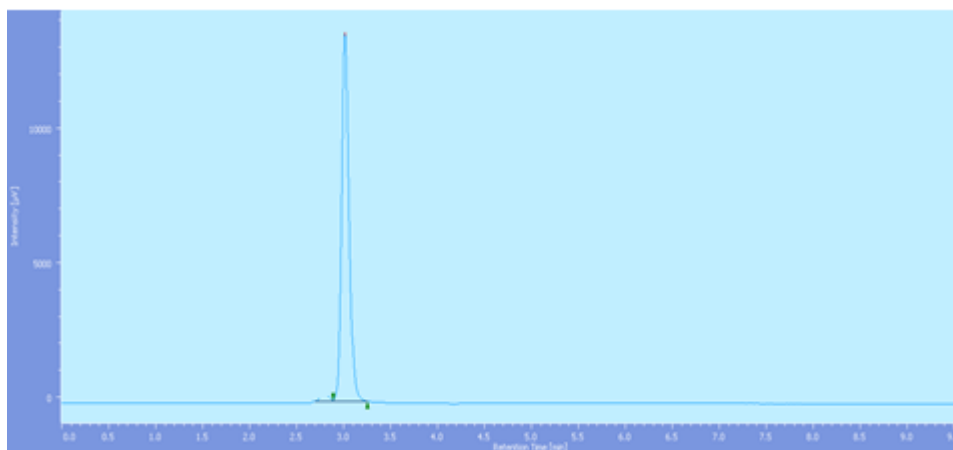
Fig. 3: Optimized chromatogram of Levetiracetam

Table 1: System suitability parameters

Sr. No.	Parameter	Levetiracetam	Formula	Limits
1	Retention time (min)	2.7	-------	$1<K<20$
2	No. Of theoretical plates (N)	17219	$N=16(t/W)$	$N>2000$
3	Tailing factor	1.4	$T_f=W_{0.05\%}/2f$	$T_f<2$

Report: The system suitability parameters were determined for Levetiracetam and were found to be within acceptance criteria.

Linearity and Range

Table 2: Calibration data of Levetiracetam

Sr.no.	Concentration (µg/ml)	Mean peak area
1	10	90074
2	20	180357
3	30	269156
4	40	354128
5	50	445233
6	60	532357
7	70	609468
8	80	702315
9	90	782355

$$y = 8471.4x + 7882.4$$
$$R^2 = 0.9999$$
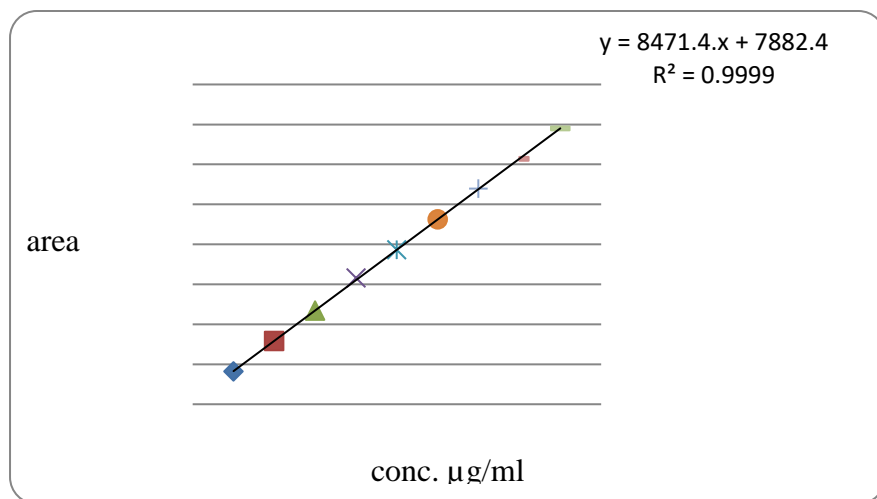
Fig. 4: Standard calibration curve of Levetiracetam for RP-HPLC method (10-90 μg/ml)

Table 3: Linearity parameters for RP-HPLC

Sr. No.	Parameters	Observation
1	Linearity range (μg/ml)	10-90
2	Regression equation	Y = 8471.4x + 7882.4
3	Coefficient (r^2)	0.9999
4	Intercept	8471.4
5	Slope	7882.4

Report: The proposed method was found to be linear over the concentration range of 10-90 μg/ml. The regression coefficient (r^2) for Levetiracetam was found to be 0.9999 which is well within the acceptance limits.

Accuracy

Table 4: Recovery study of Levetiracetam

Level of recovery (%)	Mean	SD	%RSD
80%	99.94	0.4615	0.4688
100%	99.36	0.9136	0.9251
120%	99.70	0.3241	0.3325

Report: The percentage recovery of Levetiracetam was well within the limit. Hence, the method was found to be accurate.

Precision

Precision was performed by intraday and interday precision.

Table 5: Intraday Precision studies

Sr. No.	Amount claimed	Area	Amt found	%Amt found	Mean	SD	%RSD
1	20	177275	19.79	98.98			
2	20	178971	20.01	100.03	99.45	0.5335	0.5365
3	20	177832	19.86	99.34			
4	60	531568	59.54	99.23			

5	60	532460	60.21	100.36			
6	60	531986	59.64	99.41	99.66	0.6071	0.6091
7	90	785916	90.83	100.92			
8	90	781234	89.91	99.90	100.16	0.6653	0.6642
9	90	780956	89.70	99.67			

Table 6: Interday Precision studies

Sr. No.	Amount claimed	Area	Amt found	%Amt found	Mean	SD	%RSD
1	20	176975	19.77	98.85			
2	20	179452	20.08	100.42	99.64	0.7851	0.7879
3	20	178956	19.93	99.66			
4	60	532241	60.10	100.17			
5	60	531415	59.65	99.42	99.85	0.3883	0.3889
6	60	531989	59.98	99.97			
7	90	780589	89.67	99.63			
8	90	779858	88.64	98.48	99.27	0.6914	0.6964
9	90	786895	89.75	99.72			

Report: The % RSD values of peak areas for reported injections of Levetiracetam were found to be <2%, which indicates that the proposed method was precise.

Robustness

Table 7: Robustness data of Levetiracetam

Factor	Level	Levetiracetam (Retention Time)
A: Flow rate (ml/min)		
0.6	-0.1	2.65
0.7	0	2.7
0.8	+0.1	2.83
B: Wavelength change		
219	-0.1	2.56
220	0	2.7
221	+0.1	2.83

Report: From the above observation, it can be concluded that, the method is robust with respect to change in flow rate.

LOD and LOQ

Table 8: Summary of the validation parameters

Parameters	Levetiracetam
Regression equation	Y=8471.4x+7882.4
Correlation coefficient	0.9999
Linearity	10-90 µg/ml
Recovery	99.52-99.98%

LOD	0.6134
LOQ	1.8163
Robustness	Robust
% Assay	0.6569

Estimation of the In-house tablet formulation

Assay of In-house tablet formulation is represented in table no 31 and the overlain chromatogram is shown in fig. no.

Table 8: Estimation of the In-house tablet formulation

Sr. No.	Amount taken (µg/ml)	Peak Area	Amount of drug found (µg/ml)	% Amount found
1	20	178695	19.94	99.72
2	20	179245	20.01	100.03
3	20	177985	19.79	98.98
4	20	179312	20.09	100.49
5	20	177991	19.80	99.02
6	20	179346	20.08	100.42
Mean				99.77
Standard Deviation (S.D)				0.6629
%Relative Standard Deviation (%R.S.D)				0.6569

Report: Levetiracetam is not less than 98 % and not more than 102 %

Forced degradation studies

The forced degradation studies of Levetiracetam were carried out under various stress conditions, and the resultant chromatogram of alkaline hydrolysis shown in figures.
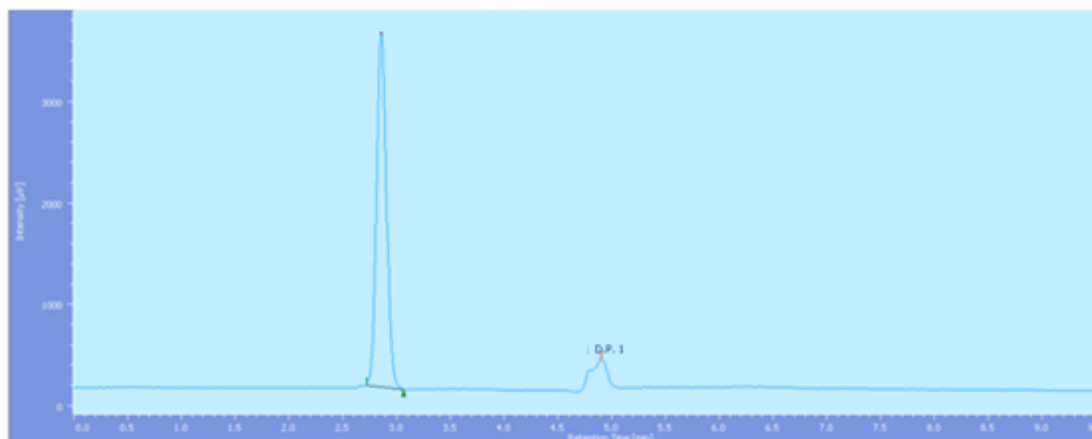
Fig 5. Chromatogram of Levetiracetam after alkaline hydrolysis (20 µg/ml)
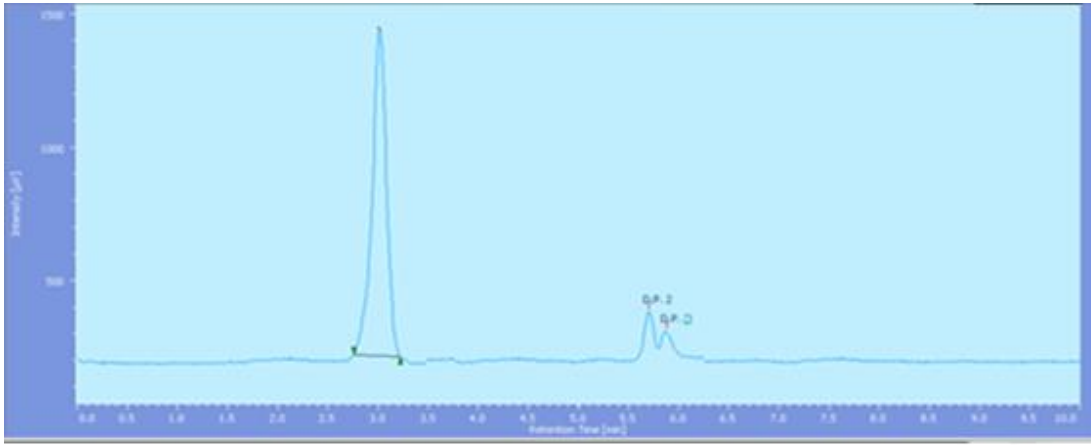
Fig 6. Chromatogram of Levetiracetam after acid hydrolysis (20 µg/ml)
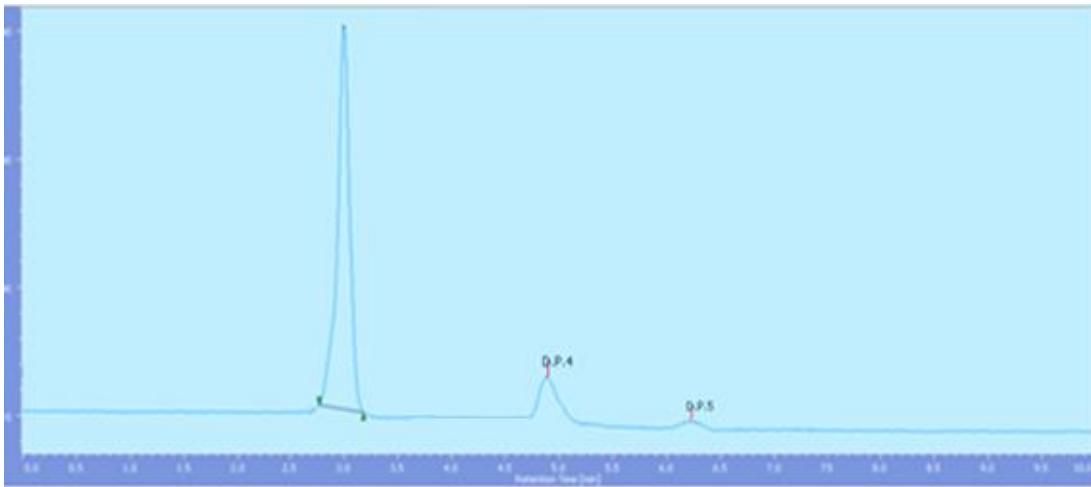
Fig 7. Chromatogram of Levetiracetam after oxidation (6% H_2O_2) (20 µg/ml)
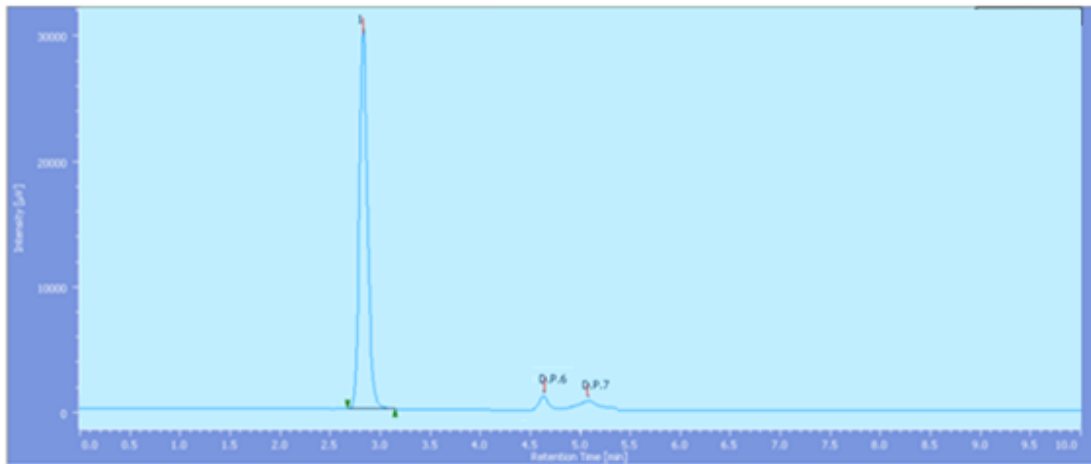
Fig 8. Chromatogram of Levetiracetam after neutral hydrolysis (20µg/ml)
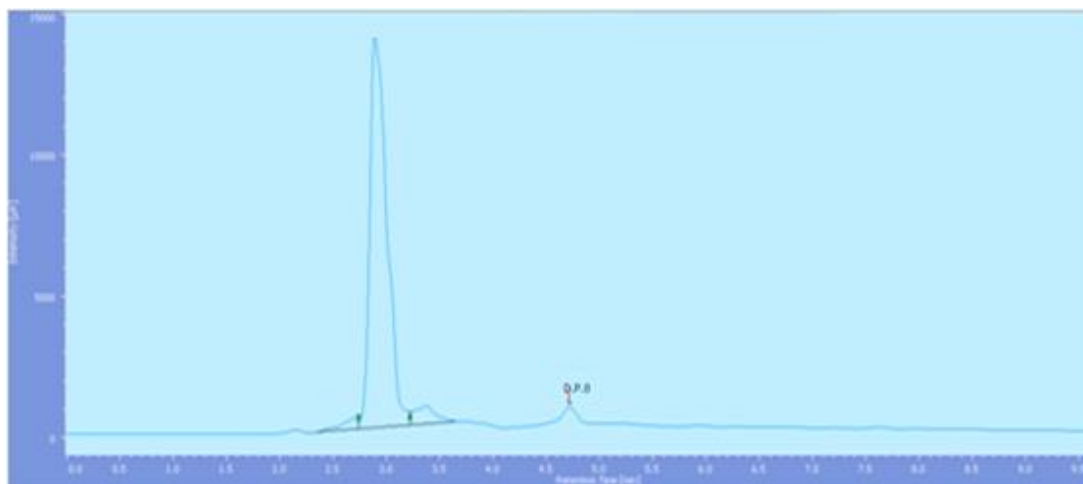
Fig. 9. Chromatogram of Levetiracetam after photo-degradation (20 μg/ml)
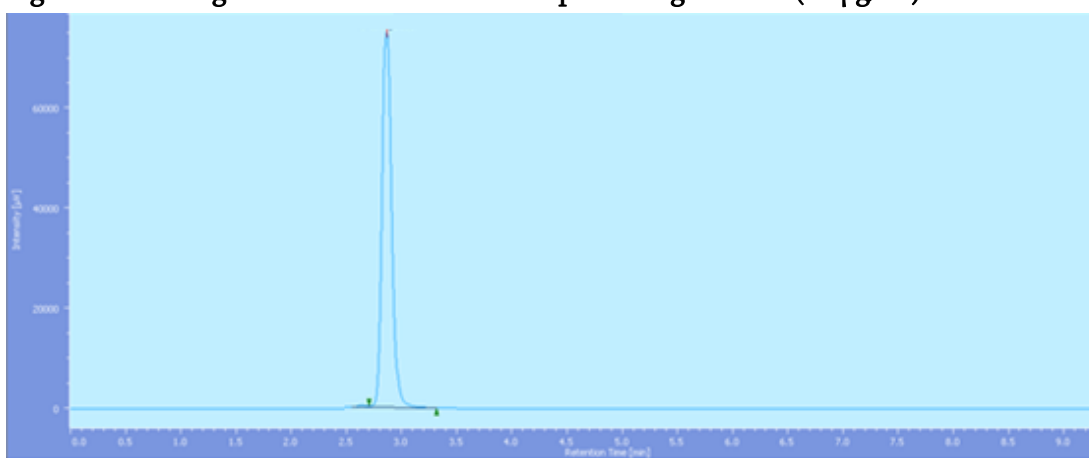
Fig 10. Chromatogram of Levetiracetam after dry heat (20 μg/ml)

Table 9: Result of forced degradation studies of Levetiracetam

Sr. No.	Stress Degradation Condition	Percent recovered (%)	R_t of Levetiracetam	% Degradation	R_t of Degradants
1	Base (1 N NaOH, kept for 24 hr.)	91.41	2.7	8.59	5.88
2	Acid (1 N HCl, kept for 24hr)	90.25	2.7	9.75	5.62, 5.75
3	H_2O_2, 6% (kept for 24hr)	89.61	2.7	10.39	4.83, 6.29
4	Neutral (kept for 24hr.)	96.27	2.7	3.73	4.62, 5.12
5	Photo stability [Sun light for 24hr]	93.28	2.7	6.72	4.79
6	Dry heat (60°C for 4hr)	98.26	2.7	1.74	--

IV. CONCLUSION

The proposed Spectrophotometric and RP-HPLC method was found to be simple, accurate, precise, linear, robust and specific for quantitative estimation of Levetiracetam in bulk and pharmaceutical dosage form. The proposed RP-HPLC method was less cost effective and less time consuming. The values foe system suitability

parameters showed feasibility of this method for routine pharmaceutical application. Hence, the present RP-HPLC method is suitable for routine assay of Levetiracetam in bulk and pharmaceutical dosage form.

Acknowledgments

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Wet Chemical Synthesis and Characterization of Zirconia : As A Biomaterial

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ABSTRACT

The objective of the following study was synthesis of zirconia by wet chemical method and evaluation of its structural and biological properties. The sample was characterized by powder X-ray diffraction (XRD), Field Emission Scanning Electron Microscopy (FESEM) and evaluated the antibacterial property are investigated by spread plate method against *E. coli* bacterial pathogen and studied for degradation using phosphate buffered saline (PBS) solution. The XRD pattern shows that the monoclinic phase of zirconia was obtained. The FESEM images showed that the prepared sample consists homogenous particle size distribution. The sample of zirconia inhibited the bacterial growth. The sample shows stability at physiological condition and does not show degradation.

Keyword: Zirconia, wet chemical synthesis, biocompatibility, biomedical application

I. INTRODUCTION

Zirconia based ceramic materials have received extensive interest in the past decades as important structural ceramic and biomedical materials. The excellent electrical, mechanical, optical and thermal properties of zirconia, makes it a good choice for application such as: structural materials [1], dental crowns [2], femoral heads for total hip replacement [3], solid oxide fuel cell electrolytes [4], air-fuel ratio sensors for automotive applications [5], Catalytic application [6].

There are many synthesis routes have been employed to obtain zirconia particles likes co-precipitation [7], Glycothermal Processing [8] Solid-State Reaction [9], Pechini Method [10], microwave-assisted sol-gel synthesis [11], bio-phase protocol [12], hydrothermal method [13] and sol-gel [14].

In the present work zirconia synthesized using efficient wet chemical method and characterize the sample for their structural and biological properties.

II. METHOD AND MATERIALS

A. Co-precipitation of zirconia

Aqueous zirconium chloride ($ZrOCl_2$) was added drop by drop with sodium hydroxide (NaOH) solution kept at PH around the 10. Then it gets converted into precipitation. It stirs for 1 hrs. The precipitation were allowed to settle over night followed by decantation and washing. The resulting precipitates were dried for 24 hrs and made pellets. The resulting pellets were sintered by using microwave furnace at 800^0C for a 2 hrs respectively.

B. Evaluation of antimicrobial activity

Viable count method, a relatively quick and easily executed semi quantitative test is employed to determine the antibacterial potential of ZrO_2 powder from pellets against bacterial pathogen *E. coli* was used for testing. The agar used is Muller –Hinton agar that is rigorously tested for composition and pH. The stock solution was prepared by mixing 1ml *E. Coil* with 9ml Luria-Bertani broth and incubated at 37^0c for 24 hrs with shaking at 250 rpm. The broth was serially diluted up to 10^5 concentrations for minimizing the load of bacterial cells. 0.01g and 0.1 g ZrO_2 extract were mixed with stock solution. 0.1ml of prepared mixture was then inoculated on Luria-Bertani agar plates followed by incubation 37^0c for 24 hrs. Then, the number of colony-forming units was counted for each dilution.

C. Study of degradation

Degradation test of Zirconia pellets were done by taking phosphate buffered saline solution. The pH of solution was 7.4 at 37^0c. Initially, took the weight of pellets P1, P2 and P3. Then pellets were soaked in phosphate buffered saline solution. The pellets were dried at 120^oc after every one week and final weight of sample was taken. This process was repeated for five weeks.

$$\%Weight\ loss = \frac{W_0 - W_t}{W_0} * 100$$

Where, W_0 = initial weight of pellet

W_t = final weight of pellet after soaking in phosphate buffered saline solution

III. RESULT AND DISCUSSION

Powder X-ray Diffraction analysis of sintered samples was carried out in order to study the structural properties of zirconia using a Rigaku diffractometer (XRD, miniflex Rigaku. Field effect scanning electron microscopy (FESEM) technique was also used to observe the surface morphology. For this, a very small amount of powder was placed on an adhesive carbon tape, coated with gold/palladium and then observed in a FE-SEM (HITACHI S-4800).

A. X-ray diffraction (XRD) analysis

The structural properties are studied by X-Ray diffraction technique. The XRD pattern of CP synthesis ZrO_2 as shown in Fig. 1 which is well matched with standard ICCD file no, 01-074-0815). ZrO_2 has a single pure phase with a monoclinic crystal structure which was sintered at 800^0C.
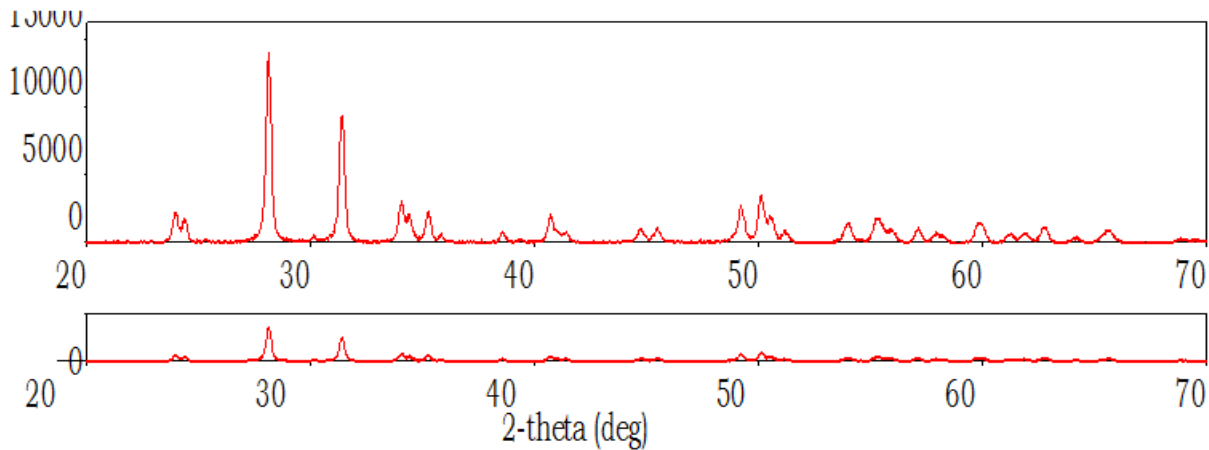
Figure 1: XRD patterns of CP synthesis ZrO₂ sintered at 800⁰C

B. FESEM analysis

Field Effect scanning Electron Microscope (FESEM) is well known and reliable technique to analyze nanoscale samples. It gives surface morphology of samples. The FESEM image for ZrO₂ Fig. 2at different magnification shows uniform distribution of particles and spherical like morphology.
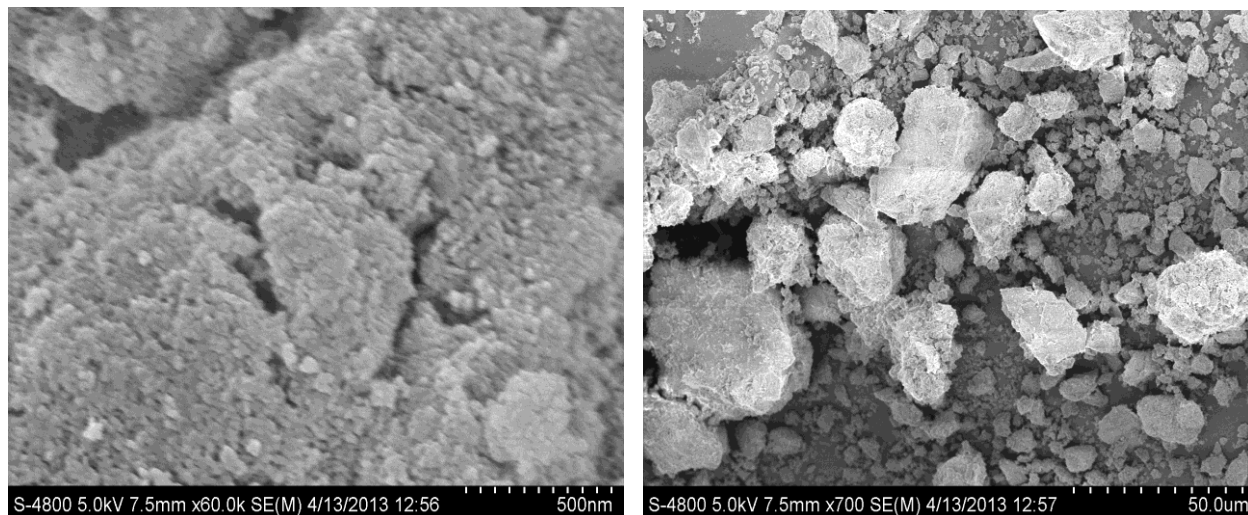
Figure 2: FE-SEM images of ZrO₂ at different magnification

C. Antibacterial assessment of ZrO₂

Extract from ZrO₂ pellets tested for its antimicrobial activity against bacterial pathogen, *E. coli* by viable count method. Fig. 3 (a) is control plate (without extract of ZrO₂) shows growth of bacterial pathogen. Fig. 3 (a-b) shows ZrO₂ pronounced significant growth inhibitory effect against surface area by their size. However ZrO₂ particles possess superior antimicrobial bacterial activity against E. coli bacteria which are clearly visualized in the antibacterial photograph. The antimicrobial performance due to the following assumptions: active oxygen species generated from the ZrO₂ particles actively inhibit the growth of *E. coli* cells by accumulation or deposition on the surface of *E. coli* cells. It is also suggested that ZrO₂ nanoparticles are able to slow down *E. coli* growth due to disorganization of *E. coli* membranes, which increases membrane permeability leading to

accumulation of nanoparticles in the bacterial membrane and cytoplasmic regions of the cells. From the above discussion we clearly came to know about the enhanced antimicrobial activity of ZrO_2 particles.
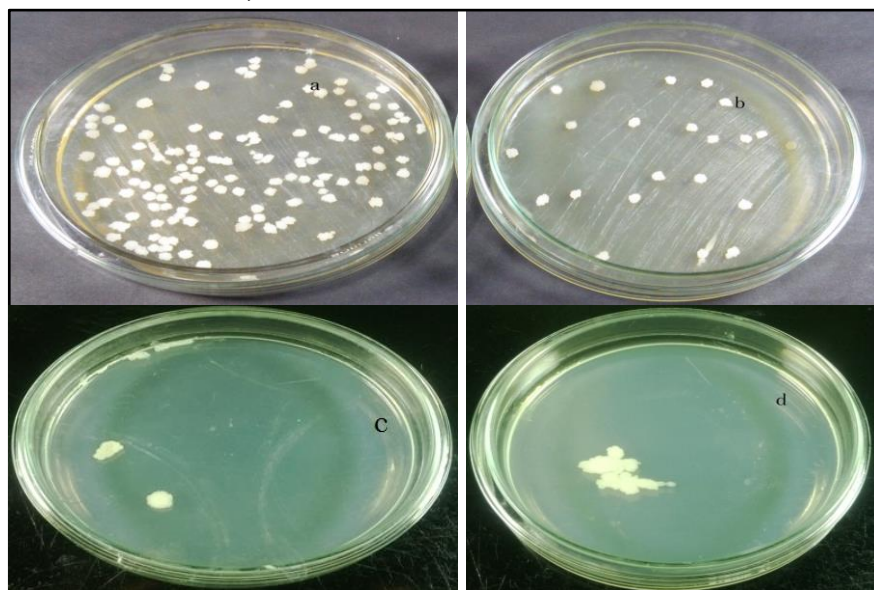
Figure: 3 photographs of (a) in absence of ZrO_2 powder, (b-c) ZrO_2 powder from pellet

D. Degradation of ZrO_2

Fig. 4 shows the degradation of ZrO_2 materials. The Pellets of ZrO_2 powder shows that 0.0021% for five weeks which is very negligible. It means that a zirconia material does not show any degradation and stable at physiological condition in PBS solution. zirconia is inert bioceramic that way it does not shows any degradation and physiologically stable.
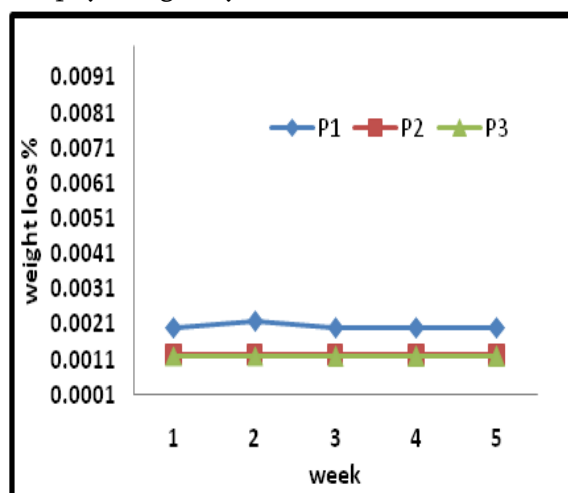
Figure: 4 Degradation of ZrO_2 pellets in PBS

IV. CONCLUSIONS

Zirconia was synthesized by co-pracipretation method and its structural and biological properties were studied. The formation of monoclinic crystalline phase was confirmed by powder XRD. The morphology, particle size were analyzed using field effect scanning electron microscopy. zirconia shows inhibition of bacterial growth. Since, the sample is stable at physiological condition; it can be used for biomedical applications.

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Phenotypic Characterization and Primary Metabolite Profiling Of Black Cherry Heirloom Tomato

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ABSTRACT

Tomato (SolanumlycopersiconL.) is an important vegetable crop with numerous uses with a high nutritional value as dietary carotenoids serve as the precursor for vitamin A and prevent several chronic-degenerative diseases. Carotenoid profiling is necessary to understand its importance on human health. In tomatoes, carotenoids are important concerning major breeding traits such as fruit color and human health. In our study, we have selected black cherry and black pear heirloom tomatoes and ArkaVikas as control. To investigate these heirloom lines we have framed our objective in two parts (I) phenotypic characterization of these heirloom lines and (II) metabolite profiling of the lines to understand the development of fruit ripening and which metabolite play an important role in phenotypical character and also levels of primary metabolites by GC-MS. In our study Black Pear, a transition from mature green to red ripe took almost double time. , In the ripening stage of Black Cherry and black pear phytofluene level is completely absent and lycopene level is 3-fold less in comparison to ArkaVikas.

Keywords: Black Cherry, Carotenoid, Primary metabolites, Arkavikas (AV), Black cherry (BC), Black Pear (BP)

I. INTRODUCTION

Tomato (*Solanumlycopersicum*) is one of the most important vegetable crops. In India, its consumption is highest and is next to potato. It is the most widely grown solanaceous vegetable crop grown worldwide under outdoor and indoor conditions. It is consumed as fresh fruit, or cooked and also in processed form. Tomato is grown worldwide with a production of 152 million tonnes [1].Tomato is a rich source of nutrients like lycopene and beta-carotene, the compounds that protect cells from cancer [2]. Tomato is intently modified by plant breeders to improve economically important traits such as yield, fruit size, color, taste, sugar content, and health-related metabolites, lycopene, β-carotene, vitamin C,etc. [3][4].

Tomato is the world's favorite fruit due to its special flavorand high nutritional value. Tomato fruit contains largeamounts of metabolites such as sucrose, hexoses, citrate,malate, and ascorbic acid. There are also many

health-beneficialcompounds such as carotenoids, phenylpropanoids,and terpenoids that accumulate in tomato fruit[5]. The existence of these compoundsestablishes that many basic biosynthetic pathwaysare intact in tomatoes. Therefore, when undertaking metabolicengineering, a limited number of additional genesneeds to be introduced, which can significantly simplifythe engineering process. In addition, substrates such assugars and aromatic amino acids, Therefore, GC-MS can facilitate the identification and robust quantification of a few hundred metabolites within a single plant extract, resulting in fairly comprehensive coverage of the central pathways of primary metabolism [6][7]. Although no single analytical system can cover the whole metabolome, GC-MS has a relatively broad coverage of compound classes, including organic and amino acids, sugars, sugar alcohols, phosphorylated intermediates, and lipophilic compounds [7][8]. The main advantages of this technology are that it has long been used for metabolite profiling and thus there are stable protocols for machine set-up and maintenance, and chromatogram evaluation and interpretation. Furthermore, the advent of faster computers, improved algorithms, statistical software packages, and available databases will likely allow for the exploitation of this method and thus enable the capture of more biologically relevant information.

II. MATERIAL AND METHODS

A. Plant Materials and Growth Conditions

For a study of phenotypical characterization and metabolite profiling of tomatoes, ArkaVikas variety was used as control, and black cherry and back pear heirloom varieties were used as study plant material. The seeds were surface sterilized with 4% (v/v) sodium hypochlorite approximately for five to ten minutes till the seed coat became thinner which was evident by the visibility of the embryo. Thereafter, seeds were washed thoroughly in distilled water till hypochlorite smell goes off and spread on filter papers moistened with distilled water in plastic cups for germination. These cups were kept in the darkroom at a temperature of 25±2°C. After seeds germination (showing radical emergence), seeds were transferred in plastic germination boxes filled with coconut peat. These boxes were kept in a growth room for twenty days then these seedlings were transferred into pots filled with red loam sandy soils in the field.

B. Fruit development and phenotypic characterization

Phenotypic characters such as life morphology, flower morphology, and fruit morphology were observed as well as other characters such as phyllotaxy, intermodal distance, and flower per inflorescence, and fruit per inflorescence were observed. Plants were photographed to observe phenotypic variations.

To determine the age of the fruit, the flowers were tagged day after pollination (DOP) that was considered as zero-day. Pollinated flowers were differentiated by observing floral senescence and the presence of pollen on the stigma. The size of the fruit was periodically measured using software called tomato analyzer version 3.0, also maximum height, maximum width, pericarp thickness were measured.Fruit firmness was measured by Durofel DFT–100 (Agrotech). Two measurements were taken at equatorial positions of each fruit two times and an average was taken into consideration. The firmness unit was expressed in percentage DUR.

With the same tomato analyzer software version 3.0 fruit color of ArkaVikas, black cheery, and black pear were measured at different stages of fruit including mature green, turning and red ripe stage. The color was expressed in L*, a*, b*. L* value relates to lightness (white to black), a* value relates to (green to red), and the b* to (blue to yellow) color of the fruit.

C. Analysis of primary metabolites by GC-MS

GC-MS analysis of ArkaVikas was done in the Red Ripe stage according to Roessner. (2000) for identification of primary metabolites. All experiments were carried out *with* 3 *biological replicates* for each stage. A polar metabolite fraction was extracted from approximately 100mg of powdered fruit tissue in 1400 μl 100% methanol with 60 μl internal standard (0.2 mg ribitol ml^{-1} water). The mixture was extracted for 15 min at 70°C. The extract was vigorously mixed with 1400 μl water and centrifuged at 2200 *g.* Aliquots of the methanol/water supernatant (150 μl) were dried *in vacuo* for 2h. The dried residue was redissolved and derivatized for 90 min at 30°C (in 80 μl of 20 mg ml^{-1} methoxyamine hydrochloride in pyridine) followed by a 30 min treatment at 37°C (with 80 μl MSTFA). 20 μl of a retention time standard mixture (F.A.M.E. Mix, Sigma, 1 μg μl^{-1} in hexane) was added beforetrimethylsilylation.

The sample volume of 1 μl was injected in splitless mode. The GC–MS system consisted of an MPS Autosampler (Gerstel), a GC 7890A (Agilent) gas chromatograph, and a Pegasus 4D TOF mass spectrometer (Leco, US). Gas chromatography was performed on a 30 m Rxi-5ms column with 0.25 mm i.d. and 0.25 μm film thickness (Restek). The injection temperature was 230°C, the interface set to 250°C, and the ion source adjusted to 200°C. The carrier gas used was helium set at a constant flow rate of 1.5 ml min^{-1}. The temperature program was 5 min isothermal heating at 70°C, followed by a 5°C min^{-1}oven temperature ramp to 290°C and a final 5 min heating at 290°C. Mass spectra were recorded at 2 scans/sec with an *m/z* 70–600 scanning range. The chromatograms and mass spectra were evaluated using the ChromaTOF software (Leco, US). The mass spectra of the identified peaks were matched by the NIST library.

Data analysis was done by normalizing all the data by ArkaVikas as the reference sample. All the data was scaled to Pareto-scaling before analysis. Heatmap visualization of the data was done between different replicates of MG and BR and MG and RR stager of using the Pearson distance measure. Principal Component Analysis (PCA) with 95% confidence interval of metabolite data from biological replicate samples was done shows differences between MG, BR, and RR stage. All the statistics were done using Metaboanalyst 3.0.

D. Statistical analysis

All measurements and estimations were done with at least three biological replicates of control ArkaVikas and three experimental replicates at each stage of fruit development. The data were represented in the form of graphs using their mean and standard error values plotted by Sigmaplot software 10.0 version.

III. RESULTS AND DISCUSSION

A.   Phenotypic Characterization

Higher plants have evolved several mechanisms by which they can adapt themselves to their surrounding environment. Most prominent of these is the use of environmental stimuli that alters physiological and developmental responses, thus enabling them to cope up with the existing environment. Hereis our observation in table 1.Phenotypic characteristics such as leaf morphology and flower morphology of control as well as two experimental heirloom varieties. Generally,the tomato has compound leaves, a compound leaf is made up of leaflets that are distributed along the leaf rachis, but in the case of black pear we found that there isa decrease in the number of leaflets and potato type leaf morphology as a comparison to ArkaVikas. Here we also observed the other characters such as average internodal distance, average flower per inflorescence, and average fruit per inflorescence but only in case we found black cherry found the difference in flower per inflorescence and fruit per inflorescence.

Tomato fruit attains different colors like green, yellow, pink, light red, and dark red at different time points of the ripening stage. By using tomato analyzer software color of the fruit was measured at red ripe (Table 2). Wild-type fruit at the mature green stage is darker and less dark in red ripe than experimental lines. The Colour of the fruit was measured at the red ripe stage. The tomato analyzer readings showed a decrease in L^* value as the fruit reach red ripe from mature green indicating the change in colour of fruit from light to dark and increase in a^* value from mature green to red ripe stage indicating the gradual decrease of chlorophyll level and increase in carotenoids level. L^*, a^*, and b^* values were measured at red ripe (RR). Black cherry and black pear significantly lower value of L^* at red ripe stage as compared to wild type but in case of black pear l* value comparative more than black cherry. Black cherry and black pear has a significantly high a^* value and b^* at red ripe stage as compared to the control. L^* Lightness,-L^* Darkness, +a *Red direction, -a *Green direction, +b *Yellow direction, -b* Blue direction.

Table1.Phenotypic characteristic of AV, BC and BP

LINE	Intermodal distance (cm)	Avg.flower/inflorescence	Avg.fruit/inflorescence	phyllotaxy
ARKA VIKAS	4	2	8	opposite
BLACK CHERRY	7	2.2	9	opposite
BLACK PEAR	3	3	6	opposite

Table.2 Average chromaticity values of AV, BC and BP

Sr.no	Lines	Avg.L* values	Avg.a* values	Avg.b* values
1	Arkavikas	43.66	33.98	43.81
2	Black cherry	22.82	12.24	24.11
3	Black pear	42.15	20.22	3841

B.   Fruit development

Physiology of fruit formation includes three phases: Fruit development; characterized by the active growth of fruit until it reaches to mature green stage, where cell division and expansion of fruit almost stops[11] (figure 1). Fruit ripening; follows soon after attainment of mature green stage and that can be characterized by change in colour from green to yellow to orange to bright red and finally senescence; characterized by change in colour from bright red to dull brown and softening of fruit texture. At developmental stages of Arkavikas, black cherry, and black pear fruits we observed to turn from mature green to turning they almost took average 6 to 7 days but to reach the red ripe stage it took almost 18 days in case of black pear rather than control and black cheery.
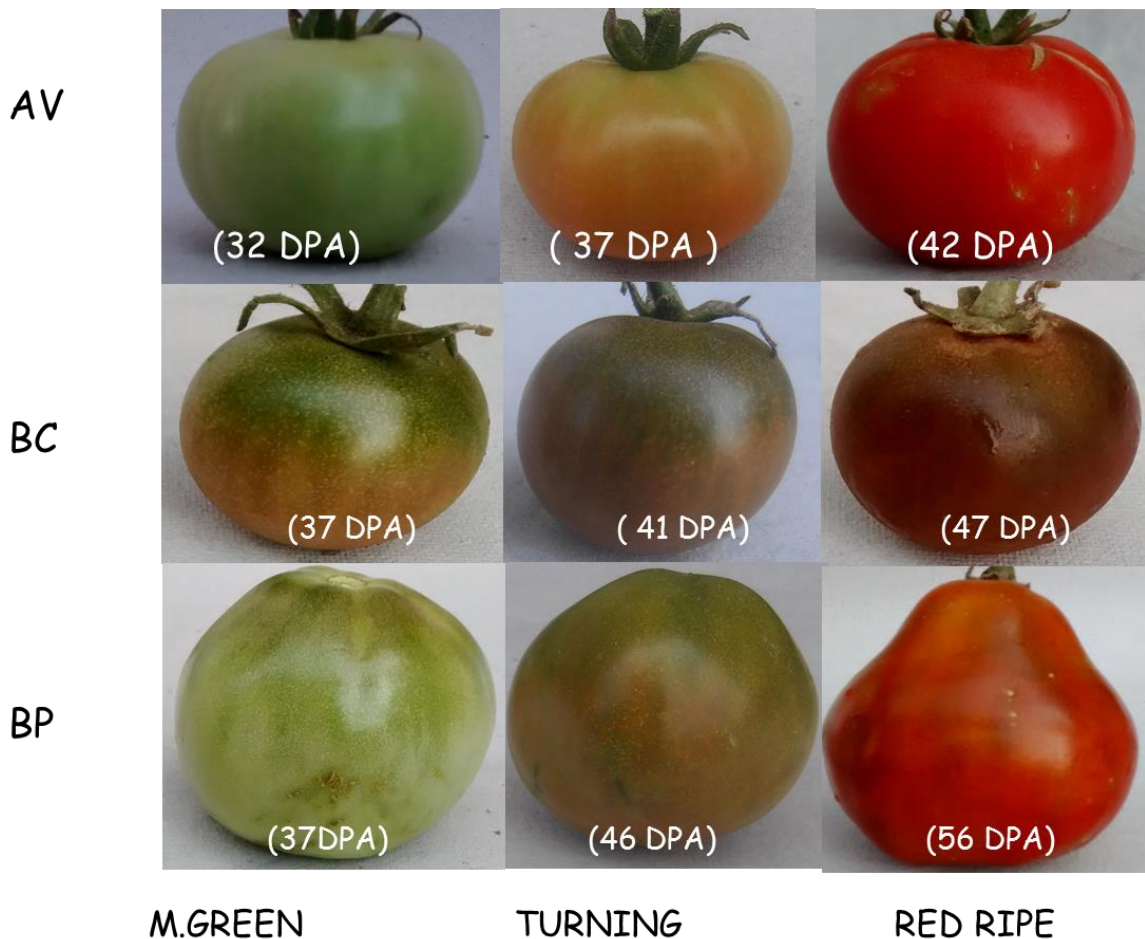
Figure 1: Different developmental stages of AV, BC, and BP

C. Primary metabolite profiling

The most dramatic change in tomato fruit development occurs during the transition to the ripening process that is coupled with the accumulation of numerous secondary metabolites. Moreover, the transition to ripening is accompanied by a massive change to metabolism as a result of the de-greening process, in which the photosynthetically active chloroplasts are differentiated to chromoplasts. The metabolome is defined as the total small-molecule complement of a cell, and metabolomics is therefore the study of all the low molecular-weight molecules or metabolites of a cell or organism[9][10].

Metabolite profiling is a rapidly expanding technology that aims to quantify the entire metabolome of biological samples. Gas Chromatography-Mass Spectrometry (GC-MS) is one of the most widely used analytical tools for profiling highly complex mixtures of primary metabolites, such as organic and amino acids, sugars, sugars alcohols, phosphorylated intermediates, and lipophilic compounds[9].

Primary metabolite profiling study was done in a red ripe stage of AV, BP, and BC. In this primary metabolite study, we found we identified around 72 different metabolites. (Table 3). The hierarchical clustering was done between different replicates of ripened fruit tissue using two parameters- similarity measure and clustering algorithms. Each sample can be treated as one cluster. Thus depicting the pictorial relationship among the replicates of ripened fruit samplesbased on identified metabolites. Further, Principal Component Analysis was done. It tells about the variance in the sample clusters. We found that AV, BC and BP formed three different

clusters which were indicative of these lines behaving distinctly in terms of the concentration of metabolites present.

A heat map from the clustering data of the identified metabolites was generated for detailed analysis (Figure 4). Several metabolites were identified with the significant increase in concentration in varieties of tomato analyzed. In the case of primary metabolite analysis, we identified, Black cherry and Black pear havea high concentration of amino acid and low concentration of organic acid as compared to Arkavikas and low content of organic acid.
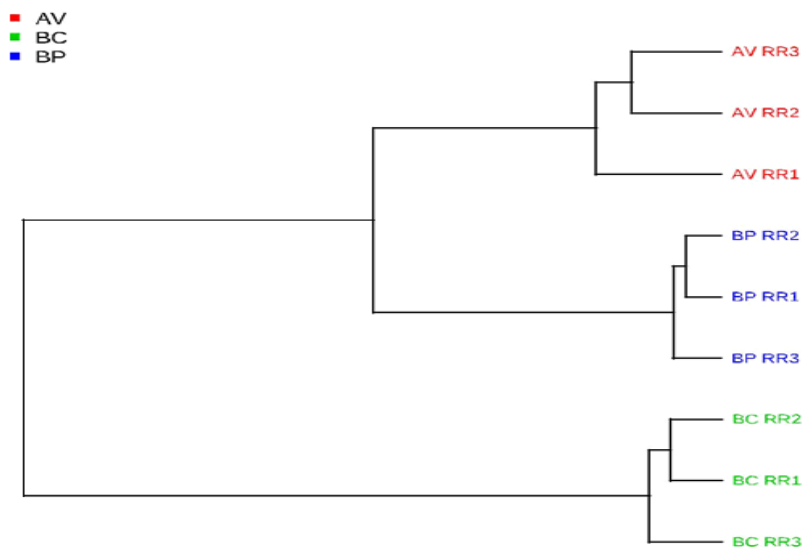
Figure 2: Dendogram showing hierarchical clustering of replicates of ripened fruit of AV, BC and BP plant.
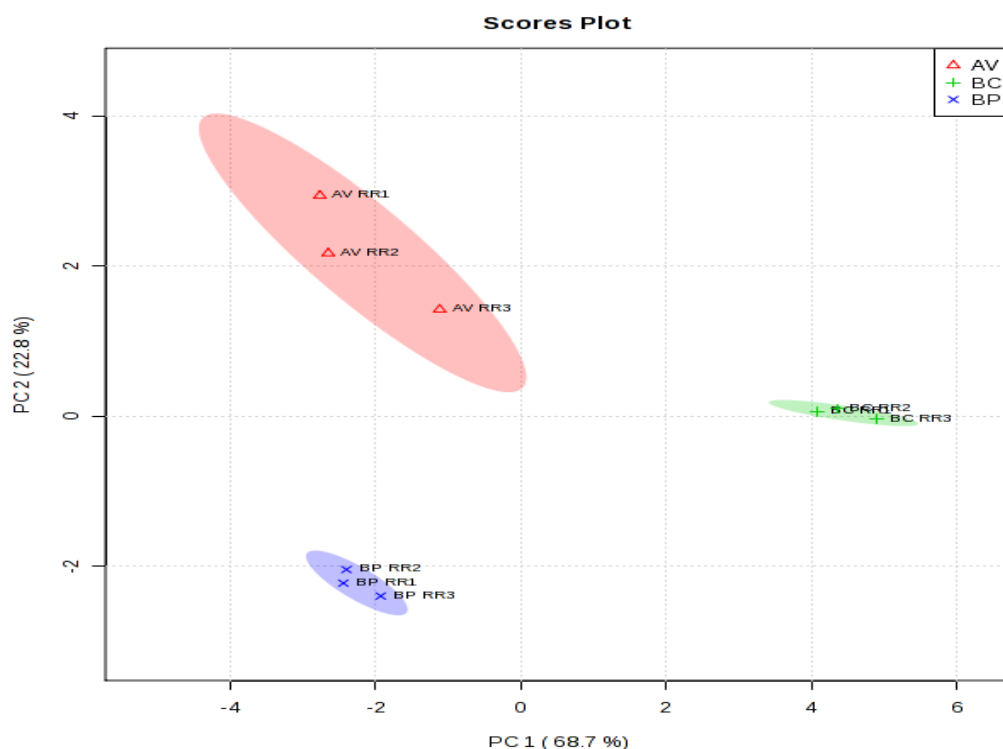
Figure 3: PCA analysis of replicates of ripened fruits of AV, BC and BP plant.
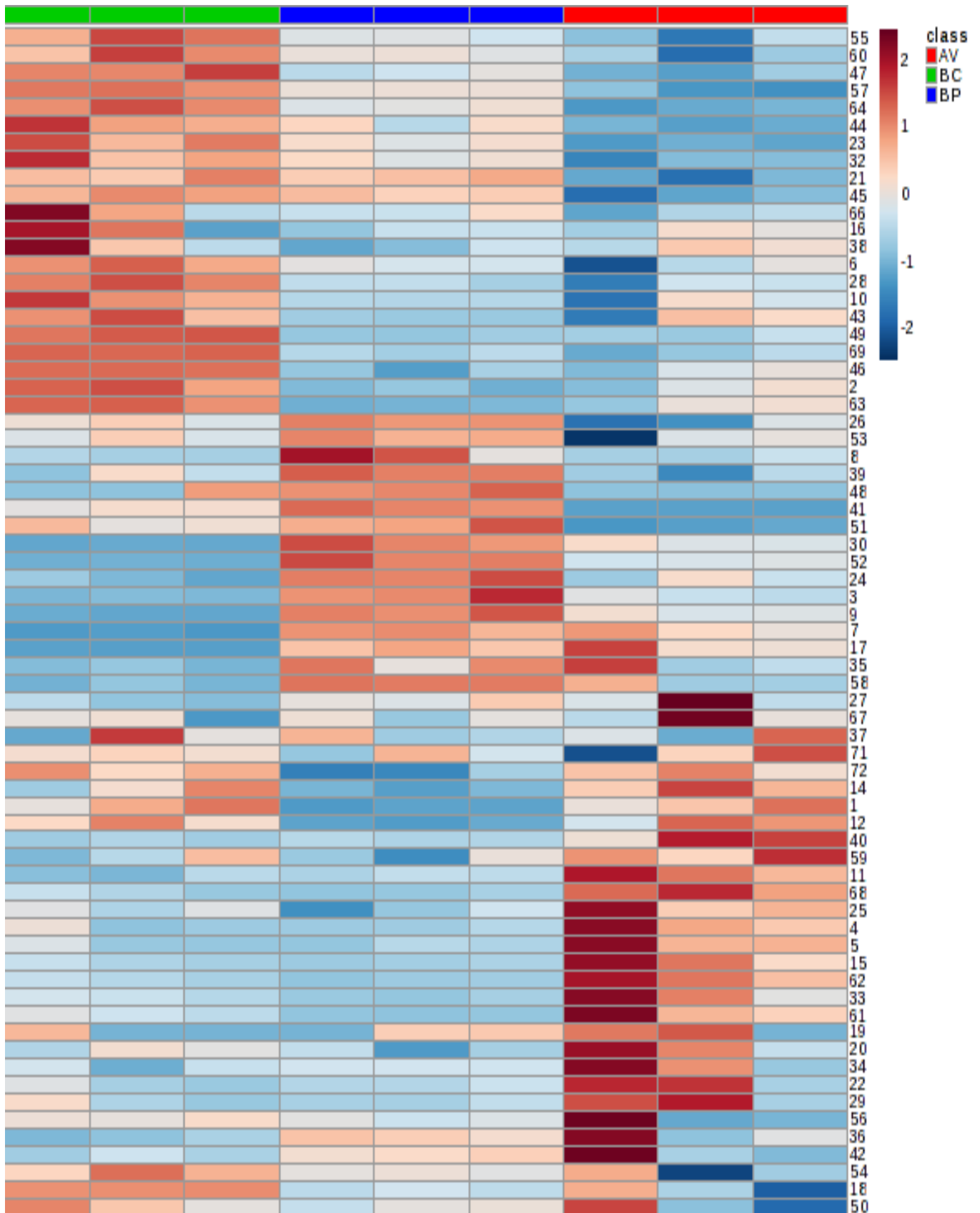
Figure 4: Heat map of the identified metabolite. Heat map visualization of the data was done between different replicates of red ripe stages of fruits using the Pearson distance measured.

Table 3: List of metabolites significantly present at high concentration in AV, BC.BP

Sr. No	LINES	METOBOLITES
1	ARKA VIKAS	Putrescine, L-Tryptophan, Decanoic acid, Succinic acid , Lactic Acid, 3-Hydroxybenzoic acid, 4-Hydroxybenzoic acid, Fumaric acid, Malic acid , Nicotinic acid , Maleic acid .
2	BLACK CHERRY	L-Alanine, L-Glutamic acid, Asparagine, Pipecolic acid, Dodecanoic acid, Pyroglutamic acid, L-Glutamine, L-Asparagine, L-5-Oxoproline, 2-Imidazolidone-4-carboxylic acid, Asparagine, Alanine, 3-cyano, Glutamine, Ornithine, L-Threonine.
3	BLACK PEAR	L-Leucine , L-Valine , d-Mannose, L-Serine, myo-Inositol-2-phosphate , cis-Aconitic acid, Itaconic acid, Methyl maleic acid, Hydroxylamine, cis-Caffeic acid, Octadecanoic acid, Galactaric acid, Palmitic Acid, Adenosine, L-Cysteine, D-Xylose, Arabinose methoxyamine , Glucose methoxyamine , Sucrose , Citric acid , 2,3-Butanediol, Myo-Inositol.

IV. CONCLUSION

In this study, phenotypic characterization and metabolite profiling of black cherry and black pear was done. We found that in the case of Black Pear, a transition from mature green to red ripe took almost double time in comparison to control. At developmental stages of Arkavikas, black cherry, and black pear fruits we observed to turn from mature green to turning they almost took average 6 to 7 days but to reach the red ripe stage it took almost 18 days in case of black pear rather than control and black cheery. In the case of primary metabolite analysis, Black cherry and Black pear havea high concentration of amino acid and a low concentration of organic acid.

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Synthesis of Cobalt Oxide Nanoparticles and Characterization through Various Spectroscopic Techniques

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ABSTRACT

The cobalt oxide nanoparticles were synthesized by chemical reduction approach. The synthesized cobalt oxide nanoparticles were characterized through various spectroscopic techniques which includes Fourier transform infra-red spectroscopy (FT-IR), x-ray diffraction spectroscopy (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM). FT-IR spectrum of Co3O4 nanoparticles showed significant absorption peaks at 588.74 and 664.69 cm-1. From the X-ray diffraction pattern of chemically synthesized Co3O4 nanoparticles. The size of the nanoparticles was calculated through the Scherer's formula, D=0.94λ/β cosθ, the size and morphology of the nanoparticles was studied using scanning electron microscopy (SEM). The nanocrystalline nature of the chemically synthesized Co3O4 sample was further confirmed by Transmission electron microscope.

Keywords : - cobalt oxide (Co3O4), FT-IR, XRD, SEM, TEM.

I. INTRODUCTION

Nanotechnology

The first ever concept was presented in 1959 by famous Professor of physics Dr. Richard Feynman and term nanotechnology was coined by an eminent scientist professor Norio Taniguchi in 1974. "Nanotechnology" is a technology of applied science which works in the field of theoretical as well as experimental changes at molecular level of compound [1,2]. The word nano derived from Greek word which means extremely small at nano level the prefix nano a size of 10^{-9}. It allows the arrangement of small structure with accuracy, in intelligibility and in expensive Drexler is known as the father of nano technology is the man who explains the nano technology in depth and the popularized the subject [3], he is an American engineer known for increasing the value of molecular nano technology. Nano technology has a break through as a multidisciplinary scientific field and is undergoing uncontrollable development as the products of nanotechnology are nano particle, nanotubes, and nano rods, nanospheres that have size below 100 nm and have high surface area to volume ratio [4]. The minimization of size brings about marked changes in their morphological properties with respect to thus properties observed in massive materials. The products of nano technology can be of metallic nature,

having mineral and polymer-based materials [5]. Nano technology is big tree of research having branches in every dimension and touches in different fields like cosmetics, electronics, packaging, biosensor medicine, paints, automobiles, bioengineering, and catalysts in Canada there are 80 companies that make 150 products that use 88 different nano materials. Nanomaterials are used in various applications, such as drug delivery [6] bio-separation, magnetic refrigeration systems, gas sensing, catalytic application, absorbent materials [7], ultra-high-density recording, magnetic resonance imaging, data processing devices, microwave and radio frequency devices, multilayer chip inductor and electromagnetic interference (EMI) suppression [8]. These applications of nanomaterial depend on its structural, magnetic and electrical properties.

Metal oxide nanoparticles:

Bi_2O_3, CeO_2, CuO, ZnO and Co_3O_4 are some metal oxide nanoparticles These particles have wide range of properties like magnetic, electronic, and optical properties which are used in different fields like agriculture, medicine and electronics these particles pusses a large surface area in which it acts like a substrate for the electron transfer reaction just before the electron transfer reaction both reactants are adsorbed upon the surface of metal consequently there will be gain of an electron by reactants and then reduced thus through the electron transfer process cobalt oxide nanoparticles will acts as an efficient catalyst [6-11] .

In recent years, there has been an increasing interest in the synthesis of nanosized crystalline cobalt oxide (Co_3O_4) nanoparticles because of their large surface area, unusual adsorptive property, surface defect and fast diffusivity. Co_3O_4 is an important transition metal oxide because of its application in various field of research and industry include pigments, gas sensor, magnetic materials, catalyst, anode materials for rechargeable Li batteries, electrochromic devices, electrochemical systems and high-temperature solar selective absorbers Co_3O_4 is a very important material extensively used in catalysis, gas sensors, electrochromic films, battery cathodes, heterogeneous catalytic materials and magnetic materials [12-15]. Due to their small size, nanoparticles exhibit novel material properties that are significantly different from those of their bulk counterparts [16-21]. Cobalt oxide is a well-known p-type semiconducting material of its electronic and electro optic properties. Co_3O_4 is an important ceramic oxide used for electro chromic and, magnetic and catalytic applications [22]. Electrochromism is characterized as a reversible change of the optical properties of the material by the application of a voltage stimulus and Co_3O_4 represents a promising anodic electrochromic material [23]. Its optical properties have attracted considerable attention. Co_3O_4 is a very important material extensively used in catalysis, gas sensors, electrochromic films, battery cathodes, heterogeneous catalytic materials and magnetic materials. Cobalt oxide (Co_3O_4) is a promising material for use as a gas sensor and catalyst in hydrocracking processes of crude fuels, pigment for glasses and ceramic [24-27]. The cobalt oxide nanoparticles play an important role as a catalyst in water electrolysis process [28].

Materials required: -

Cobalt Chloride and Sodium Succinate was obtained from Sigma- Aldrich chemicals, polyvinyl pyrrolidone (PVP) was procured from Merck, India. 99% hydrazine hydrate was taken from Loba chemise. Malachite green (MG), Eriochrome Black-T (EBT), Bromophenol blue (BPB), Methyl Red (MR) were taken from Loba chemise. All the chemicals used as received.

Preparation of cobalt oxide nanoparticles

In a 250 ml conical flask 1g cobalt chloride was dissolved in 10ml of distilled water with help of magnetic stirrer. In another beaker 3.6g sodium succinate was dissolved in 50 ml distilled water. Sodium succinate solution was added into cobalt chloride solution at 70^0 c with continuous

stirring for 10 min. 0.05g PVP was weighed and dissolved in 6ml distilled water. Transfer this PVP solution in cobalt chloride solution and heated for another 5 min. Now added approximately 1.5ml hydrazine hydrate into the above solution drop wise with constant heating. Color changes from pink to grayish. Filtered solution through whatmann filter paper, washed with absolute alcohol and acetone, dried in oven at 60^oc. After drying this dried powder was calcined in muffle furnace at 450^oc for 3hrs. Black colored powder was obtained which is further characterized by various spectroscopic techniques.
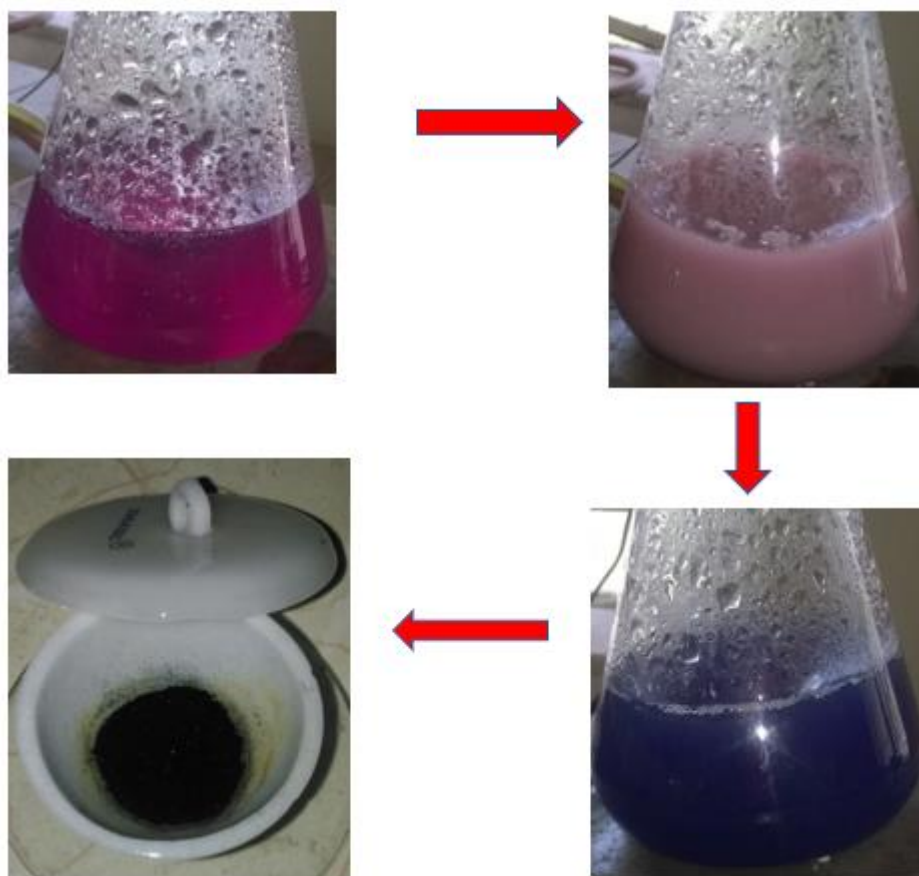
Fig 1: Process of synthesis of cobalt oxide nanoparticles by Chemical reduction method

Results and Discussion: -

1. FT-IR

Figure 2. shows FTIR spectra of Co_3O_4 nanoparticles synthesized by chemical reduction method. FTIR spectroscopy was carried out in order to ascertain the purity and nature of metal or metal oxide nanoparticles. FT-IR spectrum of Co_3O_4 nanoparticles showed significant absorption peaks at 588.74 and 664.69 cm-1. The absorption band at 588.74 cm-1 was assigned to Co-O stretching vibration mode and 664.69 cm-1 was assigned to the bridging vibration of O-Co-O bond. The absorption peak at 1049.86 cm-1 may be due to $-CH_3$ stretching

vibrations. The absorption peaks at 1627.37, 3422.02 cm-1 may be due to –CH$_2$ stretching, and –CH stretching vibrations.
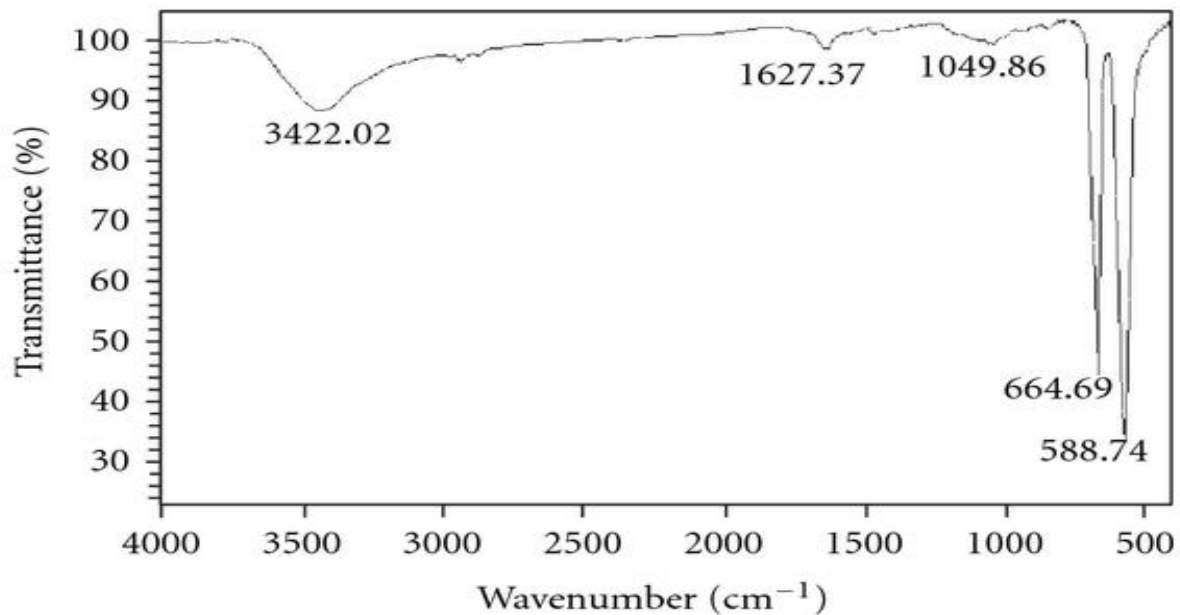
Figure 2 : FT-IR spectrum was recorded for cobalt oxide nanoparticles after calcination at 450^0 C for 3 Hours.

2. X- ray diffraction studies: -

Fig.3 shows the X-ray diffraction pattern of chemically synthesized Co$_3$O$_4$ nanoparticles. Several dominant 2θ peaks were observed. According to JCPDS data (74-2120), the distinct diffraction peaks at 2θ = 18.972^o, 31.383^0, 36.81^0, 44.708^0, 59.375^0, 65.232^o can be well indexed to the cubic phase and corresponds to (1.1.1),(2.2.0),(3.1.1),(4.0.0),(5.1.1),(4.4.0), plane respectively of crystalline Co$_3$O$_4$. Any other characteristics peaks are not found, indicating that the as- prepared Co$_3$O$_4$ is pure. The strong and sharp diffraction peaks implied that the as- prepared Co$_3$O$_4$ nanoparticles possess good crystalline nature. The size of the nanoparticles was calculated through the Scherer's formula, D=0.94λ/β cosθ, Where D is the average crystal size, β is the half-height width of the diffraction peak, θ is the diffraction angle, and λ is the X-ray wavelength (0.1541 nm). The average particle size of the bio synthesized Co$_3$O$_4$was 49.27nm.
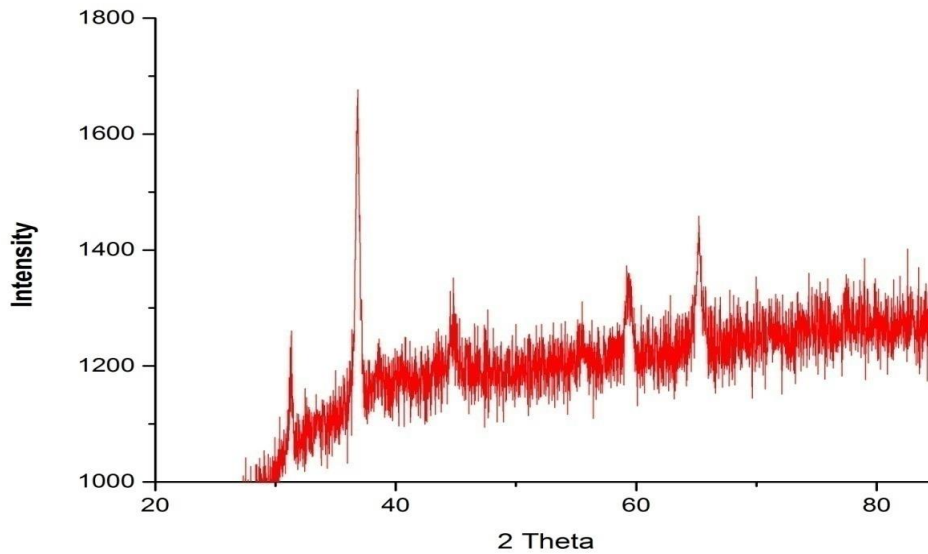
Fig 3: X-RD spectrum was recorded for cobalt oxide nanoparticles after calcination at 450°C for 3 hours

3. Scanning electron microscopy analysis

The size and morphology of the nanoparticles was studied using scanning electron microscopy (SEM). SEM analysis of chemically synthesized Co_3O_4 nanoparticles was shown in Fig. 4, which depicts the particles were agglomerated and flower shaped like structure. It might be beneficial for its photocatalytic activity improvement because large surface area can enhance more photon absorption.
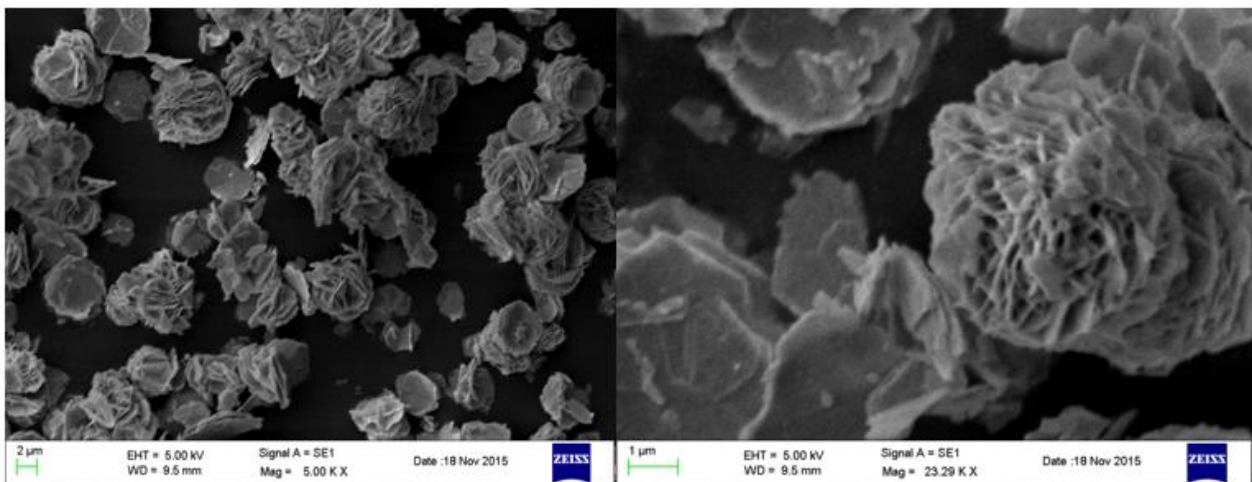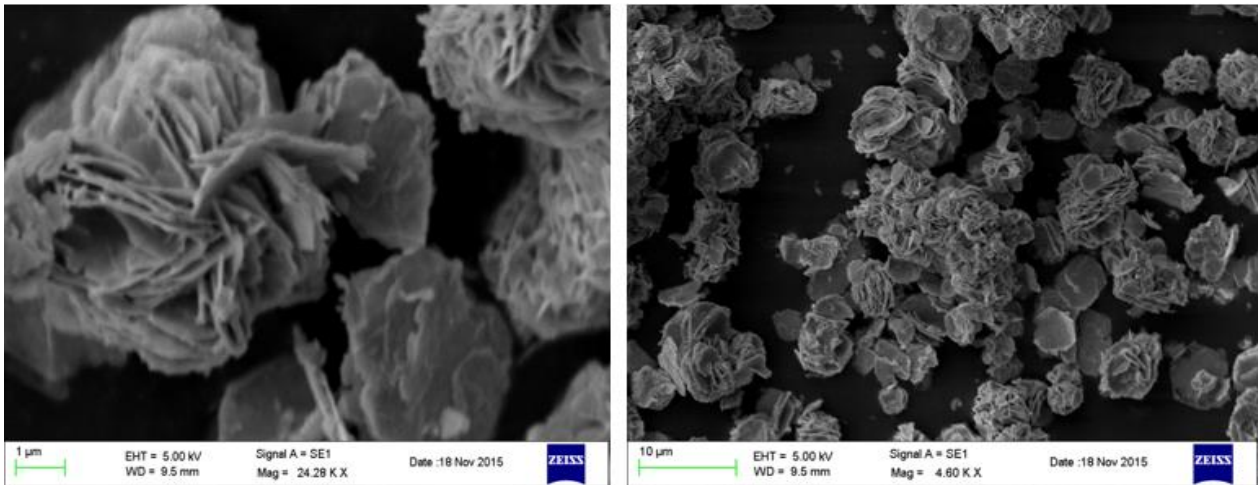
Fig 4 : SEM images were recorded for cobalt oxide nanoparticles after calcination at 450°C for 3 hours.

4. TRANSMISSION ELECTRON MICROSCOPE ANALYSIS (TEM)

The nanocrystalline nature of the chemically synthesized Co_3O_4 sample was further confirmed by Transmission electron microscope image. Figure 5 shows, the bright field TEM micrograph of the prepared cobalt oxide sample. This image represents the crystalline morphology with mostly irregular particle shape and particles are in nano range. The particles seems to be closely joined together to form fine nano spheres.
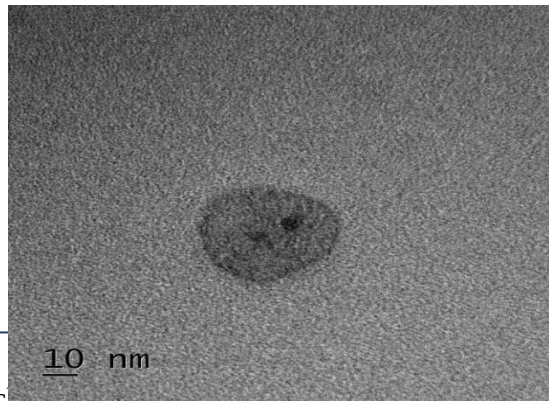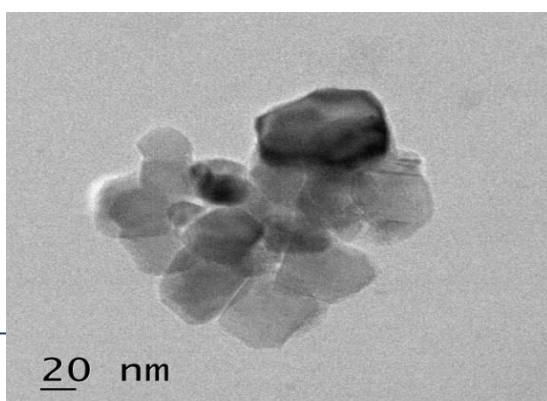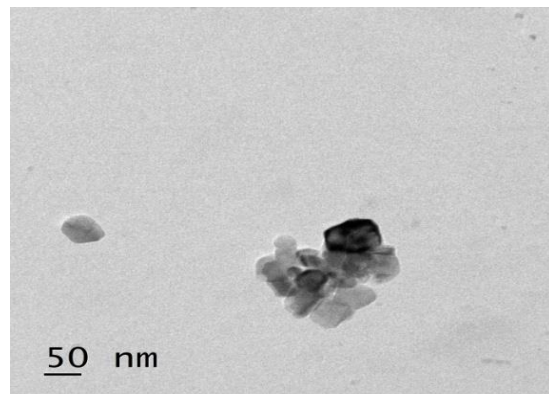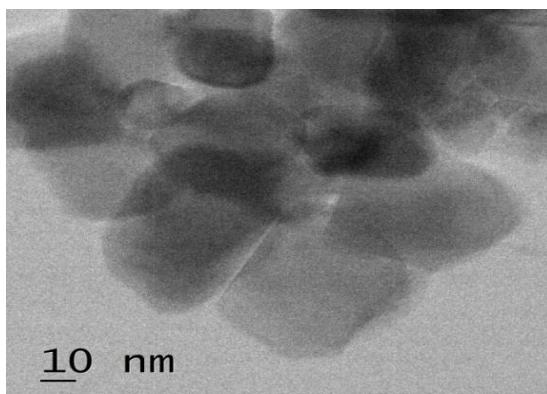
Fig 5: TEM images were recorded for cobalt oxide nanoparticles after calcination at 450℃ for 3 hours

Conclusion

1. In FT-IR spectrum of Co_3O_4 nanoparticles synthesized by chemical reduction method has significant absorption peaks at 588.74 and 664.69 cm-1. The absorption band at 588.74 cm-1 was assigned to Co-O stretching vibration mode and 664.69 cm-1 was assigned to the bridging vibration of O-Co-O bond.

2. The average particle size of the bio synthesized Co_3O_4 was 49.27nm.

3.The particles were agglomerated and flower shaped like structure.

4.Mostly irregular particle shape and particles are in nano range. The particles seem to be closely joined together to form fine nano spheres.

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Library Consortia : A Need of Hour

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ABSTRACT

The concept of library consortia and library networking to aid information resource sharing and support activities in libraries has become a real necessity in India. This paper briefly discusses the concept, need, factors, advantages, disadvantages of library consortia and it gives brief information about Main Consortium likeCSIR,INDEST, INFLIBNET consortia in IndiaThis paper covers various models and the benefits of e-journals consortia. It also discussesthe existing environment about users preferences and difficulties.

Keywords: Library Consortia, CSIR,INDEST, INFLIBNET, E-Journal;

I. INTRODUCTION

The concept of library networking to aid information resource sharing and support activities in libraries has become a real necessity. explosion of information and inadequate library urged the libraries to adopt new philosophies and technologies for collection development and reduce the costs of information. Library Consortium is an Association of a group of libraries to achieve mutually the common objective. It is i felt that the concept of E-Journals consortia can work well the libraries without requiring additional fees to access the e-journal.

Definition of Consortia: A consortiais an association of two or more individuals, companies, organizations or governments (or any combination of these entities) with the objective of participating in a common activity orpooling their resources for achieving a common goal. Consortium is a Latin word, meaning 'partnership,association or society' and derives from censors 'partner', itself from con- 'together' and sores 'fate',meaning owner of means or comrade.

Need for library consortium:
The consortium is needed for libraries because of:
1) Information explosion.
2) Diversity of user needs
3) Financial crunch
4) Impossibility of self-sufficiency

Factors to Consider before Consortia Formation: factors to be taken for an effective functioning of a successful consortium.Like resources identification on the basis of usage and usability, long run planning of the technology infrastructure,access to back runs of periodicals will have to clearly spelt, copyright and licensing, archival issue, price issue should be economically favorable. Last but not least, designing and launching a library consortium should be long term sustenance and robust models towards achieving the above goals.

Advantages of Consortia:

i. Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost;
ii. Optimum utilization of funds.
iii. Facilities to build up digital libraries
iv. Helpful to provide better library services like CAS and SDI
v. Cost Sharing for Technical and training support
vi. ElectronicJournals demand neither library space nor shelling costs nor can they be stolen from the library
vii. The consortium have been offered better terms of licenses for use, archival access and preservation of subscribed electronic resources, which would not have been possible for any single institution;
viii. Available 24 hours a day, 7 days a week
ix. Economy in maintain

Disadvantages of Consortia:

1. Absence of a printed copy of Journals
2. Require training of staffs in handling electronic documents etc.
3. Consortia require high initial investments in licensees and information and communication technology.
4. Copyright problems
5. Unreliable telecommunication links and insufficient bandwidth
6. Lack of archiving and back files availability
7. Internet Access id necessary
8. Users are not accepting e-journals as per with the printed Journals

CSIR Consortium:

The Council of Scientific and Industrial Research (CSIR) in India has 40scientificlaboratories involved in basic and applied research in various disciplines. Many of the laboratories have well equipped libraries, and some of them act as the main information centers for different subjects, functioning as consultant libraries at the national level. Access to e-journals through the use of state-of-the art technology is possible in many of the libraries belonging to these laboratories. Each of the laboratories has a well-established library or documentation center.

INDEST Consortium:INDEST is an open-ended proposition, and welcomes other institutionswith the similar area of interest and who can join for sharing benefits. The INDESTConsortium is the most ambitious initiative taken up so far in India in the area of engineering and technology disciplines. The Ministry of Human Resource Development (MHRD) has set up the Indian National Digital Library in Science and Technology (INDEST) Consortium. Institutions including the Indian Institutes of Science (IIScs), the Indian Institutes of Technology

(IITs), and a few other centrally funded government institutions through the consortium. Besides that, 60 government or government-aided engineering colleges and technical departments in universities have also joined the consortium with the financial support from the All India Council for Technical Education. In addition, a total of 26 other engineering colleges and institutions have also joined the consortium on a payment basis.

II. INFLIBNET

Information and Library Network (INFLIBNET), a programmer of the University Grants Commission, was launched in May 1991. The main aim of INFLIBNET is to establish a national computer-communication network to link libraries and information centers in universities, colleges, universities, UGC information centers, institutions of national importance, R&D institutions, etc., and thereby improve capability in information handling and services. It is a programme for academic excellence to be achieved through establishment of a mechanism for information transfer and access to support scholarship and academic work. It facilitates pooling, sharing and optimization of scarce library resources in the country. As a major programme it helps modernize libraries and information centers in the country through application of information technology.

Benefits of E-Journals Consortia:
a. Scope for electronic archives;
b. Availability and monitoring of usage statistics;
c. Getting deep discounts through joint pricing negotiations – hence lower unit cost Of information;
d. can be read anywhere in the world, at any time, by any number of people as long as the readers have an internet connection;
e. Also allow the inclusion of audio-visual material as well as the other formats and technological innovations that are available on the Internet, such as keyword possibility of self-sufficiency

Consortia Models
The types of consortia identified are generally based on various models evolved

in India in Varity of forms depending upon participations' affiliation and funding sources.

i). **Open Consortia**: -This type of consortia is very flexible and it is the wish of members of consortia can join and leave any they please. INDEST Consortium is an example to this.

ii). **Closed Group Consortia:** -It is within defined group. This kind of consortia emerges either by affiliation and collaboration among them like CSIR, DAE, IIM Consortium. And the formation and operation of the consortia guidelines and its administration are fairly simple and easy.

iii). **Centrally Funded Model:** -In this model, consortium will solely depend on the parent body. A few examples are INFONET by UGC, ICMR, CSIR by DSIR.

iv). **Shared-budget Model:** -"In this model the participating libraries take the lead and form the consortium. IIM and FORSA are examples of this model".

III. CONCLUSION

Library consortia, providing for physical and electronic delivery of materials, and integrating theCollection-developmentprocess is all distinct and crucial steps in moving toward the twenty-firstcentury library. It is the case; clearly identified landmarks represent important goals and milestonesfor measuring our common progress on a journey through a new and unfamiliar landscape. Consortia are tools, which will aid in exploiting the features of the e-resources as well as in effecting savings.

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E- Learning Tools for Distance Education in COVID – 19: An Effective Delivering of Online Classes during Lockdown Using various ICT Tools

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ABSTRACT

The world as we know it has changed over a short period of time, with the rise and spread of the deadly novel Corona virus known as COVID-19, the world will never be the same again. This study explores the devastating effects of the novel virus pandemic, thus the need to transform the offline classroom into an online classroom. It explores and describes the numerous online teaching platforms, study materials, techniques, and technologies' being used to ensure that educating the students does not stop. Furthermore, it identifies the platforms, technologies which can be used to conduct online examination in a safe environment devoid of cheating. Additionally, it explores the challenges facing the deployment of online teaching methods. The results indicate that students prefer the multimedia means of studies. As a result of binary logistic regression, poor internet connection, awareness on COVID19, enough sources of materials, recommends massive open online course, favorites online methods, and satisfaction with online study are significant in the model or attitudes towards delivering of online classes during lockdown COVID-19 pandemic at 5% level of significance. Yet, they perceived many challenges during online learning like lack of face-to-face interactions, lack of socialization, distraction by social media, technology related issues etc. Students also opted for a combined approach of learning in the post pandemic period.

KEYWORDS: - COVID-19, E-learning tools,Online learning, Classroom learning, Binary logistic regression.

I. INTRODUCTION

COVID 19 made a serious impact on many aspects of everyday life. World Health Organization (WHO) announced COVID19 as a global public health emergency of international concern on 30th January 2020 [1] and declared it a pandemic on 11th March 2020 [2]. The education system is one of the most impacted aspects of routine learning and daily life. This sudden and rapid transformation from an environment of conventional learning to virtual learning has made a great impact on the attitude of the students towards learning [3].

In view of the forgoing, all institutions of learning across the globe are subjected to an imminent and unavoidable indefinite break. This is an attempt to stop the virus from affecting the students or the teachers. This however has brought about lackadaisical attitudes among the students at home because they are idle and

thus thinking nothing but evil. Consequently, all hands are now on desk, reviewing academic online platforms and updating it to meet up with the peculiarities of our day-to-day challenges while making it easy for studies and evaluations of student's academic performance.

Hence, the need for a platform that will substitute the obsolete means of teaching in an effective and efficient method with the capability of evaluating students' academic performance is imminent. Research gap: there are no academic researches on this topic; researches are yet to study online classes platforms, etc.

Objectives: The study explores and describes the present state of online classes, opportunities, and challenges. It is a novel research on the techniques and method adopted by teachers to bring the offline classroom online [4].

II. LITERATURE REVIEW

Videoconferencing is just one of the technological systems that can be used in online learning. The value of online learning is being recognized by more organizations, since it is a cost effective way to deliver a large number of people. It can produce significant results by not only decreasing costs, but also by improving performance .It can produce significant results by not only decreasing costs, but also by improving performance. Online Learning is encouraged due to following reasons during lockdown period for Covid-19.

- One can acquire knowledge staying at home and can maintain social distancing.
- Outbreak of Covid-19can be minimised due to social distancing.
- It offers highly effective learning environments.
- It offers complementary interactive support that allows students to study 24/7 and work at their own pace.
- It offers flexible scheduling.
- It is available in any location, with an internet connection and students can attend using their devices (mobile, computers, tablets, etc.).
- Deals with real-time student monitoring as well as reporting.
- Improves the image of institution by offering technological solutions that solve real problems.

Teachers and scientists can foresee that new advances will in any case be presented, which can require transformation by the two understudies and educators, upheld by examination by analysts on their viability. It is essential to appear for "hints on how e-learning advances can turn out to be ground-breaking impetuses for change additionally as devices for updating our education and instructional frameworks" [5].

These resources include general e-learning tools for educators, subject-based tools for students, and extensions to assist students with learning differences. Almost all of these resources are free, with the exception of a few inexpensive tools/available free trials [6].

III. METHODOLOGY

Study Design

An observational, descriptive study based on designed questionnaire was conducted through Google forms which was circulated among the undergraduate students of various institute. Online classes are being conducted.

Study Population: - A total of 170 third MBBS undergraduate students participated in the students.

Study Conduct

The designed questionnaire consisted of set of questions to know the attitude of undergraduate students regarding online v/s classroom learning and to know what are the reasons for their likes and dislikes about online and class room learning. Initial questions included socio demographic data and the Gadget being used for online classes. Table 1 of the questionnaire was based on the opinion of students towards classroom and online classes. Table 2 consisted of statements for which their opinion was obtained by Yes/ No/ May be responses and end questions on what kind of approach they would prefer during the pandemic either online or classroom and after this pandemic with the options of Online classes, Classroom classes and a combined approach were given.

Results

My study included 170 students of which 78 were males and 92 were females within the age group of 18–24 years. The average attendance for online class was found to be 96%. 52% of the students opted for using mobile, 36% laptops and 12% of them used tablets as devices for online classes (Fig.1)
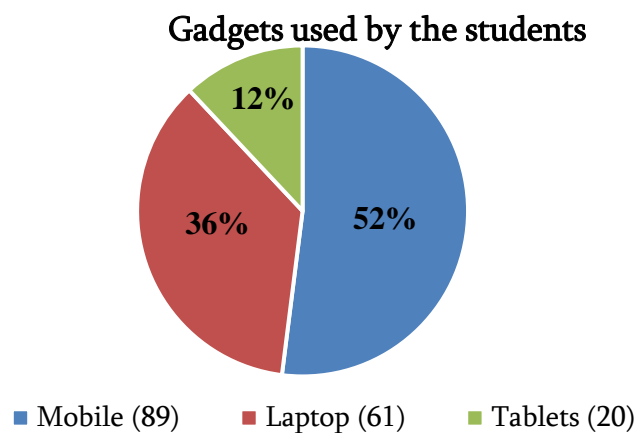
Fig. 1 Distribution of Gadgets used by the students

Table 1 of the questionnaire suggested a comparable result in terms of content covered in both online (37%) and classroom learning (41%). 58% of the students felt understanding concepts is better in classroom learning while 52% students felt retention of the topic was better through classroom learning.

Table 1 for the questionnaire

Sr. No	Question	Online Learning (%)	Offline Learning (%)	Both (%)
1	Understanding concepts of ENT is easier in	41	53	06
2	Coverage of content of particular topic is more in	37	41	22
3	Retention rate of content of the topic is better in	42	48	10
4	We can get access to good amount of study material in	59	27	14
5	Interaction among student and teacher is better in	41	54	05
6	Punctuality and self-discipline are acquired better in	16	77	07
7	Acquiring practical knowledge of ENT is more effective in	06	90	04
8	Clarification of doubts is easier in	55	33	12
9	Appearing for internal assessments is easier in	41	43	16

Majority of the students (59%) felt that they had better access to online study materials. Students favored classroom learning in terms of student teacher interaction (54%), punctuality & discipline (77%), acquiring practical skills (90%). Students predominantly favored online classes for doubt clarification (57%). Apprehension of exams were nearly equal in both.

Table 2 revealed students preferred online classes in terms of ease of participation, attending classes (91%) and time investment (67%). Students felt that the outdoor activities, group projects and development of communication skills were better in classroom learning (82%). 78% of the students sensed that poor internet connections, social isolation and eye strain as the commonest problems faced during online learning.

Table 2 for questionnaire

Sr. No	Statement	Yes (%)	No (%)	May Be (%)
1	Ease of participation and attending classes during lockdown is better online	91	07	02
2	Online learning requires less of a time investment	67	18	14
3	Multiple choice questions incorporation during online learning adds up to the interest among students	74	14	12
4	Classroom learning prevents social isolation of the individual	72	16	12
5	Poor internet connections during the class causes loss of interest in online learning	78	13	09
6	Online learning causes decreased out-door activity, group projects, communication skills	82	11	07
7	Increased screen time during online learning can cause eye related problems	75	05	20

When asked a specified question regarding preference of classes during the pandemic, majority of the students preferred online classes (89%) to sustain their academic interest and development during this pandemic (Fig. 2).
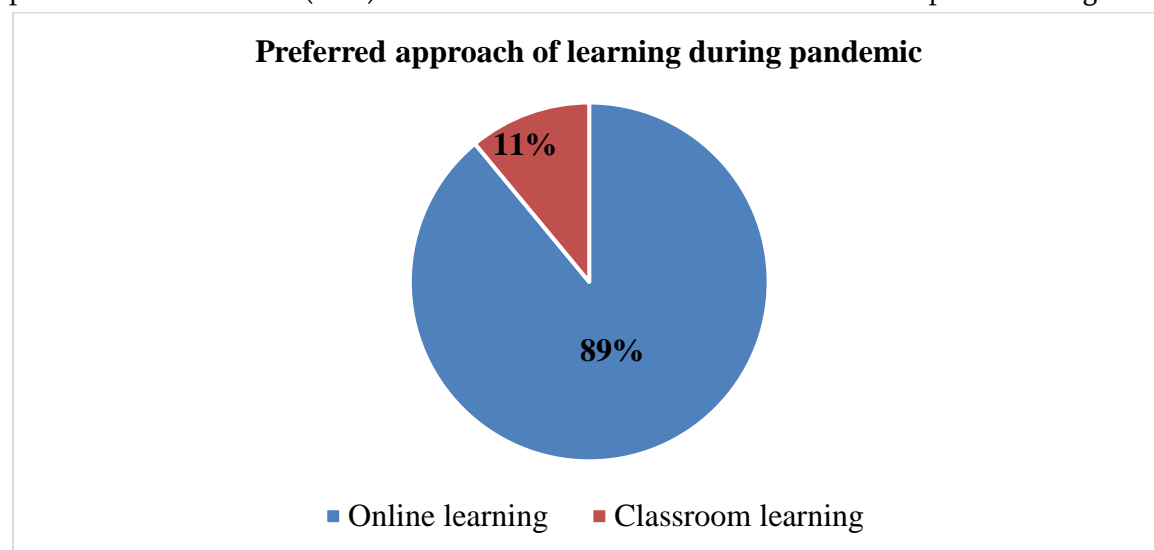
Fig. 2 Preferred approach of learning during pandemic

For the opinion of preferred approach of learning after COVID 19 pandemic, 31% of students opted for the option of only classroom learning, 16% opted for only online learning where as 53% of the students opted for combined approach of classes (Fig. 3).

Preferred approach of learning after pandemic

- Combined approach (90)
- Only Classroom learning (53)
- Only online learning (27)
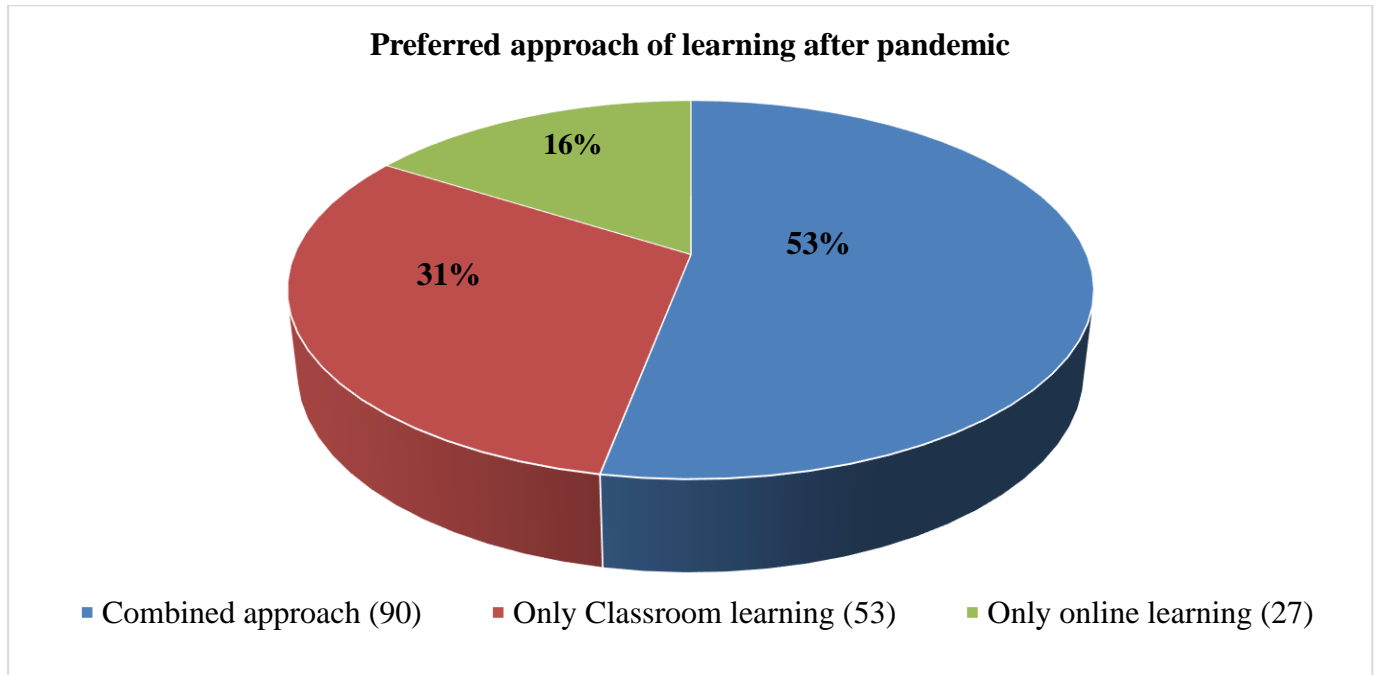
Fig. 3 Preferred approach of learning after pandemic

Table 1. [13] Characteristics of the sample and views about studying, two and 12 weeks after the national lockdown in Norway on 12 March 2020 due to the COVID-19 pandemic.

	2 weeks after lockdown n = 16	12 weeks after lockdown n = 21
	n (%)	n (%)
Age, years		
≤ 21	0 (0)	0 (0)
22–25	7 (44)	11 (52)
26	9 (56)	10 (48)
Study programme		
Bachelor	8 (50)	11 (52)
Master	8 (50)	10 (48)
Prior experience with digital learning	7 (44)	9 (43)
Expectations upon learning outcome from digital education		
Higher	3 (19)	0 (0)
Lower	8 (50)	15 (71)
No change	6 (38)	5 (24)
Do not know [a]	NA	2 (10)
Studying has become more challenging after COVID-19 lockdown	12 (75)	12 (57)

[a] Only after 12 weeks.

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IV. E LEARNING TOOLS FOR DISTANCE EDUCATION

With the growing concerns over COVID-19, many school districts have moved classroom instruction online for the foreseeable future. We understand that this change can present challenges on many levels for educators, administrators, students, and families.

1. **Zoom:** This is another online live streaming tool but it is a mobile app. It is available on Android and iOS. While online, you can record sessions, collaborate on projects, and share or annotate one another's screen. It cost $14.99/month, and it allows meetings recording on the cloud. It has unlimited number of participants, but the meetings can only last for 40 min (https://zoom.us).

2. **Google Classroom:** This is an open source Web service provided by Google for education and training with the sole aspire of online evaluation of test and assignment in a paperless way. However, organizations must register their corporate account on G-Suit before they can use this service. The students only need a valid email account to get connected to the class. This is linked to Google Drive, Google Docs, and Gmail for efficient sharing of resources (https://classroom.google.com).

3. **Microsoft Teams:** This is designed by Microsoft as an all-round collaborative platform offering: chats, voice, and calling features. It allows instant messaging with inbuilt office 365 for manipulating documents with live stream. All you need to do is to subscribe to the Microsoft 365 business essentials package; however, this package cost $5/month and per single user (https://support.ofce.com).

Internet learning content is available through various types (text, pictures, sounds, and curios) [7] and kinds of media (versatile, intelligent, account, profitable) [8].

V. DISCUSSION

Since the serious outbreak of this global pandemic Covid 19 majority of the countries practiced lockdown. Currently there are in excess of 26 million cases of Covid 19. Social distancing and restrictive movement policies are being implemented to curb this rising curve of cases [9].It also has markedly deranged conventional education practices as most of the schools and colleges are being temporarily shut down.

Due to the constrains of classroom learning in this indeterminate time course of pandemic, online learning has come to the forefront to partly resolve perplexity. Online classes are being conducted through the student portal since the outbreak of pandemic. The average attendance for the online classes was found to be 96% over a period of 5 months. Most of our students possess a mobile phone, making it the most accessible and feasible platform to attend online classes (52%). 36% and 12% students preferred using laptops and tablets respectively as they might feel more distracted while using mobile phones. Students themselves gave the feedback that accessing online classes on mobile was sometimes distracting them. They feel the urge to access social media, check messages, and answer calls while using mobile phones which leads to loss of interest and attentiveness during the class.

Conventional learning has face to face interactions, motivates one to learn, better interactions among student and teacher and most important a feel of togetherness in learning and sharing opinions. The author [10] some of these aspects lack in online learning. Our survey suggested that although both methods of teaching covered

almost equal content of a particular topic yet the students preferred classroom learning for understanding and retention of a topic. The students also preferred classroom learning as practical knowledge, punctuality and self-discipline is better acquired through a reciprocal interaction among teachers and student in a classroom. Long duration of online classes can cause eye related problems, distraction by social media. [3] Decreased outdoor activity, group projects, communication skills causes social isolation in an individual. [10] Our students also reported that 79% of them lost interest during online classes due to issues with the internet connection when the class went on for more than an hour. Sedentary life with decreased outdoor activity and project works was a major disadvantage of online classes as pointed out by 80% of our students. 75% of the students complained eye related issues like eye strain, epiphora and headache while attending long online sessions.

VI. CHALLENGES OF ONLINE CLASSES

1. Technology related challenge and clinical skill training are the two paramount constraining factors. [11, 12] Other crucial constraining factors include student interest captivation and emotional wellbeing. These could be overcome by using simulation based training apps, establishing a fast and reliable internet connection, prior training of teachers in using this technology, flexibility in time and a shorter duration of classes.

2. Security: The major challenge of anything online is security. This is because of the fair of cyber-attacks by hackers. Such a proposed framework will be handling students' records and examination results. Any possible breach of access can result to serious information mismanagement. Hence, the need to put a serious security in place.

3. Lack of infrastructures like computers and ICT gadgets due to the level of poverty in some regions like India: for a successful online classroom, there must be resources to be sufficiently made available.

4. There cannot be technology without electricity and the issue of electricity is a regional challenge& this makes it impossible for the students to gain access online as expected because they may not have the means of power supply.

5. In some countries, there are strict policies on the use of ICT; this might be due to the prevailing cybercrimes over the cyberspace and the process of adhering to such policies; it poses a great challenge in the development of educational technologies and other ICT-related platforms.

6. Lack of ICT knowledge/awareness among students and lecturers: In some countries and institutions, the knowledge of ICT is very scarce. In fact, some are resisting to accept technology as a modern science. They view the concept of ICT as an attempt to scam and hence, posing a very big challenge in the implementation of any ICT framework to such categories of Institutions/people.

VII. ADVANTAGES & DISADVANTAGES OF ONLINE CLASSES

Sr. No	Advantages	Disadvantages
1	Easily accessible: you can log in anywhere you are, so long as you are online and you are registered on the platform. Unlike the traditional classroom where you to be at a scheduled venue, to receive lectures	Not all students have the necessary knowledge, skills and resources to keep themselves safe online. Spending more time on virtual platforms can leave students vulnerable

	physically.	to online sexual exploitation
2	Unlimited access to resources: Most online-learning platforms are connected to an unlimited number of e-libraries from various academic institutions. Once you have access, you will gain access to unlimited e-books, journals, etc.	When there is a problem with your internet system, online learning is impossible. There is nothing you can do. Slow connections are even worse.
3	Very portable and comfortable: Students can log in at their comfort zones. You can be in bed and still connect to the class and situation where you have travelled or lost your computer; all you need to do is to fine another one, connect to the internet, and log in to your classroom to continue your classes.	There are courses that require many practical sessions such as surgery, medicine, and the sciences. You will need a lab, which online programs cannot offer.
4	Academic collaborations are enhanced: With the use of online teaching platforms, students collaborate far more than physically been in class.	Online classes imply an initial learning curve and extra effort on the teacher's behalf to create a successful online course.
5	Online class/conference session can be saved in website for future reference e.g. class notes can be saved and distributed via network for references by students.	The classic disadvantages of online learning center on technical problems. Nothing disrupts an online lesson more than audio, video, or connection issues.

VIII.   POSSIBLE SOLUTIONS TO THE CHALLENGES OF ONLINE CLASSES

In the present situation of countrywide lock down schools, colleges and other educational institutions are leftover with only one option to continue teaching that is to provide online education to students. Online classes is a virtual alternative of live classes. It was a sudden shift for all students and educational institutions to educate students amidst lock down. This step was so sudden that there was no time for proper research about the pros and cons of online education in India.

The Pros of Online Education in India are:
- Students can learn from anywhere, at any time
- Saves time and is also pocket friendly
- Students get to know about things going around the world.
- Students is free to learn at their own pace
- Gives recognition of online degrees of students

The Cons of Online Education in India are:
- Chances of distraction of students are very high
- Unauthorized online courses are easy trap for students
- Students cannot do courses that require labs/workshops
- Long classes may adversely affect a student's health
- Students become technology and gadget bound for education

Effective online teaching uses professional lighting and high-quality input devices to create rich and engaging presentations, which will surely catch students' attention and make learning all the more effective. Two-way communication – Teachers should give their students opportunities for two-way communication.

Use the chat function for students to respond to questions. Use physical whiteboards for students to show their thinking. Allow students to share their screen to showcase their work and explain how they solved a problem. Use virtual whiteboards for increased engagement.

IX. CONCLUSION

One of the participants of our survey rightly said 'There is a difference to play football on ground and in mobile' but in this apprehensive socially distanced period of COVID, one must embrace the alternative to classroom learning to keep up with one's academic development. Though the replication of classroom learning is not completely attainable through online learning, yet it is a convenient method with ease of participation, sustaining the academics and maintaining the student teacher interaction amidst pandemic. A combined approach can be considered post pandemic for a finer learning with more innovative methods.

Online Learning is the most common method of distance learning today. During the lockdown period for Covid-19, online learning is the best platform to keep learners/educators engaged and safe by maintaining social distancing. Govt. of India has initiated different online learning platforms to continue educational activities during lockdown period.

Online Learning method utilizes various applications of the internet to distribute classroom materials and help learners and educators interact with one another. Using the various technologies available for Online Learning, educators can provide a more interactive distance learning experience by delivering real-time. Online Learning is the best method of learning at this time of lockdown due to the outbreak of Covid-19 and further in-depth statistical study may be undertaken on impact of online learning during lockdown period.

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Toxic Effect of Root Extracts of Balanitesaegyptiaca on Liver of Fresh Water Fish Catlacatla

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ABSTRACT

The study examined the toxic effect of root extract of *Balanitesaegyptiaca*on fresh water fish *Catlacatla*. The corresponding effect of this plant extract on health status of the *Catlacatla* were similarly studied using their histopathological profiles.The experiment is carried out at the research laboratory of J. D. PatilSanglutkarmahavidyalaya, Daryapur Dist. Amravati (M.S.). Fish were acclimatized for one week and fed twice daily at the rate of 2% body weight. Water in tank was replenished daily. Total of 10 fish of *CatlaCatla* were exposed to concentration of 09.00 mg/l13.00 mg/l13.00 mg/l root extract of *Balanitesaegyptiaca* set up in three replicates. Histology of liver showed variations in distortion and damages to the tissue; with observed severity increasing with increase in extract concentrations. This study suggested that the 96-h LC_{50} of *Balanitesaegyptiaca* could be greater than 5 g L^{-1}. The study concluded that caution must be taken in the disposal of this plant in water bodies as extended exposure time and at higher concentrations could pose adverse effect on the fish *Catlacatla*.

Key words: toxicity, *Balanitesaegyptiaca*, *Catlacatla*, histopathalogy

I. INTRODUCTION

The purpose of the acute-lethal toxicity is to determine lethal toxic effect of a toxicant within a short duration of usually 96 hours or 4 days on a particular tested organism. The acute-lethal toxicity test with fish species is to help in the assessment of possible risk to similar species in natural environments, as an aid in determination of possible water quality criteria for regulatory purposes, and for use in correlation with acute testing of other species for comparative purposes (USEPA, 2000). Acute-lethal toxicity test can be done in the laboratory using static, semi-static and renewable methods as the case may be. In modern toxicology, it is usually advisable for the toxicologist to use the renewable method whereby test solutions are renewed at 48 hours in a 96-hour acute-lethal toxicity test (Adesina, 2008).Test organisms to be used for acute toxicity test must be ecologically important, occupy trophic position leading to humans or other important species, and have adequate background biology, be widely distributed, be genetically stable, have its early stages (larvae, fry, and juveniles) available throughout the year and be sensitive (Ernest Hodgson, 2004).*Catlacatla*(Hamilton) is one of the major fresh water carps native to India, Bangladesh, Myanmar, Nepal, and Pakistan and introduced in many other

countries as exotic species. Because of its high nutritive value, it is a highly priced food fish and of great demand in the market.The Indian major carps *Catlacatla*(Hamilton) was used as the test animal because it is present in almost all freshwater reservoirs in India and is suitable for toxicity monitoring **(Nair, Sherief, 1998)**.Plant extracts are referred to as botanicals and when poisonous to fish is called piscicides**(Burkill, 1985)**.**(Neuwinger, 2004)**. Barbascos of ethnobotanical origin and their application in capturing fish been reported from other regions of the world such as India**(Tiwari and Singh, 2005)**. Histological effects of fish poisons on different organs of fish lead to know about the impact of poisons on the ecosystem. The tissues of fresh water fishes show various responses when exposed to toxicants.Some information has been reported on the histological effects of plant piscicidal compounds on fish organs **(Olaifa*et al.*, 2008)**.

II. MATERIAL AND METHOD

Roots of *B. aegyptiaca* are collected from local area near to the Daryapur. After shade drying the plant material was grounded into powder using pestle and mortar. One liter of distilled water was mixed with 200 g of powdered plant material. The mixtures were kept for 2 days in tightly sealed vessels at room temperature and stirred several times daily with a sterile glass rod. This mixture was filtered through muslin cloth. Further extraction of the residue was repeated 3-5 times until a clear colorless supernatant extraction liquid was obtained indicating that no more extraction from the plant material was possible. The extracted liquid was subjected to water bath evaporation to remove the solvent. The water bath temperature was adjusted to 400^0 C. The semi-solid extract produced was kept under a ceiling fan to dry. The extract was weighed and portion of it used for phytochemical screening while the rest was use for the susceptibility test.

The adult specimens of *Catlacatla*were collected from the local market and brought to the laboratory. So for this experiment, fish are acclimatized in glass aquarium for 10 days.The survived fish are maintained in aerated condition and are fed regularly with fish food. The water is replaced every week and replaced with declorinated water. Faecal material and debris, if any, is also removed as and when necessary.

Lethal concentration of 13.00 mg/l was selected for this experiment. Ten fishes were exposed to each concentration. Along with this, appropriate control was maintained for each test. The mortality did not exceed 5% during the test period in control. Survival and mortality percentage were tabulated after 24, 48, 72 and 96 hrs.

For the lethal toxicity test, the fresh water fishes were divided in two groups as follows.

Group I: - Control group of *Catlacatla*

Group II: - Fishes *Catlacatla*were exposed to lethal concentration of root water extract.

To determine structural changes in internal tissues such as liverof both control and exposed fishes of lethal concentration were examined histologically.

III. RESULTS AND DISCUSSION

For lethal concentration at control there are No lesion, no necrosis, no pigments, no malignancy, no inflammation and cellular degradation seen for the 24hrs, 48hrs, 72hrs, and 96hrs.(Plate-1.1).At 9.00mg/l lesion, inflammation occurs on hepatic cell for 24hrs, for 48hrs inflammation and pigments on hepatic cell while for 72hrs necrosis occurs in hepatic cell and inflammation on blood vessels and blood sinusoid and for 96hrs necrosis occurs on hepatic cell while inflammation on blood vessels and blood sinusoid. (Plate-1.2).At

11.00mg/l lesion and inflammation on hepatic cell for 24hrs, for 48hrs lesion, inflammation occurs on hepatic cell and blood vessels while for 72hrs necrosis occurs in hepatic cell and blood sinusoid and inflammation on blood vessels and for 96hrs malignancy and necrosis occurs on hepatic cell and necrosis on blood vessels and blood sinusoid.(Plate-1.3).At 13.00mg/l lesion occurs on hepatic cell and blood vessels for 24hrs, for 48hrs lesion, inflammation on hepatic cell and blood vessels while for 72hrs necrosis, malignancy occurs in hepatic cell and blood sinusoid and for 96hrs necrosis, malignancy and cellular degradation occurs on hepatic cell, blood vessels and blood sinusoid.(Plate-1.4).

Plate-1.1: Liver (Section) of *Catlacatla* exposed to lethal concentration (control) of root water extract of *B.aegyptiaca.*
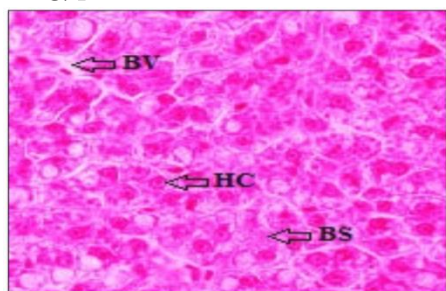
Fig.Liverof*Catlacatla* (Control).

HC: Hepatic cell, BV: Blood vessels and BS: blood sinusoid. No lesion (L), inflammation (I), pigment (P), necrosis (N), malignancy (M) and cellular degeneration (C).

Plate-1.2: Liver (Section) of *Catlacatla* exposed to lethal concentration (9.00 mg/l) of root water extract of *B.aegyptiaca*showing lesion (L), inflammation (I), pigment (P) and necrosis (N).
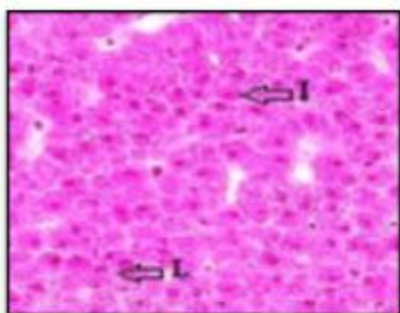
Fig.- 24hrs.   Fig.- 48hrs.
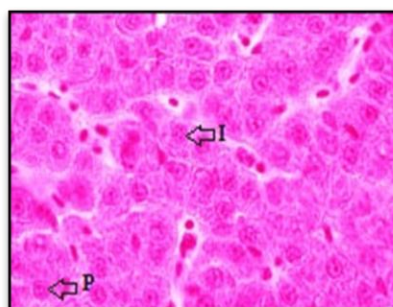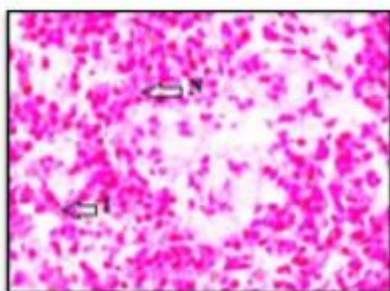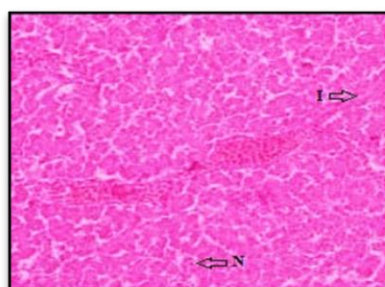
Fig.- 72hrs.   Fig.- 96hrs.

Plate-1.3: Liver (Section) of *Catlacatla* exposed to lethal concentration (11.00 mg/l) of root water extract of *B.aegyptiaca*showing lesion (L), inflammation (I), pigment (P), necrosis (N)and malignancy (M).
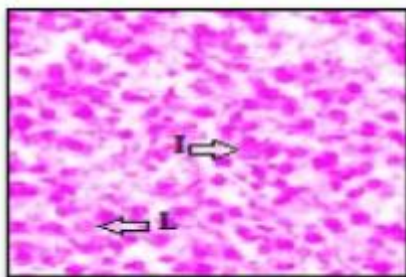
Fig.-24hrs.   Fig.- 48hrs.
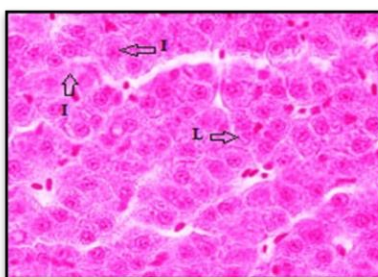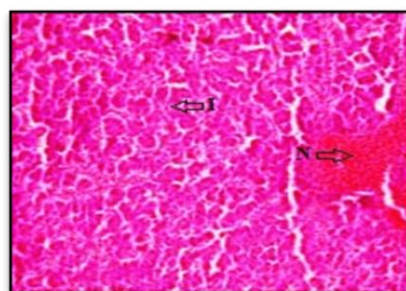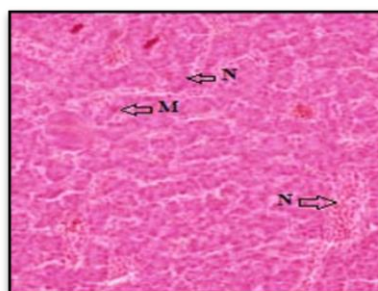
Fig.72hrs.   Fig.- 96hrs.

Plate-1.4: Liver (Section) of *Catlacatla* exposed to lethal concentration (13.00 mg/l) of root water extract of *B.aegyptiaca*showing lesion (L), inflammation (I), pigment (P), necrosis (N)malignancy (M)and cellular degeneration (C).
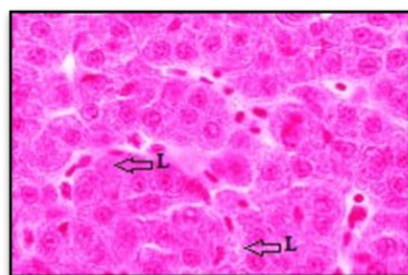
Fig.- 24hrs.   Fig.- 48hrs.
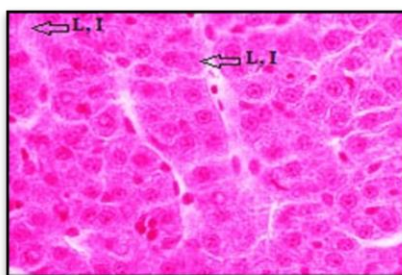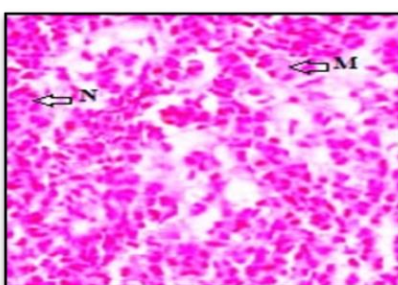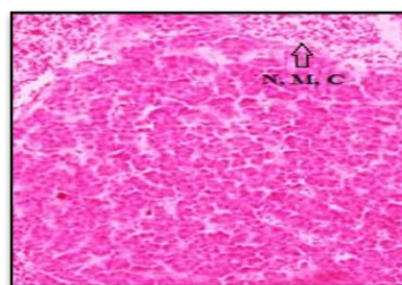
Fig.- 72hrs.   Fig.- 96hrs.

The liver of fish exposed lethal concentration for different time exposure (24hrs. 48hrs. 72hrs. and 96hrs.) showed lesion, inflammation, pigment and necrosis of hepatic cell, blood vessels and blood sinusoid during low concentration while, increasing concentration for different time exposure showed necrosis, malignancy and cellular degeneration were seen at later time of exposure(Plate-1.2, 1.2, 1.3, 1.4). Histological biomarkers have

been largely used in fish to identify and evaluate the toxic effects of pollutants exposure (**Oliveira Ribeiro** *et al.*, **2006**). The histological examination of the liver of the exposed fish indicated that the liver were the organs most affected. This observation agrees with the finding of (**Ayoola, 2008**).In the present investigation, histological effects of root extracts of *B.aegyptiaca* on *Catlacatla* indicated lesion, pigments, inflammation, necrosis, malignancy and cellular degeneration on the liver after exposure. This is agree with (**Fafioye** *et al.*, **2004**)reported that aqueous and ethanolicextracts of *Parkiabiglobosa*and *Raphiavinifera*exposedto*Clariasgariepinus*juveniles liver showed disorganized hepatic cords, haemosiderosis, coagulative necrosis andsevere oedema occurred.The liver is considered the most important target organ from a toxicological point of view because of its role in detoxification, biotransformation and excretion of xenobiotics(**Hassanein***et al.***, 1999**).

IV. CONCLUSION

The present study proves the toxic potential of the plant root extract and shows moderate to severe alterations in liver tissue which can lead to metabolic changes in the fish. The results of the present study clearly indicated that piscicides have a direct impact on the structural alterations in *Catlacatla*. The plant root extract is known to impair the metabolic and the physiological activities of the organism and through repeated exposure the pesticide tends to accumulate in its tissues even at lethal concentration.

The important aspect of this research is, besides the description of the histological effects of the plant root extract on the liver of *Catlacatla,* the detection that some of them are significant and appears very inactive shortly after exposure. One wants to point out that the observed effects are serious if considered that the concentration of the product used in the tests is considered safe according to a perspective of environmental safety.

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New Approach / Definition of Fractional Derivative i.e Generalization of Comfortable Fractional Derivative

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ABSTRACT

In this paper we define new definition of fractional derivative i.e Generalize comformable fractional derivative and verify its validity for Linearity property, product rule, Quotient rule, and verify derivative of some Standard function. The definition satisfies the previous results for ordinary derivative and derivative of some standard function.

Keywords: Fractional Derivative, New Approach of Fractional Derivative.

I. INTRODUCTION

Fractional derivative is as old as calculus. L'Hospital in 1695 asked what does it mean if $\frac{d^n f}{dx^n}$.if n=$\frac{1}{2}$ Since then, many researchers tried to put a definition of a fractional derivative. Most of them used an *integral form* for the fractional derivative.

Two of which are the most popular ones.

1) Riemann liouville definition. For $\alpha \in [n-1, n)$ the α derivative of f is

$$D_a{}^\alpha = \frac{1}{\Gamma(n-\alpha)} \frac{d^n}{dt^n} \int_a^t \frac{f(x)}{(t-x)^{\alpha-n+1}} dx$$

2) Coputo definition. For $\alpha \in [n-1, n)$ the α derivative of f is

$$D_a{}^\alpha = \frac{1}{\Gamma(n-\alpha)} \int_a^t \frac{f^n(x)}{(t-x)^{\alpha-n+1}} dx$$

Now, all definitions including (i) and (ii) above satisfy the property that the fractional derivative is linear. This is the only property inherited from the first derivative by all of the definitions. However,

II. METHODS AND MATERIAL

(i) The Riemann–Liouville derivative *does not* satisfy $D_a{}^\alpha(1) = 0$
($D_a{}^\alpha(1) = 0$ for the Caputo derivative), if α is not a natural number.

(ii) All fractional derivatives *do not* satisfy the known formula of the derivative of the product of two functions:
$$D_a{}^\alpha(fg) = fD_a{}^\alpha(g) + gD_a{}^\alpha(f)$$

iii) All fractional derivatives *do not* satisfy the known formula of the derivative of the quotient of two functions:

$$D_a{}^\alpha(f/g) = \frac{gD_a{}^\alpha(f) - fD_a{}^\alpha(g)}{g^2}$$

(iv) All fractional derivatives *do not* satisfy the chain rule:
$$D_a{}^\alpha(f \circ g) = f^\alpha(g(t))g^\alpha(t)$$
(v) All fractional derivatives *do not satisfy*: $D^\alpha D^\beta f = D^{\alpha+\beta} f$ general.
(vi) The Caputo definition *assumes that the function f is differentiable*.

Let $f : [0, \infty) \to$ R and $t > 0$. Then the definition of the derivative of f at t is
$$\frac{df}{dt} = \lim_{\epsilon \to 0} \frac{f(t+\epsilon) - f(t)}{\epsilon}.$$

According to this, one has $\frac{dt^n}{dt} = nt^{n-1}$. So the question is: Can one put a similar definition for the fractional derivative of order α, where $0 < \alpha \leq 1$? Or in general for $\alpha \in (n, n+1]$ where $n \in$ N.

Let us write T_α to denote the operator which is called the fractional derivative of order α. For $\alpha = 1$, $T1$ satisfies the following properties:
(i) $T_1(af + bg) = aT_1(g) + bT_1(f)$, for all $a, b \in$ R and f,g in the domain of T_1.
(ii) $T_1(t^p) = pt^{p-1}$
(iii) $T_1(fg) = fT_1(g) + gT_1(f)$
(iv)

$$T_1(f/g) = \frac{gT_1(f) - fT_1(g)}{g^2}$$

(v) $T_1(\lambda) = 0$, for all constant functions $f(t) = \lambda$.

Now, we present our new definition, which is the simplest and most natural and efficient definition of fractional

derivative of order $\alpha \in (0, 1]$. We should remark that the definition can be generalized to include any α. However, the

case $\alpha \in (0, 1]$ is the most important one, and once it is established, the other cases are simple.

III. RESULTS AND DISCUSSION

New approach of fractional derivative/Another definition of fractional derivative

Definition 3.1. Given a function $f : [0, \infty) \dashrightarrow$ R. Then the ''*conformable fractional derivative*'' of f of order α is defined by

$$\lim_{\varepsilon \to 0} \frac{f(t + (\varepsilon t)^{1-\alpha}) - f(t)}{\varepsilon^{1-\alpha}}$$

This definition satisfy all the above five properties of T_1 of derivative.

for all $t > 0$, $\alpha \in (0, 1)$. If f is α-differentiable in some $(0, a)$, $a > 0$, and $\lim_{t \to 0^+} f^\alpha(t)$ exists then define $\lim_{t \to 0^+} f^\alpha(t) = f^\alpha(0)$

We will, sometimes $f^\alpha(t)$ for $T_\alpha f(t)$ write to denote the conformable fractiona derivatives of f of order α. In addition,

if the conformable fractional derivative of f of order α exists, then we simply say f is α-differentiable.

We should remark that $T_\alpha(t^p) = pt^{p-\alpha}$. Further, our definition coincides with the classical definitions of R–L and of

Caputo on polynomials (up to a constant multiple).

As a consequence of the above definition, we obtain the following

Theorem 3.1. *If a function $f : [0, \infty) \longrightarrow$ R is α-differentiable at $t_0 > 0 >$, $\alpha \in (0, 1]$, then f is continuous at t_0 .*

Proof.

Since $f(t_0 + (\varepsilon t)^{1-\alpha}) - f(t_0) = \frac{f(t_0 + (\varepsilon t)^{1-\alpha}) - f(t_0)}{\varepsilon} . \varepsilon$ then

$$\lim_{\varepsilon \to 0} f(t_0 + (\varepsilon t)^{1-\alpha}) - f(t_0) = \lim_{\varepsilon \to 0} \frac{f(t_0 + (\varepsilon t)^{1-\alpha}) - f(t_0)}{\varepsilon} . \lim_{\varepsilon \to 0} \varepsilon$$

$$\lim_{\varepsilon \to 0} f(t_0 + (\varepsilon t)^{1-\alpha}) - f(t_0) = f^\alpha(t_0). 0$$

$$\lim_{\varepsilon \to 0} f\left(t_0 + (\varepsilon t)^{1-\alpha}\right) - f(t_0) = .0$$

Which implies that

$$\lim_{\varepsilon \to 0} f\left(t_0 + (\varepsilon t)^{1-\alpha}\right) = f(t_0)$$

Hence f is continuous.

Theorem.3.2. *Let $\alpha \in (0, 1]$ and f, g be α-differentiable at a point $t > 0$. Then*
(i) $T_\alpha(af + bg) = aT_\alpha(g) + bT_\alpha(f)$, for all $a, b \in R$ and f, g in the domain of T_1.
(ii) $T_\alpha(t^p) = pt^{p-1}$ for all p$\in R$
(iii) $T_\alpha(fg) = fT_\alpha(g) + gT_\alpha(f)$
(iv)

$$T_\alpha(f/g) = \frac{gT_\alpha(f) - fT_\alpha(g)}{g^2}$$

(v) $T_\alpha(\lambda) = 0$, for all constant functions $f(t) = \lambda$.
VI) If in addition , f is differentiable then $T_\alpha(f)(t) = t^{1-\alpha} \frac{df}{dt} t$
we will prove II, III VI other follows directly from definition.
VI)ans.

$$T_\alpha(f)(t) = t^{1-\alpha} \frac{df}{dt} t$$

$$\lim_{\varepsilon \to 0} \frac{f(t + (\varepsilon t)^{1-\alpha}) - f(t)}{\varepsilon^{1-\alpha}}$$

Let $=h = (\varepsilon t)^{1-\alpha} = \varepsilon^{1-\alpha} t^{1-\alpha}$ *implies* $\varepsilon^{1-\alpha} = ht^{\alpha-1}$ *as* $\varepsilon \to 0, h \to 0$

$$= \lim_{h \to 0} \frac{f(t + h) - f(t)}{ht^{\alpha-1}}$$
$$= \lim_{h \to 0} \frac{f(t + h) - f(t)}{ht^{\alpha-1}}$$
$$= t^{1-\alpha} \frac{df}{dt} t.$$

II)

$$T_\alpha(t^p) = \lim_{\varepsilon \to 0} \frac{(t+(\varepsilon t)^{1-\alpha})^p - t^p}{\varepsilon^{1-\alpha}}$$

$$=$$

$$\lim_{\varepsilon \to 0} \frac{t^p + pt^{p-1}\varepsilon^{1-\alpha}t^{1-\alpha} + \frac{P(P-1)}{2}t^{p-2}\varepsilon^{(1-\alpha)^2}t^{(1-\alpha)^2} + \cdots \dots\dots\dots\dots + -t^p}{\varepsilon^{1-\alpha}}$$

$$= \lim_{\varepsilon \to 0} \frac{pt^{p-1}\varepsilon^{1-\alpha}t^{1-\alpha} + \frac{P(P-1)}{2}t^{p-2}\varepsilon^{(1-\alpha)^2}t^{(1-\alpha)^2} + \cdots \dots\dots\dots}{\varepsilon^{1-\alpha}}$$

$$= \lim_{\varepsilon \to 0} p t^{p-1} t^{1-\alpha} + \frac{\frac{P(P-1)}{2} t^{p-2} \varepsilon^{(1-\alpha)^2} t^{(1-\alpha)^2} + \cdots \cdots \cdots}{\varepsilon^{1-\alpha}}$$

$$= p t^{p-\alpha} \qquad \blacksquare$$

III)

$$T_\alpha(fg)(t) = \lim_{\varepsilon \to 0} \frac{f(t + (\varepsilon t)^{1-\alpha}) g(t + (\varepsilon t)^{1-\alpha}) - f(t)g(t)}{\varepsilon^{1-\alpha}}$$

$$= \lim_{\varepsilon \to 0} \frac{f(t + (\varepsilon t)^{1-\alpha}) g(t + (\varepsilon t)^{1-\alpha}) - f(t)g(t + (\varepsilon t)^{1-\alpha} + f(t)g(t + (\varepsilon t)^{1-\alpha} - f(t)g(t)}{\varepsilon^{1-\alpha}}$$

$$= \lim_{\varepsilon \to 0} \left(\frac{f(t+(\varepsilon t)^{1-\alpha})-f(t)}{\varepsilon^{1-\alpha}}\right).g(t + (\varepsilon t)^{1-\alpha}) += \lim_{\varepsilon \to 0} \left(\frac{g(t+(\varepsilon t)^{1-\alpha})-g(t)}{\varepsilon^{1-\alpha}}\right).f(t)$$

$$== T_\alpha(f) \lim_{\varepsilon \to 0} g(t + (\varepsilon t)^{1-\alpha}) + f(t) T_\alpha(g)$$

Since g is continuous $\lim_{\varepsilon \to 0} g(t + (\varepsilon t)^{1-\alpha}) = g(t)$.   ■

Conformable fractional derivatives of certain functions.
1. $T_\alpha(t^p) = p t^{p-1}$ for all $p \in R$
2. $T_\alpha(1) = 0$
3. $T_\alpha(e^{cx}) = cx^{1-\alpha} e^{cx}, c \in R$
4. $T_\alpha(sinbx) = bx^{1-\alpha} cosbx, b \in R$
5. $T_\alpha(cosbx) = -bx^{1-\alpha} sinbx, b \in R$
6. $t_\alpha \left(\frac{1}{\alpha} t^\alpha\right) = 1$
   1. Is proved in above thm we will prove 3, and 4 other follow directly from the definition.

$$T_\alpha(e^{cx}) = \lim_{\varepsilon \to 0} \frac{e^{(cx+c(\varepsilon x)^{1-\alpha})} - e^{cx}}{\varepsilon^{1-\alpha}}$$

$$T_\alpha(e^{cx}) = \lim_{\varepsilon \to 0} \frac{e^{cx} e^{c(\varepsilon x)^{1-\alpha}} - e^{cx}}{\varepsilon^{1-\alpha}}$$

Here $h = h = (\varepsilon x)^{1-\alpha} \Rightarrow \varepsilon^{1-\alpha} = h. x^{\alpha-1}$
Putting the values

$$T_\alpha(e^{cx}) = \lim_{\varepsilon \to 0} \frac{e^{cx}(e^{ch} - 1)}{h.x^{\alpha-1}}$$

$$T_\alpha(e^{cx}) = \lim_{h \to 0} \frac{e^{cx}(e^{ch} - 1).c}{c.h.x^{\alpha-1}}$$

$$T_\alpha(e^{cx}) = \frac{e^{cx}c}{x^{\alpha-1}} \lim_{h \to 0} \frac{(e^{ch} - 1).}{c.h.}$$

$$as\ \varepsilon \to 0, \Rightarrow h \to 0$$

$$T_\alpha(e^{cx}) = \frac{e^{cx}c}{x^{\alpha-1}}.1$$

$$T_\alpha(e^{cx}) = cx^{1-\alpha}e^{cx}, c \in R\ .\ \blacksquare$$

4)

$$T_\alpha(sinbx) = bx^{1-\alpha}cosbx, b \in R$$

By using definition.

$$= \lim_{\varepsilon \to 0} \frac{sinb(x + (\varepsilon x)^{1-\alpha}) - sinbx}{\varepsilon^{1-\alpha}}$$

$$= \lim_{\varepsilon \to 0} \frac{2cosb\left(x + \frac{(\varepsilon x)^{1-\alpha}}{2}\right) sin\frac{b(\varepsilon x)^{1-\alpha}}{2}}{\varepsilon^{1-\alpha}}$$

$$= cosbx \lim_{\varepsilon \to 0} \frac{sin\frac{b(\varepsilon x)^{1-\alpha}}{2}}{\frac{b(x\varepsilon)^{1-\alpha}}{2}}.bx^{1-\alpha}$$

$$= cosbx.bx^{1-\alpha}\ \blacksquare$$

In similar mannar as above $T_\alpha(cosbx) = -bx^{1-\alpha}sinbx, b \in R$ can be proved.

However, it is worth noting the following conformable fractional derivatives of certain functions:

7. $T_\alpha\left(e^{\frac{1}{\alpha}t^\alpha}\right) = \left(e^{\frac{1}{\alpha}t^\alpha}\right)$

8. $T_\alpha\left(sin\frac{1}{\alpha}t^\alpha\right) = \left(sin\frac{1}{\alpha}t^\alpha\right)$

9. $T_\alpha\left(cos\frac{1}{\alpha}t^\alpha\right) = \left(cos\frac{1}{\alpha}t^\alpha\right)$

This result can proved as above.by using definition.

IV. CONCLUSION

one can also generalize this derivative.

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A Pharmacophoric Pattern for 6-Nitro-2,3-Dihydroimidazo [2,1-B][1,3]Oxazoles for Leishmania Infantum

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ABSTRACT

The present work is a first ever attempt to identify a common pharmacophoric pattern for *Leishmania infantum* inhibitory activity of 6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazole derivatives. The dataset used in this work covers a wide chemical space and contains 224 molecules. The analysis reveals that the activity has link with the presence of nitro group, imidazole and oxazole rings. The results of present analysis could be useful to develop a better derivative of 6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazole having augmented activity against *Leishmania infantum*.

Keywords: modeling,6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazole, *Leishmania infantum*

I. INTRODUCTION

It is an established fact that *Leishmania infantum* (*L.Inf.*) is the causative agent of infantile visceral leishmaniasis (kala-azar), a fatal disease, if left untreated. It is a neglected disease and also known as *Leishmania chagasi.* The emergence of resistant against existing marketed drugs have been reported. Therefore, a fresh quest for a new drug for this disease is essential [1-3]. Recently, Thompson*et al* [1-3] screened 6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazolefor their *Leishmania infantum* inhibitory activity.Some of the tested compounds are found to be active in micro and sub-micro molar level. Although, Thompson*et al* [1-3] describedexhaustive and varied SAR (Structure-Activity Relationships), but no attempt was implemented by them to develop a consensus pharmacophore model. Hence, the present work isdesigned to achieve development of such pharmacophore model.

II. EXPERIMENTAL METHODOLOGY [4-6]

1. Selection of Dataset: The development of consensus pharmacophore model is based on a dataset of 224 molecules [1-3]. The selected dataset comprises stereo, positional and functional isomers, thus covering a broad chemical space. The molecules were screened for their *Leishmania infantum* inhibitory activity. The activity

values(IC$_{50}$ expressed as μM) were used to find most active molecules. The Table 1 contains top active molecules used for model building.

Table 1. SMILES notations and activity values IC$_{50}$ (μM)for top five molecules used for alignment

S.N.	SMILES	L. inf IC$_{50}$ (μM)
1	FC(C=C1)=CC=C1C(N=C2)=CC=C2OCC3CN4C(O3)=NC([N+]([O-])=O)=C4	0.03
2	FC(C=C1)=CC=C1C(N=C2)=CC=C2OC[C@@H]3CN4C(O3)=NC([N+]([O-])=O)=C4	0.03
3	FC(C=C1F)=CC=C1C(N=C2)=CC=C2OCC3OC4=NC([N+]([O-])=O)=CN4CC3	0.03
4	FC(C=C1F)=CC=C1C(C=N2)=CC=C2OCC3OC4=NC([N+]([O-])=O)=CN4CC3	0.037
5	O=[N+](C1=CN2C(OC(COC3=CC=C(OC(F)(F)F)C=C3)CC2)=N1)[O-]	0.047

2. Development of model: The whole methodology is based on four main steps

1. Structure drawing: The structures of 224 molecules were drawn using ChemSketch 12 freeware.
2. Structure optimization: in second step, Avogadro 1.1 was used to optimize the 3D- structure of all the molecules using semi-empirical method (MMFF94).
3. Alignment of molecules: This step was accomplished using Open3Dalign.
4. Model generation: Finally, top five active aligned molecules were introducedinPyMOL 2.0. Then,PyMOL plugin 'LIQUID' was employed to createconsensus model using default settings.

III. RESULT AND DISCUSSIONS

The present *in-silico*analysis discloses that the *Leishmania infantum* inhibitory activityof molecules used in the present work has strong correlation with nitro group on imidazole ring and oxazole ring.The developed consensus pharmacophore model has been shown in figure 1.
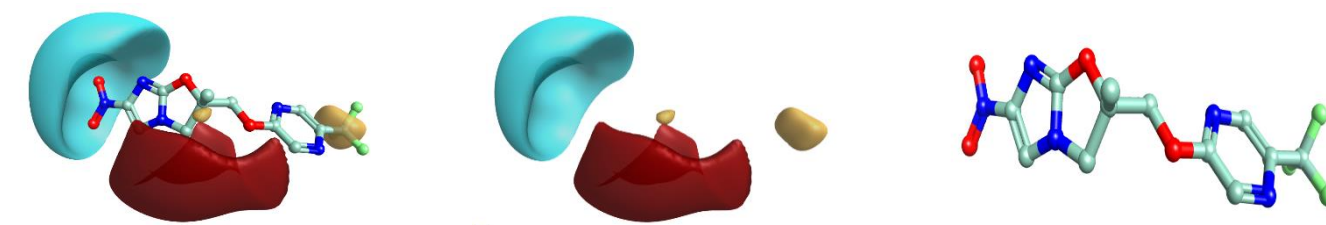
Figure 1. Consensus pharmacophore model with and without molecule and contours for different regions (Yellow: Lipophilic, Blue: negative and Red: positively charged region)

A simple analysis of figure 1 reveals that *Leishmania infantum* inhibitory of 6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazoles is influenced by the negatively charged region due to the nitro group attached to imidazole ring and a big positively charged region due to oxazole ring. It also varies with a small lipophilic region near to aromatic ring. Therefore, a good strategy to retain the activity is to give good importance to these regions.

IV. CONCLUSIONS

The 6-Nitro-2,3-Dihydroimidazo [2,1-b][1,3]oxazoles have fascinating *Leishmania infantum* inhibitory which is associated with the presence of imidazole and oxazole rings as well as with the nitro group, such a combination of these moieties must be retained in future optimization to have good activity. The present study was effective in discovering useful structural features for future optimizations.

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Study of Household Bagworms (Psychidae- Lepidoptera) from Dongarkharda Village of Yavatmal District, Maharashtra, India

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ABSTRACT

Yavatmal district is the third largest district after Nagpur and Amravati in Vidarbha by population which is surrounded by dense forest. Total forest area in Yavatmal district is 2508.010 Sq/km which is 18.46% of the geographical area of the District. Kalamb is one of the Taluka of Yavatmal District rich in both flora and fauna including Durug, Madkona, Zadkinhi, Devnala, Potgavhan & Dongarkharda are the well-known forests of the district. Trees like teak, bamboo, Tendu, Hirda, Apta and moha available in the forests. Wild-bear, Deer, Nilgai, Sambar and Hyena are some of the animals found in the forests. Bag worm protecting themselves by closing in a bag, so it is sincere attempt to find out about Creature (bagworms) from my village started survey of houses from my surroundings during September – October 2020 daily from 10 AM to late Evening. In search of bagworms 10 houses were surveyed and found bagworms were reported from only 3 houses. In current study total 47 species were reported and 13species were successfully recognized from 5 different genera.

Key Words: -Bagworm, Case, Dongarkharda,.

I. INTRODUCTION

The larval form of the Bagworm put up bags made up of silk and environmental resources such as plant debris, dirt, leaves of plants or from grass materials. These bags are sediments to rocks, foliages or branches at the time when they are in inactive phase or throughout their pupa stage otherwise mobile when they are active or in search of food. Bagworm, also are a family of the Lepidoptera which includes butterflies and moths, but comparatively bagworm family is quite smaller with in relation to 1,350 species belonging to 241 genera (Van Nieukerken et. al., 2011) these all species from Lepidoptera are found worldwide, out of which some are snail case bagworm (*Apterona helicoidella*). While the larvae of some species feed on lichen, and others favors green leaves while some eat spider webs, wool, and the superfluous larval bags of members of its own species. Hampson published 36 species in 1892, from British India together with Sri Lanka and Myanmar. Currently in India 106 species belonging to 34 genera have been found to occur (Sobczyk & Thomas 2011)

In several species, the adult females not have wings and are as a result they may be difficult to identify exactly. Shuhei Niitsu (2003) .The first evidence of these species came from Lord Walsingham in 1897 (Busck, 1933). Though, the species he collected from the Virgin Islands were not recognized properly.

Mostly all household Bagworms require high moisture for its complete development, a preventive factor for its spreading during the rest of the State. Hetrick (1957) studied that the insect in various parts of Florida and Louisiana, as well as USDA records of the household bagworms from Mississippi and North Carolina. He also found that these species might be present in the coastal areas of Alabama, Georgia, South Carolina, Texas and Virginia. Though, appropriate identification by a professional taxonomist is suggested as few other unidentified but identical species were also studied.

In its larval period, the bagworm has three set of legs as well as fake legs. It is found that that the real legs are actual which helps it walk on floors, even the fake legs through hooks on the tops permit them to walk within its defensive case.

II. MATERIAL AND METHODS

A) Study Area

Area selected for study of bagworm is outskirt area around the village of Dongarkherda of is about   on 79.01 E; 19.88 N;   in Kalamb Taluka. According to Census 2011 information the location code or village code of Dongarkharda village is 542335 the forest is dense with great floral and faunal diversity. The temperature of area ranges from 31.0⁰C to 38.0⁰C. The region receives an annual rainfall of 289.7 mm to 510.9 mm during the monsoon between Junes to September. The relative humidity varies from 25-59%.

Map of India showing Yavatmal
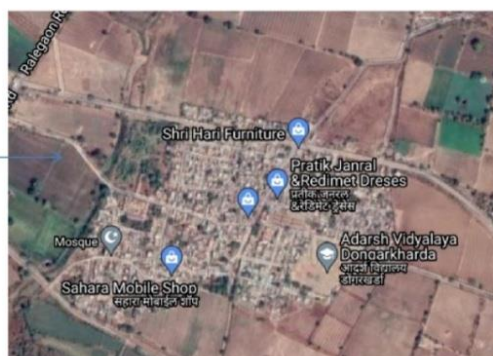
Satellite image :- Study area Village Dongerkherda District Yavatmal

Fig 1:- Satellite Map of Study Area

B)   Methods

The bagworms were photographed using mobile camera ASUS Zen phone 3 with camera resolution of 16M (4:3) and few were collected by handpicking in plastic container for further development while some were left to its habitat; repetition of collection was avoided. Available keys are used to identify but no mature adult were recorded to its actual identification.

C)   Observation:-

During study it is observed that the case constructed by larvae of bagworms is a slightly , horizontal and equally flattened , tapering at both ends; or spindle-shaped case which look or seem like Seed of a pumpkin which is made up of a silk-lined jacket inside and opens at both ends.

Completely shaped cases are 7-13 mm long and 4-5 mm wide. Once a larva has constructed its case, it not at all leaves its case and its all Biological activities such as feeding, excretion, molting, and pupation were took place inside the same case. To feed collected larvae we used older webs of spiders, some fresh leaves and some sort of dry grasses respectively in plastic container but unfortunately no evidences were reported of feeding.

Larvae 1   Larvae 2

Larvae 3   Larvae 4

Plate 1:- *Lepidoptera* **Larvae**

III. RESULT & DISCUSSION

In the above study , it was found that in only 4 out of 10 houses where plaster was applied on walls we found bagworms, on another hand in one or two places only molds were found in cowsheds. By this it is noticed that plaster applied wall absorbs a lots of moisture in rainy season's & winter, so bagworms may have been found there.

All most all Bagworms (Lepidoptera) Constructed carrying cases for the period of their larval stage of life cycle. In order Lepidoptera such cases were created in a lot of families (e.g., Psychidae, Tineidae, Mimallonidae, Stenomidae), and show a discrepancy between genera in relation to size, shape, and materials. They may be tapering, elliptical, spherical, oval, rounded spindle-shaped. Cases studied amongst order Lepidoptera revels the only ones similarity with genus Phereoeca of family Tineidae.. Mainly entire study of bagworms morphology, taxonomy, habit and habitat, life cycle were described here was taken from keys and identification charts of Aiello's(1979).

Total Number of Organisms:	47	Total Number of Species:	13
Average population size:	3.615	Decimal Accuracy:	4

Simpson Index Approximation $\frac{\sum_i n_i^2}{N^2}$ 0.09552

Shannon Index $-\sum_i \left(\frac{n_i}{N} \cdot \log_2 \left(\frac{n_i}{N} \right) \right)$ 3.514

Table Shows Bagworm Species from Study area.

Genus - *Narycia*
Narycia berecynthia
Narycia scelerata
Genus Typhonia
Typhonia colonica
Typhonia cremata
Typhonia deposita
Typhonia devincta
Typhonia imparata
Typhonia infensa
Genus Sapheneutis
Sapheneutis colocynthia
Sapheneutis galerita
Genus Acanthoecia
Acanthoecia larminati
Acanthopsyche bipars
Acanthopsyche elwesi

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Best and ICT based Practices in Phulsing Naik Mahavidyalaya, Library, Pusad

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ABSTRACT

The Present research paper discusses on the best and ICT Practices conducted in Phulsing Naik Mahavidyalaya, Pusad (P. N. College) respectively. This college conducted the following best and ICT Practices as per the NAAC indications. Some Special Best and ICT based practices followed by the College libraries successfully, effectively and efficiently in the libraries as well as its impact on library use.

Key Word – College Library, Best and ICT Practices, Special Services, NAAC

I. INTRODUCTION

Library and Information Services of Higher Education Institutions plays a vital role in enhancing the quality of academic and research environment. Library is the fulcrum of support for the entire range of academic activities on an educational campus. In Today's high-tech learning environment, the library as a learning resource is taking up increasingly more academic space and time in the life of a learner. This paper discusses on the Best and ICT based Best practices in the **Phulsing Naik Mahavidyalaya, Pusad (P. N. College)**. Library and Information services are always helpful to increasing quality in higher education. NAAC is always trying to maintain the quality of colleges and universities. Library is the heart of every college and Institution, so wherever NAAC is evaluating the colleges and universities mainly focus on the library and information services but the library is the heart of the every colleges and universities because while re-evaluation of college NAAC pointed out of college development. NAAC specially mention some best practices in re-evaluation of colleges. It will help to bring library forwards. State Government of Maharashtra became the first state Government in the country to establish 'Quality Assurance Cell' in the Higher Education Ministry to promote and push the concept of assessment and accreditation in colleges and universities. This college established only for the rural area students. This college submitted the SSR to NAAC Office, Bangalore for getting NAAC re-accreditation.

II. PHULSING NAIK MAHAVIDYALAYA, PUSAD (P. N. COLLEGE)

Janta Shikshan Prasarak Mandal, Pusad has been established the **Phulsing Naik Mahavidyalaya, Pusad** in the year 1961 at Pusad Taluka Pusad Dist Yavatmal. This area is famous for Cotton production in Maharashtra. The

library is functioning from the establishment of college and rendering the efficient and effective services which are the well known college in Maharashtra. In the Year of 2012 the NAAC Peer team was visited and awarded the **B level 2.66** gradation. The college running the further courses i.e. B.A., B.Com, (Marathi & English) B.Sc., B.C.A, B.B.A., and B.Sc. Seed-technology and Post Graduate courses are i.e. M.A. (Marathi, English,). M.Com M.Sc. (Chemistry, Computer Science) This College affiliated to Sant Gadge Baba Amravati, University Amaravati.

III. DEPARTMENT OF LEARNING RESOURCE CENTER

The P. N. College situated in the Independent Special library building. Library holds the more than 70,794 Books on different subjects. The subject's focus the four languages i.e. English, Marathi, Hindi, Sanskrit and Urdu all social science subjects and science subjects' books are also available in the library. The college library holds excellent collection on reference books. Presently, the library is functioning fully computerized and automated with Web OPAC. It has standard library software named as **Library Management** with online OPAC system. As the first step for introduction of bar coded in circulation control system it is necessary that the holding the accession number and member identification are converted in to barcodes. Total 70 journal/ periodicals are available in the library. 250 CD collections on various subjects and 6,00 Bound Back Volumes of periodicals and journals from 1961 up to 2008.

IV. AIMS OF THE STUDY

1. To identify the best practices maintained by NAAC
2. To study the best practices followed by the Phulsing Naik Mahavidyalya, Pusad.
3. To find out special best practices of the college library.

V. LIMITATION OF THE STUDY

This study is limited only Phulsing Naik Mahavidyalya, Pusad.

VI. NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC)

The National Assessment and Accreditation Council (NAAC) is an autonomous body established by the University Grants Commission (UGC) of India to assess and accredit institutions of higher education in the country. It is an outcome of the recommendations of the National Policy in Education (1986) that laid special emphasis on upholding the quality of higher education in India. The system of higher education in India has expanded rapidly during the last fifty years. There have been criticisms that the country has permitted the mushrooming of institutions of higher education with substandard facilities and consequent dilution of standards. To address the issues of deterioration in quality, the National Policy on Education (1986) and the Plan of Action (POA-1992) that spelt out the strategic plans for the policies, advocated the establishment of an independent national accreditation body. Consequently, the NAAC was established in 1994 with its headquarters at Bangalore.

Vision and Mission

NAAC states that: The activities and plans of the NAAC are guided by its vision and mission that focus on making quality assurance an integral part of the functioning of higher education institutions. The vision of the NAAC is to make quality the defining element of higher education in India through a combination of self and external quality evaluation, promotion and sustenance initiatives. The mission statement of the NAAC defines the following key tasks:

VII.   QUALITY INDICATORS IN LIBRARY AND INFORMATION SERVICES FOR COLLEGE LIBRARIES

NAAC has developed a set of objective indicators to facilitate assessment of library and

Information services in academic institutions. The guidelines are derived from an understanding of global developments, the national environment, and the outcome of a recent national-level workshop held at the NAAC, in which college and university librarians and library scholars from across the country had participated. College libraries need facilities that promote effective and interactive access and use of information resources for all users. In the area of physical facilities, libraries need safe, comfortable, well lighted, clean space, with adequate and appropriate seating, to ensure effective use of the library's resources. College libraries must consider study space needs, with special attention to reserve collections and the hostel environment of the institution. The libraries need well-framed rules and guidelines with regard to hours of access, circulation policies, and other regulations, to offer better services to users. Affiliated college libraries have the primary mission of meeting the library and information needs of undergraduate students. The guidelines below identify the principal factors influencing the development and maintenance of college library services and collections.

1. Management of library and information services.

According to the guidelines of NAAC, the core objective of the library in the degree colleges is to support the academic programmes offered. The library may design a system to delivery products and certain minimum infrastructure, such as book stacks, reading halls, circulation counter, and so on.

2. Collection and services provided to users.

The library is required to provide varied, authoritative, and up-to-date resources that supports its mission and fulfill the needs of its users. Resources may be provided in a variety of formats. A college library must have the quantity of resources prescribed by the UGC and other governing bodies. The library has a key role in supporting the academic activities of institutions. Assessment of college libraries must be carried out regularly to sustain and enhance their quality.

VIII.   BEST PRACTICES MAINTAINED BY NAAC

Listed below are some of NAAC best practices for enhancing the academic information environment and usability.

8.1 Management and administration of Library -
1.   In Service Programme
2.   Observation of other library Practices
3.   Staff Promotion policy

4. Maintenance of service areas

5. Special deposit scheme

6. Resource generation

7. Student Internship programme

8. Resources generation through internet services

9. Student Participation Programme

10. Earn While Learn Programme.

8.2 Collection and Services –

11. Compact Storage and less used collection

12. Collection development in different formats

13. Library book exhibition

14. Extended library opening hours

15. Extended hours of services

16. Collection enhancement in hybrid library

8.3 Use of Information Technology

28. Online Information Retrieval

29. Free browsing unit

30. Broadband internet centre.

36. Access to digital repository through website

37. Digital Repositories

38. CD mirror server facility

39. CD net server facility,

40. Using self development integrated library software automation of in house services.

41. Information Retrieval through Web OPAC.

42. LAN Facility 43. Database creation using international standard formats

IX. BEST AND ICT BASED PRACTICES FOLLOWED BY PHULSING NAIK MAHAVIDYALAYA, PUSAD

9. 1 Library Users

The **Phulsing Naik Mahavidyalaya, Pusad** holds **114** teaching and non teaching staff as the users, **3200** students of all disciplines. The Vasant Sudha Study Circular (MPSC Centre) students are the regular users of the library and the other mother society members, society members, ex-students are the regular users of the library.

9.2. Library Staff

The **Phulsing Naik Mahavidyalaya, Pusad** library holds Librarian-1, Assistant Librarian-1, and Library Attendant-5 and one Peon. The Whole staff is appointed as per the S. G. B. A. Uni., Amravati and Government of Maharashtra rules and regulations.

9.3 Tools for Acquisition

The Phulsing Naik Mahavidyalaya, Pusad library are using the bibliography, expert's opinion, head of department opinion and purchase committee remarks, students' recommendations, syllabus of the courses.

Book shops and exhibitions are the primary sources of acquisition. Library department heads and Faculty members use those cited sources and recommend selection.

9.4 Library Opening and Closing Hours

The Phulsing Naik Mahavidyalaya, Pusad library opens from Monday to Saturday in the morning session at 7.30 a.m. to 2.30 p.m. and in the evening session at 10.15a.m. to 5.45 p.m. every day. The Reading Room is kept open to all students for whole day and college Library will be closed on the Government holidays only.

9.5. Book Selection Policy

In the college the selection body for library books is the department head and faculty members. Sometimes management of the college does book selection for libraries, while the library committee also occasionally selects books.

9.6. Access Services

In the college library always keeps the open access for the P. G. students and teachers. The society members are also taking the books to their personal use. The Library also provides the access to management members, M.Phil., NET, SET and Ph.D. students who are coming from the society.

9.7. Library Lending Services

The Phulsing Naik Mahavidyalaya, Pusad library issues the two books through computers system at one time to one student and kept for 8 days returning time and for one faculty member 50 books are issued to one faculty for one month.

X. ORGANIZATION OF THE COLLECTION

10.1 Classification

In the Phulsing Naik College, Library the librarian has used the 22th Edition of Dewey Decimal Classification System for classifying the documents and 100 percent documents are classified as per DDC 22th edition scheme and all library collection arranged according to the DDC scheme by all subjects in the library.

10.2 Documents Cataloguing

Phulsing Naik College Library is maintained computer cataloguing

10.3 Stock Verification

Phulsing Naik college libraries is conducting the stock verification in every two year as per the accession numbers and keeping the record and recovering the missing documents and preparing the annual stock verification report and also recovering the missing documents as per rules of the Maharashtra state government. College library are maintaining the withdrawal register to withdraw the lost and damaged documents and books.

10.4 Services ---

Phulsing Naik College Library College is providing the following services to the learners

1. Book Bank facility to poor students
2. Library facilities to Competitive Exam (MPSC, UPSC) and Ex-students on deposit basis.
3. Inter library loan facility.
4. Ready reference services to any citizens.
5. New arrivals display and issue to learners.
6. Employment news and job orientation information to learners.
7. News paper clipping information services.

8.   Examination Question-papers and Course Syllabus Providing Services.
9.   Educational guidance services
10. Environmental Information services to learners.
11. Information on books published by faculty
12. Information on actual job services.
13. User Orientation Programme

XI. MANAGEMENT COOPERATION

The Phulsing Naik college Librarian found that the management is cooperative and encouraging them to improve the qualification and quality services in the library.

XII. SERVICES TO ENHANCE QUALITY

The college library is providing the services as SDI, CAS, educational help, no dues, Photocopying, Computerized circulation, Services on job oriented information i.e. MPSC, UPSC, banking, Career Oriented Courses etc. To improve the quality of the services, college library are giving priority to computerized services.

XIII.   QUALITY ASSESSMENT PRIORITIES

The college library gave preference to conduct the Seminars and Workshops for quality assessment techniques under lead college scheme. The librarian and library attendant are attending the National and International Conferences, Seminars, Workshops for their quality development and doing the refresher and orientation courses of library and information science.

XIV.   FINANCIAL MANAGEMENT

1. Sources of Library Funds
The Phulsing Naik College Library College Librarian specified "University Grants Commission" as the main source of their budget since both colleges have been recognized as "2 (F) and 12 (B) of UGC Act 1956. Second source of library funds are the fees collected from the students as per rules laid down by S. G. B. A., University, Amravati. Third source is Management; it gives the funds for the development of library.

XV. COMPUTERIZATION

15.1 Automation
Automation is a very important element in service quality. The Phulsing Naik College Library has used the standard library software which is named as **Library Management** . With the help of this software the library completed the computerization. Now, this library working with fully automated library operations.

15.2 UGC NRC Centre

The college library has received the UGC Grants under the UGC-NRC Scheme and developed the UGC Network Resource Centre in their library and developed the Internet Network Laboratory for the faculties and students.

15.3. Broadband Internet Connectivity

The college library have taken the connection of broadband internet connectivity to supply the services to the faculty members and students. The College has Subscribed the annual fee of Rs.**11,000/-** for Internet connectivity advance charges to BSNL office, Pusad.

15.4 N-List Membership to college library

The college libraries have subscribed the N-List membership to INFLIBNET Ahemdabad for their college users and fees paid Rs.**5000**/- as the annual fee. The Inflibnet has given the IP Addresses to the college.

15.5. Online Services to learners

The college library is providing the online information services to the learners of their institution.

15.6 Special Best Practices in both college libraries

The Phulsing Naik College conducting the Vasant Sudha Study centre (M.P.S.C.) for the college and other students. It provides special library services to all students. The colleges Librarian's are trying to earn the maximum funds from the UGC on various library aspects.

XVI.   CONCLUSION

In accordance with NAAC standards, libraries should establish, promote, maintain, and evaluate a range of quality services that support the colleges, mission and goals. Despite warnings of the UGC and directions to all the colleges, the college has undergone NAAC evaluation and colleges have awarded B level respectively. Presently, the college is preparing for NAAC Re-Accreditation. Phulsing Naik College, Library is following the so many best Practices in their library about management and services to their libraries. These types of best and ICT based practices are very useful in this modern information era to maintain carrier guidance for user than circulation of books and documents.

The Phulsing Naik College library are providing special guidance for completing course and selecting carrier of employment and it is an important educational task. All these above best and ICT based best practices helps library to create special image among students, teachers, lecturers, researchers as well as in the society. With the help of these quality based services the college library creates the good citizens for the nation.

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Big Data Security : An Overview

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ABSTRACT

Data is one of the most important resources in every field. The continuous growth in the importance and volume of data has created a new problem. It cannot be handled by traditional analysis techniques. This problem was, therefore, solved through the creation of a new paradigm: Big Data. However, Big Data originated new issues related not only to the volume or the variety of the data, but also to data security and privacy. In order to obtain a full perspective of the problem, we decided to carry out an investigation with the objective of highlighting the main issues regarding Big Data security, and also the solutions proposed by the scientific community to solve them. In this paper, we explain the results obtained after applying a systematic mapping study to security in the Big Data ecosystem. It is almost impossible to carry out detailed research into the entire topic of security in a Big Data system, along with the principal solutions to them proposed by the research community.

Keywords: Big Data; Security; Systematic Mapping study

I. INTRODUCTION

Datahasbecomeoneofthemost importantassetsinalmosteveryfield.Not only are they important for companies related to the computerscienceindustry,butalsofororganizations,such ascountries'healthcare, governments,education,orthe engineering sector. Data are essential with respect to carrying out their daily activities, and also helping the businesses'managementtoachievetheirgoalsandmake thebestdecisionsonthebasisoftheinformationextracted from them [1]. It is estimated that of all the data in recorded human history, 90 percent hasbeen created in the last few years. In 2003, five exabytes of data were createdbyhumans,andthisamountofinformationis,at present,createdwithintwodays.Thistendencytowards increasing the volume and detail of the data that is collectedbycompanieswillnotchangeinthenearfuture, asthe riseofsocialnetworks,multimedia,andtheInternet of Things (IOT) is producing an overwhelming flow of data [2].WearelivingintheeraofBigData.Furthermore, thisdataismostlyunstructured,signifyingthose traditional systemsarenotcapableofanalyzingit.Organizationsare willing to extract more beneficial information from this highvolumeandvarietyofdata.Anewanalysisisparadigm with
which to analyze and better understand this data, therefore,emergedinordertoobtainnotonlyprivate,but alsopublic,benefits,andthiswasBigData [3].

Eachnewdisruptivetechnologybringsnewissueswithit.   InthecaseofBigData,theseissuesarerelatednotonlyto thevolumeorthevarietyofdata,butalsotodataquality, data privacy, and data security. This paper will focuson thesubjectsofBigDataprivacyandsecurity.BigDatanot   onlyincreasesthescaleofthechallengesrelatedtoprivacy andsecurityastheyareaddressedintraditionalsecurity management, but also create new ones that need to be approached in a new way [4]. As more data is storedand analyzed by organizations or governments, more regulations are needed to address these concerns. AchievingsecurityinBigDatahas,therefore,becomeone ofthemostimportantbarriersthatcouldslowdownthe spread of technology; without adequate security guarantees,BigDatawillnotachievetherequiredlevelof trust.BigDatabringsbigresponsibility.

According to the Big Data Working Group at the Cloud SecurityAllianceorganizationthereare,principally,four different aspects of Big Data security: infrastructure security,dataprivacy,datamanagement,andintegrityand reactive security. This division of Big Data security into four principal topics has also been used by the InternationalOrganizationforStandardizationinorderto createasecuritystandardforsecurityinBigData.
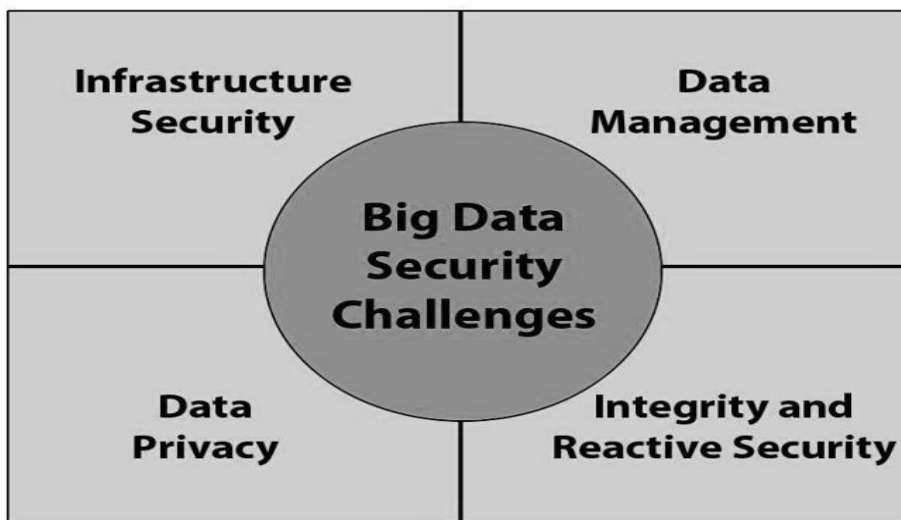
Figure1. Mainchallengesof securityinbigdata

II. INFRASTRUCTURESECURITY

When discussing infrastructure security, it is necessary to highlight the main technologies and frameworksfoundasregardssecuringthearchitectureof a Big Data system, and particularly those based on the Hadooptechnology,sinceitisthatmostfrequentlyused.In   thissectionweshallalsodiscusscertainothertopics,such ascommunicationsecurityinBigData,orhowtoachieve high-availability.

A. Security forHadoop

Thegraphicshowsthatthemaintopicdealtwithbythat researching infrastructure securityissecurityforHadoop. Hadoop can be consideredasadefectstandardforimplementingaBig Data environment in a company. The security problems related to this technology have been widely discussedbyresearchers,whohavealsoproposedvarious methodswithwhichtoimprovethesecurityoftheHadoop system. This category is probably the most transverse since, in order to protect it, the solutions use different securitymechanismssuchasauthenticityorcryptography.

Forexample,thereisaproposalforasecuritymodelfor G-Hadoop(anextensionoftheMap Reduceframeworkto run on multiple clusters) that simplifies users' authenticationandsomesecuritymechanismsinorderto protect the system from traditional attacks [5]. A few papers focus on protecting the data that is stored inthe HDFSbyproposinganewschema,asecureaccesssystem, oreventhecreationofanencryptionscheme.

B. Availability

Researchers have also dealt with the subject of availability in Big Data systems. One of the main characteristicsofBigDataenvironments,andbyextension ofaHadoopimplementation,istheavailabilityattainedby theuseofhundredsofcomputersinwhichthedataarenot only stored, but are also replicated along the cluster. Findinganarchitecturethatwillensurethefullavailability ofthesystemis,therefore,apriority.

For instance [6], in the authors propose a solution with whichtoachievehighavailabilitybyhavingmultipleactive NameNodesatthesametime.Othersolutionsarebased oncreatinganewinfrastructureofthestoragesystemso astoimproveavailabilityandfaulttolerance.

C. ArchitectureSecurity

Anotherdifferentapproachisthatofdescribinga newBigDataarchitecture,ormodifyingthetypicalone,in
Order to improve the security of the environment. The authors of propose a new architecture based on the Hadoopfilesystemwhich,whencombinedwithnetwork coding and multi-node reading, makes it possible to improve the security of the system. Another solution focuses on secure group communications in large-scale networks managed by Big Data systems, and this is achieved by creating certain protocols and changing the infrastructureofthenodes.

D. Authentication

Thevalueofthedataobtainedafterexecutingabig Dataprocesscan,toagreatextent,bedeterminedbyits authenticity. A few papers deal with this problem by proposing solutions related to authentication. In, the authorssuggestsolvingtheproblemofauthenticationby creating an identity-based signcryption scheme for Big Data.

E. CommunicationSecurity

Thesecurityasregardscommunicationsbetween different parts of the Big Data ecosystem is a topic that often is ignored, and only a small number of papers thereforedealwiththisproblem.Onepaperapproaches thetopicbyexplainingtheregulardatalifecycleinaBig Datasystem,followingthedifferentnetworkprotocolsand applicationsthatthedatapassthrough.Theauthorsalso enumeratethemaindatatransfersecuritytechniques.

III. DATAPRIVACY

Data privacy is probably the topic about which ordinarypeoplearemostconcerned,butitshouldalsobe oneofthegreatestconcernsfortheorganizationsthatuse BigDatatechniques.ABigDatasystemusuallycontainsan enormous amount of personal information that organizations use in order to obtain a benefit from that data. However, we should ask ourselves where the limit regardingtheuseofthatinformationis.

Organizationsshouldnothavetotalfreedomtousethat information without our knowledge, although they also needtogainsomebenefitfromtheuseofthatdata.Several techniques and mechanisms with which to protect the privacyofthedata,andalsoallowcompaniestostillmake a profit from it have therefore been developed, and attempttosolvethisprobleminvariousdifferentways.

Figure 2 Main topics on data privacy.

A. Cryptography

The most frequently employed solution as regards securingdataprivacyinaBigDatasystemiscryptography. Cryptography has been used to protect data for a considerableamountoftime.Thistendencycontinuesin the case of Big Data, but it has a few inherent characteristics that make the direct application of traditionalcryptographytechniquesimpossible.

Oneexampleoftheuseofcryptographycanbefound in, in which the authors propose a bitmap encryption scheme that guarantees users' privacy. Other authors' researchisfocusedonhowtoprocessdatathatisalready encrypted.Onepaper,forexample,explainsatechnique with which to analyze and program transformations withPig Latininthecaseofencrypteddata.

B. AccessControl

Access control is one of the basic traditional techniques used to achieve the security of a system.- Its main objective is to restrict non-desirable users' access to the system. In the case of BigData, the access control problem is related to the fact that there are only basic forms of access control. In order to solve this problem, some authors propose a frameworkthatsupportstheintegrationofaccesscontrol features. Other researchers focus their attention on the Map Reduceprocessitself,andsuggestaframeworkwith which to enforce the security policies at the key-value level.

C. Confidentiality

Although privacy is traditionally treated as a part of confidentiality,wedecidedtochangetheorderowingto the tremendous impact that privacy has on the general public'sperceptionofBigDatatechnology.

Theauthorsthatapproachthisproblemoftenpropose newtechniquessuchascomputingonmaskeddata(CMD), which improves data confidentiality and integrity by allowingdirectcomputationstobemadeonmaskeddata, or new

schemes, such as Trusted Scheme for Hadoop Cluster (TSHC) which creates a new architecture framework for Hadoop in order to improve the confidentialityandsecurityofthedata.

D. Privacy-Preserving Queries

The main purpose of a Big Data system is to analyzethe data in order to obtain valuable information. However, while we manipulate that data, we should not forget its privacy.Afewpaperspayattentiontotheproblemofhow to make queries whilst simultaneously not violating the privacyofthedata.

One way in which to achieve this protection is by encryptingthedata,asdiscussedpreviously,butthisadds a new problem: how do we analyze the encrypted data? Someauthorsproposethatthisproblemcanbesolvedby means of a secure keyword search mechanism over that encrypteddata.

E. Anonymization

One of the most extended ways in which toprotect the privacy of data is by anonymizing it. This consists of applyingsomekindoftechniqueormechanismtothedata   inordertoremovethesensitiveinformationfromitorto hideit.BigDatausuallyimpliesalargeamountofdata,and   this   problem,   therefore,   increases   in   Big   Data environments.

Theauthorsofproposeahybridmethodthatcombines the two most frequently used anonymisation schemes: top-down specialization (TDS) and bottom-up generalization(BUG).

F. DifferentialPrivacy

The objective of differential privacy is to provide a methodwithwhichtomaximizethevalueofanalysisofa set of data while minimizing the chances of identifying users'identities.Afewpapersfocusonachievingprivacy inBigDatabyapplyingdifferentialprivacytechniques.For example, in the authors attempt to distort the data by addingnoise.

IV. DATA MANAGEMENT

This section focuses on what to do once the data is containedintheBigDataenvironment.Itnotonlyshows how to secure the data that is stored in the BigData system, but also how to share that data. We shall also discussthedifferentpoliciesandlegislationthatauthors suggestinordertouseBigDatatechniquessafely.

V. INTEGRITYAND REACTIVE SECURITY

OneofthebasesonwhichBigDataissupportedisthe capacity to receive streams of data from manydifferent originsandwithdistinctformats:eitherstructuraldataor non-structural data. This increases the importance of checkingthatthedata'sintegrityisgoodsothatitcanbe used properly. This topic also covers the use case of applying Big Data in order to monitor security so as to detectwhetherasystemisbeingattacked.

A. Integrity

Integrity has traditionally been defined as the maintenance of the consistency, accuracy, and trustworthinessofdata.Itprotectsdatafromunauthorized   alterationsduringitslifecycle.Integrityisconsideredtobe oneofthethreebasicdimensionsofsecurity(alongwith confidentiality and availability). Ensuring integrity is

criticalinaBigDataenvironment,andauthorsagreeasto   thedifficultyofachievingtheproperintegrityofdatawhen attemptingtomanagethisproblem.

For example, they propose an external integrity verification of the data [7] or a framework to ensure it during a Map Reduceprocess [8].

B. Attack Detection

Asoccurswithallsystems,BigDatamaybeattackedby malicioususers.Someauthors inherit characteristics of Big Data and suggest certain indicators that may be a sign that the Big Data environmentisunderattack.

For instance, in [9] the authors a computational system develops. That captures the provenance data related to a Map Reduce process. There are also researchers who proposeanintrusiondetectionsystemespeciallyintended for the specific characteristics of a Big Data environment [10].

C. Recovery

The main purpose of this topic is to create particular policies or controls in order to ensure that the system recoversassoonaspossiblewhenadisasteroccurs.Many organizations currently store their data in Big Data systems, signifying that if a disaster occurs the entire company could be in danger. We have found only a few papersthatcoverthisproblem.Forexample,in [10]there are some recommendations regarding what can be done to recover from a desperate situation.

VI. CONCLUSION

The infrastructure security, the main problem dealt with by researchers would appear to be security for Hadoop systems. This is not surprising since, as stated previously, Hadoop can be considered as a de facto standard in industry. The remaining problemsaddressed in this topic are usually solved by modifying the usual schemeofaBigDatasystemthroughtheadditionofnew securitylayers.

The most frequently dealt with by researchers would appear to be privacy. There are a lot of different perspectivesasregardsensuringprivacy.Authorsusually propose different means of encryption, based on traditionaltechniquesbutwithafewchangesinorderto   adaptthesetechniquestotheinheritcharacteristicsofa   Big Data environment. Owing to the large number of papersfoundonthistopicincomparisontotheothers,we believethatitisadvisabletosplitthiscategoryupinto,on the one hand, data privacy itself, and on the other, cryptographyandaccesscontroltechniques.

The entire lifecycle of the data used in a Big Data system, from its collection to its sharing, and also includes how to properly govern the securityofthatdata.Withregardtocollectionandtoits sharing, authors propose the creation of new schemas, frameworks, and protocols with which to secure data. Other authors also suggest toughening   up   thelegislation   concerning   the   privacy   of   the   data   used   by   companies. Furthermore,wehavefoundalackofpapersdealingwith   theneedtocreateaframeworkthatcoverssecuritydata governanceinaBigDatasysteminitsentirelifecycle.

In this section, the main topic discussed by researchers would appear to be the integrity of data. In order to secure that integrity, they propose various kinds of verification to ensure that the data has not been modified.

Possibility of detecting the attacks that a Big Data system may undergo. This is probably a consequence of the high availability that a Big Data system usually achieves, but this topic should not be overlooked.

This paper provides an explanation of the research carried out in order to discover the main problems and challenges related to security in Big Data, and how researchers are dealing with these problems. This objective was achieved by following the systematic mapping study methodology, which allowed us to find the papers related to our main goal.

Having done so, discovered that the principal problems are related to the inherent characteristics of a Big Data system. and also, to the fact that security issues were not contemplated when Big Data was initially conceived. Many authors, therefore, focus their research on creating means to protect data, particularly with respect to privacy, but privacy it is not the only security problem that can be found in a Big Data system; the traditional architecture itself and how to protect a Hadoop system is also a huge concern for the researchers.

However, also detected a lack of investigations in the field of data management, especially with respect to government. They were considered opinion that this is not acceptable, since having a government security framework will allow the rapid spread of Big Data technology.

In conclusion,the Big Data technology seems to be reaching a mature stage, and that is the reason why there have been a number of studies created the last year. However, that does not mean that it is no longer necessary to study this paradigm, in fact, the studies created from now should focus on more specific problems. Furthermore, Big Data can be useful as a base for the development of the future technologies that will change the world as we see it, like the Internet of Things (IOT), or de-demand services, and that is the reason why Big Data is, after all, the future.

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Online Services of Library and Role of Academics during Pandemic

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ABSTRACT

Currently we are facing the pandemic situation in the world and there is lockdown situation in the education system like schools and colleges are physically closed now. Now there is need of specify the role of libraries and academics in the pandemic situation. This research study focuses on the problems of the online sources and the implementation of the online library services by libraries. Also author give an example of their own library Bharatiya Mahavidyalaya, Amravati's Central Library's example how the online services are running during pandemic.

Keywords: Academic libraries, Online services by libraries, E-resources

I. INTRODUCTION

Libraries are dynamic, and librarians are trained and responsible for gather, consolidate and disseminates the all kind of possible information to the users. Libraries mostly relay on and work on offline situation due to college pattern and tend to physical work of libraries such as acquisition, processing and circulation of library collection to the users. But there are some obstacles which are seen in last few years that many country facing lockdown situation and thus now it is necessary to disseminates desire and require information in other form and in other repackaging by using different platform.

Thus this study consist of dissemination of information and library services through online mode in lockdown situation.

Terminology and definitions:

In this research study we are going to see the role of libraries in pandemic situation and dissemination of information by using online platform through different media.

According to Oxford Lexico Dictionary "Online Services are a company or other organization which provides a service via a computerized system or computer network (now rare)."

A company which provides access to the internet and/or exclusive content and services through its own computer network.

also pandemic is a situation an outbreak of a pandemic diseases. And **lockdown is a situation in which a state of isolation or restricted access instituted as a security measure.**

II. OBJECTIVES OF STUDY

1) To determine the role of libraries during pandemic through online services.
2) To suggest the different resources during pandemic.
3) To modify the services in pandemic and lockdown situation.
4) To suggest and review the various platform of library services after taking feedback from the users of central library.

III. RESEARCH METHODOLOGY AND TOOLS

Research Methodology: For the study of Role of libraries during pandemic there is need to know some important factors like their needs, available tools and also the technical skills of the librarians as well as the students. Also there need to know common factors about all users equally, so I found '**Survey Method**' is the most beneficial for this kind of studies.

Research Tool: It was the biggest task to approach the all possible approcahes and meet the almost all admitted students and literate them about library services and tell them about survey. I choose the '**Questionnaire method**' for the data collection tool and make it possible through 'Google Forms' the best and time saving online survey method for the students as well as me.

Questionnaire was mainly focused on to determine what are students are learning and using the current online resources from the given.

The online services given by the library during pandemic:

1) Provide study materials in textual and non-textual i.e. video form.
2) Resources browsing and information dissemination through internet.

The platforms, programs and tools which are used during pandemic

According to criteria and the need of the situation to disseminate the information here are the following platforms are used during pandemic.

1)   To connect with the students and giving updates and orientation to users

a)   Moodle Cloud: MoodleCloud is a hosting service provided by the people who make Moodle, where you can get a fully-hosted Moodle site in your site you can create effective online teaching and learning experiences in a collaborative, private environment. In our Bharatiya Mahavidyalaya, Amravati we near about six faculty uses the Moodle Cloud for taking lectures and assignments it have many benefits like taking online assignment and submission and we can also mark attendance of students and we can also take test.

b)   Use of Moodle for Library:

i)   **For promoting the resources:** as a librarian we should promote the resources which users can be access online, by using announcement tool or feature in in we can promote the resources and can give users various notification or information of new arrivals in the library.

ii)   Orientation of resources and library services: In this platform professors or teachers uses the feature of assignment but as a librarian we can use and even I use as a orientation of resources and central library services for the students
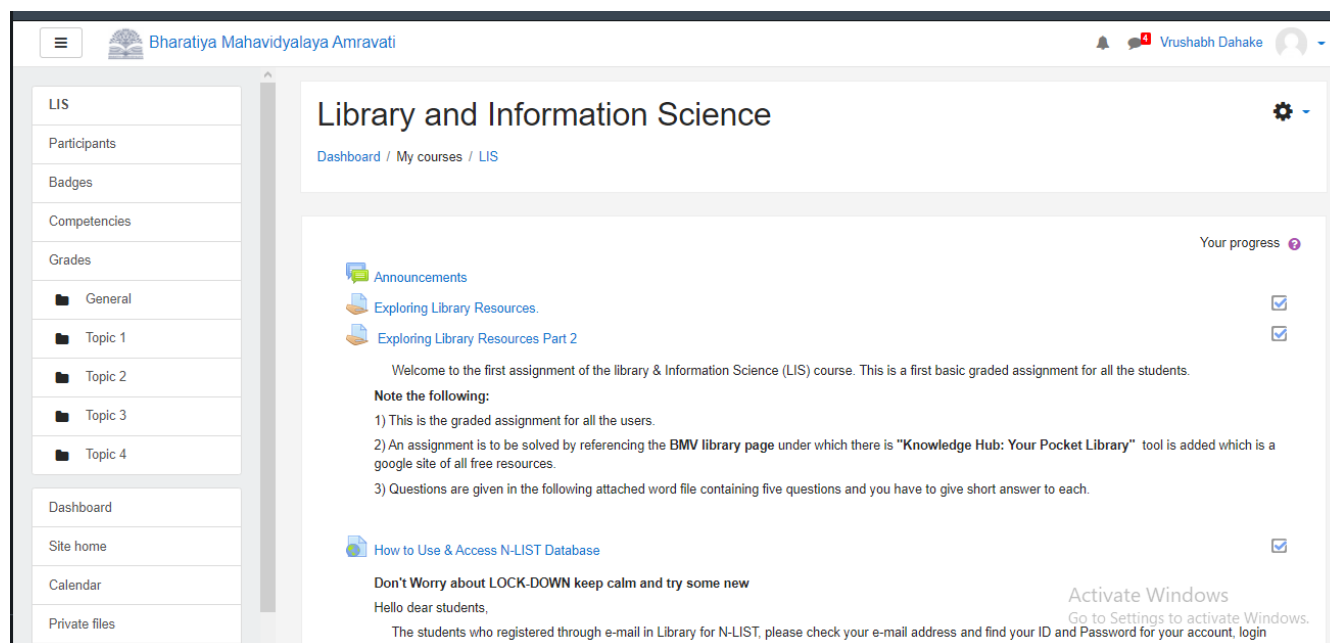
Fig: Screenshot of Moodle Cloud Platform and class of Library

c)   Google Meet platform

Google Meet is a official app and meeting software especially made for team meeting. Google meet is use in academic purpose as follows

i)   To conduct the lecture Google meet is best platform because it no need subscription and non-practical subject are taught by it.

ii)   Giving feedback of students as it is two way conservation from the both users.

2)   To disseminate information, notes and study materials

It is most important and priority base service which central library have to give to users and in this pandemic here are following some ways that

a)   N-LIST database

The Project entitled "National Library and Information Services Infrastructure for Scholarly Content (N-LIST)", being jointly executed by the e-ShodhSindhu Consortium, INFLIBNET Centre and the INDEST-AICTE Consortium, IIT Delhi provides for i) cross-subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE resources for universities and e-ShodhSindhu resources for technical institutions; and ii) access to selected e-resources to colleges. The N-LIST project provides access to e-resources to students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Centre. The authorized users from colleges can now access e-resources and download articles required by them directly from the publisher's website once they are duly authenticated as authorized users through servers deployed at the INFLIBNET Centre. (def from N-LIST official website)

In this pandemic central library of Bharatiya Mahavidyalaya, Amravati focuses on this consortium because it can be remotely access from the mobile and smartphone devices.

Sr.No.	E-resources and E-books included in the N-LIST
1.	American Institute of Physics [18 titles]
2.	Annual Reviews [33 titles]
3.	Economic and Political Weekly (EPW) [1 title]
4.	Indian Journals [180+ titles]
5.	Institute of Physics [46 titles]
6.	JSTOR [2500+ titles]
7.	Royal Society of Chemistry [29 titles]
8.	H. W. Wilson [3000+ titles]
9	Cambridge University Press [224 titles] (2010-2016)
10.	Oxford University Press [262 titles]
11.	Cambridge Books Online [1800 titles]
12.	E-brary [185000+ titles]
13.	EBSCoHost-Net Library [936 titles]
14.	Hindustan Book Agency [65+ titles]
15.	Institute of South East Asian Studies(ISEAS) Books [382+ titles]
16.	Oxford Scholarship [1402+ titles]
17.	Springer eBooks [2300 titles]
18.	Sage Publication eBooks [1000 titles]
19.	Taylor Francis eBooks [1800 titles]
20.	Myilibrary-McGraw Hill [1124 titles]
21.	South Asia Archive [through NDL]
22.	World e-Books Library [Now available through NDLI only]

Table: list of all e-resources that users can be access through N-LIST service

b)   Library's Google site pocket library

Bharatiya Mahavidyalaya, Amravati's Central Library create the hub of online knowledge even before pandemic situation to promote the online library services and to unite all the useful study material at one place, so we made Pocket Library on Google site (https://sites.google.com/view/knowledge-hub-for-all/home)

Fig: Home page of Pocket Library Knowledge Hub

Resources, tools and services through Google site:

There are various kinds of resources are divided into different categories in this site and then the resources are added to it here are following types of resources are included in it.

i)   **Textual Resource:** Under textual resources there are free and open sources are added which are non-copyrighted and in public domain which are helpful for the users these resources are as follows

a)   National Digital Library

b)   NOAJ NISCAIR Open Access Journals

c)   ACM Digital Library Journals

d)   Indian Journals

e)   E-PG pathshala

f)   NCERT Books

g)   SAGE Publications

h)   IGNOU Notes for all

ii)   **Resource Centers:** There are two resource centers are added are Information and Library Network INFLIBNET and National Library of India.

iii)   **Online Coerces:** There are free and open courses are added to this which are authorized and run by government different projects like SWAYAM and WIPO certificate and diploma courses.

iv)   **Video Resources:** video resources like swayamprabha channel is added.

v)   **Personal development tools:** in the personal development section we add Google Scholar link the link of Vidwan Database operated by INFLIBNET center and Ted Talk program link etc.

so this kind Google site is develop for the library users and the best part is that it is any time editable and we make changes whenever we want to do so.

To arrange the various programs and orientation program for the users.

Do you found all resources and material that you need ?

92 responses
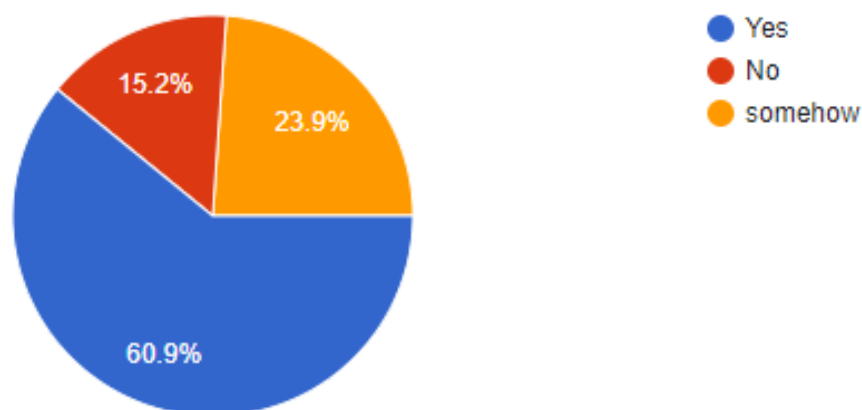
Fig: Survey result by library users

This above figure shows that there are 15% users are not know how to use resources and about 24% are somehow literate about this so there was need to literate them online, so on 7th March 2021 Bharatiya Mahavidyalaya, Amravati's Central Library organizes an online event called 'Orientation Program' and in this training we teach library users now to use N-LIST? What things are included in the Google site? And how to access other library resources etc.

The characteristics and criteria for the platform which are elect.

Roles of the academic and specially libraries are important in this pandemic situation and we have to manage the academic work from the remote access like home and all, thus in this situation we have to think for all kinds of users and students before selecting the platform. Platform should be easily accessible, easy to learn for both students and teachers as well and most importantly it will be easy that these will already in public domain. So here are some criteria we used for selecting the tools for performing academic work.

1) Easily available and accessible
2) Less internet consumption is a criterion because many students have limited data for day and there are numbers of lectures they have to attend daily.
3) Mostly smartphone operated for input from students' side.

Findings of the research study:

During study I received total 92 responses during this study from all kind of faculties and stream of Arts, Commerce and Science of our Bharatiya Mahavidyalaya, Amravati's Central Library here are the major findings from this study are

1) Students/users are using pocket library (41%) service mostly which include all study material and Moodle Cloud (22%) followed by N-LIST consortium (18%).
2) The most shocking finding was 31% students and users are not using the any service prescribe above

3) In the feedback students confess that they want to use the services but there is no training so they can't use so.

4) After orientation program students clear their doubt and start using the services.

Which Online Services do you use of Bharatiya Mahavidyalaya, Amravati's Library (More than one option can be select)

92 responses
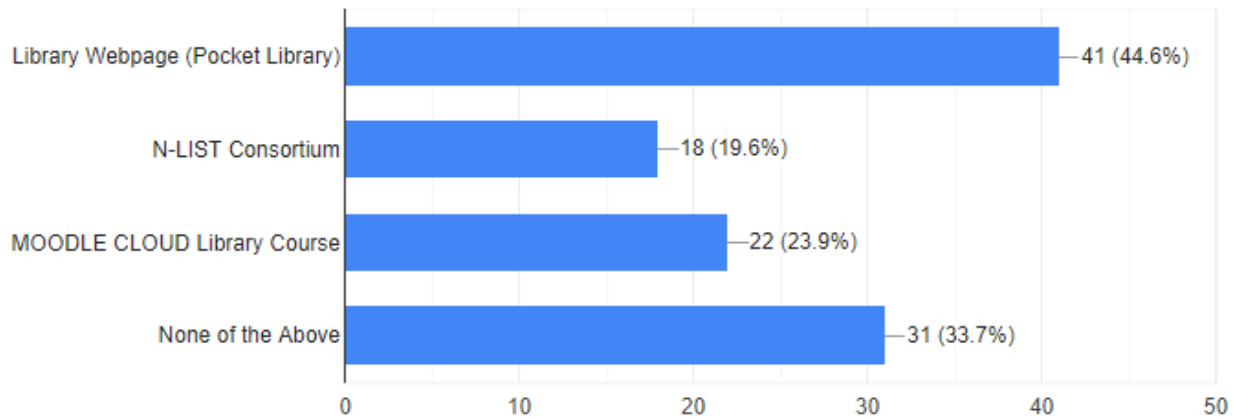
Fig: Chart of the data of findings after survey of online services

Class

92 responses
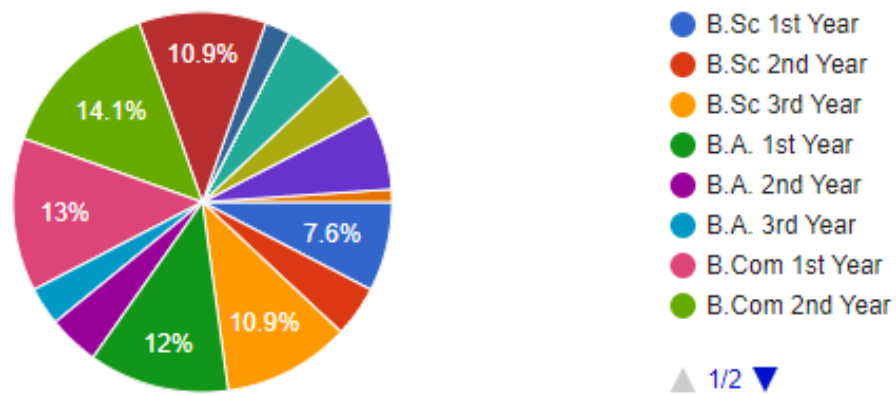
Fig: Data of students who submitted the feedback for online services

IV. CONCLUSIONS

The role of academics and specially libraries is defined in this research and there is need of update and training for all academicians for this kind of online infrastructure.

V. SUGGESTIONS

From the above study, research and findings here are some suggestions for improving the pattern of role of academic during pandemic

1) There is need of clarity and training to both the students as well as teachers for improvement of academics in online platform.
2) There should be adaptation of this online situation and we should focus more on recording the lectures and as a librarian we must give more references to the students in form of textual and non-textual formats.

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Diversity of Snake Species from Pusad Region, Maharashtra, India

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ABSTRACT

The diversityof venomous, semi venomous and Non venomous snakes species by different habitat from the Pusad region (Vidarbha), and common species found like Common kukri, Common Wolf snake, Green keelback, Russell's viper, Worm snake, Bamboo pit viper, Common trinket, Indian rat snake, total seventeen species observed survey conduct day time and night time, from study period during July 2017 to August 2018. The study is essential for the enrichment of the individual species survival and will helps to provide information, awareness and conservation of snake species from Pusad Tahasil of Maharashtra state, India

Keywords: snakes, Pusad region, Maharashtra.

I. INTRODUCTION

Every year, about 5.4 million snakebites occur worldwide. These cause up to 2.7 million envenoming's, almost 138,000 deaths, and 400,000 cases of squeal or disability Various[1,2] Every year, two million snakebites occur in Asia, with India presenting more than 46,000 deaths each year [1,3]. kinds of snakes are existing all over the world by various habitat. It is postulated that there are about 3000 species of terrestrial snakes in the world and they are predominant in the warm climates and lush-green regions of the tropics. About 278 species are found in India out of which 58 species are poisonous [1]. 3000 species of snakes are distributed worldwide. 500 are venomous species 52 venomous species are found in Indian subcontinent [2]. Snake bite is an acute life threatening time limiting medical emergency an occupational hazard often faced by farm laborers and farmers. It is in endemic form all over tropical countries like India. In India there are 2.5 lakhs snake bites out of which 35,000 to 50,000 deaths per year due to snake bite. There are 216 species of snakes identified in India which 52 are known to be poisonous. The dominant families of poisonous snakes in India are Elapidae which is includescommon cobra (*Najanaja*), King cobra and common krait (bungaruscaerulus), viperidae includes *Russell's viper*echiscarinatus (saw scaled or carpet viper) and pit viper and hydrophidae (Sea snakes) [4].The present study is essential for conservation of snakes species.

II. MATERIALS AND METHODS

The study initially requires well-trained snake rescuers for the observation, it needs courage, self-daring, confidence, and very essential experience and also skill is the very essential and most important is the study of behavior and nature of the snake to be caught. Snake rescue records of survey was made from July 2016 to August 2017, Sampling was done as per the need, request of the local people or stress calls made by residents, for twenty four hrs. Individual species of snakes were located and try to catch by hand, sticks and through pitfall traps in association with drift fences. After catching the snakes, their characteristics, predominant features were observed then noted for taxonomical study, take the photographs and identified up to species level using keys and other publications as per [5], [6],[7],[8]. After the study the captured snakes species were released in the forest/safely area as per the guidelines of wildlife and forest department rescued and released into the proper habitat without harm them.

III. RESULTS AND DISCUSSION

Total sixteen Species sixteen genus of snakes belong to five families were recorded in and around the human habitations of resident people of Pusad Tehsil ,it is indicated in the table no I. Out of these rescued species four species were poisonous, two were semi-venomous and remaining ten was non-venomous. The unavailability of suitable habitat and prey base, snakes have to move outside which leading to such conflicts that sometimes leads to death of a snake. However, some citizen ecofriendly or some stressfully call to expert snake catcher for stressfully call to expert snake catcher for the escape and survival of the species.

Sr. No .	Family	Genus	Species	Common name	Local Name	Nature	Status
1	Elapidae	Naja	naja	Spectacled cobra	Naag	***	C
		Bungarus	caeruleus	Common krait		***	C
2	Viperidae	Daboia	russelii	Russell's viper	Ghonus	***	C
		Echis	carinatus	Indian saw-scaled viper	Furase	***	C
3	Colubridae	Boiga	trigonata	Common cat snake	Manjarya	**	C
		Ahaetulla	nasuta	Common vine snake	Harantol	**	C
		Ptyas	mucosa	Indian rat snake	Dhaman	*	C
		Coelognathus	helena	Common trinket snake	Taskar	*	C
		Macropisthodon	plumbicolor	Grass snake	-	*	U
		Amphiesma	stolatum	Striped keelback	Iral/Pandhi vad	*	R
		Lycodon	aulicus	Common wolf snake	Kawadya	*	C
		Xenochrophis	*piscator*	Checkered keelback		*	C

4	Boidae	Eryx	johnii	Earth boa/Red sand boa	Mandul	*	C
		Gongylophis	conicus	Common Sand boa		*	C
		Python	morulus	Indian rock python	Ajgar	*	R
5	Typhlopidae	Ramphotyphlops	braminus	Brahminy worm snake		*	U

Table No.I: Diversity of Snakes from Pusad Tehsil, (MS), India(Note1: C- common, U-uncommon, R-rare.) (Note2:Non-venomous=*, Semi-venomous=**,Venomous=***)

Families	Species
Elapidae	2
Viperidae	2
Colubridae	8
Boidae	3
Typhlopidae	1

Table No.2: Species recorded according to families
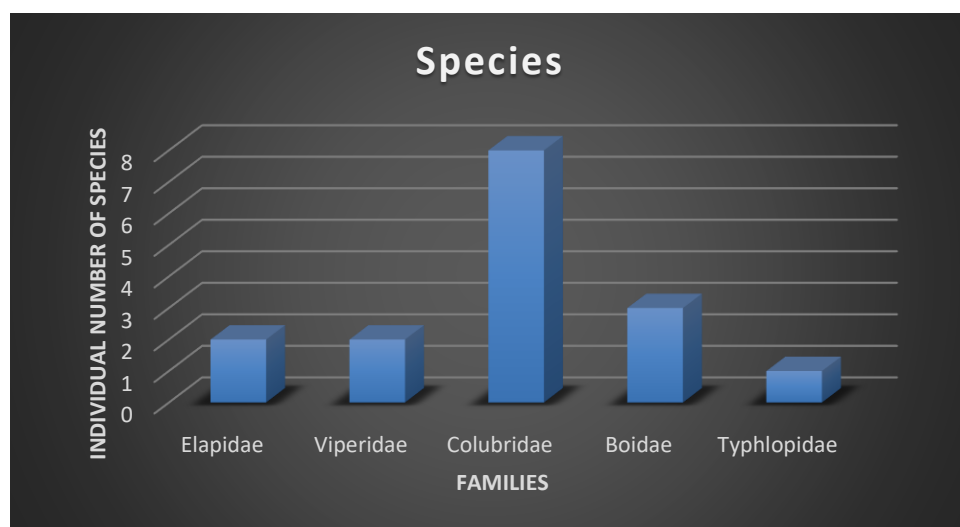
Graph No.I: Showing number of individuals according to families

Among the non-venomous snakes the rare species reported here as Indian rock python, *Python morulus*and Striped keel back, *Amphiesmastolatum*belongs from Boidaeand *Colubridae* family respectively. The anthropogenic activities, physical development, civilization and mainly the changing environmental conditions, like global warming are affecting the habitat of the animals. Therefore this important part of the ecology conflict against man. In the present investigation abundance of snake fauna rescued opined that snake produced unimaginable fear and anxiety. Right from the cases where earliest man lived, snakes would have caused first kind of poisoning [9]. Present study also observed the tress calls and down to root level at any time calls of the infrastructural development including townships etc. and as such these areas are prone to habitat loss due to which different types of snake including poisonous, semi-poisonous, non-poisonous are being noticed in the residential areas during monsoons and winter seasons. The present studies are an attempt to

evaluate the information, occurrence, abundance &species richness and further assist in the knowledge, awareness and conservation of snake fauna in this region since there is acute paucity of established work and data on this subject till date. Snake bite is an acute life threatening time limiting medical emergency an occupational hazard often faced by farm laborers and farmers. It is in endemic form all over tropical countries like India. In India there are 2.5 lakhs snake bites out of which 35,000 to 50,000 deaths per year due to snake bite and this is because of less information amongst the people.

IV. CONCLUSION

The study of snakes from Pusad region including remote area, having rich diversity and it urgent need to provide correct knowledge regarding snakes especially which are venomous and nonvenomous if they pursue the knowledge, they will not panic themselves and kill the snakes, instead of they will leave them in their natural habitat, unnecessary these species use to killed by people in this way this article help to conserve snakes species for ecosystem which is essential.

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Dielectric Parameters of Aniline, N-Methyl Aniline, N, N-Dimethylaniline with 1, 4 Dioxane Using Time Domain Reflectometry

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ABSTRACT

The dielectric relaxation measurement of Aniline, N-methyl aniline,N, N-dimethylaniline with 1, 4 Dioxanemixtures have been carried out over entire concentrations, at temperatures 250C using picoseconds time domain reflectometry technique in the frequency range of 10 MHz to 30 GHz. The complex permittivity spectra of Aniline, N-methyl aniline,N, N-dimethylaniline with 1, 4 Dioxanemixtures were fitted using Havriliak-Negami equation. Kirkwood correlation factor for all concentrations have determined using least square fit method. The variations in Kirkwood correlation factor with molecular size is studied.

Keywords: Dielectric Relaxation, time domain reflectometry, Kirkwood correlation factor.

I. INTRODUCTION

The dielectric properties of a substance such as dielectric constant, dielectric loss, relaxation time have provided an insight into the structure of the molecules of the system. In liquids, the molecule has rotational freedom and its dispersion occurs at microwave frequency. Hence studying the dielectric properties at microwave frequency will reveal the dielectric relaxation of polar molecules and its variation with respect to the interaction with the neighbouring polar as well as non polar molecules. Time domain reflectometry gives dielectric relaxation study over a wide frequency range [1-3].

Patil et al. [4] obtained the complex dielectric spectra for alcohols and aniline binary mixtures and reported that ε_0 and τ decrease with increasing concentration of aniline in the alcohol. Fattepur et al. [5] measured complex permittivity spectra for aniline-methanol mixture, as function of frequency between 10 MHz to 10 GHz & observed strong interaction between solute-solvent molecules through hydrogen bonding at low methanol concentration. From microwave absorption measurement in dilute solutions, Deogaonkar& coworkers [6] found that aniline and N, N-dimethylaniline form complexes with o-chlorophenol through hydrogen bonding at room temperature. Oswal et al [7] suggested strong cross association due to strong hydrogen bonding between –OH and –NH2 groups, from the viscosity and excess molar volume studies of liquid mixtures of alcohols with amine.

The present paper consist of , the detail study of dielectric behaviour of aniline-1, 4 dioxane (ANI-DX), N-methylaniline-1, 4 dioxane (NMA- DX) and N, N-dimethylaniline-1, 4 dioxane (NNDA-DX) mixtures in the frequency range of 10 MHz to 30 GHz using Time Domain Reflectometry (TDR) at temperature 25^0C.From the dielectric parameters,Kirkwood correlation factor are obtained. On the basis of these parameters, intermolecular interaction and dynamics of molecules at molecular level are discussed.

II. EXPERIMENTAL

Aniline (ANI), N-methyl aniline (NMA) and N, N-dimethylaniline (NNDA) and 1, 4 Dioxane (DX) was obtained commercially (s. d. fine, India) and was used without further purification. The solutions were prepared at different volume fraction of DX in ANI, NMA and NNDA.The dielectric spectra were obtained by the time domain reflectometry (TDR) technique. The Tektronix model no. DSA8200 Digital Serial Analyzer sampling mainframe along with the sampling module 80E08 has been used for the time domain reflectometry (TDR). A repetitive fast rising voltage pulse with 18ps incident rise time was fed through coaxial line system of impedance 50 ohm. Sampling oscilloscope monitors changes in step pulse after reflection from the end of line. Reflected pulse without sample R_1 (t) and with sample R_x (t) were recorded in time window of 2ns and digitized in 2000 points.

III. RESULT AND DISCUSSION

The Kirkwood correlation factor 'g'is also parameter containing information regarding orientation of electric dipoles in polar liquids [8].The value of 'g'for   pure liquid is given by expression

$$g\mu^2 \frac{4\pi N\rho}{9kTM} = \frac{(\varepsilon_0 - \varepsilon_\infty)(2\varepsilon_0 + \varepsilon_\infty)}{\varepsilon_0(\varepsilon_\infty + 2)^2}$$

(1)

where 'μ'dipole moment is in gas phase, 'N' is Avogadro's number, 'M'is molecular weight, 'ρ' is the density of the liquid and 'kT' has usual meaning. We have taken ε_∞value from refractive index ($\varepsilon_\infty = n^2$) data at 25^0C.

For binary mixture, the static dielectric permittivity needs to be considered as the dipole orientation correlation factor (g^{eff}). The modified form of Eq. (1) is used to study the orientation of the electric dipoles in the binary mixtures as follows [8,9].

$$\frac{4\pi N}{9kT}\left[\frac{\mu_{DX}^2 \rho_{DX} X_{DX}}{M_{DX}} + \frac{\mu_A^2 \rho_A (1 - X_{DX})}{M_A}\right] \times g^{eff} = \frac{(\varepsilon_{0m} - \varepsilon_{\infty m})(2\varepsilon_{0m} + \varepsilon_{\infty m})}{\varepsilon_{0m}(\varepsilon_{\infty m} + 2)^2}$$

(2)

where M_{DX} and M_A are molecular weight of DX and ANI, NMA and NNDA respectively. $\rho_{DX}$and ρ_A are corresponding densities. X_{DX} is volume fraction of DX in ANI,NMA andNNDA. ε_{0m} and $\varepsilon_{\infty m}$are the static dielectric constant and dielectric constant at high frequency of the mixtures. To calculate the values of g^{eff}, we have taken μ= 1.13, 1.64, 1.66 and 0.45 D for ANI, NMA, NNDA and DX respectively [10]. The values of g^{eff} for ANI, NMA and NNDA in DX mixtures are given in Table 1. The observed g^{eff} value is greater than unity in ANI-DX mixtures leads to the conclusion that the molecules associate to form multimer. The g^{eff}values of these mixed solvent also have some deviation from ideality, which confirms the net change in dipolar ordering of the mixture constituents due to H-bond complexation.

Table 1. Kirkwood correlation factor (g^{eff}) for ANI, NMA and NNDAwith DX mixtures at 25^0C.

X_{DX}	NI-DX	NMA-DX	NNDA-DX
	g^{eff}	g^{eff}	g^{eff}
0.0	166	0.84	0.63
0.2	1.42	0.72	0.59
0.4	1.31	0.66	0.76
0.6	1.20	0.55	0.86
0.8	1.91	0.58	0.96
1.0	0.69	0.69	0.69

IV. CONCLUSION

From the dielectric relaxation study , it is observed that the Kirkwood correlation factor deviates from the unity, which confirms the net change in dipolar ordering of the mixture constituents due to H-bond complexation.

V. ACKNOWLEDGEMENTS

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A Simple, Solvent Free Synthesis of 3-(Bis(4-Chlorophenyl) Metheylene) - Ethoxy-5-Oxopentanoic Acid and its Antimicrobial Activity

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ABSTRACT

A Simple and solvent free synthesis of alkylidene acid esters by using a mixture of 4, 4 -dichloro-benzophenone and Diethyl succinate was treated with tert.potassium butoxide at room temperature. The synthesis of alkylidene acid esters and their different compounds are very popular in the world of synthetic organic chemistry due to their activities such as antibacterial, antiviral and anti-inflammatory. The reaction remained ignored almost for a century, but with the confirmation that alkylidene acid esters possess diverse and important biological properties, the intrest in their synthesis has been greatly increased from last decade. In the conclusion, we have developed a simple and solvent free method for the synthesis of compounds containing benzophenone moieties were successfully synthesized in excellent yield and their structures are elucidated using elemental analysis and FTIR, 1H-NMR spectral analysis. The result of antimicrobial activity reveals that the newly synthesized compound found to have moderate to outstanding antimicrobial effect against various bacteria at all concentrations analyzed.

Keywords: Benzophenone, tert. potassium butaoxide, diethyl succinate, 4,4 dichlorobenzophenone, antimicrobial activities etc.

I. INTRODUCTION

In 1893 Hans Stobbe[1] demonstrated that when a mixture of acetone and diethyl succinate was treated with sodium ethoxide the expected acetoacetic ester type of condensation to give a 3-diketo compound, which do not take place; but the main reaction product was Teraconic acid, formed by an aldol type of condensation between the carbonyl group of the ketone and a methylene group of the ester. This reaction was indeed surprising in view of the numerous precedents from the work of Claisen for the former type of behavior. It is striking that this facile aldol type of condensation of esters with ketones is limited to succinic and substituted succinic esteia, with few exceptions. Benzophenone condenses with diethyl succinate to give pure 3-

carbethoxy-7,substitued-diphenyl-vinyl-acetic acid[2] in under the same conditions this ketone in contrast fails altogether to react with ethyl or t-butyl acetate[3].

1) The Stobbe condensation is the reaction in which diethyl ester of succinic acid requiring less strong bases. For example, its reaction with benzophenone as follows:
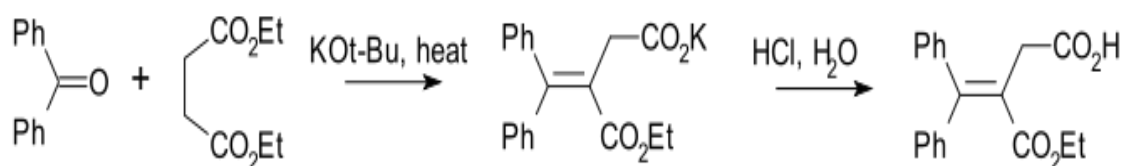
2) A reaction mechanism that explains the formation of both an ester group and a carboxylic acid group is centered on a lactones intermediate:
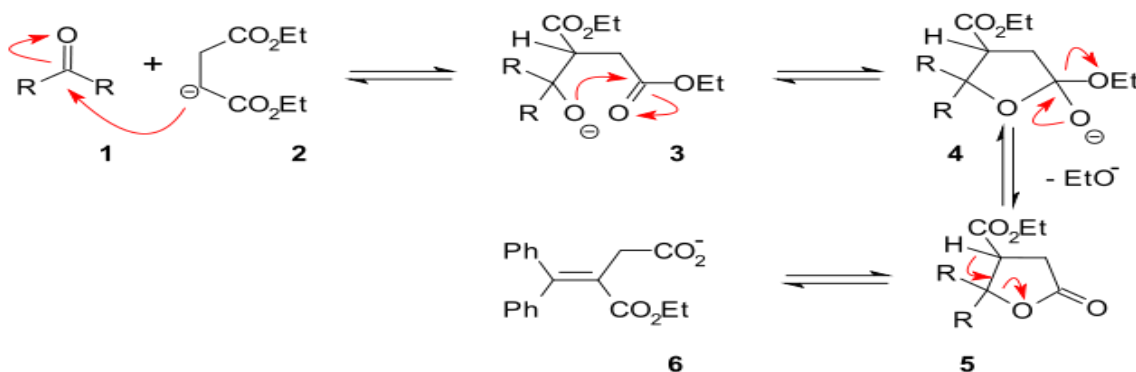
Benzophenone is widely used as photo initiator for inks and lacquers that are cured with ultraviolet light. In the area of food packaging UV-cure inks and lacquers are used without solvent and they contain typically 5–10% photo initiator. UV-cure lacquers are commonly employed either as varnishes for UV-cure printing or as varnishes for materials printed by other processes. Benzophenone is not completely used up or removed during or after the printing process, nor is it bound irreversibly into the print film layer.

In these reaction systems, good to excellent yields (up to 97%) of acylation products were obtained in a short reaction time. This method features high yield, a simple product isolation procedure, ILs reusability and reduced waste discharge, thus rendering this catalytic system both efficient and environment friendly.

K. Amimoto and etals studied photochromism of organic compound and found Fulgides are important for their photochromic properties[4-5]stobbe condensation[6-7] S. Banerjee &etalsstadied green synthesis of acid ester they reacted different substituted carbonyl compound including aldehyde, aromatic and alicyclic, aliphatic ketones and an active methylene group namely dimethyl succinate were condensed in anhydrous condition and found the reaction is feasible in a dry agate mortar at room temperature, avoiding hazards of using solvent[8].

Yadav Hanumansingh *et al*[9] synthesized by greener chemical reaction strategy managed to synthesize Fulgenic acid successfully by simple and efficient means with improved yield.

II. EXPERIMENTAL METHOD

i) Synthesis of dichloro benzophenone and its derivatives

A mixture of chlorobenzene react with of carbon tetrachloride in presence of alluminiumchloride .This mixture was refluxed for 3-4 hours, after cooling the reaction mixture poured in ice-cold water with stirring till precipitation was complete.Melting point of compound - 139°CPercentage of yield is 41%

Reaction

PRG 1

chlorobenzene   CCl₄   bis(4-chlorophenyl)methanone
                                 Anhy. AlCl₃
                                 H₂O

Properties of compound:

1) Element detection: Presence of halogen :Sodium extract + dilute H_2SO_4 + boil + dilute HNO_3+ 1% $AgNO_3$, a heavy curdy white ppt of silver chloride is obtained.

2) Group detection: *Test for –CO of ketone.* Dissolve a small quantity of sodium nitroprusside in about of 1 ml of distilled water in a clean test tube and then add a small quantity of given compound. Shake the test tube well and add sodium hydroxide solution drop wise. Appearance of red colour confirmed the presence of ketonic group.

3) Percentage of elements:

%C	%H	% Cl	%O
62.18	3.21	28.24	6.37

4) Spectral analysis:IR spectral Study

The main absorption bands observed in IR spectrum of compound are shown below.

Abs. Observed (cm⁻¹)	Assignment	Absorption expected
1485 cm⁻¹	C=C Ringstretch	1600 – 1475
1734 cm⁻¹	C=O stretch	1715-1810

ii)   Synthesis of derivative of 4,4 dichloro benzophenone.

A mixture of 4, 4 dichlorobenzophenone and Diethyl succinate was treated with tert.potassim butoxide at room temperature.

Reaction :
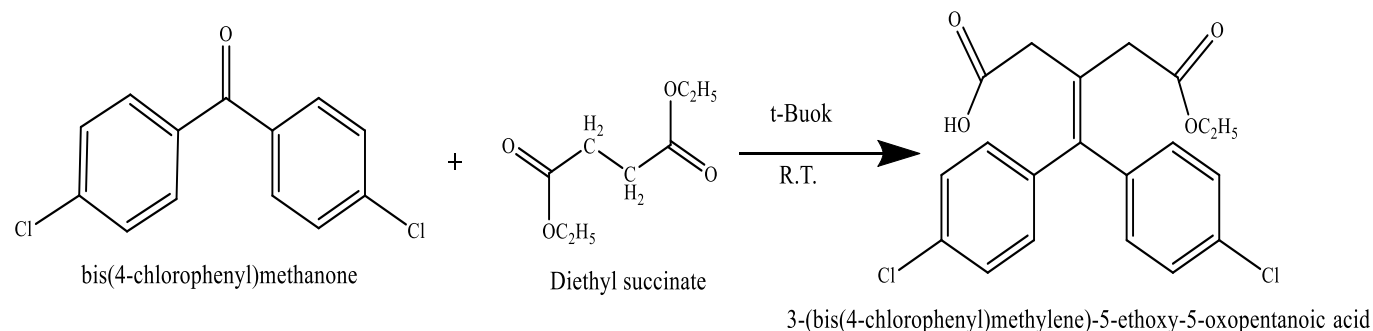
bis(4-chlorophenyl)methanone   Diethyl succinate   3-(bis(4-chlorophenyl)methylene)-5-ethoxy-5-oxopentanoic acid

Properties of compound:

1) Element detection: Presence of halogen:Sodium extract + dilute H_2SO_4 + boil + dilute HNO_3+ 1% $AgNO_3$, a heavy curdy white ppt of silver chloride is obtained.

b) Presence of halogen: Sodium extract + dilute H_2SO_4 + boil + dilute HNO_3+ 1% $AgNO_3$, a heavy curdy white ppt of silver chloride is obtained.

2) Group detection: *Test for –CO of ketone.*Dissolve a small quantity of sodium nitroprusside in about of 1 ml of distilled water in a clean test tube and then add a small quantity of given compound. Shake the test tube well and add sodium hydroxide solution drop wise. Appearance of red colour confirmed the presence of ketonic group.

3)Percentage of elements

%C	%H	% Cl	%O
61.08	4.61	18.03	16.27

4) Spectral analysis:IR spectral Study:

The main absorption bands observed in IR spectrum of compound are shown below.

Abs.Obs. (cm^{-1})	Assignment	Abs. expected
1494cm^{-1}	C=C Ring stretch	1600 -1475
1719cm^{-1}	C=O stretch of -COOH	1700-1725
1749cm^{-1}	C=O stretch of Ester	1735-1750

NMR spectral study:[1]*NMR spectrum shows signals due to three C-H proton of ester at δ 3.35 ppm, singlet due to one hydrogen atom of –COOH at δ 11.13 ppm and aromatic eight protons multiplate at δ6.95-8.18 ppm.*
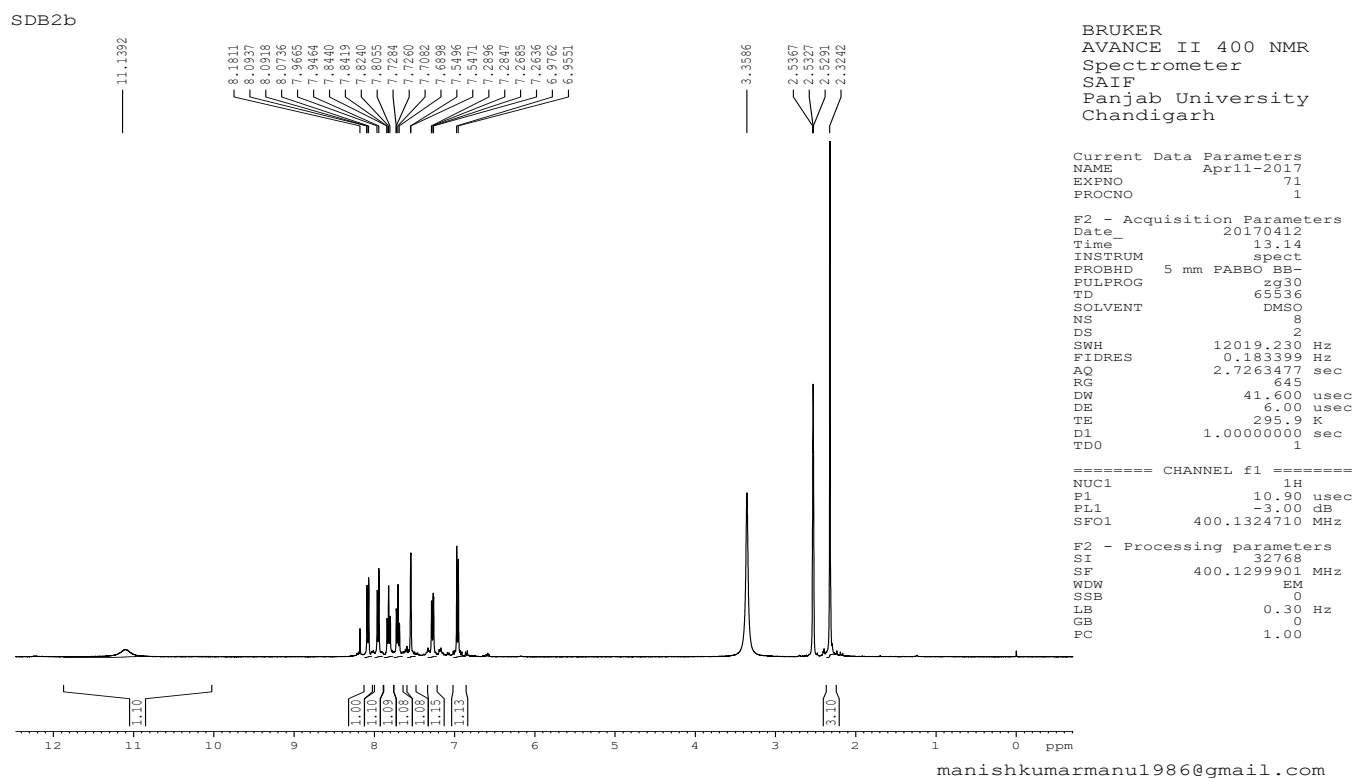
III. ANTIMICROBIAL ACTIVITY OF SYNTHESISED COMPOUND

In the 20th century antibiotics are undeniably one of the most imperative therapeutic discovery that improved or alleviate in human beings that had been effective against serious bacterial infections. The advancement in science and technology occurs in four decades so remarkable progress had been made in the field of medicine with the discoveries of many natural and synthetic drugs[10]. However, only one third of the infectious diseases known have been treated from these synthetic products[11]. This is because of the emergence of resistant pathogens that is beyond doubt the consequence of years of widespread indiscriminate incessant and misuse of antibiotics[12-13].The antibacterial activities of the compounds synthesized in were tested to evaluate their efficiencies against pathogenic organisms.

i)   First the substance to be evaluated must be brought in an intimate contact with the test organisms against which activity is to be estimated.

ii) Secondly, favourable conditions (nutritional, environmental etc.) must be provided to offer a maximum opportunity for optimum growth of the organisms in absence of antimicrobial agent and

iii) Thirdly, there should be a method for measuring antibacterial response obtained by antimicrobial agent[14].

The antimicrobial activities of the synthesized compounds against *Escherichia coli* is highly remarkable, synthesized compound was highly active than*, Staphylococcus aureus, E.Aerogenes* and *Salmonella typhi.* The synthesized drugs can be used the alternative drugs for the treatment of diseases caused by *E.coli.*

E. Coli	S. Typhi	S. Aureus	E. Aerogenes
Active	Active	Active	Active

IV. RESULTS AND DISCUSSION

In the present work substituted -benzophenone viz. 4, 4 dichloro-benzophenone by reacting them with diethyl succinate. Reaction was carried out in the presence of tertiary potassium butoxide. The reaction mixture stirred for 50 – 60 minutes at the room temperature. The product so obtained is filtered washed with water and crude product were recrystallized from 80% ethanol. The structure of these compounds was confirmed by FT-IR, 1H-NMR, and elemental analysis techniques. Spectral data were in good agreement with the composition of the synthesized compounds.

V. CONCLUSION

Compound containing benzophenone moiety was successfully synthesized in excellent yield; their structureis elucidated using elemental analysis, FTIR, 1HNMR spectral analysis. The result of antimicrobial activity reveals that all newly synthesized compound found to have moderate to outstanding antimicrobial effect against *E.coli, S.aureus, E.aerogenes* and *Salomonella typhi* at all the concentrations analysed. Thus it is concluded that these newly synthesized alkylidene acid ester can be usedfor the development of new antibacterial drugs to cure many disorders caused by different bacterial species.

VI. ACKNOWLEDGMENT

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Synthesis of Formazan 1 N-(4-Methoxyphenyl)(Phenyl-Diazynl) Methylene)-4-Methyl Aniline

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ABSTRACT

In the present work first the schiff base is synthesisedthrough refluxing 4-methoxy benzaldehyde and 4-methyl aniline in presence of glacial acetic acid.Theschiff base so obtained on treatment with diazxonium chloride gives the desired formazan.This procedure gives an alternation of using 1 butanol instead of ethanol.

Key words: -Formazan, 1-butanol,diazotisation.

I.   INTRODUCTION

Formazans are the compounds containing the characteristic azohydrazone group (-N=-C=-NH-), which is a good carrier of TT-bonding and chelating properties.They are used as dyes,ligands in complex formation, and as analytical reagents, in which their intensecolor makes them good indicators of a redox reactions[1,2].Formazans form salts and complexes with several metal ions andthey are also biologically active[3].In the present study, a novel formazan complex with substituent on 1-phenyl ring has been synthesized and it structure was determined using the X-ray diffraction method and characterized with spectroscopic techniques.

II.   EXPERIMENTAL WORK

In a round bottom flask, a mixture of aldehyde and substituted aniline in 1-butanol in the presence of 2,3 drops of glacial acetic acid was refluxed for half an hours.The reaction was monitored through thin layer chromatography.The reaction mixturecooled and poured on ice.Theprecipitatedcompound was filtered,washed with water and recrystallised from absolute alcohol.
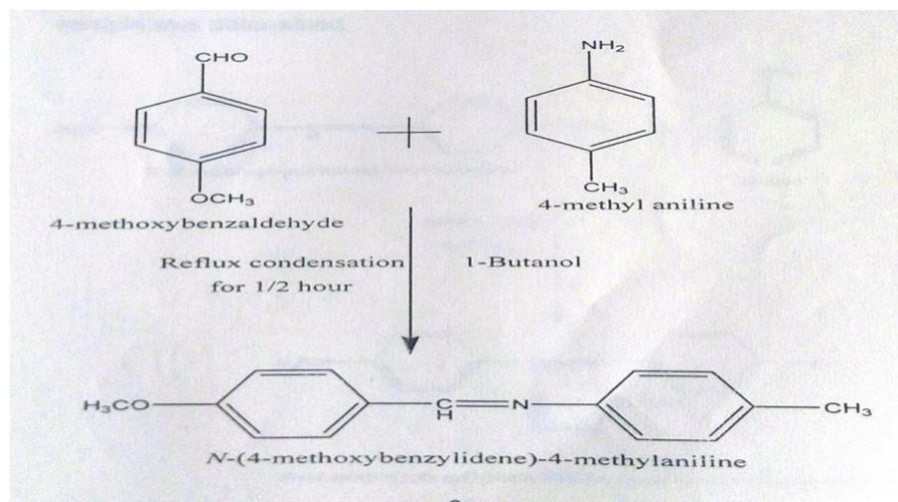
Fig. Synthesis of N-(4-methoxybenzylidene)-4-methylaniline

SYNTHESIS OF FORMAZAN 1 N-(4-METHOXYPHENYL)(PHENYL-DIAZYNL) METHYLENE)-4-METHYL ANILINE:-Aniline in glacial acetic acid and conc.HCL was diazotized with sodium nitrite in cold medium.The resultant diazonium chloride solution was added with stirring to the Schiff base and resulting dark coloured solution was kept overnight room temperature and then poured onto crushed ice.The solid thus obtained was filtered,washed with water,dried and recrystallized from ethanol.The melting point of crystallized sample was determined.
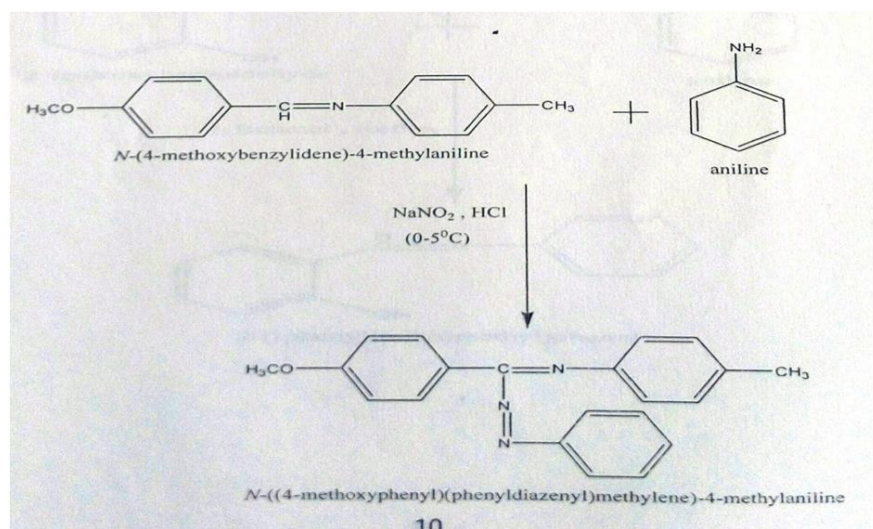
Fig. SYNTHESIS OF FORMAZAN 1 N-(4-METHOXYPHENYL)(PHENYL-DIAZYNL) METHYLENE)-4-METHYL ANILINE

Analytical data: - Melting point of the product is 98^0 C and the percentage yield is 78.45 %.

SPECTRAL ANALYSIS:-The IR Spectral graph shows following characteristic I.R. frequencies.

I)   A band at 2925(cm^{-1}) is for C-H stretch of –CH$_3$ group.

II)   Band at 1615 (cm^{-1}) is a characteristic band for C=N stretch.

III)   C=C stretch of aromatic ring is observed at 1566(cm^{-1}).

IV)   A band at 1300 (cm^{-1}) is a characteristic band for C-N stretch.

V)   C-O stretching band observed at 1253 (cm^{-1}).
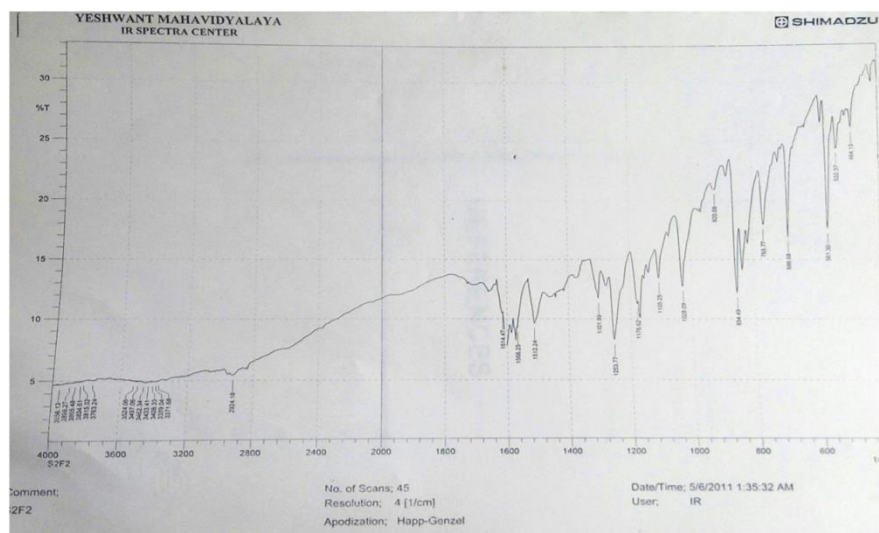
Fig. IR SPECTRA OF 1 N-(4-METHOXYPHENYL)(PHENYL-DIAZYNL) METHYLENE)-4-METHYL ANILINE

III. RESULT & DISCUSSION

The I.R. spectra of formazans was recorded on SHIMADZU IR spectrophotometer.The percentage yield is calculated by the formula.

Percentage yield =   (experimental yield of the product/Theoretical yield of the product) * 100

IV. CONCLUSION

The procedure described here provides a useful alternation for the formation of Schiff bases and formazans in mild conditions. It allows 1-butanol instead of ethanol.

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Palynological Investigations of Cleome Viscosa Linn- A Medicinal Plant

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ABSTRACT

Pollen is appropriately referred by some as 'Golden dust' extremely valuable on account of their tremendous applications in science, industries and public health. No other plant part even though extremely tiny in size is packed with so much information and power. For the breeders the pollen is a discrete mobile male partner of the fertilization process in higher plants. It carries the genotype of one partner of the pollination process, which is in fact the process which the breeder manipulates. In the present study Palynological investigations of Cleome viscosa Linn.- an annual weedy herb medicinal plant was carried out. *Cleome viscosa* Linn. the whole plant and its parts like leaves, seeds and roots are widely used in traditional and folkloric system of medicine. In traditional systems of medicine, the plant is reported to possess beneficial effects as an anthelmintic, antiseptic, carminative, antiscorbutic, febrifuge, and cardiac stimulant.

In the present study, Pollen phenology, pollen morphology, pollen physiological studies like pollen production, viability, germination – in vitro and in –vivo etc., total pollen protein estimation, histochemical studies of germinated pollen grains of Cleome was investigated.

I. INTRODUCTION

Pollen is known to have a higher energy investment per gram of organic tissue than other plant parts. Pollen anemophilous species have lower calories contains than pollen of entomophilies species. In addition to its main function pollination and fertilization, pollen attracts and nurtures a variety of pollinators. Enhanced pollen energy contents could increase attractiveness to pollen consumers to cover their energy requirements (Agashe, 2006).

Cleome viscosa linn. Commonly known as 'Dog Mustard' due to its yellow flowers. It is a common weed found throughout the plains of India, found abundantly on open and waste land. Cleome is an annual sticky herb with a strong penetrating odor and coated with a simple glandular hairs having immense medicinal importance. Leaves are 3-5 foliate gradually becomes shorter upwards. Flowers yellow in lax raceme. Flowering season is June to October. Seeds are brownish black when ripe, sub-globose with faint transverse lines. Oil extracted from seeds is said to be used for culinary purpose in some area. The oil is having a property of killing worms in intestine and also expels gases from bowels. Leaf juice along with common salt relieve headache when applied on forehead. The plant is used as a medicine for curing ear diseases and joint pains (Rangari, 2008).

Whole plant contains glycoflavinone and navigenin glycoside a novel dipterpene lactone elemcolide. The seeds contain umbeliferon derivatives, Cleosandrin, Cleomiscosin and viscusic acid and viscosin. Roots possess kaempferol-4 methylether3-glucoronide, Betulinic acid, β-sistosterol (Chatterjee and Prakashi, 1991; Anonymous, 1992; Asolkar et.al., 1992). Whole plant is medicinally important. Bark is acrid, irritant, vesicant. Root is anthelmintic and vermifuge. The poultice of leaves is externally applied for wounds and ulcer (Dymack, 1890). Seeds are used as carminative, anthelmintic and stimulant. Along with all these qualities, the roots of Cleome viscosa reported as anticancerous in nature (Raychaudhari, 1991). With many of the properties pollen grains are allergenic in nature and causes dermal allergy (Nair et.al., 1986).

Kumar et al. (1988) have experimen¬tally proved that this plant is tolerant and resistant to salt and water stress, which is important for erosion control and, hence, is an ideal weed in both warm and cool environments. Apart from these advantag¬es, they have a unique role to play in plant commu-nity restoration, bloom quickly and sustain diverse insect pollinator, as well as herbivore communities. Cleome species are used as leafy vege¬tables in many regions Therefore, these species are im¬portant ecologically, medicinally and economically, and are essential constituents of tropical ecosystems by their interactions with local insects/animals and serve their part as constituents of biodiversity (Mali, 2010).

Fig-1 Cleome viscosa bush along

Fig-2 Cleome flower with

Plant germplasm resources are one of the most important renewable natural resources of the world. Increasing exploitation coupled with natural calamities has led to rapid dwindling of important plant species. Nearly 20,000 to 25,000 species of vascular plants are currently facing threat their existence. This necessitates urgent measures to conserve the plant wealth of ecosystem, species and gene pool levels, to enable sustained use for present and future generations by establishing pollen banks and germplasm resources centers.

The direct and indirect roles played by pollen in various spheres of applied biological research will be found useful in view of the fact that pollen is a material to work which seems to be providing an easier and even better means for experimentally controlling the genetic behaviors of the plants.

II. MATERIAL AND METHODS

Pollen phenology, pollen morphology, pollen physiological studies like pollen production, viability, germination – in vitro and in –vivo etc., pollen storage, total pollen protein estimation, Histochemical studies of germinated pollen grains of Cleome viscosa was carried out.

Pollen phenology- Anthesis took place nearly 6.00am on plant. Yellow coloured pollen dust deposited on anther. Pollen grains are monads, triangular, yellow, and slightly sticky.

Pollen morphology-The morphological analysis comprises fresh material collected from respective field and study was made with light microscopy and electron microscopy. Pollen morphology was studied by two method first by acetolysis method in which the pollen were subjected to the chemical treatment and the pollen become able to clear it surface and provides useful information in reaching conclusion of exine on variable taxonomy.

Fig-3 Acetolyzed pollen grains 400X

However, scanning electron micrographs serves to elucidate further detail of exine sculpture such as pores and colpi and the external surface of the pollen grains as well as diameter of pollen and measurement of the exine stratification.

Grain Trizonocolporate, polar axis 30 μm, equitorial axis 22 μm, grains prolate, colpi 28 μm in length, crassimarginate. Exine surface rough, finely reticulate, ora lolangate.

Fig-4 SEM image of Cleome Pollen 1000X

Fig-5 SEM Image of pollen in equatorial view 4000X

Pollen production- Pollen production was studied by two methods i) Simple method and ii) Haemocytometer method. It was noted that there were some differences in the total pollen output by both the method. Out of

the two the Haemocytometer method appears to be more accurate as the number of pollen is counted for 0.1 cubic mm. of the solution. Whereas, in simple method it is counted from 0.05 ml. of the solution. Counting becomes easier by Haemocytometer and it appears to be the best suited instrument for the evaluation of pollen grains as the pollen size is small. In case of Cleome, the 1, 02, 384 pollen per flower found whereas pollen per anther was found to be 4266.

Pollen viability- Pollen viability by stainability technique was studied using 2, 3, 5,-triphenyl tetrazolium chloride which is a vital stain used for the viability of tissues. The test is based on the presence of functional enzyme which converts the colorless solution of 2, 3, 5-triphenyl tetrazolium chloride into the insoluble red Triphenyl formazon. The viability of the pollen by TTC in the present study was 98.23%.

In-vitro germination study- Pollen viability by pollen germination in vitro was carried out by 'Hanging Drop Technique'. The fresh material was sown in various artificial culture mediums like Sucrose, Boric acid along with sucrose and in Brewbaker's medium and observations were noted after 24 hours, so that they grow to their maximum limits. The different media used for pollen culture were standardized by series of experiments. The different media used for studies were sucrose solution (from 5% to 40%), Boric acid medium with sucrose as a basal medium (from 10 ppm,25 ppm,50 ppm,100 ppm,200 ppm, 300 ppm, 500 ppm and 700 ppm) and in Brewbaker's medium which also known as 'Calcium complex'.

i)   Sucrose

Cleome viscosa pollen grains showed vigorous germination in all the grades of sucrose except 35 and 40 percent were they do not showed any germination. In the remaining grades, i.e. from 5 % to 30 % pollen showed the effective germination. The maximum germination was noticed in 15 percent of sucrose which was 97.67 percent with maximum tube length of 1489 microns. The average tube length varies from 1289 to 1423 micron. The Cleome pollen showed population effect.

During daily experiments when Cleome pollen was subjected to germination, in 15 percent sucrose they showed variation in germination from 91 to 97.67 percent with maximum tube length range from 1388 to 1489 microns. The pollen tubes grow straight and no bulging at tip of tube was recorded. No bursting of pollen tube and pollen content was recorded.

ii)   Boric acid with sucrose

Cleome pollen grows well in the lower concentration of Boric acid with 15 percent sucrose as a basal medium. In 10 ppm the pollen showed 78 percent germination, in 25 ppm pollen showed 82 percent germination, in 50 ppm boric acid 89 percent germination recorded with bursting of pollen tubes. In 100 ppm of boric acid maximum percent of germination was recorded i.e. 94 percent. From 200 ppm onwards the germination percent decreases with the increase in the bursting of pollen contents. The maximum pollen tube length was noticed in 100 ppm of boric acid with 15 percent sucrose that was found to be 1378 microns. In certain cases the bulging at the tip portion recorded. The average pollen tube ranges between 689 to 1178 microns.

When daily experiment carried out with 100 ppm boric acid with 15 percent sucrose the pollen grains of Cleome showed variation in maximum germination from 89 to 94 percent and maximum tube length varies from 1172 to 1378 microns.

iii)   Brewbaker's medium

In Brewbaker's medium, Cleome pollen grains showed good germination like sucrose. It showed 96 percent maximum germination and the percentage varies from 90 to 96. The maximum length recorded in the Brewbaker's medium was found to be 1549 microns highest than any other medium. The average pollen tube length varies from 1179 to 1346 microns.

In vivo germination study- The breeding system of an angiosperm is multidimensional and covers, among other aspects, sequential processes such as pollen delivery, pollination, and pollen germination on the stigma, pollen tube growth down the style, fertilization of the ovules, seed development and dispersal of the seeds. Out of this broad field, the pollen germination and the competition of the tubes in the transmitting tract plays very important role in the fertilization that we studied in the laboratory by studying the stigmas.

In vivo studies was conducted on the stigma with some portion of styles on the first, second, third day of the anthesis till the drooping stage. All days stigma showed the germination. 10 stigmas in each category was studied and maximum 88% germination was found in Cleome viscosa and maximum pollen tube length was found on second day with 1995 microns in length. The number of pollens retained on stigma on drooping stage was also large i.e. 2947 pollens per stigma.

Day 1 stigma
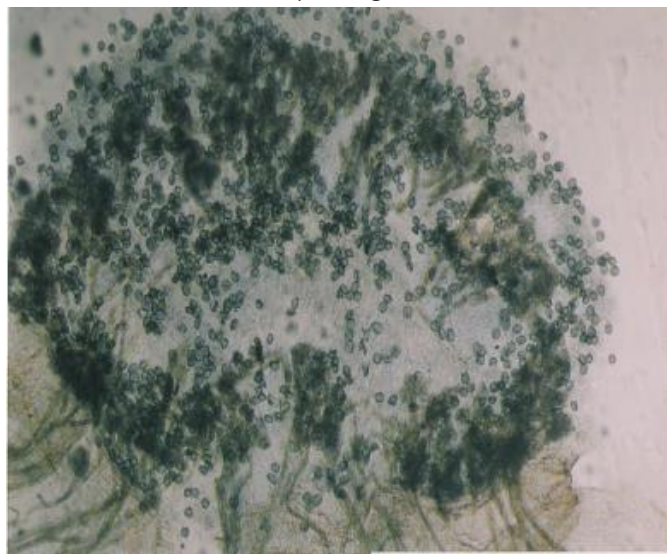
Day 2 stigma
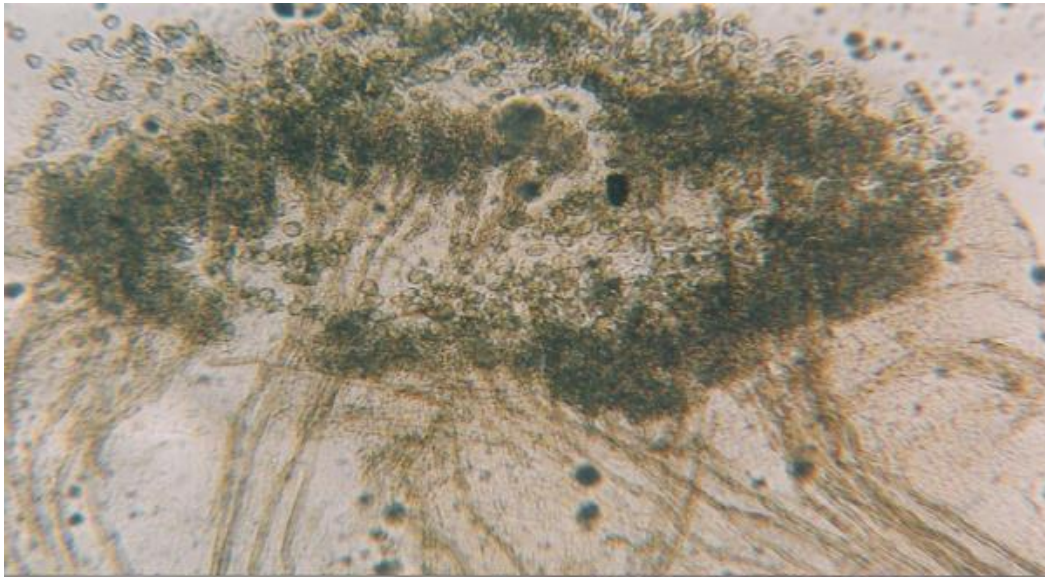
Drooping stage stigma

Fig- 6 In –vivo germination of pollens on stigma

1.	Period after opening of flower.	Day 1	Day 2	Day 3	Dropping
2.	Total number of stigma's observed.	10	10	10	10
3.	Number of stigma's showing germination.	7	8	10	10
4.	Mean number of pollen retained on stigma.	2835	2947	2872	2298
5.	Mean number of pollen germinated on stigma	1234	1667	1845	2024
6.	% of germinated pollen.	44	56	64	88
7.	Average tube length in microns.	708	1557	1180	1288
8.	Maximum tube length in microns.	1273	1995	1287	1353

Table 1: In vivo pollen germination on stigma

Pollen storage- The longevity of the pollen is governed by a number of factors. Temperature, Relative Humidity, light and the time of blooming govern the longevity of the pollen. Of special significance temperature & relative humidity and their effects are interdependent. Here, in the present study, the storage of pollen grains was studied using different parameters such as providing the different temperature as well as the relative humidity. Pollen storage in different organic solvents at 4°C was also studied as a different parameter.). Low temperatures are generally found suitable for long term storage. At room temperature & 100% RH pollen lost viability within 24 hrs. Relative humidity between 0 – 20% had been reported to retain viability for several days. In the light of at available evidences, it is obvious that temperature alone cannot be the ideal storage condition, unless coupled with suitable levels of relative humidity.

The artificial maintenance of the viability and fertilizing ability of pollen over a long period is an important problem from both the theoretical and practical point of view. The pollen longevity of different species varies between minutes and years depending primarily on the taxonomic status of the plant & abiotic environmental conditions.

The pollen of Cleome viscosa was   subjected to various RH levels like,0%,10%,20%,30% and 100% RH on room temperature (32°C) as well as on freeze temperature (4 °C). Their storability was checked by germinability of pollen grains by germinating in artificial growth media in which they showed maximum germination in vitro. Here in the present study 15% sucrose solution was used as a basal medium.

Cleome showed good storage results from 0 %RH to 100% RH in both the condition at room temperature as well as on freeze temperature. On the room temperature, the storage days vary from 57 days to 2 days in 0 % RH to 100% RH respectively. In 0% RH 57 day's storage was recorded with 94 percent germination and 945 micron tube length. In 30% RH 17 days viability was recorded. In 100 % Rh pollen can be stored up to 2 days with 5 percent germination and 40 microns tube length. On freeze temperature, here also in all the RH level, pollen of Cleome showed, viability ranging from 64 days to 4 days. In 0% RH 64 day's storage was recorded with 95% germination and 1123 micron tube length. In 10% RH 52 days with 68% germination and 943 microns length and 36 days storage with 46% germination and 465 microns tube length observed (Table 2).

| No. of days storage | Temp. | % of relative humidity | | | | | | | | | |
| | | 0% RH | | 10% RH | | 20% RH | | 30% RH | | 70% RH | |
		% of Ger.	PT (◻)	% of Ger.	PT (◻)	% of Ger.	PT (◻)	% of Ger.	PT (◻)	% of Ger.	PT (◻)
2	Room	94	945	63	845	38	521	40	348	05	40
	Freeze	95	1123	68	945	46	465	33	175	13	99
4	Room	87	735	56	635	23	463	23	129	--	--
	Freeze	89	1085	61	813	37	325	26	93	03	27
15	Room	63	779	43	670	18	379	15	45	--	--
	Freeze	68	978	53	735	30	270	12	56	00	00
17	Room	65	693	45	439	15	314	03	12	--	--
	Freeze	63	735	56	625	28	185	08	36	--	--
21	Room	48	678	36	348	09	39	01	08	--	--
	Freeze	59	539	52	420	23	122	02	18	--	--
22	Room	52	563	30	273	01	11	00	00	--	--
	Freeze	56	598	44	329	15	89	00	00	--	--
30	Room	45	439	22	118	00	00	00	--	--	--
	Freeze	49	440	49	269	08	65	--	--	--	--
36	Room	32	375	11	90	--	--	--	--	--	--
	Freeze	45	332	35	149	03	14	--	--	--	--
42	Room	36	239	05	25	--	--	--	--	--	--
	Freeze	37	275	28	117	00	00	--	--	--	--
48	Room	22	114	00	00	--	--	--	--	--	--
	Freeze	24	158	12	42	--	--	--	--	--	--
52	Room	11	89	--	--	--	--	--	--	--	--
	Freeze	17	93	04	36	--	--	--	--	--	--
57	Room	03	21	--	--	--	--	--	--	--	--
	Freeze	13	49	00	00	--	--	--	--	--	--
64	Room	00	00	--	--	--	--	--	--	--	--
	Freeze	02	25	00	00	--	--	--	--	--	--
66	Room	00	00	--	--	--	--	--	--	--	--
	Freeze	00	00	--	--	--	--	--	--	--	--

Table 2: Effect of Temperature and Relative Humidity on Storage of pollen grain

Pollen viability in various organic solvents was studied, like Benzene, Isopropyl alcohol, Chlorophyll, Acetone and Xylene. In the present investigation Xylene was proved to be a bad solvent for storing the pollen grains. Isopropyl alcohol and chloroform showed maximum viability i.e. 48 and 59 days Overall these solvents appear to be good for storing pollen for short term.

	Organic solvent	Viability (in days)	Maximum percent of germination	Maximum tube length (in μ)
1	Benzene	65	95	1305
2	Isopropyl alcohol	48	88	865
3	Chloroform	59	91	958
4	Acetone	61	83	1116
5	Xylene	18	62	356

Table 3: Pollen viability of Cleome viscosa in different organic solvents

The major cause of the loss of viability during storage appears to be the deficiency of metabolites due to the continued metabolic activity of the pollen is going on at the much reduced rate had found that a higher moisture & temperature level reduces pollen quality by increasing metabolic rates & promoting microbial activities. Pollen storage conditions that maintain fertility increases the efficiency of handling breeding & genetics material of any plant species.

Free amino acids estimation- Although the amino acids contained in pollen grains have been studied as a part of pollen pathology here we studied from the pharmacological point of view. Changes in free amino acid pattern and amino acid composition of pollen grains were recorded while studying pollen chemistry. Free amino acids are always found in relatively large amount. Altogether 14 different free amino acids were separated and identified by chromatographic methods.

Protein estimation- Proteins are the essential metabolic substance for activation of pollen, following germination were accompanied by the initiation of protein synthesis. The localization of proteins and enzymes has shown that the proteins occur most prominently in the cellulosic intine near the pore & in the cavities of exine. Protein synthesized or activated in the germination stage of pollen tube are apparently required for the early stage of tube development. 30.12% total pollen protein was estimated spectrophotometrically.

Histochemical studies of germinated pollen grains- In the light of the present work of Histochemical analysis of these anticancerous plants, it can be said that pollen is equipped itself at the time of shedding to carry out, its metabolism during the active phase of germination as evident from rich localization of reserve metabolites. It is also apparent that the pollen tube is the site for active metabolism in the tube.
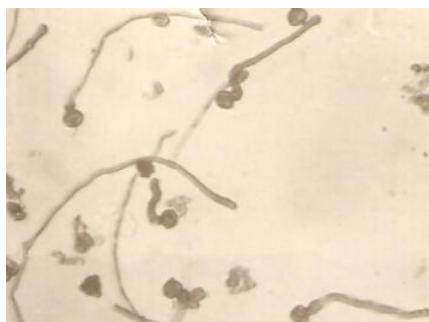
Polysaccharides early stage
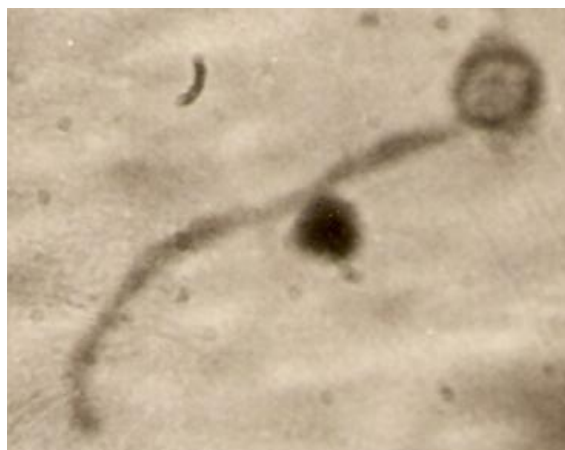
Pectic substances late

Pollen grain and pollen tube with ascorbic acid after five hours

Cytochemical substances	Time Interval (in hours)	Pollen grain	Pollen wall	Pollen tube content		Pollen tube wall
				Lower half	Upper half	
polysaccharides	1	Present	Positive	Rich	Rich	Positive
	2	Rich	Positive	Rich	Rich	Positive
	3	Rich	Positive	Present	Rich	Positive
	4	Intense	Positive	Present	Rich	Positive
	8	Intense	Positive	Present	Present at Tip.	Positive
Cellulose	1	Absent	Negative	Absent	Absent	Negative
	2	Absent	Negative	Absent	Absent	Negative
	3	Absent	Negative	Absent	Absent	Negative
	4	Absent	Negative	Absent	Absent	Negative
	8	Absent	Negative	Absent	Absent	Negative
	1	Absent	Negative	Absent	Absent	Negative

Cytochemical substances	Time Interval (in hours)	Pollen grain	Pollen wall	Pollen tube content		Pollen tube wall
				Lower half	Upper half	
Starch	2	Absent	Negative	Absent	Absent	Negative
	3	Absent	Negative	Absent	Absent	Negative
	4	Absent	Negative	Absent	Absent	Negative
	8	Absent	Negative	Absent	Absent	Negative
Pectic substances	1	Rich	Positive	Present	Present	Positive
	2	Rich	Positive	Absent	Absent	Positive
	3	Present	Positive	Absent	Absent	Positive
	4	Present	Positive	Absent	Absent	Positive
	8	Present	Positive	absent	Absent	positive
Lignin	1	Absent	Negative	absent	Absent	Negative
	2	Absent	Negative	absent	Absent	Negative
	3	Absent	Negative	absent	Absent	Negative
	4	Absent	Negative	absent	Absent	Negative
	8	Absent	Negative	absent	Absent	Negative
Lipids	1	Intense	Positive	Rich	Rich	Positive
	2	Intense	Positive	Rich	Rich	Positive
	3	Rich	Positive	Rich	Rich	Positive
	4	Rich	Positive	Rich	Present	Negative
	8	Rich	positive	Rich	Present	Negative
Protein	1	Rich	positive	Rich	Rich	Positive
	2	Rich	Positive	Rich	Rich	Positive
	3	Rich	Positive	present	Present	Negative
	4	Rich	Positive	present	Present	Negative
	8	Rich	Positive	present	present	Negative
DNA	1	Rich	Positive	Absent	Absent	Negative
	2	Rich	Positive	Absent	Absent	Negative
	3	Rich	Positive	Absent	Absent	Negative
	4	Rich	Positive	Absent	Absent	Negative
	8	Rich	Positive	Absent	Present in few tubes as dark spot in tip.	Negative
	1	Present	Positive	Absent	Absent	Negative

Cytochemical substances	Time Interval (in hours)	Pollen grain	Pollen wall	Pollen tube content		Pollen tube wall
				Lower half	Upper half	
RNA	2	Present	Positive	Absent	Absent	Negative
	3	Present	Positive	Absent	Absent	Negative
	4	Present	Positive	Absent	Absent	Negative
	8	Present	Positive	Absent	Absent	Negative
Ascorbic acid	1	Rich	Negative	Present	Present	Negative
	2	Rich	Negative	Present	Present	Negative
	3	Rich	Negative	Present	Present	Negative
	4	Rich	Negative	Present	Present	Negative
	8	Rich	Negative	Present	Present	Negative

Table 4: Distribution of cytochemical substances in germinated pollen of Cleome viscosa.

III. CONCLUSIONS

We can say that there are many opportunities regarding the Palynological work of medicinal plants;

i)   The pollen is used as a convenient experimental system in genetic investigations, directed towards plant improvement. Pollen are irradiated to induce desired mutational variations and to overcome intraspecific incompatibility or to remove other fertilization barriers.

ii)   The direct and indirect roles played by pollen in various spheres of applied biological research will be found useful in view of the fact that pollen is a material to work which seems to be providing an easier and even better means for experimentally controlling the genetic behaviors of the plants.

iii)   In the eye of biochemist the pollen is a sac full of enzymes and substrates, locked up in compartments and filled with some types of cell organelles. In fact, if one carefully looks, one can find in pollen of different plant species nearly all physiologically important classes of substances, not only carbohydrates, proteins but all types of lipids, growth hormones, vitamins, pigments, sterols etc.

iv)   India, with its vast biodiversity and potential for commercial exploitation, could become a world leader in the supply of raw material for the phytopharmaceutical industry.

v)   By drawing up a comprehensive strategy for the cultivation and conservation of medicinal plants in league with the forest department, many threats outlined earlier could turn into opportunities for successful commercial exploitation without tampering with the interest of the communities involved in the collection of plants.

vi)   India is among the traditional producer and exporter of several medicinal plants. Lack of basic information on different parameter of crop productivity is a limiting factor in this group of plants. There is therefore need for intensive agricultural studies leading to the genetic improvement and cultivation methods for expansion of area under medicine and medicinal plants.

vii)   Plant germplasm resources are one of the most important renewable natural resources of the world. Increasing exploitation coupled with natural calamities has led to rapid dwindling of important plant species. Nearly 20,000 to 25,000 species of vascular plants are currently facing threat their existence. This necessitates urgent measures to conserve the plant wealth of ecosystem, species and gene pool levels, to

enable sustained use for present and future generations by establishing pollen banks and germplasm resources centers.

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Removal of Dyes in Water by Adsorption Method Using Zeolite as Adsorbent

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ABSTRACT

There are various industries that make use of dyes for various application and Residual solution put back in the river which pollute the water. These dyes are toxic and health hazardous so the objective of research work is to remove this type of dye by using adsorbent (zeolite) via adsorption process.Intend of this study is to evaluate adsorption process of absorbent i.e., Zeolite and adsorbent i.e., Methyl orange dye at three different parameters such as time, concentration of adsorbent and PH of solution.

I. INTRODUCTION

Pollution is when something is added to the environment harmful or poisonous to all living things.The presence in or introduction in to the environment of a substance which has harmful.Types of pollution: air Pollution, light pollution, noise pollution, land pollution, thermal pollution, radioactive pollution, water pollution. Water pollution:Water pollutionis the contamination of water bodies e.g. lakes, rivers, oceans, aquifers and groundwater This form of environmental degradation occurs when pollutants are directly or indirectly discharged into water bodies withoutadequate treatment to remove harmful compounds. Water Pollutant: there are number of pollutants which pollute the water such asInorganic salt (ca+2, mg+2, cl-)[1], Microscopic matter (bacteria, algae and fungi), Inorganic impurities (clay, sand), Dissolved gas (oxygen, carbon dioxide), Chloride, sodium, sulphate, magnesium, calcium. These are the pollutants which are very dangerous to human health and environment. Causes of water pollution: water pollution causes due to Sewage and waste water, Accidental oil leakage, burning of fossil fuels, Dumping of solid waste, Acid rain Global warming, Industrial waste[2].

 Industries produce huge amount of waste which contain toxic chemicals and pollutant that are extremely harmful to people and Environment. They contain pollutant such as lead, mercury, Sulphur, asbestos-nitrate etc. There are some industries they use dye or colored solution which is put back in the river or see water and which causes the water pollutionDye using IndustriesTextile industry, Leather industry, Paper industry, Chemical industry, Food, Cosmetic

Dyes are the natural or synthetic substance used to are a color to or change the color of something   or a dye is color chemical substance that impart color when applied to a substrate. Dye is generally soluble in solvent. Alizarin, alizarin red S, alizarin yellow R, Chrysopidae R, Congo red, methyl orange, methyl red, naphthol green B these are examples of dyes. Methyl orange It is one of the dyes which is pH indicator used in titration.

Methyl orange shows red color in acidic medium and yellow color in basic medium.Drawback of methyl orange causes Skin irritation, Eye irritation, it causes respiratory disease. Method of water purificationthere are number of methods for water purification such asCrystallization Sublimation, Distillation, Chromatography, Adsorption.

AdsorbentIt is the solid substance on the surface of which adsorption occur. Adsorbate It is the substance that get adsorbed on the surface of solid due to intermolecular attraction.Factor affecting on adsorptionNature of Gas,nature of adsorbent,specific area of adsorbent,temperature, Pressure.

Zeolite are micro porous aluminosilicate minerals used commercial   adsorbent and catalyst zeolite characterized by their ability to lose and absorb water without damage to their crystal structure. Zeolite have large surface area[3].Adsorptionin zeolite is significantly differ from adsorption in e.g., silica gel or active coal. In zeolite porosity is determined by crystalline structure i.e., the pores are arranged in a regular fashion with only one discrete pore sizes. Also pores have molecular dimensions. In this case the zeolite is used as adsorbent and molecular sieve.One of major used of zeolite is as heterogeneous catalyst in the petrochemical industry, cracking catalyst. Zeolite catalyst give high selectivity (shape selective) and their properties may be tailored by changing the chemistry[4].

Applications Heating and refrigeration, Zeolite can be used as solar thermal collector and for adsorption refrigeration. In this application their high heat of adsorption and ability to hydrate and dehydrate while maintaining structural stability is exploited. In agriculture clinoptilolite is used as soil treatment. It provides a source of slowly released of potassium. It previously loaded with ammoniumDetergentThe largest single used for zeolite is the Global laundry detergent marker.IndustryPetroleum chemistry, Biogas industry,nuclear industry[5].

II. MATERIALS & METHODS

Stock solution is prepared by adding 20 milligram methyl orange in 200 ml distilled water and this solution is diluted with 1:3 volume by volume ratio. The solution is used for further process.For removal of dye, we have use zeolite as adsorbent in adsorption process.concentration of dye in water is studied by UV visible spectrophotometer.

Table-1 Time Variation

Time (Min)	Absorbance		
	Trial-I	Trial-II	Trial-III
0	1.972	2.075	2.154
5	1.88	2.058	2.144
10	1.78	2.103	2.235
15	1.86	2.074	2.220
20	1.80	2.033	2.228
25	1.77	2.154	2.060
30	1.627	2.064	2.075
35	1.85	2.030	2.097
40	1.62	2.005	1.988
45	1.80	2.816	2.155

Procedure: (time variation)

1) 50 ml of methyl orange solution is taken.

2) This solution is poured in 10 test tubes.

3) Equal amount of sample (absorbent) is added in each test tube.

4) adsorbent and dye solution are allowed to be in contact with each other for variable time duration (0,5,10,15,20,25,30,35,40,45 min).

5) After particular time duration filter, it and its absorbance are noted by using UV visible spectrophotometer.

6) Graph is plotted between time and absorbance

7) The time for minimum absorbance is selected.

Table-2: weight of sample variation

Weight In mg	Absorbance		Weight In mg
	Trial-I	Trial-II	
0	1.977	2.25	0
1	1.949	2.26	1
2	1.942	2.22	2
3	2.052	2.23	3
4	2.037	2.22	4
5	1.952	2.26	5
6	2.137	2.31	6
7	2.022	2.318	7
8	1.966	2.27	8
9	2.068	2.38	9

Procedure:(Weight of Sample Variation)
1)　　50 ml of methyl orange solution is taken
2)　　This will orange solution is poured in 10 test
3)　　Different amount of sample (1, 2, 3,4…10 mg) is added in different 10 test tube by keeping time constant which we have selected from above graph
4)　　Adsorbent and the solution are allowed to be in contact with each other for particular time duration
5)　　After particular time duration the solution is filtered and its absorbance is noted by UV visible spectrophotometer
6)　　Graph is plotted between weight and absorbance.
7)　　Minimum absorbance is selected.

Table-3:pH variation

pH	Absorbance		
	Trial-I	Trial-II	Trial-III
1	2.392	2.418	2.448
3	2.418	2.416	2.318
6	3.260	3.236	3.295
9	2.613	3.313	3.379
12	2.67	3.28	3.249

Procedure (pH variation)
1)　　50 ml of methyl orange solution is taken.
2)　　This methyl orange solution is distributed in 10 test tubes.
3)　　pH of solution is maintained at(1, 3, 6, 9, 12).
4)　　This experiment is carried out at fixed time and fixed concentration decided from two earlier experiment
5)　　Adsorbent and dye solution are allowed to be in contact with each other for particular time duration.
6)　　After particular time duration solution is filtered and its absorbance is noted using UV spectrophotometer.
7)　　Graph is plotted between pH versus absorbance.
8)　　Minimum absorbance for pH is selected

Spectrophotometer: spectrophotometer is an instrument that measures the amount of light absorbed by a sample.

Uses: spectrophotometer technique are used to measure the concentration of solute in solution by measuring the amount of light that is absorbed by the solution in cuvette placed in spectrophotometer that is absorbance and transmittance **UV range:** 190 to 380 nm,**Visible range:** 380 to 750 nm.

Instrumentation

Instrument for measuring absorption of UV visible radiation is made up of one or more

1)　sources
2)　wavelength selector

3) sample container
4) radiation transducer
5) signal processor and read out devices

Sources: there are number of sources used in UV visible spectrophotometer are

1) deuterium and hydrogen lamp (190-400nm)
2) tungsten filament lamp(300-2500nm)
3) light emitting diode
4) Xenon Arc lamp(160-2000nm)

Wavelength selector: The selectors used in UV visible spectrophotometer are

fluoride prism (120-200nm)

fused silica or quartz crystal(380-2500nm)

NaCl prism (2000-15000nm)

KBR prism (10000-30000nm)

sample container: The cell or cuvette that hold the sample and solvent must be constructed of a material that possess radiation in the spectral region of interest. Quartz or fused silica is required for work in the UV region below 350 nm. Silicate glasses can be employed in the region between 350 nm and 2000nm. Plastic container used in visible region. Cylindrical cells sometimes employed in the UV visible region because they are inexpensive

Types of instruments:

1) single beam
2) double beam
3) multichannel
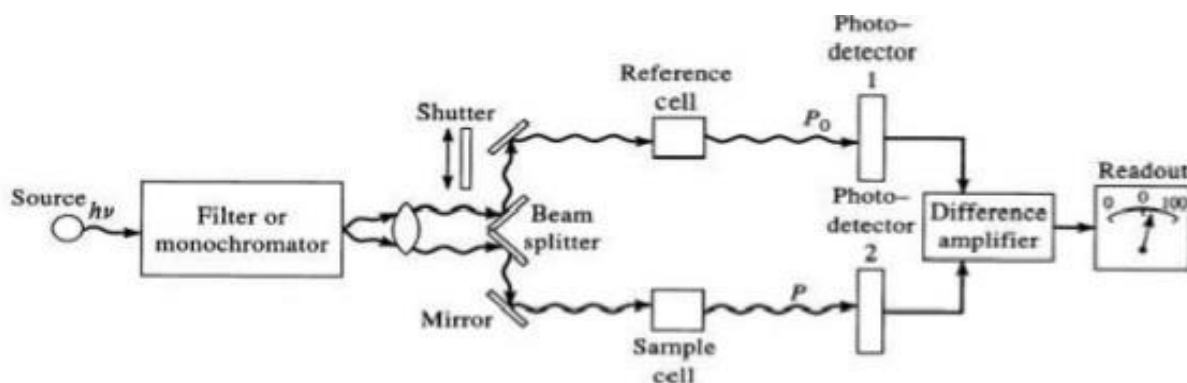
Figure-1of Double beam spectrophotometer

Many modern photometer and spectrophotometer are based on double beam design. In which two beams are formed in space by a V shaped mirror called as beam splitter. One beam passes through reference solution to a photo detector and second simultaneously transverse the sample to a second matched detector. Thetwo-output amplifier and their ratio is determined electronically or by computer and displayed by the read out devices.With manual instrument the instrument is two step operations involving first the zero adjustment with a shutter in place between collector and beam splitter. In second step the shutter opened and the transmittance

or absorbance is displayed director. The absorbance of methyl orange solution is noted by keeping water as a reference in UV visible spectrophotometer at 463 nm wavelength

III. RESULT AND DISCUSSION

Adsorption process is carried out at three different parameters such as time, concentration of adsorbent and pH of solution.

Time variation:

Graph of time versus absorbance is presented on following figure-2.
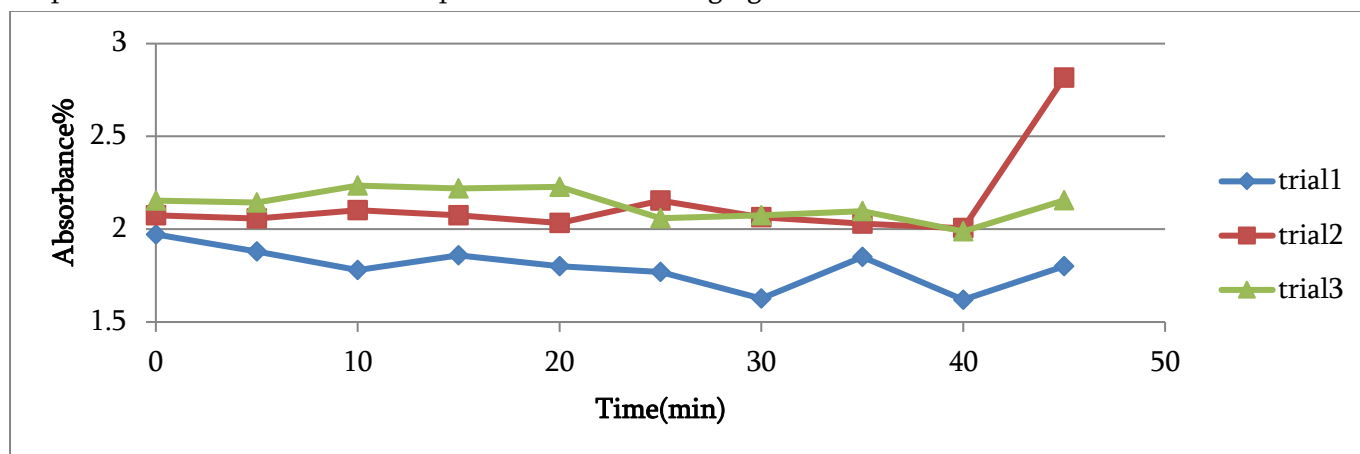
 figure-2.

The absorbance changes as a function of time. there is no variation of absorbance up to 30 min. after 30 min variations in absorbance is observed and minimum absorbance is obtained at 40 min time. Hence maximum adsorption occurs at 40 min time.So, 40 min time is best for adsorption process.

Concentration variation

Graph of concentration versus absorbance is presented in following figure-3
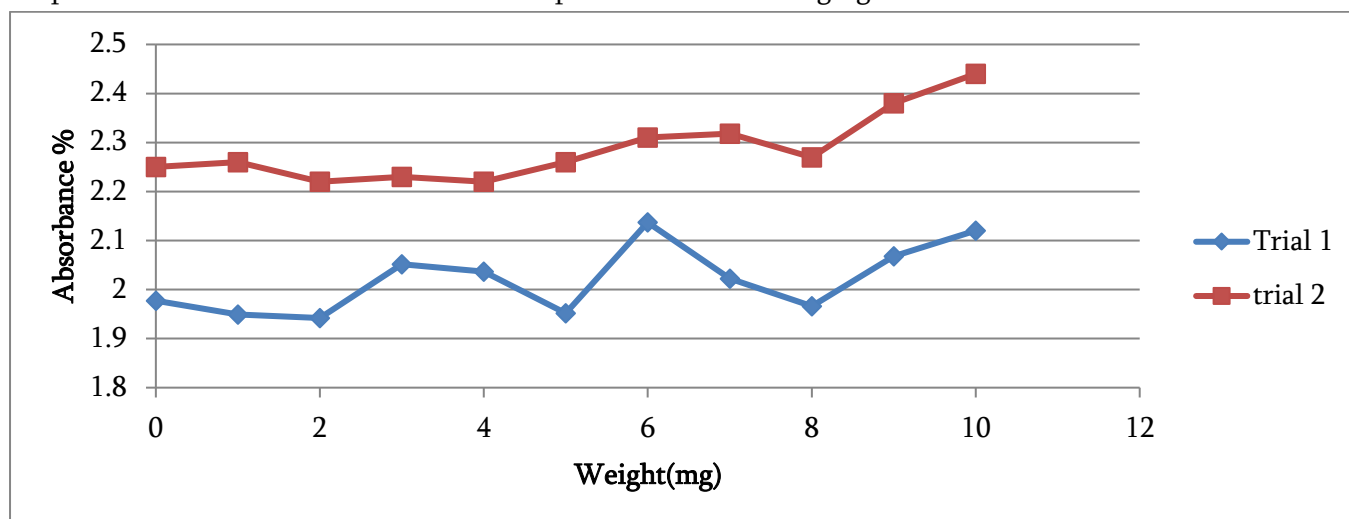
figure-3

The absorbance changes as a function of concentration of adsorbent.At a particular concentration of adsorbent (2mg) it shows minimum absorbance so maximum adsorption occur at that point. Hence 2mg concentration is selected for best adsorption process.

pH variation

Graph of pH of solution versus absorbance is presented in following figure-4
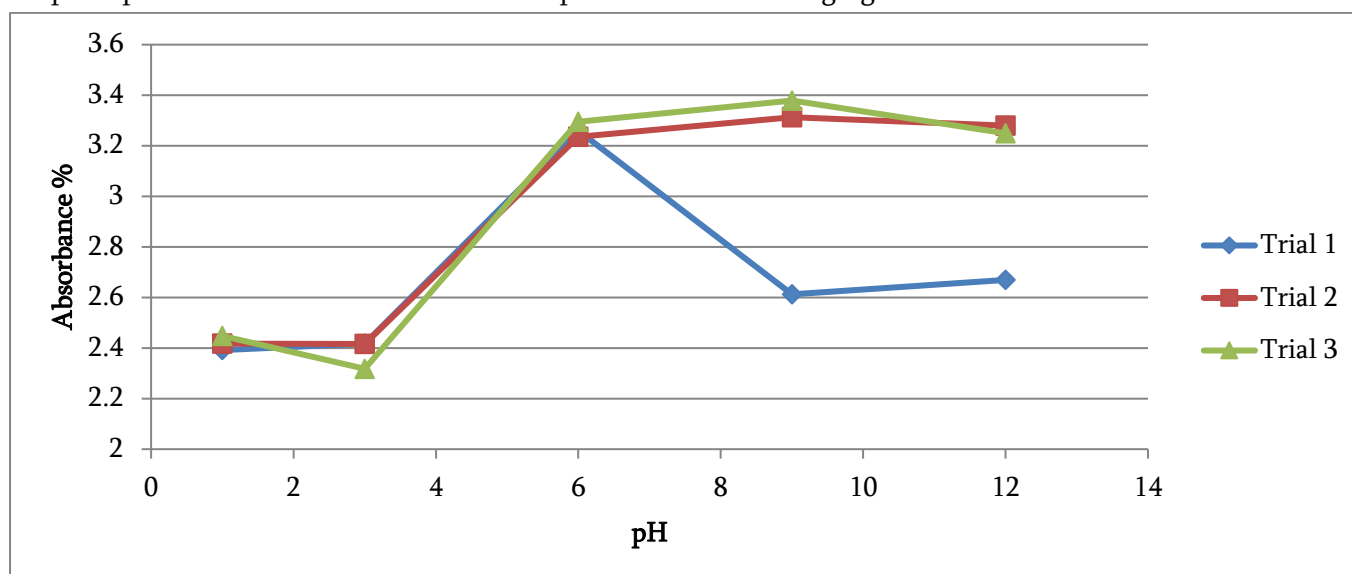
figure-4

Absorbance of solution changes as a function of pH of solution. As pH of solution increase absorbance also increases and   minimum absorbance is obtained at 3 pH of solution. Hence it shows maximum adsorption at that point.

IV. CONCLUSION

Maximum adsorption is obtained at 40 min time and Maximum adsorption is obtained at 2 mg of concentration of adsorbent. Maximum adsorption is obtained at 3 pH of solution. So by overall observation it is conclude that, Maximum adsorption is obtained at 2 mg of sample (zeolite) for 40 min time and at 3 pH of solution.Natural zeolites are important low cost materials for water and wastewater treatment. Due to the nature of cation exchange, natural zeolites exhibit high performance in adsorption of cations in aqueous solution such as ammonium and heavy metals[4].

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Induced Mutation for Improvement in Nutritional Quality of Pulse Crops

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ABSTRACT

Pulses have an important role in daily diet and about 60 grams of pulsesare necessary for good heath of human being (WFP).They are great source of protein, high insoluble and non-soluble fiber content, vitamins and minerals - iron, potassium, magnesium, zinc etc. As per WHO, pulses particularly helps to fight against some non-communicable diseases by improving the immune capacity.

As per IAEA, 3290- mutant varieties were developed through induced mutagenesis. Out of which, in pulse crop- 460 mutant varieties were developed throughout the world while India contributed 57mutant varieties. The improved characters were early maturity, high yield, high protein content, disease resistant, resistant to biotic and abiotic stresses etc. Likewise, 1161 and 1,026 mutant varieties were developed for improvement in quality and nutritional traits as well as for high yield respectively. (IAEA https://mvd.iaea.org).

Improving nutritional quality by lowering anti-nutritional factors through induced mutagenesis beneficial to increase consumption and to fulfill nutritional demand of increasing population, helps to reduce malnutrition among the poor's especially in women and also beneficial to ensure additional income to the farmers.

Keywords: Pulse Crop, Nutritional quality, induced mutations

I. INTRODUCTION

In the world, India is the largest producer of pulses. Pulses are valuable economically important group of plants as they are source of foreign currency for the country. Pulses have high nutritional value. Pulses are main source of protein in the daily diet and rich in carbohydrate, fats, dietary fibers and calories required for good health of human being. Pulses are multifunction crops that fix atmospheric nitrogen and increase soil fertility and boost the growth and development of the next crop in crop rotation. Pulses can grow in all type of soil including marginal soil and thus helpful to poor farmers by reducing the cultivation cost. Majority pulses are short duration crops thus cultivation of another crop on the same farm is also possible to farmer. Pulses provide raw material to various food related industries like papad, dal and roasted grain industries.Along with three major cereals viz. wheat, maize and rice, pulse crops are also important valuable source of protein which meets the demand of increasing population of the world.

Mainly Chickpea (*Cicer arietinum* L.), Pigeon pea (*Cajanuscajan* L.), Mungbean (*Vigna radiata* L. Wilczek), Urdbean (*Vigna mungo* L. Hepper), Lentil (*Lens culinaris* L.), Fieldpea (*Pisum sativum* L.) etc. are the popular

pulse crop. As per the data reported by Chauhan and Gupta (2016), In India, pulses contribute 25.7% to the world production proves that India is the largest producer of pulses.The states - Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Karnataka, Andhra Pradesh, Gujarat, Tamil NaduBihar are known for highest pulse crop production

Pulses are not only good source of protein and fiber, it is also rich source of vitamins and minerals, such as iron, zinc, folate, and magnesium. It has great medicinal properties due to the various phytochemicalsfound in pulses possess antioxidant and anti-carcinogenic effects, indicating that pulses may have significant anti-cancer effects. It also effective positively to lowers blood pressure. High content of fibre thus have a low glycemic index which helps to maintain blood glucose and insulin levels.

II. MUTAGENESIS

Hugo de Vries (1901) identified that the heritable change in character was due to mutation which is differ from segregation or recombination. After that H. J. Muller (1927)in fruit fly, Drosophila melanogaster and by L. J. Stadler (1928) in maize and barley through X-rays proved that mutations may be induced artificially. Later on in 1934, Tollenaar isolate a light green "Chlorina" mutant of Tobacco and released for commercial cultivation in Indonesia (Kharkwal, 2012). After that use of physical mutagen X-rays, gamma rays, alpha and beta particles, neutrons, protons, ultra-violet (UV) radiation and chemicals like ethyl methanesulphonate (EMS), ethylineimine (EI), N-nitroso-N-methyl urea (NMU), sodium azide (SA) etc., were found to be more efficient and effective to induce mutation to create variability and were useful to release new varieties with improved characteristics.Now a days mutation breeding has contributed significantly to the global biodiversity, agriculture and human welfare by producing 3290 mutant varieties with enhanced production and productivity in a large number of crop species. Out of 3290, India (341) secure 3rd position afterChina (810) and Japan (479). (IAEA https://mvd.iaea.org).

III. MUTAGENESIS IN PULSE CROP

In pulse crop, trough out the world,461 mutant varieties were developed. Highest number of mutant varieties i.e.170 was reported in soybean followed by ground nut (72), French bean (59), Mung bean (36), Pea (32) etc. India contributed 57 mutant varieties- Mungbean (15), blackgram (9), chickpea (8), cowpea (10), mothbean (5), pea (1), pigeonpea (5), frenchbean (1) and lentil (3).The improved characters were early maturity, high yield, high protein content, improved nutritional quality, disease resistant, resistant to biotic and abiotic stresses etc.

Mutagenesis for enhanced nutritional quality in pulse crop:

Out of total 3290 mutant varieties, 1161 mutant varieties of different crops were developed for improved quality and nutritional traits. (IAEA https://mvd.iaea.org).Mutant varieties of Cowpea (*Vigna unguiculata*Walp.) - CBC5 and Lukusuzi were developed from Zimbabwe and Zambia in 2017 and 2018 respectively. The mutant variety of Lentil (*Lenseculinaris*Medik.) - Binamasur-8 and Soybean (*Glycine max* L.) - DT2012 were released for cultivation from Bangladesh and Viet Nam in 2014 and 2017 respectively. (https://mvd.iaea.org/)

Concerning about the anti-nutritional factor, phytic acid content, induced mutations were proved to be beneficial tool for reduction of phytic acid content. Wilcox et al. (2000) reported that, phytic acid content was decreased 2-3 fold (about 50-70%) in mutant lines - M156 and M766 of soybean. Raboy (2002) also reported that seed phytic acid is reduced by 50–95% in soybean (*Glycine max*) through induced mutations. Low phytic

acid mutants have been isolated by several researchers. Campion et al. (2009) in common beanby using chemical mutagenesis andYuan et al. (2007) in soybean byusing chemical and physical mutagenesis reported their results. The data of some improved nutritional quality mutant varieties of pulses were recorded in Table No.1

The successful attempts were made by Nuclear Agriculture and Biotechnology Department (NABTD) of Bhabha Atomic Research Centre, Trombay, Mumbai (Maharashtra) in Development of mutant varieties. They have been developed valuable 42 different crop varieties for commercial cultivation in different climatic zones of country (http://www.barc.gov.in).

The mutant variety - TAMS 98-21 of Soybean (*Glycine max* L.) released for cultivation in 2007. The improved characters were multiple disease and pest resistance, (2243kg/ha) produced 21% higher yield over best check variety JS-335 (1853kg/ha) in Maharashtra State multi-location trials. The mutant variety-TC-901 of Cowpea (*Vigna unguiculata*Walp.) has yield superiority of 15% over the national check variety RC-101 and was released for commercial cultivation in 2018. It is semi-determinate mutant, High yielded, increased seed size, pod size and number, resistance to cowpea mosaic and root-rot diseases.

Nutritional quality of food grains is achieved by improving biomolecule availability by lowering phytic acid content. It was confirmed by many researchers that induced mutations were effective tool for reduction of phytic acid content of food grains.Sweta Kumari et al (2014) reported that phytic acid and phytic acid phosphorus (PA-P) contents significantly reduced in five mutant lines, IR-JS-101-4, IR-V-101-3, IR-DS-118-2, IR-DS-119-4 and IR-DS-122-2 of plants of M10 generation as compared to their parent lines of soybean by using EMS and γ-radiations.

IV. CONCLUSION

Mutation breeding plays an important role indevelop new varieties with desirable traits. But now the research work should be focused on the nutritional quality of the pulse crop by lowering the anti-nutritional factors like phytic acid, tannins, polyphenols etc. This research work will be beneficial to increase consumption and thereby farmers may attract for cultivation. Thus, it leads to fulfill nutritional demand of increasing population, helps to reduce malnutrition among the poor's especially in women and also beneficial to ensure additional income to the farmers.

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Table No. 1 Some Released Mutant Varieties for nutritional quality (https://mvd.iaea.org/)

Pulse crop	Variety	Country	Year of release	Mutagen	Character
Glycine max L.	Bisser	Bulgaria	1984	100Gy gamma rays and 0.1%EMS.	higher protein content and yield
	DT90	Viet Nam	1993	gamma rays (180 Gy)	higher protein content and yield
	DT96	Viet Nam	2004	gamma rays (180 Gy).	high protein content (43 – 45%)
	Yume-minori	Japan	2004	Gamma rays	Low allergen and high globulin content
	Tamaurara	Japan	1999	Hybridization with mutant line	protein content of "Tamaurara" is 2-3%
	TAEK C10	Turkey	1994	gamma rays (200 Gy)	High yield, higher seed protein and pod position
	TAEK A3	Turkey	1994	gamma rays (100 Gy)	Higher oil content, early maturity and higher yield
	Sui Nong 12	China	1996	gamma rays (120 Gy)	High yield, high protein content (40-54%) and high oil content (21%)

	Ryokusui	Japan	1990	gamma rays (200 Gy).	Good eating quality
	Ore-richi 50	Japan	2008	x-rays (200 Gy)	High oleic acid content
	Kefeng 14	China	2003	EMS	high protein content and high-yield.
	Kexin 3	China	1995	EMS	Nutritional quality . specialty and anti-nutrients
	Kaidou 4	China	2005	gamma rays	Nutritional quality . specialty and anti-nutrients
	Heihe 48	China	2006	Crossing with two mutants	Industrial and marketing quality
	Ludou 9	China	1993	Irradiation of seeds from F1 generation with gamma rays (180 Gy).	protein content (38%), fat content (21%),
	Heihe 48	China	2006	(Crossing with two mutants)	Industrial and marketing quality
	Heinong 31	China	1987	thN	fat (23.14%), protein (41.4%),
	Heinong 32	China	1987	thN, 5x10e11	good adaptability, 22.8% fat and 40.7% protein
	Heinong 34	China	1988	Croosing with mutant gamma rays (100 Gy)	High yield and high protein content
	Heinong 35	China	1990	Crossing with mutant gamma rays (100 Gy)	High yield and high protein content
	Heinong 37	China	1992	thermal neutrons (1x 10e11)	Culinary (eating and cooking) quality
	Heinong 38	China	1992	thermal neutrons (1x 10e11)	Nutritional quality . specialty and anti-nutrients
	Heinong 41	China	1997	Hybridization of two mutant (thN induced mutant)	Nutritional quality . specialty and anti-nutrients High protein content (45,29%),
	Heihe 47	China	2004	Crossing with one mutant	Nutritional quality . specialty and anti-nutrients
	Heihe 12	China	2000	neutrons	High yield and good quality

				(5x10e11)	
	Kinu-sayaka	Japan	2008	Hybridization with mutant obtained by irradiation with gamma rays.	All-lipoxygenase free
Arachis hypogaea L.	Colorado Irradiado	Argentina	1972	X-rays (200 Gy).	higher oil content.
	TG 39	India	2008	Gamma rays, 200-350Gy	Seed contains 50% oil, 26.5% protein, 12.6% carbohydrate and 4.5% sucrose. Its oil contains 59% oleic acid and 23% linoleic acid.
	TDG 39	India	2009	Hybridization with mutant	Large seeds, 120 days maturity and high content of oleic acid
	Huayu 16	China	1999	gamma rays (250 Gy)	High yield, high protein content and good adaptability
	Huayu 22	China	2003	Co 7-rays	High yield, good quality
	Luhua 15	China	1997	Hybridization with mutant Irradiated Runner obtained by irradiation with gamma rays (250 Gy)	Main improved attributes of mutant variety are oil ratio, early maturity and high yield.
Vigna radiata (L.) Wil.	Chai Nut 84-1	Thailand	2012	Gamma rays, 500Gy	Starch content
*Lens culinaris*Medik.	Verzuie	Moldova, Republic of	2004	Gamma rays (250 Gy).	proteins – 26,7%, oils 1,5%, fructose – 0,17%, glucose – 0,08%, saharose -1,23%, starch - 45,30%, cellulose – 7,16%
Viciafaba L.	Severino-vskie 1	Russian Federation	1992	0.01% NMU	High yield and high protein content
	Babylon	Iraq	1994	gamma rays (30 Gy)	Resistence to diseases, high yield and high protein content
	Geca 5	Moldova, Republic of	2008	gamma rays (250 Gy)	Quality and nutrition traits: dry substance -90,68%, proteins – 30,2%, oils 1,2%, fructose – 0,17%, glucose – 0,08%,

					saharose -1,23%, starch - 45,30%, cellulose – 7,16%.
Pisum sativum L.	Moskovsky 73	Russian Federa-tion	1974	0.03% dES	Larger grain size and higher protein content

Properties, Characterization and Effect of Stilbite Zeolite on Growth and Yield of Mushroom

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ABSTRACT

Zeolites are crystalline hydrated aluminosilicates of alkali and earth metals. Properties of the aluminosilicates, framework and presence of well defined channel systems make it possible a variety of application such as agricultural, industrial, and medicinal etc. Zeolites have many more useful properties with high ion exchange and retention capacity. Due to such fascinating properties of zeolites the plant growth, yield of crop have been increased by the application of zeolites and the work has been reported in many national and international journals. Taking this fact in to consideration, we have planned to focus on the characterization, properties of natural zeolite Stilbite and to study their application on the growth and yield of Mushroom. Natural zeolite Stilbite crystals were collected from Fardapur, near Ajanata cave, District Aurangabad from the Marathwada region of Maharashtra state, India. Characterization XRD and IR of Stilbite were carried out. The powdered form of Stilbite were applied in various proportions to study the germination period, growth and yield of Mushroom. We found the growth and yield of Mushroom increased relevantly on the application of natural zeolite Stilbite.

Keywords: Stilbite, Zeolites, Fardapur, Ajanta caves, Mushroom.

I. INTRODUCTION

Zeolites are crystalline hydrated aluminosilicates of alkali and earth metals that possess infinite, three dimensional structures. These crystals are further characterized by an ability to lose and gain water reversibly and to exchange some of their constituent elements without major change of structure[1]. Now a days soilless culture is the modern cultivation system of plants is used for organic or inorganic substrate through nutrient solution nourishment[2]. Soilless growing media are easier to handle with compared to soil culture and it may provide better growing environment.

Zeolites are having potentiality as soilless media for its unique properties. Zeolite crystals alumina-silicates have negative charges, which is balanced by one or two valence of positively charged cations[3]. It has high water absorption, retention and releasing capacity. It has high cation exchange capacity with high buffering ability of

ph change[4]. Zeolites are microporous crystalline materials having high internal surface area[5]. It has been reported that due to its higher cation exchange capacity, nutrient and water holding capacity yield of wheat, tomato, carrot with another grains increased greatly. Tomato plants grown in perlite and zeolite mixture substrate increases yield. Taking this fact of the references in to consideration, we have focused on application of the zeolite Stilbite in different proportions, a platy variety of the VIIth group of zeolite crystals to check growth and yield of eatable mushroom.

II. METHODS AND MATERIAL

A platy variety of natural zeolite crystal Stilbite was collected from naturally occurring zeolite queries around Fardapur village near Ajanta caves Dist. Aurangabad of Maharashtra state, India. The sample was manually transformed into powder form using agate - mortar to a final grain size and sieved to 334 micron size mesh. A washing treatment was given to the material by magnetic stirring for a period of 1 hour. Subsequently, the material was dried at a temperature of 80°C for 24 hrs

Collected sample were characterized by XRD and IR techniques. The identification of the crystalline phases of the sample was conducted by XRD using a JEOL X-ray Diffractometer TIFR, Mumbai between the scan range 50° to 60°. IR spectra was recorded on Perkin IR instrument, Mumbai to confirm the phase structure and zeolitic nature of the collected sample Stilbite. The culture(seeds) of oyster mushroom variety P. Sajor Caju ware obtained from Vasantrao Naike Agriculture Marathwada University Parbhani (MS). For the purpose of cultivation, soybean straw was used as substrate and which is collected from village Gour Tq. Purna(Jn.) Dist. Parbhani (MS).

Dry Soybean straw was soaked in a cold water for 12 hours and separated from water. The soybean straw was pasteurized in a autoclave under 15Ibs pressure for 20 minutes and discharged from autoclave and cooled down to room temperature. After suitable cooling, 1kg quantity of straw per bag filled into the polythene bags with addition of powdered form of a platy variety of zeolite crystal Stilbite, in different proportions i.e 1, 3, 5,7 and 10gms. After this process polythene bags tightly packed and transferred to the Mushroom house for soil less cultivation of mushroom. Temperature and humidity conditions are maintained at 16-25^{0}C and 70-80 % respectively. Time period recorded for the formation of fruiting bodies in addition of different proportions of Stilbite. The data of experiment were recorded for the germination period and yield of the mushroom.

IR and XRD Characterization:

Sample of Zeolite characterized by IR spectroscopy shown in fig.-2, in which the band near region of 3520-3540 cm^{-1} shows –OH starching for symmetrical as well as asymmetrical region. As the metal zeolite showing property of hydrophilic in nature and it is confirmed by presence of H-O-H overtone in plane bending vibration at 2940 cm^{-1}. Not only that the strong band bending vibration observed in the region of 1644 cm^{-1} which confirmed the presence of hydrogen bonding with –OH functional group present in the zeolite. The another vibrations for Al-O and Si-O observed at the region 1090-1027 cm^{-1} for respectively asymmetric as well as symmetric stretching of Al/Si-O.
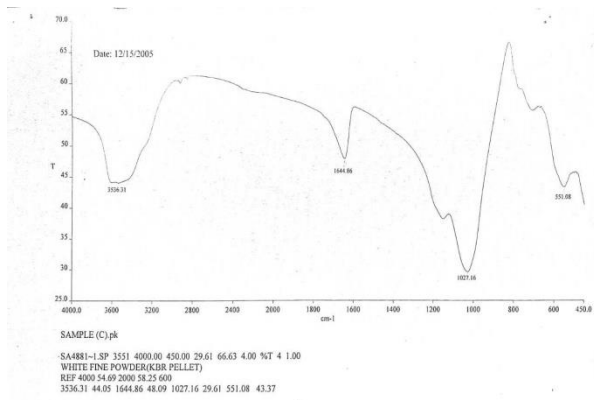
Figure 1: IR Spectrum of Stilbite zeolite
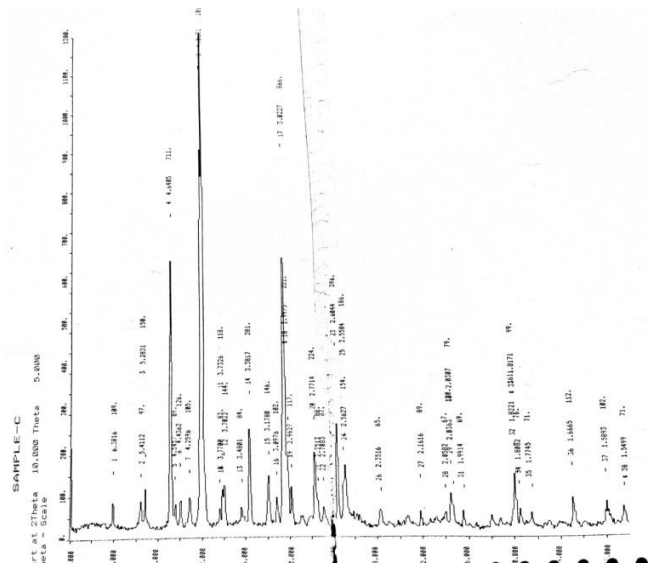
Figure 2: X-RD Pattern of Stilbite zeolite

TABLE I IR WAVENUMBER VALUES

OH stretch symmetric and asymmetric	Overtone in plane bending H-O-H	Bending H-O-H	External Al/Si-O	Asymmetric stretching Al/Si-O	Symmetric stretching Al/Si-O
3536 (s)	2940 (w)	1644 (s)	1190 (w)	1027 (s)	650 (s)

S= Strong band; W= Weak band

The XRD pattern of sample stilbite zeolite is as shown in fig.-2. which shows 2θ values 13.86°, 16.36°, 21.85°, 22.02°, 26.33°, 29.52°, 29.78° as major peak values. The scattering of X-rays from atoms produces a diffraction pattern, which contains information about the atomic arrangement within the crystal. Depending upon 2θ values miller indices are shown in spectra 109, 711, 1866, 281, 866, 224, 396 etc. Miller indices (hkl) are used to identify different planes of atoms. Observed diffraction peaks can be related to planes of atoms to assist in analyzing the atomic structure and microstructure of a sample.

III. RESULTS AND DISCUSSION

Experimental data presented in table-II, from the analysis of the data it is clear that, on the addition of zeolite Stilbite in different proportions, the yield of the P.sajor caju mushroom have been increased considerably. The fruiting bodies (mushroom) were harvested in three slots. The germination period of mushroom culture(seeds) have been reduced by 2 hours and time period required for formation of fruiting bodies of the mushroom were reduced by 1 to 2 days on the application of zeolite crystal Stilbite.

TABLE III

EFFECT OF STILBITE ZEOLITE ON MUSHROOM GROWTH

Substrate	Days for formation of fruiting bodies	Fresh wt. of Mushroom (gm/kgm of straw)	Dry wt. of Mushroom (gm/kgm of straw)
Soybean straw (Control)	17	122.10	11.91
Soybean straw + 1gm Zeolite	17	161.43	12.64
Soybean straw + 3gm Zeolite	16	171.51	13.80
Soybean straw + 5gm Zeolite	15	234.38	14.23
Soybean straw + 7gm Zeolite	15	239.3	17.25
Soybean straw + 10gm Zeolite	15	258	18.45

IV. CONCLUSION

The identification of the crystalline phases of the sample was conducted by XRD and IR spectra confirm the zeolitic nature of the applied sample. From experimental data presented in table-II, the yield (Fresh and dry wt.) of mushroom increased relevantly with the addition of different proportions of zeolite Stilbite. We found that the maximum yield of mushroom obtained 258.00 gm/kgm of straw with the addition of 10 gm of Stilbite and the ratio of the increase in the yield is 1: 2.11 as compared to control. From the above result, it can be concluded that, the productivity increases with decrease in germination period of mushroom on the application of zeolites.

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Determination of some X-ray near Edge parameters of Nickel (II) Complexes of Schiff base ligands

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ABSTRACT

Three nickel (II) complexes of Schiff base ligands, L1 =(P-methoxy anilino)-P- methoxy phenyl acetonitrile, L2 = (P-methoxy anilino)- phenyl acetonitrile and L3 = (P- methoxy anilino) –P– chloro phenyl acetonitrile have been prepared by the condensation of P-methoxybenzaldehyde , benzaldehdye and P-chloro-benzaldehyde with P-anisidine respectively. The mentioned three ligands L1, L2 and L3 were used to prepare three nickel (II) complexes Ni-21 = [Ni2(p-Methoxy ben)(p-Ani)](NO3)2 , Ni-22 = [Ni2(ben) (p-Ani)](NO3)2 and Ni-23 = [Ni2(p-Chloro ben)(p-Ani)](NO3)2 respectively. X-ray k-Absorption Near Edge (XANES) spectra of these three complexes have been recorded at RRCAT (Raja Ramanna Center for Advance Technology), Indore, M.P, India by using Synchrotron radiation source. Various X-ray absorption parameters e.g., chemical shift, edge-width and shift of the principal absorption maximum have been obtained with the help of XANES spectra. Data analysis program Athena and the computer software Origin 6.0 professional have been used to processed the obtained data. The results of the study have been reported in this paper.

Keywords: Schiff base, XANES, RRCAT, Athena, Origin 6.0

I. INTRODUCTION

Aminonitrile compounds are documented species for its biologically activity like pharmaceutical interest and biocatyalysis in industrial synthesis. 1-3 They were also used as synthetic activating transcription for the explanation of biological reaction. It is identified as biologically inhibitors. 4-7 Aminonitrile is potentially a chelating ligand. 8-9 α-Amino nitriles were first prepared by Strecker by treating aldehydes or ketones with alkaline cyanide and salts of amines.10 The ligands - L1 =(P-methoxy anilino)-P- methoxy phenyl acetonitrile, L2 = (P-methoxy anilino)- phenyl acetonitrile and L3 = (P- methoxy anilino) –P– chloro phenyl acetonitrile which included the reaction of P-anisidine with P-methoxybenzaldehyde , benzaldehdye and P-chloro-benzaldehyde respectively were synthesized by a modified Strecker's procedure.11-12 XANES and EXAFS studies of some of the Cu(II) and Co (II) complexes of P-methoxybenzaldehyde, benzaldehyde, P-chloro-benzaldehyde with P-anisidine and P-toluidine have been already discussed in previous literature.13-20 A search through literature reveals that no work has been done on the XANES of nickel(II) complexes of P-

methoxybenzaldehyde, benzaldehyde, P-chloro-benzaldehyde with P-anisidine . Keeping this in view, we have studied X-ray K absorption spectra of nickel in the nickel complexes. The results of the study have been reported in this paper.

II. METHODS AND MATERIAL

Three nickel (II) complexes of Schiff base ligands, L1 =(P-methoxy anilino)-P- methoxy phenyl acetonitrile, L2 = (P-methoxy anilino)- phenyl acetonitrile and L3 = (P- methoxy anilino) –P– chloro phenyl acetonitrile have been prepared by the condensation of P-methoxybenzaldehyde , benzaldehdye and P-chloro-benzaldehyde with P-anisidine respectively. The three complexes studied in the present investigations are Ni 21= [Ni2(p-Methoxy ben)(p-Ani)](NO3)2 , Ni 22 = [Ni2(ben) (p-Ani)](NO3)2 and Ni 23 = [Ni2(p-Chloro ben)(p-Ani)](NO3)2   respectively. All the three complexes were synthesized according modified Strecker's procedure and their purity was checked. 11-12 The X-ray absorption spectra at the K-edge of nickel (II) complexes have been recorded at the Dispersive Extended X-ray Absorption Fine Structure (DEXAFS) beamline, which has been recently set-up by Applied Spectroscopy Division, BARC at the Indus-2 synchrotron radiation source at Raja Ramanna Centre for Advanced Technology (RRCAT), Indore.21-23 To select a band of energy from the white synchrotron beam, a bent crystal (Si 111) polychromator is used in this beamline, which is horizontally dispersed and focused on the sample. The crystal is bent in the shape of an ellipse in such a way that source and sample positions are at the two foci of the ellipse. The position sensitive
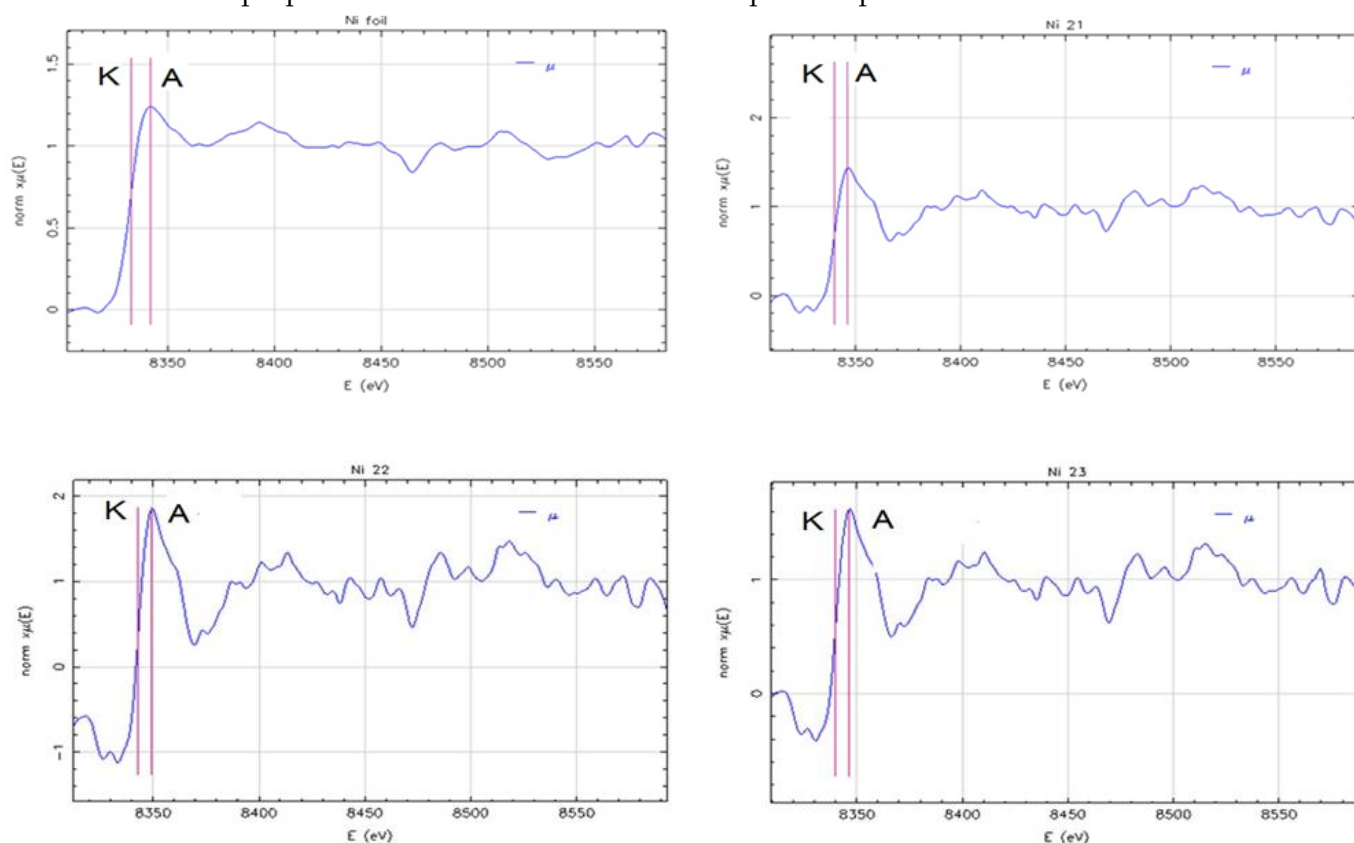
Fig.1. Metal K-edge XANES E(eV) Vs normalized μ(E) spectra for the metal complexes
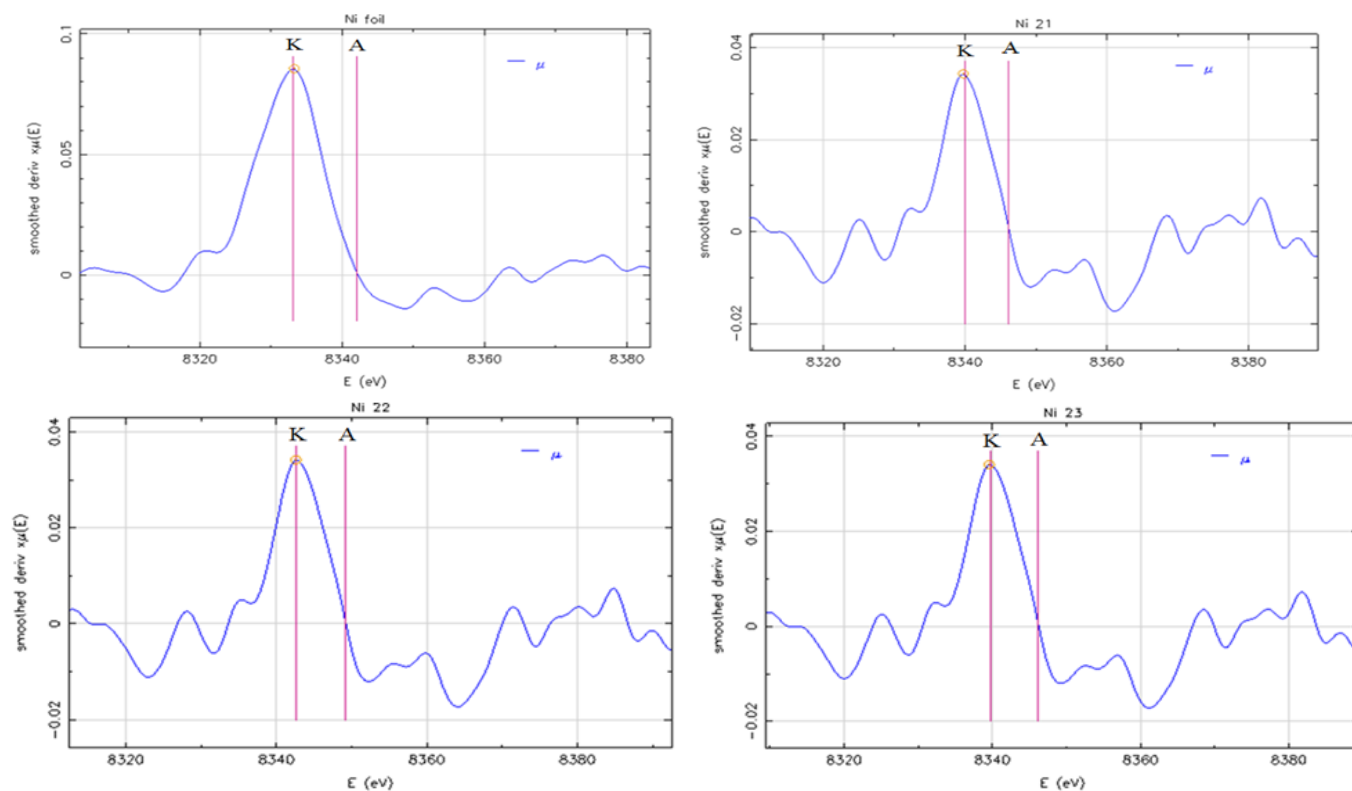
Fig.2. Derivative of the XANES region of the absorption spectrum at the K- edge of metal in the complexes indicating positions of the absorption edge K and the principal absorption maxima A.

Table 1. XANES data for the K absorption edge of metal in the complexes

Complexes		E_k value(eV)	E_A (eV)	Chemical shift (eV)	Shift of principal maxima (eV)	Edge width (eV)	ENC (eV) Electron atom	% covalancy
Ni foil	Metal	8333.2	8342.2	-	-	-	-	-
Ni 21	[Ni 2(p-Methoxy ben) (p-Ani)](NO3)2	8340.0	8346.1	6.8	3.9	6.1	0.71	65.15
Ni 22	[Ni 2(ben) (p- Ani)] NO3)2	8342.7	8349.2	9.5	7.0	6.5	0.91	42.10
Ni 23	[Ni 2(p-Chloro ben) (p-Ani)] (NO3)2	8339.0	8346.0	5.8	3.8	7.0	0.63	68.38

III. RESULTS AND DISCUSSION

The normalized K absorption spectra for nickel metal and all the three complexes are shown in Fig 1. The first derivative of the spectra, indicating positions of the absorption edge K and principal absorption maximum A are shown in Fig. 2.The energies of the cobalt K-edge(E_K)and the principal absorption maximum (E_A) alongside the values of the edge-width (E_A-E_K) ,effective nuclear charge Zeff and therefore the chemical shift ΔE_K are

given in Table 1. It can be readily seen from the table that nickel k-edge is found to be shifted towards the high-energy side in all the complexes, as compared with the nickel metal k- absorption edge.

3.1. Chemical Shift

The shift of the X-ray absorption edge of an element in a complex with respect to that of the pure element is written as:

$$\Delta EK = EK(complex) - EK(metal)$$

For computing the chemical shift, the value of EK(Ni metal) has been taken as 8333.2 eV. For the complexes under study, the order during which the ligands contribute to the chemical shift is:

Ni 23< Ni 21< Ni 22

Thus it is clear from the data that the value of the chemical shifts in all the three complexes is more than 5 Ev. Hence, on the basis of values of the chemical shifts, the complexes are found to have nickel in oxidation state +2 25.

3.2. Principal absorption maximum

The shift of principal absorption maximum of an element in a complex with respect to that of the pure element is written as:

$$\Delta EA = EA(complex) - EA(metal)$$

The principal absorption maximum EA of copper metal has been taken as 8342.2 eV for computing the shift .It has been observed that for all the three complexes, the value of EA is shifted towards the higher energy side. 26

3.3. Edge-width

The edge-width is computed by (EA-EK). In Table 1, we have reported the values of the edge-width . The edge-width values are 6.1, 6.5 and 7.0 eV, respectively for Ni 21, Ni 22and Ni 23.

3.4. Effective nuclear charge [Zeff]

Various methods have been proposed for the estimation of effective nuclear charge.27-28 By employing the procedure which was suggested by Nigam and Gupta , Zeff has been obtained from the measured chemical shift by using the semi-experimental method.29 The effective nuclear charge on the nickel in the complexes under present study is 0.71, 0.91 and 0.63 electrons/atom respectively for Ni 21, Ni 22 and Ni 23. The order for Zeff in the complexes is as follows:

Ni 23 < Ni 21 < Ni 22

The order is found to be same as that of order of chemical shift. The results show that chemical shift increases with ENC. A parabolic co–relation is observed between them.

3.5. Percentage covalency

Percentage covalency of studied three nickel complexes is 65.15, 42.1 and 68.38 % respectively for Ni 21, Ni 22 and Ni 23.The order for percentage convalency in the complexes is as follows:

Ni 23 > Ni 21 > Ni 22

Inverse relation is observed between percentage covalency and chemical shift, i.e percentage covalency decreases as chemical shift increases. A parabolic co–relation is observed between them.

Similar relation is observed between percentage covalency and effective nuclear charge i.e percentage covalency decreases as effective charge increases. A parabolic co–relation also observed between them.

IV. CONCLUSIONS

X-ray absorption spectra of schiff base nickel complexes at the K-edge of nickel are recorded at the EXAFS beamline setup at the Indus-2 synchrotron source at RRCAT, Indore. The energy of K-edge (EK), and principal absorption maxima (EA) alongside the allied parameters are reported. The shift of the K-edge (chemical shift), shift of the principal absorption maximum and edge-width has been obtained from the allied parameters. The chemical shift has been wont to determine the effective nuclear charge on the a bsorbing atom. Reported chemical shifts suggest that nickel is in oxidation number +2 altogether of the complexes.

ACKNOWLEDGEMENT

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Study of Adiabatic Compressibility and Excess Adiabatic Compressibility in Ternary Liquid Mixtures of Alcohol + Triethylamine + Acetic Acid

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ABSTRACT

The acoustical parameters like density, viscosity and ultrasonic velocity have been measured experimentally for the ternary liquid mixture of alcohol, tri-ethylamine and acetic acid at three different temperatures 30o, 35o and 40o. The samples were prepared by mixing the components in volume proportion. From the measured parameters adiabatic compressibility and excess compressibility have been calculated. Non linear behaviour of the parameters gives the assurance of presence of molecular interaction.

Keywords: Molecular Interaction, Ternary Liquid Mixture, Adiabatic Compressibility, Excess Adiabatic Compressibility

I. INTRODUCTION

The study of molecular interaction in binary and ternary liquid mixtures plays an important role in the study of development of molecular science. Since long, thermodynamic and transport properties of liquid mixtures have been used to study the departure of real liquid mixture behaviour from ideal one[1-4]. Acoustical parameters are important to understand different kinds of association, the molecular packing, molecular motion and various types of intermolecular interactions and their strength. Generally due to the presence molecular interaction the variation of acoustical and other properties is nonlinear. The sign and magnitude of the nonlinear deviation from their ideal values of velocity, adiabatic, temperature are generally ascribed to the difference in molecular size and strength of interaction between unlike molecules[5-7].

II. THEORY

The adiabatic compressibility is the fractional decrease of volume per unit increase of pressure, when no heat flows in or out. These changes are related to the compressibility of the medium by thermodynamic relation;

$$U^2 = \left(\frac{\partial P}{\partial \rho}\right)_S$$

So that

$$\frac{1}{U^2} = \rho. \left[1/\rho \left(\frac{\partial \rho}{\partial P}\right)_s \right] = \rho.\beta_a$$

and then

$$\beta_a = 1/(U^2 \rho) \qquad ...(1)$$

Where, 'ρ' stands for density of liquid and 'β_a'is adiabatic compressibility. Thus, from experimental measurement of 'U' and 'ρ' we can calculate adiabatic compressibility.

The Excess adiabatic compressibility β_a^E for the ternary mixture were calculated by using following equation,

$$\beta_a^E = \beta_{a\ mix} - (\beta_{a1}f_1 + \beta_{a2}f_2 + \beta_{a3}f_3) \qquad ...(2)$$

III. METHOD AND MATERIAL

In the present work density was measured by using density bottle (corning made certified 10 ml). Stopper is used in order to avoid evaporation of chemicals. Weight of bottle was taken by monopan balance (model no. K15) supplied by, K-Roy and Company, Varanasi. Its capacity is 100 gm with sensitivity of 0.01 mg. For the measurement of viscosity Ostwald viscometer was used. During measurement prepared sample was poured in to the viscometer and the time taken by the liquid sample to fall down from higher mark to lower mark and a crystal controlled interferometer, model No. M8 15 supplied by Mittal enterprises, New Delhi, was used for determination of ultrasonic velocity. Measurements are made at frequency 2 MHz. Density viscosity and ultrasonic velocity were measured at three different temperatures.

IV. RESULT AND DISCUSSION
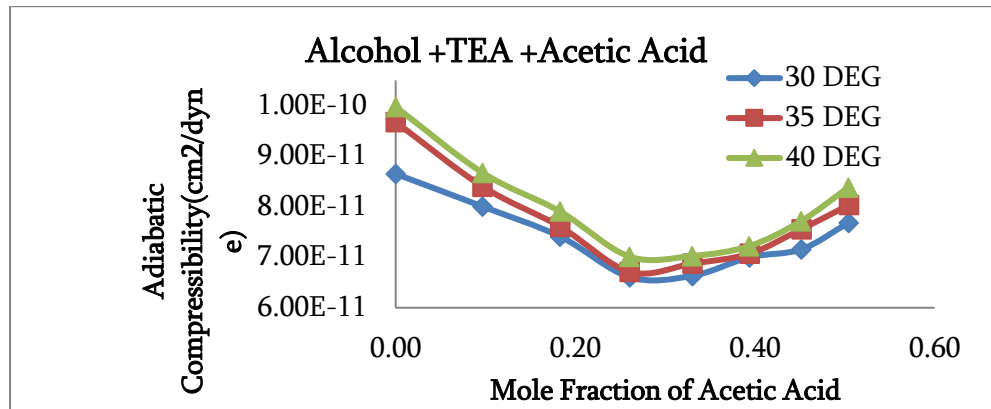
Fig. 1
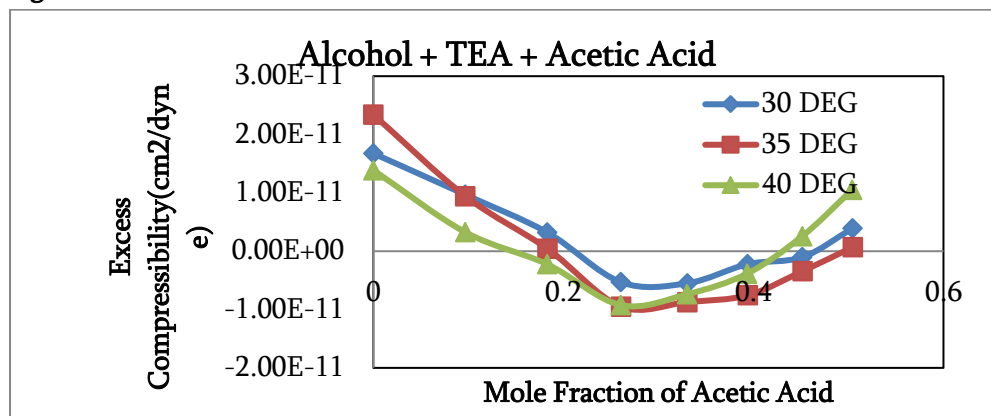
Fig. 2

Physically the decrease in adiabatic compressibility indicates that the component molecules are held close to each other. From Fig.1 the compressibility curves shows minimum at intermediate concentration of carboxylic acid. In general the alcohol molecules have both hydrophilic OH group which can attract polar molecules and hydrophobic hydrocarbon chain that can attract non polar values[8]. The minimum of compressibility shows that at this mole fraction the mixture is less compressible indicating hydrogen bond formation between acid and amine. Even though alcohols are self-associated liquids the addition of acid having more dipole moment (1.74 for Acetic acid) hydrophilic interaction increases giving rise to decrease in adiabatic compressibility. The donor acceptor interaction between carboxylic acid and amine seems to be mainly responsible for decrease values of compressibility. Further the increase in temperature increases adiabatic compressibility and decrease in ultrasonic velocity due to increase in molecular thermal motion. In order to understand the nature of molecular interactions between the components of the ternary liquid mixture, it is better to discuss the results in terms of excess parameters rather than their actual values. Curves of excess adiabatic β_a^E compressibility versus mole fraction of acetic acids are shown in Fig.2 The positive excess values of adiabatic compressibility (β_a^E), is the indication of weak interactions between molecules due to dispersive forces[9]. This suggests the rupture of the associated structure of alcohols that dominates the hydrogen bond interaction between like molecules of alcohol[10]. In the present case β_a^E values are positive on either ends where mole fraction of either carboxylic acid or amine is more. Comparatively higher values of compressibility at lower concentration of acid may be due to dissociation of alcohol molecules on account of breaking of hydrogen bonds. The positive values of β_a^E suggest the rupture of the associated structure at a smaller mole fraction of acid or amine molecules[10]. When their mole fractions become equal it is the hydrogen bond formation that dominates the other effects and this makes the β^E values negative. On either sides of minimum in β^E, mole fraction of either acid or amine is more leading to positive values of β^E. Similar results are found by J Edward Jayakumar et al[11].

V. CONCLUSION

In present investigation acoustical parameters like adiabatic compressibility and excess adiabatic compressibility have been calculated. From the graphical representation of acoustical parameters it is confirmed that there is presence of strong intermolecular interaction between the components of the mixture. The temperature variation of the ternary mixtures indicates that the strength of the intermolecular interaction decreases with rise in temperature.

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Ultrasonic Velocity and Jones-Dole Equation B Coefficients for Aqueous Solution of Piperacillin and Tazobactam at Different Temperatures

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ABSTRACT

The acoustic and viscometric study of aqueous solution of Piperacillin and Tazobactam is carried out. This study was carried out at 298.15 K. The accurately measured viscosity values were used to calculate Jhon-Dole coefficient A and B. The viscometric and acoustic parameters are useful for understanding the different types of interactions of drugs in solution. The effect of solute on solvent is predicted from coefficient constant A and B.

Keywords : Acoustic, Jhon-Dole, Piperacillin ,Tazobactam

I. INTRODUCTION

To study the physical, chemical and thermodynamic properties of thepolymeric solutions, liquids, liquid mixtures and electrolytic solutions Ultrasonic and viscometry study is useful[1-2]. Jones-Dole viscosity coefficients 'A' and 'B' are very useful in predicting the type and extent of molecular interactions present in the solution. The Jones–Dole B coefficient [3] is often used to classify ions as either structure-makers (kosmotropes) or structure-breakers (chaotropes) according to their supposed strengthening or weakening of the hydrogen-bond network of water [4-5].

$$\eta / \eta_0 = 1 + Ac^{1/2} + BC$$

The constant A is related to the long-range interionic [6-8] and the term Ac^{1I2} is predominant in very dilute solutions. The coefficient B is related to the interaction between the ions and the solvent and is interpreted as a measure of the structure forming and structure-breaking capacity of an electrolyte in solution [9].

In the present study ultrasonic velocity and viscosity of aqueous solution of Piperacillin and Tazobactamin is measured at different temperatures . From the viscosity coefficient A and B molecular interaction is predicted.

II. Experimental

The ultrasonic velocity (U) of Piperacillin and Tazobactam in aqueous solution which prepared by taking purified AR grade samples, have been measured using an ultrasonic interferometer (Mittal type, Model F-81) working at 2MHz frequency and at different . The accuracy of sound velocity was ±0.1 ms-1. An electronically

digital operated constant temperature water bath has been used to circulate water through the double walled measuring cell made up of steel containing the experimental solution at the desire temperature. The density of pure liquids and liquid mixtures was determined using density bottle by relative measurement method with an accuracy of ±0.1Kgm-3. The viscosities of the solution is determined by using Ostwald's viscometer.

III. Result and Discussion

With increase in concentration ultrasonic velocity increases shows that strong interaction exist in the solution in aqueous solution ultrasonic velocity is more at 303.15K compared to 298.15K , indicates strong molecular interaction in aqueous solution. Positive values of 'A' show the presence of strong solute-solute interactions while negative values of 'B' show weak solute-solvent interactions at low temperature. A negative B-ionic coefficient indicates that the ion is a 'structure breaker' and a positive B-ionic viscosity coefficient indicates that the ion is a 'structure former'[10].in the present study it is seen that from the value the B- coefficient is positive for both temperature suggesting structure making property of ions with strong solute solvent interaction present in the solution. Also the value of A- coefficient indicates strong interaction exist in the solution. at 303.15K strong solute –solvent interaction is observed.

Table 1 : Ultrasonic Velocity, Viscosity, jones -Dole Coefficient of Aqueous Solution of Piperacillin and Tazobactam at Different Temperatures

Concentration	Ultrasonic Velocity (m/s)	Density (Kg)	Viscosity $*10^{-3}$	Relative Viscosity	Coefficient A	Coefficient B
At 298.15K						
0.001	1632.33	1512.66	0.346	-0.61124	-0.0165	0.0513
0.01	1581.66	1508.30	0.389	-0.56292		
0.1	1521.30	1505.40	0.409	-0.54045		
At 303.15K						
0.001	1645.36	1514.21	0.334	-0.62472	-0.0168	0.0524
0.01	1598.63	1510.98	0.392	-0.55955		
0.1	1543.58	1507.32	0.412	-0.53708		

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Fluoride Induced Biochemical Changes In Cyprinus Carpio

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ABSTRACT

Fluoride ions are directly toxic to aquatic life and accumulate in the tissues where absorption rates exceed excretion rates. In the present investigation, the toxicity of fluoride to fresh water fish, *Cyprinus carpio* was evaluated after exposure to Lethal & Sub-lethal concentrations of naturally occurring fluoride water (4.285 F mg/ L) for 96h. Changes in biochemical parameters of Muscle, Liver, & Kidney were recorded. There is significant depletion of Lipid, Carbohydrate & Total protein in all the tissues, at both the concentrations.

Keywords: Fluoride, Biochemical Parameter

I.   INTRODUCTION

Fluoride is widely distributed in the environment. It occurs most abundantly in ores, such as fluorspar (CaF_2), phosphate and silicate minerals, such as fluroapatite [CaF_2. $3Ca_2(PO4)_2$]; and in topaz [$AL_2SiO_4(F, OH)_2$]. It is also present in lesser amounts in most igneous (210 to 1000 ppm) and sedimentary (180 to 940 ppm) rocks. Normal mineral soils average 200 to 300 ppm fluoride. Generally, sandy soils contain less than average amounts of fluoride while heavier soils contain more. Fluoride is a normal constituent of natural waters. The fluoride content of surface water depends on the water source and the amount of precipitation. Sources of excess fluoride intake for animals are diverse and mainly include drinking water; soil rich in soluble fluoride may also be responsible for fluorosis in grazing animals, particularly when growing vegetation is small and scanty. Toxicity arising due to airborne fluoride is rare and oral intake remains the major route of excess fluoride uptake. The effects of fluoride in drinking water on animals are analogous to the effects on man (McKee and Wolf, 1963). Fluoride accumulates in bone rather than soft tissues, leading to tooth damage and bone lesions. Hence the present investigation was undertaken to evaluate the toxic effects of fluoride on certain biochemical parameters in different tissues of fresh water fish, *Cyprinus carpio.*

II.   METHODS AND MATERIAL

Cyprinus carpio, weighing about 250 gm., were collected from a nursery pond at Sawargaon in Umri Tahsil of Nanded district at a distance of about 50 km. from Nanded. The animals were brought to the laboratory and

were acclimatized to lab condition for four days. They were fed with rice cake and groundnut cake. The fluoride water was obtained from bore well in nearby area and tested in Public Health Lab. for fluoride concentration. The reports indicate that, the bore water contained 4.285 mg/lit, while the permissible limit is 0.5 to 1.5 ppm. /lit (WHO, 1994). The people who consume this water show typical symptoms of fluoride toxicity. Similarly, the livestock maintained by the inhabitants show fluoride toxicity. Majority of the residents have tooth decay, mottling of teeth, bent bones and general weakness. Water collected from these areas was diluted hundred times while some water was kept undiluted. The experimental animals were divided in ten groups each containing ten animals and were exposed to undiluted fluoride water, for study of LC_{50s} Mortality was reached on fourth day. The behavioural changes during four days of exposure were noted. All the fish were sacrificed for sampling. The muscle, liver & kidney were pooled for biochemical estimations. Total proteins were estimated by the method of Biuret (1951).Total Fats were estimated by using Ethanol-ether method (Folch *et al.,* 1957), while glucose was estimated by using Anthrone Method (Oser, 1965) as represented in graph.

III. RESULTS AND DISCUSSION

Biochemical parameters	Tissues	Control	Lethal conc. of fluoride	Sub lethal conc. of fluoride
Total protein	Muscle	0.46± 0.11	0.1±0.01 P<0.001	0.19 ±0.08 P>0.001
	Liver	0.27 ±0.013	0.07 P<0.001	0.18 ±0.009 NS
	Kidney	0.18 ±0.009	0.26 P<0.01	0.18 ±0.009
Carbohydrates	Muscle	0.16 ±0.08	0.04 P>0.001	0.15 NS
	Liver	0.21 ±0.14	0.03 P>0.001	0.12 ±0.06 P>0.05
	Kidney	0.19 ±0.11	0.03 P>0.05	0.08 ±0.03 P>0.05
Lipids	Muscle	0.16 ±0.07	0.02 P>0.01	0.04 ±0.002 P>0.05
	Liver	0.04 ±0.002	0.02 P>0.01	0.01 P>0.01
	Kidney	0.04 ±0.002	0.02 ±0.001 P>0.05	0.02 ±0.001 P>0.05

Table no.1

Showing the Effects of fluoride on different biochemical parameters of freshwater fish, *Cyprinus carpio* at 96h, in 100mg/wet. Wt of tissues, the values are expressed in mean of 6 observation ±SD, Significant at 0.05 &0.01

Total protein: Fish were exposed in lethal concentrations of fluoride water after 96h, showed highly significant decreases in total protein content muscle & liver (P<0.001),significant. While significant increase (P<0.01) was observed in kidney. In sub lethal exposure, after 96h, total protein content in muscle decreased significantly (P>0.001), but decreases in total protein content of liver was insignificant. No alteration was found in kidney.

Carbohydrates: In lethal the carbohydrate content was highly decrease significant (P>0.001) in muscle & liver. In the kidney carbohydrate content was also significantly reduced (P>0.05). In the sub lethal concentration the carbohydrate content in muscle decreased insignificantly, while in liver & kidney, it was decreased significantly (P>0.05), after 96h.

Total Lipid: In the muscle & liver the total lipid content was significantly decreased (P>0.01) after 96h in lethal concentrations. In sub lethal it was significantly decreases (P>0.05) & (P>0.01) in total lipid content of muscle and liver. Total lipid content of kidney also decreased significantly (P>0.05) (Graph No- 1).The results is summarised in table and graph
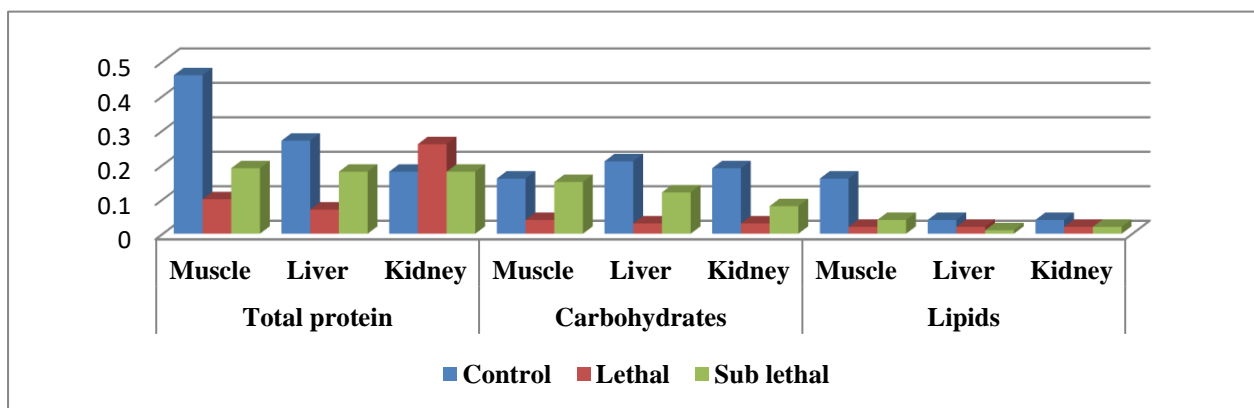
The decreased biochemical composition in different tissue due to fluoride intoxication *Cyprinus carpio* as observed here is similar to the observation of (Gupta, 2003) with *Channa punctatus* after exposed to fluoride for 90 days. This decrease may be due to the blocking of the metabolism of amino acid, thereby preventing cells from synthesizing protein. In fact, studies have shown that fluoride inhibits protein synthesis (Chinoy, 1994) and interferes with amino acid metabolisms (Pandit, 1940). Another possible reason for depletion of protein may be its conversion in to glucose (Srivastava, 2002) or utilization of protein in the form of mucoprotein which is eliminated in the form of mucus by the fish to combat toxic stress. Several studies have revealed that fluorides inhibit many glycolytic enzymes (Camargo, 2003).The decline in sugar content of liver & muscle suggest enhanced conversion of glycogen to glucose to meet an increased energy requirement under stress conditions. Kasturi and Chandran (1977) have also made a similar observation in their study with *Mystus gulio* exposed to lead. Radhaiah *et al* (1987) observed decreased carbohydrates content in heptachlor intoxicated fish, *Tilapia mossambica* and stated related it to rapid utilization of carbohydrates by the tissue possibly to overcome the pesticides induced stress. Koundinya and Ramamurthy (1979) reported hyperglycaemia accomplished by a decrease in the levels of glycogen in liver and muscle of fish.

The decreased lipid content may be due to the inhibition of lipid synthesis by Fluoride as well as increased utilization of stored lipids as a source of energy to conduct regular metabolic function. Fluoride is a well-known enzyme inhibitor like against lipase, phosphatase, & esterase. It interferes with fatty acid oxidation (Batenburg, 1972) and also inhibits the enzymes acetyl Co-A synthetase involved in fatty acid oxidation. Singh

et al (1985), also have found decreased lipid content in the liver of rabbits treated with fluoride. Thus depletion of lipid content may be due to inhibition of these enzymes.

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Studies on Complication of B-Naptholazo Dye and Pb2+ Metal Ion Spectrophotometricaly

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ABSTRACT

Complexing ability of Pb2+ metal ion with β- naptholazo dyeis established.The stoichiometry between M: L is 1:1 and effect of pH on complextion study have been established. IR spectra revealed thecomplexing nature between the Pb2+ and azo dye.

Key Words: Azo dye, Pb2+ metalion, I.R. spectra.

I. INTRODUCTION

Azo dyes are an important class of organic compounds having at least a conjugated chromophoreazo (–N=N–) group and the largest and most versatileclass of dyes. Owing to its wide application in various fields it becomes research of interest. Azo dyes havenumber of uses such as dyeing of textile fiber and coloring of differentmaterials, and biological-medical studies,for plastics, andadvanced applications in organic synthesis [1-4]. Azo dyes consider significant analytical reagents for the micro-estimation of metal ions. Among the dyes azo dyes play vital role in the complexation studies and reported the number of commercial dyes[5-7]. In present paper we have studied the complexing ability of Pb^{2+} metal ion with azo dye. As Pb^{2+} metal have toxic effect on environment it is important to trace out the lead ion from various sources.

Fig.1.β-naptholazo dye

II. EXPERIMENTAL

Instrumentation

UV-Vis spectra were recorded on a (Bioera Single beam UV-Visible Spectrophotometer. The FT-IR spectra were obtained using IR spectrometer of Shimadzu make, with samples prepared as KBr discs

Synthesis of complex:

The salt of $PbNO_3$ 0.44gm were dissolved in 10ml ofethanol, and added 0.5g of azo dye to 20ml anethanol solution, in 1:1 molar ratio. This reactingmixture was stirred for a while and mixture washeated under reflux for three hours, during thisperiod, the precipitation was completed from, andcollected by filtration, then washed with ethanol, anddried under vacuum for 4 hours. The complex wascharacterized by IR spectra.

UV-Visible Study of ligand and its complex:

The complexation study of β-naptholazo dye ($5×10^{-5}$M) and Pb^{2+} ($5×10^{-6}$M) metal was studied and it was observed (Fig.1) that the ligand shows the maximum absorbance at 240 nm,which is responsible for π -π*. Upon addition of metal ion solution there is slight increase in absorbance suggest the complexation.

Fig. 2.UV-Visible Study of ligand and its complex

Effect of pH on Complexation:

The effect of pH on complexation has been studied for the dye andPb^{2+} metal ion by varying the pH from 1 to 7. From the graph (Fig.3) itwas observed that the effect of pH has pronounced effect on complex formation. As pH increases there is slight increase in absorption of complex at pH 5 there is sharp enhancement of absorption. Further increased in pH there is decreases the absorption of complex.

Fig.3.Effect of pH on Complexation

Stoichiometry of the Complex:

The Jobs method is used to determine the stoichiometry ofAzo dye-Pb^{2+} complex. The solutions of azo dye andPb^{2+} were mixed in different mole ratios keeping the sum of dye and metal ion concentration constant and the absorbance were measured at 240 nm of wavelength. The plot of absorbance versus mole fractions is shown in (Fig 4). The maximum absorption was observed for the mole ratio of 0.5, therefore it indicates the reaction stoichiometry between azo dye and Pb^{2+}is 1:1.

Fig.4. Stoichiometry of the complex

IR Study:

The IR spectroscopic analyses were studied and it helps to interpret the possible mode of interaction between azo dye and Pb^{2+} metal ion. A strong band at 3050 cm^{-1} which belongs to phenolic –OH group of azo dye which shifted to 3033cm^{-1} supports the complex formation. The band assigned for -N=N- were at 1365cm^{-1} which is shifted to 1322cm^{-1}. The stretching frequency attributed to C-N vibration decreases to 1145cm^{-1} in complex is shifted to 1143cm^{-1}.

Fig. 5. (a) IR Spectra of β-naptholazo dye

Fig.5.(b) IR spectra of Complex

III. CONCLUSION

In conclusion, we have reported the complexing ability of Pb^{2+} with β- naptholazo dye.The stoichiometry between M:Lfound 1:1. Effect of pH influenced the complex formation and at pH-5 complex shows maximum absorbance. In the IR spectra decreasing stretching frequency shift values of –OH and –N=N- functional group of ligand confirmed complexation.

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Understanding Impact of Social Media Use on Academic Performance among Elementary College Students: A Case Study for Nanded City

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ABSTRACT

Investment plays a vital role in a developing country such as India, as it provides the necessary funds for undertaking productive activities to be circulated in the economy. Savings are our country's largest source of investment. Investments are assume they control their own destiny, whereas individuals with external LOC relate their experiences to destiny, luck or chance. Consequently, LOC has a great influence on an individual's investment decision-making behaviour. As a result, this study attempts to assess the LOC of an individual and segment the investors based on their level of internal and external LOC.

Keywords: Locus of control, Individual investor, Segmentation of investors.

I. INTRODUCTION

Social networking on social media websites involves the use of the internet to connect users with their friends, family and acquaintances. Social media websites are not necessarily about meeting new people online, although this does happen. Instead, they are primarily about connecting with friends, family and acquaintances you already have. The most well-known social media platforms are Facebook, Twitter, Instagram and LinkedIn. These websites allow you to share photos, videos and information, organise events, chat, and play online games. Social media is a web based technology to facilitate social interaction between a large group of people through some type of network. In common widely used network is the Internet. But social media platforms are also for local networks as well.

This study aimed to determine the social network usages allied factories affecting the academic performance of elementary college (XI and XII) student studying in Nanded city. The factors affecting students' academic performance arises from several reasons including self- motivation, family background, social background etc. In recent years, it is witnessed that, teenage are addicted to mobile usages and suffering on social network sites. Their maximum time spent on internet activities. In line with this, research study wants to determine the impact of social network addition which definitely affected the academic performance of the students. This

study may benefit the students, parents/guardian of students by allowing them to understand better the factors that can affect their academic performance.

Social media are web-based services that gives individual the opportunity to create either a public or semi-public profile within a bounded system, add a list of others to with they share a connection and view and transvers their list of connections and those made by others within the system. Therefore, this study was carried out with the aim of examining the impact of use of social media on students' academic performance in Nanded City. In other to measure social media platforms a questionnaire was developed based on past literatures. The independent variables include: time appropriateness, time duration, Nature of Usage, Health Addiction, Friend-People connection and security/privacy problems while the dependent variable was student academic performance. However, using the regression analysis four variables is significant which include: Time appropriateness, people-friend connection, nature of Usage and health addiction while Time duration and security/privacy problems are not significant. Thus, considering the abnormal use of Social media platforms by students, it is expedient that Universities and colleges in Malaysia educate their students to positively use these platforms for educational purposes which will eventually result in a positive impact on their academic performance.

II. NEED OF RESEARCH

1. Social media plays an important role in every student's life. It is easier and convenient to access information, provide information and communicate via social media.
2. Teachers and students are connected to each other and can make good use of these platforms for the working of their education.
3. Social Media sites are on the go news platform for students. From keeping them well informed about the lives of their friends and family it also keeps them updated on various trending news from around the world.
4. Social Media is the easiest way for students to build their network in college. Friends, colleagues, associates everyone can be found and easily contacted through the means of social media.
5. Websites like LinkedIn enable students to establish a professional web presence, post a resume, connect with job seekers and employers.

III. LITERATURE REVIEW

The following different authors were worked on the social medium impact on student's academic performance using different techniques.

Aida Abdulahi ,BukitJali l(2018)

The Impact of the use of social media on students' academic performance and behaviour change written in International Journal of Applied Mathematics. The main purpose of this research study was to observe the impact of social media on students' academic performance. A modified questionnaire was constructed to elicit information from 456 randomly selected students of MawlanaBhashani Science and Technology University (MBSTU), Tangail, Bangladesh. Both univariate and multivariate analysis were used to meet his/her objective. The descriptive statistics were used to analyses the demographic data and educational information while a

multiple regression model was applied to show the influence of social media on students' academic performance. Research findings to showed that a large number of respondents experienced negative effects such as late submission of assignment, no concentration in study, students were lazy, less study time and very poor academic performance because of the heavy participation on social media networks sites. A portion of the students provided positive feedback about the involvement with the terrorist and militant activities and the tendency to the predisposition with the political issues due to social media. To this end, the study suggested that social media should be used for educational purposes as well; social networking sites should be expanded and new pages should be created to enhance academic activities, avoid setbacks in the students' academic performance; and students should be monitored by teachers and parents on how they use social networking sites.

Here the main perspective of this research was to highlight the positive and the negative effects on student's academic performance using any social medium. Social media serve to students' purpose of connecting them with people all across the globe by not hampering their working hours and schedules. Despite the several benefits that come with the participation of the students on social media networks, its misuse could badly affect the academic performance. The findings of this study showed that, there is positive consequence of average study time and negative impact of time spending on various social networking websites on students' academic performance. It indicates that, the educational performance increases by giving more time on study and decreases for spending more time on social networking websites.

Sarigam, Harshit Lad(2017)

In this paper the main focused on Social media are computer mediated technologies that facilitates the creation and sharing of information, ideas, opinion, issues, career interests and other forms of expression via virtual communities and network. Social media services are web-based services which can be used via Desktop computers, laptops, and mobile (Smartphone) & tablet computers. Using these services people can have highly interactive platform where they can also share images, videos, information's and even more with each other through a particular network. In these research papers I have tried to cover all the aspects of social media with its positive and negative impact.

The information comes to users rather than users have to make effort to get the information. It has become routine for every person and with these people are getting addicted with the technology. Social Media has affected various fields in both Positive as well as Negative aspects. The current research shows that in Education field students can get the quality of education, acquire new skills but at the same time he/she may get distracted and addicted by too much use of social media. Social media has helped Teenagers in developing awareness, develop social skills, but has also made violence normal, made everything commercial and also many teenagers are not able to score good in their exams. We can say that social media is a boon for Industries in many ways by fostering information on websites, emails, social networking etc., business can be promoted via Facebook fan following, advertising.

RiaNicolettiMorphitou&MarlenDemetriou (2017)

In this work the main issue of this research paper was to uncover the process by which potential students use social media and more specifically what the media's role is in the decision-making process of choosing a University. In an effort to understand the use of social media in Tertiary Education this research paper

consists of extensive literature review and primary data analysis. Key findings extracted by the literature review led to an inductive research approach

In the both the literature and the research findings support the notion that UNIC must upgrade its digital marketing tools. Recent literature demonstrated the heavy use of social media networks from university students. It also demonstrates that it is becoming the main method of communication among youth for both academic and personal issues. On the other hand, the research findings of this paper support the theory that university students are using social media on a daily basis, and social media can influence their views and beliefs. More specifically, it can influence their choice of university or course of study. Therefore, UNIC must upgrade its existing social media networks creative.

Sandra OkyeadieMensah,Dr. Ismail Nizam (November,2016)

Sandra and Ismail Nizam basically worked on Social media were based on web portals that gives individual and group opportunity to create a public and semi-public profile within a end point system, and add a list of this students and peoples to used on web based social media like, online games, videos and online chatting ect. Therefore, this study has been carried out with the main aim of examining the impact of use of social media on student's academic performance in Malaysian Tertiary Institution and private institution. In this paper the authors was measure social media platforms a questionnaire was developed based on past literatures review. The time spent on social media and the age of the students ration was calculate using independent and dependant variable. The authors were including objective and subjective questionnaires for research work. The survey questionnaires were includes 46 items with a Likert Scale (Disagree-1 and 5 for Agree). The sample of 208 students from Erican College was selected using convenient sampling method. The data collected was analyses using description means and regression via SPSS 21. Thus, considering the normal and abnormal use of Social sites by students, it is expedient that Universities and colleges in Malaysia educate their students to positively use these platforms for educational purposes which will eventually result in a positive impact on the student academic performance was very low.

Edosomwan, Prakasan, Kouame, Watson, & Seymour, (2011)

In this paper the authors discussed the concept of social Networking has evolved, much like other innovations, and is becoming increasingly sophisticated with advancements in technology Currently, there are hundreds of SNSs that can draw millions of people, with diverse technological affordances. According to Smith (2010), Social media sites are virtual platforms for interactivity and information exchange, where issues are debated and defined Social media users collaborate in content creation, are proactive in searching information, and value control in social media participation.

Mazer, et al., (2010)

The author Mazer has been studied the Positive perceptions obtained from users of social networking sites i.ewahtsapp, linked, port, YouTube and Facebook ect were effective learning which has resulted in an easy learning climate among students.

Dowdall, (2009)

The According to the dowdall stated that, an extensive study by the Office of Communications (Ofcom) of the United Kingdom, almost half (49%) of children aged 8-17 who used the Internet had set up their own profiles on a social networking site Of com they spent lot of time on social site and even they cannot concentrate on his/her studies., (2008a).

Young et al,(2009)

As per young disused in his paper that, Many people actively participate in content generation and value creation, and several researchers have examined their profiles to determine why and to what extent they are keen on posting their entire identity, sharing pictures and videos, and indicating their religious affiliations, marital status, and political orientations on the internet. These users interact with others, exchange information about their interests, and raise discussions about new topics, follows news about specific topics on different Social Networking Sites. The result of this paper compared with the survey done by the donals survey. His survey was given better performance than the earlier author.

Martin, (2009)

Few of studies have been done on social networking site and academic performance. Whitmore School of Business and Economics recently conducted a survey of over 2,000 students. They asked questions regarding which social network sites were used, how much time they spent on a site, what their grade point average (GPA) was, and what they were going to school for .It was concluded that there is no correlation between how much time is spent on a social networking site and grades as well as time spent and effect on academic students performance.

IV. RESEARCH DESIGN AND METHODOLOGY

In this methodology information regarding the research method and their characteristic in general is explained. It also contains the various tools that can be undertaken for the educational research.

Concerning to the present problem under study the researcher tried to bring in front the sample of study and the procedure that was adopted for carrying out thework.

In this research, 200 Students of Higher Secondary Level Students in Nanded District are selected for the study. The Questionnaire is prepared to collect the data and interpreted as follows. The questions asked are regarding their - Gender, Education Qualification, Source of Income of Father, Income of Father, Education Qualification of Mother, Source of Income of Mother, Income of Mother, Relationship with their Family, Family Support to Education, Study Time Available, Extra Tutorial Classes Attended by them, Scholarship Status, Status of Part Time Job, Status of Study at Home, Status of Own Library at Home, Status of PC at Home or Room, Place of living, Use of Internet, Uses of Free Time, Uses of Free Time Spared with Friends, Career Dream, Response regarding Sufficient Material in the Dept. or in Library, Type of Social Media Used, No. of Social Networking Sites Used, Time Spent on Social Networking Sites Used, Instrument Used for Social Networking Sites, Mobile Phone Brand for Social Networking Sites Used, Mobile Phone Price Range for Social Networking Sites Used, Mobile Phone Service Provider for Social Networking Sites Used, Mobile Phone Data Plan for Social Networking Sites Used, Use of Social Media Primarily, No. of Friends on Social Networking Sites, No. of Friends on Social Networking Sites are more as Compared to Real Life, Preference to Express Ideas and

Feelings on Social Networking Sites, Effect on Study Timings by Use of Social Networking Sites, Social Networking Sites can be an Effective Tool for E- Learning, Checking of Social Media in Classroom, Frequency of Checking of Social Media in Classroom, Feeling of Anxious if there is no Internet Connectivity for a Day, Kind of Communities

V. RESULT AND DISCUSSION

5.1 Gender-wise Number of the Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding type of their gender.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

Table 4.2.1 Gender-wise Number of the Higher Secondary Level Students in Nanded District

Sr. No.	Gender	No. of Respondents	Percentage
1.	Male	126	63.00
2.	Female	74	28.00
	Total	200	100.00

It can be seen from the above table that out of the sample of 200 student respondents, 126 (63%) student respondents have reported that type of their gender is male, while 74 (28%) student respondents have reported that type of their gender is female.

Thus, it can be noted that the highest (63%) student respondents have reported that type of their gender is male, while the lowest (28%) student respondents have reported that type of their gender is female.

5.2 Use of Internet by the Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding status of PC at their home or room.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

It can be seen from the above table that out of the sample of 200 student respondents, 164 (82%) student respondents have reported that they use internet, while 36 (18%) student respondents have reported that they do not use internet

Table 4.2.18 Use of Internet bythe Higher Secondary Level Students in Nanded District

Sr. No.	Use of the Internet	No. of Respondents	Percentage
1.	Yes	164	82.00
2.	No	36	18.00
	Total	200	100.00

Thus, it can be noted that the highest (82%) student respondents have reported that they use internet, while the lowest (18%) student respondents have reported that do not use internet.

5.3 Type of Social Media Used by Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding type of social media used by them.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

Table 4.2.23 Type of Social Media Used byHigher Secondary Level Students in Nanded District

Sr. No.	Type of Social Media	No. of Respondents	Percentage
1.	YouTube	50	25.00
2.	Twitter	18	09.00
3.	Facebook	36	18.00
4.	WhatsApp	82	41.00
5.	Any Other	14	07.00
	Total	200	100.00

It can be seen from the above table that out of the sample of 200 student respondents, 50 (25%) student respondents have reported that type of social media used by them is YouTube, 18 (9%) student respondents have reported that type of social media used by them is Twitter, 36 (19%) student respondents have reported that type of social media used by them isFacebook, 82 (41%) student respondents have reported that type of social media used by them is WhatsApp, while 14 (7%) student respondents have reported that type of social media used by them is other than the specified.

Thus, it can be noted that the highest (41%) student respondents have reported that type of social media used by them is WhatsApp, while the lowest (7%) student respondents have reported that type of social media used by them is other than the specified.

5.4 Mobile Phone Data Plan for Social Networking Sites Used by Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding mobile phone data plan for social networking sites used by them.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

It can be seen from the above table that out of the sample of 200 student respondents, 152 (76%) student respondents have reported that mobile phone data plan for social networking sites used by them is unlimited data plan, while 48 (24%) student respondents have reported thatmobile phone data plan for social networking sites used by them is limited data plan.

Table 4.2.30 Mobile Phone Data Plan for Social Networking Sites Used byHigher Secondary Level Students in Nanded District

Sr. No.	Mobile Phone Data Plan	No. of Respondents	Percentage
1.	Unlimited Data Plan	152	76.00
2.	Limited Data Plan	48	24.00
	Total	200	100.00

Thus, it can be noted that the highest (76%) student respondents have reported that mobile phone data plan for social networking sites used by them is unlimited data plan, while the lowest (24%) student respondents have reported that mobile phone data plan for social networking sites used by them is limited data plan.

5.5 Frequency of Checking of Social Media in Classroom by Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding frequency of checking of social media in classroom by them.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

It can be seen from the above table that out of the sample of 200 student respondents, 92 (46%) student respondents have reported that they do not check social media in classroom, 58 (29%) student respondents havereported that they check social media in classroom for less than 5 times, 38 (19%) student respondents have reported that they check social media in classroom for 5 to 10 times, while 12 (6%) student respondents have reported that they check social media in classroom for more than 10 times.

Table 4.2.38 Frequency of Checking of Social Media in Classroom by Higher Secondary Level Students in Nanded District

Sr. No.	Frequency of Checking of Social Media in Classroom	No. of Respondents	Percentage
1.	No	92	46.00
2.	less than 5 times	58	29.00
3.	5 to 10 times	38	19.00
4.	more than 10 times	12	06.00
	Total	200	100.00

Thus, it can be noted that the highest (46%) student respondents have reported that they do not check social media in classroom, while the lowest (6%) student respondents have reported that they check social media in classroom for more than 10 times.

5.6 Response regarding Availability of Wi-Fi in School/College by Higher Secondary Level Students in Nanded District

This is one of the important aspects of Higher Secondary level students in Nanded District. The Researcher has asked question to the student respondents regarding availability of wi-fi in their school/college.

All the sample student respondents were answered the question. Their responses are recorded and tabulated in the following table.

It can be seen from the above table that out of the sample of 200 student respondents, 64 (32%) student respondents have reported that Wi-Fi facility is available in their school/college, while 136 (68%) student respondents have reported that Wi-Fi facility is not available in their school/ college.

Table 4.2.41 Response regarding Availability of Wi-Fi in School/College by Higher Secondary Level Students in Nanded District

Sr. No.	Response regarding Availability of Wi-Fi in School/College	No. of Respondents	Percentage
1.	Yes	64	32.00
2.	No	136	68.00
	Total	200	100.00

Thus, it can be noted that the highest (32%) student respondents have reported that Wi-Fi facility is available in their school/college, while the lowest (68%) student respondents have reported that Wi-Fi facility is not available in their school/college.

VI. CONCLUSION

1. It is found that the highest (63%) student respondents are male, while the lowest (28%) student respondents are female. (Table 4.2.1)
2. It is found that the highest (82%) student respondents have reported that they use internet, while the lowest (18%) student respondents have reported that do not use internet. (Table 4.2.18)
3. It is found that the highest (41%) student respondents have reported that type of social media used by them is WhatsApp, while the lowest (41%) student respondents have reported that type of social media used by them is other than the specified. (Table 4.2.23)
4. It is found that the highest (76%) student respondents have reported that mobile phone data plan for social networking sites used by them is unlimited data plan, while the lowest (24%) student respondents have reported that mobile phone data plan for social networking sites used by them is limited data plan. (Table 4.2.30)
5. It is found that the highest (46%) student respondents have reported that they do not check social media in classroom, while the lowest (6%) student respondents have reported that they check social media in classroom for more than 10 times. (Table 4.2.38)
6. It is found that the highest (32%) student respondents have reported that Wi-Fi facility is available in their school/college, while the lowest (68%) student respondents have reported that Wi-Fi facility is not available in their school/college. (Table 4.2.41)

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An Analysis of Observed Angiospermic Airborne Pollen of Spring Season Based Upon Their Mode of Pollination in Firozabad District of Uttar Pradesh

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ABSTRACT

A floristic survey in Firozabad district was carried out from three selected sites which are 15-20 km away from each other. The main objective behind the field study was to find out angiospermic species which may shed large number of pollen in the atmosphere and to note their specific pollination period and mode of pollination which was useful criterion in the identification of atmospheric pollen. We studied variations in concentration of airborne pollen and other particles of biological origin which are collectively known as Primary Biological Aerosol Particles (PBAP) in those three sites. During the annual cycle the frequency of pollen in the air was different in different seasons. It might be due to local climatological influence on flowering of plants. The maximum pollen types have been recovered during spring, followed by rainy, summer and winter. On the basis of mode of pollination in spring season 46.94% anemophilous, 40.94% entomophilous and 10.90% amphiphilous species were found. Maximum plants bloom, during spring and rainy season followed by summer and winter season.

Keywords: Amphiphilous, anemophilous, entomophilous, pollen, pollination

I. INTRODUCTION

The study of structural and applied aspects of pollen is termed as 'PALYNOLOGY'. It is classified into fundamental and applied categories and 'AEROBIOLOGY' which is the study of biological materials present in the air, (Erdtman, 1952) comes in applied category. Both these well defined branches now commonly known as 'AEROPALYNOLOGY' and is open the focus of study owing to their direct bearing with human health, crop production and economic welfare. Most rescent aeropalynological works have been carried out in Logos (South west nigeria) (Adeniyi et al 2014). The biological particles or materials or bio aerosols, emitted from vegetation and by other living organisms are also known as Primary biological aerosol particles (PBAP) which include pollen grains, fungal spores, bacteria, viruses, cell fragments and protozoans (Despres et al.2012) and they are ubiquitous in the atmosphere (Gregory 1961, Womack et al. 2010). The main research interest regarding PBAP

have been directed to their effects on humans, animals and agriculture, their potential as agents of biological warfare (Lim *et al.* 2005). The concentration of pollen in the atmosphere is subject to variations with time because of the reproductive cycle of plants variations of pollen counts also depends on the distribution of vegetation and pollen dispersal mechanisms. Geographical variations are also responsible for pollen abundance (Latorre and Bianchi 1991).

II. METHODOLOGY

For pollen and spore trap three sites viz., Shikohabad, Firozabad and Jasrana were selected, which are semi-urban, urban and rural respectively and are 15-20 kms away from each other. Pollen sampling was conducted with the help of modified Durham Gravitational sampler which was placed 6.5-8.5 m above ground level. Two microscopic slides, coated with stained adhesive glycerine jelly were exposed daily for 24 hrs. These slides, contained trapped dust particles, pollen grains, fungal spores, hyphal fragments, insect scales, epidermal hairs, microscopic vegetative fragments and other miscellenious particles. The pollen grains and spores so trapped were identified on the basis of their morphological characters and by comparing these with reference slides. Pollen count and frequency of different pollens have been calculated by following the procedure of Mansour and Hameed (2005).

III. OBSERVATIONS

Different categories of seasonal vegetation grown in ponds, on waste lands, roadsides, on railway tracks etc. Some seasonal vegetation of rainy season includes herbs and under shrubs and revives the germination of seeds and fruit stocks. The most widely distributed dormant vegetations of the locality are grasses which flower during rainy and post rainy seasons. Aerobiota of Firozabad district consisted 28.49% pollen, 60.35% fungal spores, 10.64% other bioparticles and 0.52% unidentified objects during research period.

During the spring season (February-April) nearly 70 pollen types have been recorded in the air of the district. Their frequency varies from minimum 0.09% (*Alangium salvifolium*) to maximum 14.21% (*Parthenium hysterophorus*). A sharp increase in the frequency of *Parthenium* might be due to its profuse flowering in this area. On the other hand, the pollen of *Cynodon dactylon* showed a considerable decline in the air of the district (5.96%). The arboreal pollen types show lower frequencies (<1%) except *Azadirachta indica* which exhibits a frequency of 2.31%. The overall total pollen count has been found to be higher at the rural site of Jasrana as compared to the semi-urban site of Shikohabad and the urban site of Firozabad.

The aeropollen calendar of the spring season is represented by the pollen types of 02 grasses, 33 of non-arboreal and 35 of arboreal species. Out of these 70 types, 48 are entomophilous, 12 anemophilous and 10 amphiphilous in nature. 64 pollen types of dicotyledonous species, 05 of monocotyledonous species and one gymnospermous species (*Platycladus orientalis*) showed their presence in the atmosphere (Table 1). The total pollen count of each species showed lesser values in the air as compared to the previous season but a marked increase in pollen types has been recorded (Fig. 1).

Spring season

Fig.1: Pollen frequencies of different plant species observed during spring season.

Table 1: Aero pollen calendar of spring season.

Sl. No.	Pollen Grains	Family	Local Name	Habit	Mp	D/M
1.	*Abutilon indicum* (L.) Sweet	Malvaceae	Atibala, Khangi	Shrub	En	D(Po)
2.	*Acacia nilotica* (L.) Willd. ex Del subsp.	Mimosaceae	Desi babool	Tree	En	D(Po)
3.	*Acalypha indica* L.	Euphorbiaceae	Kuppi	Herb	En	D(Mo)
4.	*Achyranthes aspera* L.	Amaranthaceae	Latjeera, Apamarg	Herb	En	D(Mo)
5.	*Adhatoda vasica* Nees	Acanthaceae	Adusa	Shrub	En	D(Ga)
6.	*Aegle marmelos* (L.) Corr.	Rutaceae	Bel	Tree	En	D(Po)
7.	*Ageratum conyzoides* L.	Asteraceae	Uchunti	Herb	Am	D(Ga)

8.	*Alangium salviifolium* (L. f.) Wang.	Alangiaceae	Akorha	Tree	En	D(Ga)
9.	*Allium cepa* L.	Liliaceae	Piyaj	Herb	En	M
10.	*Althaea rosea* (L.) Cav.	Malvaceae	Gulkhera	Herb	En	D(Po)
11.	*Antigonon leptopus* Hook. & Arn.	Polygonaceae	Coral creeper	Shrub	En	D(Mo)
12.	*Argemone mexicana* L.	Papaveraceae	Satyanashi	Herb	En	D(Po)
13.	*Azadirachta indica* A. Juss.	Meliaceae	Neem	Tree	Am	D(Po)
14.	*Bergera koenigii* L.	Rutaceae	Meetha neem	Shrub	En	D(Po)
15.	*Blumea lacera* DC.	Asteraceae	Kakranda	Herb	En	D(Ga)
16.	*Bombax malabaricum* DC.	Bombacaceae	Semul	Tree	En	D(Po)
17.	*Brassica* sp. L.	Brassicaceae	Sarson	Herb	En	D(Po)
18.	*Butea monosperma* (Lamk.) Taub.	Fabaceae	Tesu	Tree	En	D(Po)
19.	*Callistemon lanceolatus* DC.	Myrtaceae	Bottle brush	Tree	Am	D(Po)
20.	*Cannabis sativa* L.	Cannaceae	Bhang	Herb	An	D(Mo)
21.	*Capparis decidua* (Forsk.) Edgew.	Capparaceae	Kareel	Shrub	En	D(Po)
22.	*Carica papaya* L.	Caricaceae	Papita	Tree	En	D(Po)
23.	*Carthamus tinctorius* L.	Asteraceae	Kusum	Shrub	Am	D(Ga)
24.	*Cassia* sp. L.	Caesalpiniaceae	Amaltas	Tree	En	D(Po)
25.	*Casuarina equisetifolia* J. R. & G. Forst.	Caesalpiniaceae	Vilayati Jhau	Tree	An	D(Po)
26.	*Catharanthus roseus* (L.) G. Don	Apocynaceae	Sadabahar	Shrub	En	D(Ga)
27.	*Chenopodium album* L.	Chenopodiaceae	Bathua	Herb	An	D(Mo)
28.	*Commelina forskalii* Vahl	Commelinaceae	Kankawwa	Herb	Am	M
29.	*Coriandrum sativum* L.	Apiaceae	Dhaniya	Herb	En	D(Po)
30.	*Cucumis sativus* L.	Cucurbitaceae	Khira	Herb	En	D(Po)
31.	*Cucurbita maxima* Duch.	Cucurbitaceae	Sitaphal	Herb	En	D(Po)
32.	*Cynodon dactylon* (L.) Pers.	Poaceae	Doob ghas, Durva	Grass	An	M
33.	*Dalbergia sissoo* Roxb.	Fabaceae	Shisham	Tree	En	D(Po)
34.	*Datura metel* L.	Solanaceae	Dhatura	Shrub	En	D(Ga)
35.	*Delonix regia* (Boj.) Raf.	Caesalpiniaceae	Gulmohor	Tree	En	D(Po)
36.	*Eclipta prostrata* (L.) L.	Asteraceae	Mochkand	Herb	En	D(Ga)
37.	*Eucalyptus hybrida* Labill.	Myrtaceae	Safeda	Tree	Am	D(PO)
38.	*Foeniculum vulgare* Mill.	Apiaceae	Saunf	Herb	En	D(Po)
39.	*Helianthus annuus* L.	Asteraceae	Surajmukhi	Herb	En	D(Ga)
40.	*Hibiscus rosa-sinensis* L.	Malvaceae	Gurhal	Shrub	En	D(Po)
41.	*Indigofera linifolia* Retz.	Fabaceae	Neel	Herb	En	D(Po)
42.	*Ipomoea fistulosa* Mart. ex Choisy	Convolvulaceae	Beshram	Shrub	En	D(Ga)
43.	*Launaea procumbens* L.	Asteraceae	Jangaligobi	Herb	En	D(Ga)
44.	*Leucas aspera* (Willd.) Spreng.	Lamiaceae	Chhota halkusa, Gopha	Herb	En	D(Ga)
45.	*Limonia acidissima* L.	Rutaceae	Kaith	Tree	En	D(Po)

46.	*Lindenbergia indica* (L.) Vatke	Scrophulariaceae	--	Herb	Am	D(Ga)
47.	*Madhuca indica* J. F. Gmel.	Sapotaceae	Mahua	Tree	En	D(Ga)
48.	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	--	Herb	En	D(Po)
49.	*Mangifera indica* L.	Anacardiaceae	Aam	Tree	En	D(Po)
50.	*Melia azedarach* L.	Meliaceae	Bakain	Tree	En	D(Po)
51.	*Moringa oleifera* Lamk.	Moringaceae	Sahjan	Tree	En	D(Po)
52.	*Ocimum* sp. L.	Lamiaceae	Tulsi	Herb	En	D(Ga)
53.	*Oxalis corniculata* L.	Oxalidaceae	Khat-mitthi	Herb	En	D(Po)
54.	*Papaver somniferum* L.	Papaveraceae	Afim, Post	Herb	En	D(Po)
55.	*Parthenium hysterophorus* L.	Asteraceae	Congress grass, Gajar ghas	Herb	An	D(Ga)
56.	*Phoenix acaulis* Roxb. ex Buch.-Ham.	Arecaceae	Khajeria	Tree	An	M
57.	*Platycladus orientalis* (L.) Franco	Cupressaceae	Morpankhi	Shrub	An	Gy
58.	*Prosopis juliflora* (Sw.) DC.	Mimosaceae	Kabuli kikar	Tree	An	D(Po)
59.	*Punica granatum* L.	Punicaceae	Anar	Shrub	En	D(Po)
60.	*Ranunculus sceleratus* L.	Ranunculaceae	Jaldhania	Herb	En	D(Po)
61.	*Raphanus sativus* L.	Brassicaceae	Muli	Herb	Am	D(Po)
62.	*Ricinus communis* L.	Euphorbiaceae	Arandi	Shrub	An	D(Mo)
63.	*Solanum* sp. L.	Solanaceae	Makoi	Herb	Am	D(Ga)
64.	*Spergula arvensis* L.	Caryophyllaceae	Muchmuchia	Herb	An	D(Po)
65.	*Syzigium cumini* (L.) Skeels	Myrtaceae	Jamun	Tree	En	D(Po)
66.	*Tridax procumbens* L.	Asteraceae	Shavanti	Herb	An	D(Ga)
67.	*Trigonella foenum-graecum* L.	Fabaceae	Methi	Herb	Am	D(Po)
68.	*Withania somnifera* (L.) Dunal	Solanaceae	Asgandh	Shrub	En	D(Mo)
69.	*Xanthium strumarium* L.	Asteraceae	Chhota gokhru	Herb	En	D(Ga)
70.	*Zea mays* L.	Poaceae	Makka	Grass	An	M

Am-Amphiphilous, **An-**Anemophilous, **D-**Dicot, **En-**Entomophilous, **Ga-**Gamopetalae, **Gy-**Gymnosperm, **M-**Monocot, **Mo-**Monochlamydeae, **Mp-**Mode of pollination, **Po-**Polypetaleae.

Total Pollen Types- **70**, Total Grasses- **02**, Total Herbs- **33**, Total Shrubs- **14**, Total Trees- **21**, Total Anemophilous- **12**, Total Entomophilous- **48**, Total Amphiphilous- **10**, Total Dicotyledons- **64**, Total Gymnosperm- **01**, Total Monocotyledons- **05**.

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Deepfakes, a Threat to Society

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ABSTRACT

Nowadays, people faced a problem of face swapping images and forged videos, widely known as the Deepfakes. These kind of images and videos are being circulated on social media , freely causing problem peoples privacy. Some deepfake images are very hard to distinguish from original ones and cannot be identified by human eye. This concept of fabrication and manipulation of digital videos and images are not new. This paper discusses about the fact of face swapping algorithms , their impact on the media, a review of deepfake and its development over the years. Conclusion of this paper offers recommendations based on the analysis.

Keywords: Deepfakes, Generative Adversarial Networks(GANs), deepfake threats Machine Learning.

I. INTRODUCTION

In the recent times, multimedia is used as a tool for alteration and manipulation. This altered and manipulated multimedia is freely circulated on the social media platforms without any hesitation [7]. The concept of deepfake was invented in 2014 by Ian Good fellow. Deep fakes are produced using Artificial Intelligent (AI) applications and Machine Learning that merge, combine, replace, and superimpose images and video clips to make fake videos that appear as if they are original ones [2].

Recently Social Networking sites like FaceBook and Instagram have announce their policy in January 2020 regarding banning of deepfake videos. There are many examples of Superimposing someone's face with someone else's. Specially faces of celebrities are used for this purpose to tarnish their image in society. Like in a photo the U.S.A. president Lincoln's head was swapped with politician John Calhoun's was produced in mid-19th century.

A study recently published in Cognitive Research[1] tried to measure people's ability to recognize whether a photo has been manipulated or not. The study showed that only 62% to 66% of the photos were correctly classified as original or manipulated ones. In a similar study published by Harisha et al [2] that only 58% of the images were correctly classified as original and only 46% of the images were identified as manipulated ones. The threat represented by widespread image forgery has stimulated intense research in multimedia forensics. Because of this we need an automatic algorithms for better detection of original and manipulated

images than humans. For example, in the first IEEE Image Forensics Challenge, detection accuracies beyond 90% were obtained by means of a machine learning approach with a properly trained classifier [3].

However, when the idea of neural network became popular, people began to use this technology in their everyday life. Subsequently, these techniques have been used by artists, pranksters and many others to create a collection of audio and video files depicting high-profile leaders, like Donald Trump Vladimir Putin and Barack Obama, saying things they never did. The trend has inevitably instilled fears within the national security community. Same technology was also used to create forged pornographic content, which was a threat to society.

After examining the technical literature available on deepfakes in order to assess the threat they pose, the paper draws two conclusions. Firstly, generating crude deepfakes for malicious use will become easier with time as the technology commodifies. At the same time though, the current situation of deepfake detection suggests that we can largely keep these fakes at bay. Secondly, the greater threat will come from tailored deepfakes produced by technically sophisticated actors.

People in general have a broad, vague fear that synthetic media will eventually destroy our ability to identify the real from the fake. According to one New York Times op-ed writer in 2019: "Deepfakes Are Coming. We Can No Longer Believe What We See."

Face-swapping involves the automatic replacement of a face in a video or image with another face where the identity of the person in the video changes. This original face-swapping method can be dated back to a Reddit user post in 2017 [10]. Faceswap-GAN is a popular face swap method [8]. Based on the original deepfakes method, Faceswap-GAN adds antagonistic and perceptual loss to the result of the automatic coding system. Adding counter losses improves the reconstruction quality of the generated image. The addition of perceptual loss improves eye orientation and aligns the face of the generated image with the input image. This method is an optimized version of the original deepfakes approach [1].

II. TECHNOLOGY USED

Most of the deepfakes are created with powerful graphics cards or with better computing power. This reduces the time interval from days and weeks to hours. But it takes expertise, too,not least to the touch up completed videos to scale back flicker and other visual defects. That said, many tools are now available to assist people make deepfakes. Several companies will make them for you (deepfakesweb.com) and do all the processing within the cloud. There's even a mobile app, Zao which lets users overlap their faces to a long list of TV and movie characters on which the system has trained. [2]

Similarly, government discourse on these issues have been shaped by broad concerns. The chairman of a congressional committee, after listing some possible malicious uses at a hearing on the matter, acknowledged that it is not too difficult to imagine even more horrifying scenarios that would leave the government, the media, and the public struggling to identify real from fake in future.

Since deep neural networks have been widely used in various recognition tasks, we can also adopt a deep neural network to detect fake images generated by the GANs. Recently, the deep learning-based approached for fake image detection using supervised learning has been studied. In other words, fake image detection has been treated as a binary classification problem (i.e., fake or real image). For instance, the convolution neural network (CNN) network was used to develop the fake image detector [9,10]. In [11], the performance of the fake face image detection was further improved by adopting the most advanced CNN–Xception network [12].

In [13], a manipulated face detection algorithm was proposed based on a hybrid ensemble learning approach. However, none of these studies has investigated the fully generated image, but instead, they have been focused only on partial manipulation of face images; thus, they cannot be used to detect the fully generated fake images. Many GANs have been proposed in recent years. Some of the recently proposed GANs [1–3,14–18] have been used to produce photo-realistic images. To develop a fake image detector, it is necessary to collect all of the GAN's images as the training set for deep neural networks to achieve the promising performance. However, it is difficult and very time-consuming to collect the training samples generated by all the GANs. In addition, such a supervised learning strategy [9–11] tends to learn the discriminative features of fake images generated by all the GANs, and as a result, the learned (trained) detector may not have a good generalization ability. In other words, the learned detector will be unable to recognize the fake images generated by the GANs that were not included in the detect or training process. To meet the current requirement for the GANs-based generator of fake image detection, WorkuMuluyeWubet proposed a modified network structure, including a pairwise learning approach, called the common fake feature network (CFFN)[4].

There is also positive use of deepfakes such as creating voices of those who have lost theirs or updating episodes of movies without reshooting them [14]. However, the number of malicious uses of deepfakes largely dominates that of the positive ones. The development of advanced deep networks and the availability of large amount of data have made the forged images and videos almost indistinguishable to humans and even to sophisticated computer algorithms. The process of creating those manipulated images and videos is also much simpler today as it needs as little as an identity photo or a short video of a target individual. Less and less effort is required to produce a stunningly convincing tempered footage. Recent advances can even create a deepfake with just a still image [5].

Additionally, several techniques to detect videos containing facial manipulations have been presented. While some of these methods focus on detecting videos containing only DeepFake manipulations, others are designed to be agnostic to the technique used to perform the facial manipulation. The work presented in [30, 31] use a temporal-aware pipeline composed by a Convolutional Neural Network (CNN) and a Recurrent Neural Network (RNN) to detect DeepFake videos. Current DeepFake videos are created by splicing synthesized face regions onto the original video frames. This splicing operation can leave artifacts that can later be detected when estimating the 3D head pose. The authors of [32] exploit this fact and use the difference between the head pose estimated with the full set of facial landmarks and a subset of them to separate DeepFake videos from real videos. This method provided competitive results on the UADFV [33] database. The same authors proposed a method [34] to detect DeepFake videos by analyzing the face warping artifacts. The authors of [20] detect manipulated videos generated by the DeepFake and Face2Face techniques with a shallow neural network that acts on mesoscopic features extracted from the video frames to distinguish manipulated videos from real ones. However, the results presented in [21] demonstrated that in a supervised setting, several deep network based models [35, 36, 37] outperform the ones based on shallow networks when detecting fake videos generated with DeepFake, Face2Face, FaceSwap, and Neural Texture[7].

III. THREE SIGNIFICANT FACTORS

Three key factors that will shape the use of technology in future are - the compelling feature of ML-driven faux media, the operational requirements of using the technology, and the risks of identification and detection raised by using deepfakes.

A. Advantage: Compelling Feature

Deepfakes give a unique opportunity to the online campaigner in order to create deceitful content. ML-based duping can generate strikingly realistic portrayal of individuals Center for Security and Emerging Technology 3 and situations. Especially, deepfakes can replicate subtle and minute details like convincing facial tics or realistic shadows for a fake object pasted into an image identifying fake images becomes extremely difficult due to these details. Nonetheless, these fakes are enough to bring confusion and suspicion about the targeted individual or situation. Numerous examples of crudely produced fakes which are widely circulated and perceived as real can be abundantly found on the internet. Consider the 2019 video of Speaker of the House Nancy Pelosi that spread extensively through social media, purporting to show Pelosi either drunk or suffering from some kind of mental deterioration. No ML was used in this case. The video was produced simply by slowing down a real video of Pelosi speaking at an event.

The need to achieve visual realistic fakes is clearly not required for successful hoaxes by malicious actors. The more important factor in the success of a hoax image is clearly based on "motivated reasoning" i.e. the tendency to accept information confirming pre-existing prejudices. Hence, deepfakes is in fact an unappealing method for spreading false descriptions, especially when you weigh the costs and risks involved in using this technology.

B. Expenditure: Operational Requirements

Maligning disinformation campaigns will have to bear certain operational costs in order to adopt ML. Invariably, creating high-performance AI systems needs access to a sufficient training data (enabling a machine to learn how to accomplish a given task) and computational power (the hardware needed to execute the training process). With respect to the depiction of the content of the deepfake, inevitable and high expenditure will be incurred for acquiring the training data, structuring it properly, and running the training process. At the same time, it is becoming more and more convenient to work with software platforms with integrated deepfake technologies. For example, no technical expertise is required on the users' end in order to work on easy-to-use, ML-driven software that can remove one face from an image or video and insert another, also commonly known as "face swap".

C. Perils: Algorithmic Detection

Avoiding public exposure is preferred by influence operations. An influence campaign can be "deplatformed" by social media companies by discovering, deleting accounts and hampering access to users by malicious actors. By using deepfakes, in fact online influence operations may increase their risk of exposure. Hence, deepfakes may contain a kind of "fingerprint," which allows investigators to link together all media from a given disinformation campaign. Investigators, in turn, can trace the campaign to a specific source and alert the public. The distribution of their content through intermediaries, such as Facebook, Twitter, and YouTube. As fears over deepfakes have escalated, these platforms have created new policies prohibiting the use of certain kinds of synthetic media. These policies will use detection algorithms for enforcement, given the massive scale of content uploaded and shared on social media. By choosing to distribute deepfakes, influence operations run the risk of their messaging being quickly taken down or flagged as suspicious on these platforms. These increased risks of exposure and detection may make deepfakes a less attractive means of spreading false narratives than existing methods. Manually copying content from many sources and editing media as needed may avoid the consistent "fingerprints" left by ML models.

The adoption of deepfakes for disinformation purposes will therefore depend on more than the costs of producing this content and its likely impact on the target audience. It will also depend on the speed of improvement in deepfake detection and the adoption of detection technologies by online platforms, governments, and everyday users.

IV. ANALYSIS

Three key factors determine whether and how online influence operations will use deepfakes:

What can be depicted in a deepfake:

1) Disinformation actors will adopt ML only if it creates synthetic media likely to shape public perceptions or cast doubt in the minds of a target audience.
2) The computational, human, and data requirements of generating deepfakes.: High costs of production will make deepfakes less attractive relative to manual methods, while low production costs will make them more attractive.
3) The effectiveness of detection systems: The ability to detect deepfakes at low cost makes ML less attractive to disinformation actors, while ineffectual or high costs to detection make it more attractive.

V. THE STATE OF PLAY

The state of the ML field will define the persuasive capacity, operational requirements, and detection risks of deepfakes.

1. Deepfake Creation

Deepfakes must meet two criteria in order for online influence campaigns to use them. First, the operational costs of producing a deepfake—buying hardware, acquiring data, and hiring expert engineers—must not be overly onerous. Second, deep generative models must be able to successfully produce the faked media an influence campaign seeks to distribute.

2. How to Build a Deepfake

Deepfakes are one specific application of ML, a field focused on the development of algorithms that improve as they process data. This processing results in a trained "model," a piece of software that ideally accomplishes the desired task. The first step is to bring together a training dataset of both tagged photographs of faces and photographs containing no faces.

The ML algorithm learns from the provided examples to associate the images containing a face with the tag "face" and images without faces with the tag "no face." This model gains a limited "understanding" of what a face looks like through the training process. This level of "understanding" is referred to in the field as a representation. Representations are at the core of how ML creates synthetic media.

Specifically, engineers create faked media using a generative model—a class of models that can produce novel data similar to that used to train the system in the first place. This representation can then produce new images of faces that have never existed. The imitations produced by deep generative models are the "deepfakes" sparking public concern. This is an extremely active area of research: numerous models have been proposed in

recent years that adopt different approaches with varying strengths and weaknesses. Some of the most prominent examples focus on the generation of images, including Glow (2018), PixelCNN (2016), NADE (2016), and DRAW (2015)[22-28].

One technique a major source of the "deepfakes" most widely circulated beyond the research community is known as generative adversarial networks, or GANs. . Therefore, a GAN with a discriminator trained on images of faces would produce a generative network that can create novel, synthetic images of faces.

3.   Costs and Capabilities

Examining the technical literature on generative models helps determine the resources required to produce a high-quality deepfake, and the range of different kinds of faked media that can be generated.With models trained 10 Center for Security and Emerging Technology on faces, malicious actors might seek to produce believable profile photos for fake accounts on social media platforms or to create a false narrative around a made-up individual. One widely-cited paper from 2017 illustrates that state-of-the-art GANs can produce realistic, synthetic face images up to a 1024 x 1024 pixel resolution.

A disinformation campaign unwilling to deal with the cost and complexity of creating a deepfake from scratch could obtain a pre-trained model created by someone else. Increasingly, pre-trained models are being open-sourced or embedded in software for use by laypeople. Today, the basic technology for creating fake swaps is now freely available in open-source software repositories online.48 Freely or cheaply available generative models for creating a range of different fakes will likely become the norm as the knowledge to create deepfakes grows more widespread.

Online influence campaigns will not make the decision to use deepfakes in a vacuum. . Disinformation campaigns will avoid easily detectable deepfakes in favor of ones harder to identify.

VI. CONCLUSION

A dramatic demonstration in the lab often reveals little about how a technology will be used in the real world. Deepfakes are no exception. While the use of ML to produce sharp, high-fidelity synthetic media is an impressive technical feat, the incentives of malicious actors will shape the ultimate threat the technology poses. Policymakers and national security researchers should avoid giving in to hype, but rather take precautions when sensible.

Deepfakes are not magic: ML is not yet so advanced that it can effortlessly conjure up fake scenes indistinguishable from reality. There is a real cost in using ML. Training data, computational power, and technical expertise must all be assembled to use it effectively. Limitations in the methodology constrain what fakes can be made, and how quickly they can be generated. Moreover, constantly evolving detection methods can make synthetic media easier to identify "in the wild." These real, somewhat humdrum considerations provide crucial hints toward how a disinformation campaign is likely to use this technology to manipulate public discourse.

While commodification will make deepfakes ever easier to produce, off-the-shelf technology for producing synthetic media will also become easier to detect and filter automatically. This limits the impact of this technology on mainstream platforms and narrows their scope to less monitored areas of the web. The greater threat is likely from a sophisticated disinformation effort that tailors ML models for particular purposes. Moderately well-resourced disinformation efforts can afford custom generative models that produce cutting-

edge deepfakes, but even in these cases, malicious actors are Conclusion A 30 Centre for Security and Emerging Technology constrained. The strategic dynamics of detection, the demands of training time, and accessibility of data all conspire to make some operational uses of deepfakes likelier than not.

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Repelency and Mortality Effect of Plant (Bergera Koenigii) Extracts against the Red Flour Beetle (Tribolium Castaneum)

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ABSTRACT

The effects of different concentrations of extracts of Bergera Koenigii against Tribolium castaneum (Herbst) at different time interval. Five applications of Control, 1%, 2%, 5% and 10% were used to assess the mortality of T. castaneum at three different days. The results revealed that the mortality and repellency of T. castaneum increased with highest concentration of plant extracts. Tribolium castaneum gave highest mortality (70%) at 10%, while least mortality (40%) was obtained lower concentration (1%). Comparing the relative efficacy of these plant extracts in relation to times, highest percent repellency (80%) at 10%, while least repellency (40%) was obtained lower concentration (1%). Regarding interaction between concentration and time, mortality and repellency increases with respect to increase in concentration. Therefore, this study confirmed that plant extracts are effective in the management of T. castaneum and most effectively at higher concentration with longer time period.

Keywords: Tribolium Castaneum, Plant Extracts, Mortality, Repellency.

I. INTRODUCTION

Store grain pest:

It has been predicted that one third of the world grain crop is lost each year at the time storage, much of this is due to insect's attack. The grain which is not lost is severally decreased in quality by insect's damage. Many store grain pests in preference to eat out grain embryos, there diminish the protein content of feed grain and reducing the percentage of seeds which grow (S.V. Deshmukh, et.al., 2018). After harvesting, the grain is mostly stored on-farm, where it can be infested by a different variety of beetles. Tribolium castaneum is one of the most common and damaging pests of stored products, feeding on various stored-grain and grain products (Weston and Rattlingourd, 2000).

The store grain pest is an insect that destroys stored food or other stored valuable organic matter (i.e., Grains & Plusses). The wheat grains are mostly damaged by T. castaneum (Mookherjee et al., 1968). Stored grains, cereals & pulses are important sources of the organic matter, therefore effective conservation of this resource is very

important for life. Maize, Rice, and Wheat are most consumed grains, while, chickpea supplement world food demands (Wondatir et al., 2015).

This beetles adult and larva which feed primarily on the germ of the cereal. It feeds on powdered products produced by other pests after feeding the grains or the broken grain specially rice, miller products like atta, Maida and Suji, in case of heavy infestation, flour turns grayish yellow and subsequently become moldy and emits a pungent smell, acquiring an unpalatable and objectionable taste. This pest is particularly abundant in flour mills. The pest becomes serious in humid season. It also damages beans, peas, baking powdered, ginger, dried fruits, insects' collection, nuts, chocolate, etc. (S.V. Deshmukh, et.al. 2018).

The Rust-red flour beetle is a reddish-brown in colour; Head and dorsal side of the thorax are densely covered with minute punctures. The last few segments of antennae are much larger in size than the preceding ones. They can produce up to 1000 eggs and lay them inside the damaged grain with parts of the larvae able to use the damaged grains and cereal as their food source. The beetle measures 4 mm in length. The adults are live for more than three years (Walter, 1990). Setiferous patch present on the male posterior side of the fore femur, while females have no such setiferous patch. Female lays 2-10 eggs each day throughout most of her adult life. Under optimal conditions of temperature (35˚C) and relative humidity (75%), egg-laying can increase at a rate of 70-100 times a month (Herrman, 1998). They hatch within 5 to 12 days. Beeman et al. (2012) reported that the duration of egg ranged from 3 days at 30°C and 2 days at 34°C.

II. MATERIALS AND METHODS

1) Rearing of experimental insects:

The red flour beetle (Tribolium castaneum (Herbst) was cultured on wheat flour mixed with yeast (10:1 w/w). Insects were released at the rate of 200 adults in 1 L jars containing 200 kg of wheat grains or flour (Daniel et al., 2013). The jars were covered with muslin cloth and held with a rubber band and kept in an incubator maintained at a temperature of 29 ± 2°C and 70 ± 5% relative humidity respectively, for two months of oviposition, the parent insects were separated and egg laid materials were maintained and re-cultured to produce newly emerged adults of same generation. The insects appear after four weeks were removed. One-14-day old adults and subsequently these adults were used for the experiments (Ashouri et al., 2010).

2) Soxhlet apparatus used for the Plant extraction:

For the extraction, crude extracts of the following dried plant leaves were used: Bergera koenigii (Curry leaves). These leaves were ground in an electric grinder to obtain a powder. The extraction of plant sample was done in about 12h. Soxhlet Extraction Apparatus was used to extract from plant leaves component by dipping 50g of powder in 250 ml ethanol according to the procedure described (Valladares et al., 1997). Plant leaves were done by deposit flasks in the Soxhlet Apparatus. Plant leaves were poured into a filter tube made from filter paper on one end of the cap. A flask which contained 500ml of ethanol was placed under this glass tube for 24h. Then next three days, the solvent was disappeared by the heat lamp. The plant extracts were put at 4°C prior to application.

III. RESULTS

Table 1: Mortality effect of plant (Bergera koenigii) extracts on insects:

| Sr. No.	Conc. of plant extracts in percentage	No. of T. *Castaneum* exposed	No. of T. *Castaneum* dead after some days			Total percentage of morality
			1 day	2 day	3 day	
1)	Control	10	-	-	-	00%
2)	1%	10	01	02	04	40%
3)	2%	10	01	02	05	50%
4)	5%	10	01	03	06	60%
5)	10%	10	02	04	07	70%

Table 2: Repellency effect of plant (Bergera koenigii) extract on insects:

Sr. No.	Conc. of plant extract percentage	No. of T. *Castaneum* exposed	No. of T. *Castaneum* repelled after some hours			Total percentage of repellency
			24 h	48 h	72 h	
1)	Control	10	01	02	-	00%
2)	1%	10	01	03	05	50%
3)	2%	10	03	05	06	60%
4)	5%	10	04	05	07	70%
5)	10%	10	05	06	08	80%

Graph 1: Mortality effect of plant extracts on insects:
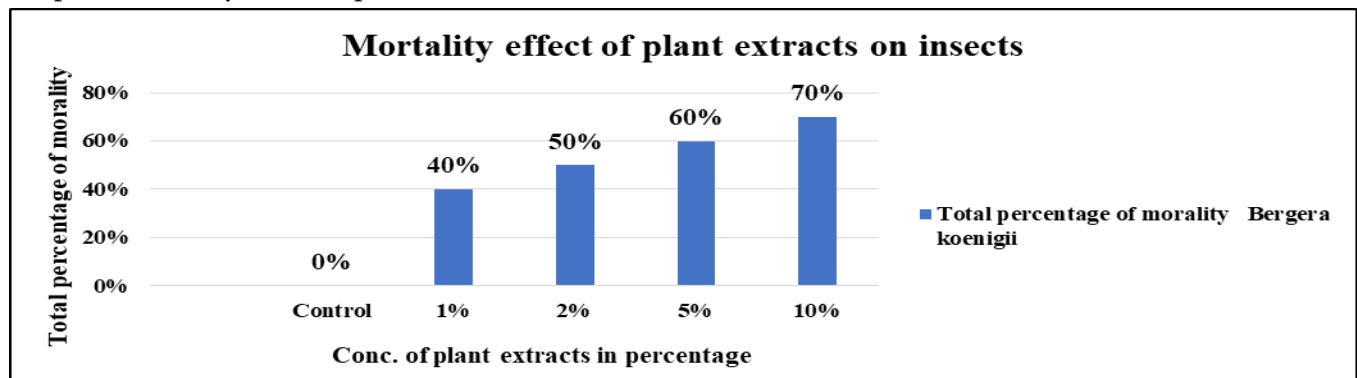
Graph 2: Repellency effect of plant extract on insects:
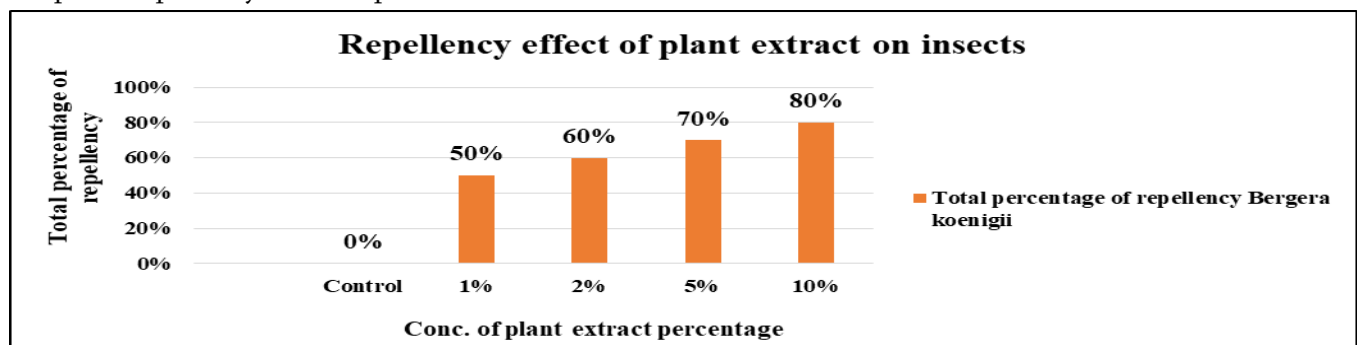
IV. DISCUSSION

There is improved curiosity during researcher to study the bioactivity of plant extracts against the various stored-grain insect pests (Dubey et al., 2008). Bishkatali plant extracts found both chloroform and ethyl alcohol they show remarkable residual effects on T. castaneum by decreasing the production of F1 generation or by increasing the population mortality (Moreira et al., 2007). In this analysis B. campestris, J. mi-mosifolia, M. chamomilla and V. arvensis prepare the excellent potential as repellent and toxicant agents to T. castaneum. Confirms the findings of various studies which determine the highly lethal or repellent effect of some of these species against stored-grain pests (Alok-Krishna et al., 2005).

In the present study the data indicated that: Bergera koenigii mortality effect of plant extracts on insect Bergera koenigii plant extract shows significant toxicity against mortality among Tribolium castenum the recorded Maximum % mortality was 70% while the minimum mortality 40% (Table 1).

Repellency effect of plant extract Bergera koenigii on insects shows significant toxicity for repellency on Tribolium castenum the recorded Maximum repellency was 80% while the minimum repellency 50% (Table 2).

V. CONCLUSION

This study clearly indicated differences in toxicity of these plant extracts in relation to exposure period and concentration used. The findings of the study predict the potential of plant extracts towards the stored grain insect pest management. Based on the high mortality and repellency results of the present study, it is concluded that the application of Bergera koenigii leaf extracts as plant derived insecticides on T. castaneum can control the damage caused by this beetle. Bergera koenigii is the most effective plant extract because it had the highest mortality effects of the plant extracts used in this study. This study suggests that Bergera koenigii is active plant extracts towards control of stored grain insect pests especially the red flour beetle, Tribolium castaneum. However, effort must be intensified to control the damage caused by T. castaneum to stored cereals, this could be achieved by the use of plant extracts which are cheap, low risk control techniques and are readily available to the farmers which prompted this study.

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Consequence of Soil pH on the Fungal and Bacterial Community

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ABSTRACT

The influence of pH on the relative importance of the two principal decomposer groups in soil, fungi and bacteria, was investigated along a continuous soil pH gradient at Hoosfield acid strip.This experimental location provides a uniform pH gradient, ranging from pH 8.5 to 4.0, within 180 m in a silty loam soil on which barley has been continuously grown for more than 100 years. We estimated the importance of fungi and bacteria directly by measuring acetate incorporation into ergosterol to measure fungal growth and leucine and thymidine incorporation to measure bacterial growth. The growthbased measurements revealed a fivefold decrease in bacterial growth and a fivefold increase in fungal growth with lower pH. This resulted in an approximately 30-fold increase in fungal importance, as indicated by the fungal growth/bacterial growth ratio, from pH 8.3 to pH 4.5.

Key Words: Fungi, Bacteria, soil pH.

I. INTRODUCTION

An inherent problem in studying soil pH effects is its varied influence on multiple parameters. The soil microbial community is responsible for most nutrient transformations in soil, regenerating minerals that limit plant productivity. Fungi and bacteria are the two groups that dominate the microbial decomposer community, and, crudely defined, they share the function of decomposing organic matter in soil, indicating that there is a strong potential for interaction. This resulted in a 30-fold increase in the relative importance of fungi and bacteria the influence of pH on fungal growth has been investigated previously. Baath and Arnebrant reported that treatment of forest soils with lime and ash, which resulted in pH changes from about pH 4 to 7 and increased fungal growth about fivefold a Similar study that included 100 different soils sample from areas Mahagaon Land uses has also been reported.

However, one limitation of these observational studies is that it is impossible to determine whether the communities are structured directly or indirectly by pH. In other words, we do not know whether pH itself is the factor shaping these communities, or whether pH may be indirectly related to the observed community changes through many environmental factors (for example, nutrient availability, organic C characteristics, soil moisture regime and vegetation type), which often co-vary with changes in soil pH.[4] Similarly, we do not know

whether soil pH is also correlated with the community composition of fungi, another dominant microbial group in soil.[5] Our objectives for this study were observe the effect of soil pH on the fungal community across the 100-m distance of the Mahagaon Dist. Yavatmal.

II. MATERIAL AND METHODS

Soil sample were collected from across the Mahagaon taluka Yavatmal district to investigate the direct influence of soil pH on the abundance, taxonomic diversity and composition of the major soil microbial fungi. We sampled along the first 100m of the strip taking 5 cm diameter, 0–23cm depth cores at each sampling position along the gradient. The gradient was sampled every 15m between 0–40 m, and every 5m between 40 and 60m and, then every 10m between the final 60–100m of the gradient. One fifty soil samples were sieved (2.8mm) in the laboratory, removing apparent roots and stones, and pH was measured using an electronic pH meter.

III. RESULT AND DISCUSSION

Spanning a pH range from 4 to 8, showed that there was an increase in bacterial growth with decreased fungal growth was found at higher pH. Thus, suggesting decrease in fungal dominance of decomposition at higher soil pH. The close correlation between the declines in fungal growth as soil pH declines requires explanation. One potential explanation could be independent physiological limitations by pH of the separate decomposer groups; i.e., low hydrogen ion concentrations limit fungal growth. Recent study has demonstrated that changes in soil microbial communities across space are often strongly correlated with differences in soil chemistry. In particular, it has been shown that the composition, and in some cases diversity, of soil fungal communities is often strongly correlated with soil pH. However, bacterial and fungal growth revealed dramatic differences in the activity of these microbial decomposer communities. In contrast, fungal growth was maximal at pH 4.5, and decreased by a factor of more than 5 toward the high pH end.[6]

Sam.No.	pH	Sam.No.	pH	Sam.No.	pH	Sam.No.	pH	Sam.No.	pH
1	7.1	5	7.8	9	7	13	6	17	7.1
2	4.3	6	6	10	7	14	8.3	18	7.6
3	4.8	7	8.2	11	7.1	15	7.8	19	6
4	8.1	8	8.5	12	8.4	16	7.8	20	5.2

Throughout the Mahagaon taluka the measured pH of the soil sample found to be lying in between 4.1 to 8.5. The value of observed soil pH is given in table below. The mainly all soil sample shows basic in nature and some soil sample shows neutral pH. The fungal growth in this range of pH hardly survives. Out of the collected sample the sample collected from river area shows 4.1 pH. This indicates that there is better survival of fungi. From above diagram it clearly shown that the majority of the sample having pH is greater than 6 pH. Irrespective of the mechanism, it is clear that the general inhibitory effects below pH 4.5 in the Hoosfield acid strip are very different from the pH effects above pH 4.5. For this reason, the analyses of the results and the remainder of the discussion concerning the influence of pH on microbial parameters focus exclusively on the pH range above pH 4.5.

IV. CONCLUSION

This study showed that neutral or slightly alkaline conditions favored bacterial growth. Conversely, an acid pH favored fungal growth. This resulted in an increase in the relative importance of fungi by a factor of 30 from pH 8.3 to pH 4.5. The drastic shift in fungal and bacterial growth affected basal respiration in the same pH range to a relatively minor extent, possibly suggesting functional redundancy in C mineralization. It was not possible to reconcile bacterial and fungal biomass measurements with growth measurements, which compromises the reliability of biomass-based methods to properly assess the relative importance of fungi and bacteria in soil. The use of growth-based measurements proved to be a sensitive way to compare the relative importance of the two major decomposer groups in soil, fungi and acteria.

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