Online ISSN : 2395-602X
Print ISSN : 2395-6011
www.ijsrst.com

Conference Proceedings

National Conference on Research Methodology in Life Science [NCRMLS-2024]

Date : 10th February 2024

Organized By

Department of Botany, M.S.P. Mandal's Balbhim Arts, Science and Commerce College, Beed – 431122, Maharashtra, India

VOLUME 11, ISSUE 12, JANUARY-FEBRUARY-2024

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN SCIENCE AND TECHNOLOGY

PEER REVIEWED AND REFEREED INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL

Scientific Journal Impact Factor : 8.014

Email : editor@ijsrst.com Website : http://ijsrst.com

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In Association with

International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 Online ISSN : 2395-602X

Volume 11, Issue 12, January-February-2024

International Peer Reviewed, Open Access Journal

Published By
Technoscience Academy

(The International Open Access Publisher)
website: www.technoscienceacademy.com

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OBJECTIVES

The quality of research is the backbone of any nation and progress of any nation depends on quality of research. Life sciences encompasses different scientific fields such as biology,chemistry,biophysics, medical technology,pharma ceutics,information technology ,nutritional science, environmental technology. Life sciences promises innovative solutions to fundamental challenges for.eg. advances in the field of Biotechnology ,agriculture proved to solve problems and promise innovative solutions to fundamental challenges related to food, agricultural and environment. The vital aim of conference is to bring together academicians, researchersand experts from different parts of country to exchange knowledge and ideas.

SUB - THEMES

1. Modern trends in Life Sciences
2. Recent trends in Plant Pathology
3. Molecular tools and applications in life sciences
4. Recent advances in Ethnobotany and Taxonomy
5. Biodiversity ,conservation and other environmental issues.
6. Recent advances in Aquaculture and fisheries
7. Nanotechnology
8. Synthetic biology
9. Microbiology
10. Plant Diversity and systematics

ABOUT DEPARTMENT

The department of Botany was established with the opening of the college in june 1960.with the goal to provides scientific knowledge of plants to the students.And to create awareness regarding importance of study of basic Botany among the students.The department offers UG and PG programs with all facilities.Department also have Recognize Ph.D. Research centre in Botany.

ABOUT INSTITUTION

Marathwada Shikshan Prasarak Mandal is one of the prominent educational institutions in the state of Maharashtra. Being founded in 1959 by the great visionary educationist, the late Shri Vinayakraoji Patil and his associates, the mandal celebrated its GOLDEN JUBILEE in the academic year 2008- 2009 and Balbhim College also celebrated its GOLDEN JUBILEE in the academic year 2009-2010. At present, the educational network of our institution has spread in five districts of Marathwada. The institution runs courses in the agriculture, commerce, arts, education, science, engineering, law, pharmacy, primary and secondary schools, junior and senior colleges. It is the recipient of BEST EDUCATIONAL INSTITUTION AWARD given by the Government of Maharashtra in 2001.

ABOUT COLLEGE

Balbhim Arts, Scienc and Commerce College was inaugurated in 1960 by the esteemed hands of late Shri Yashwantraoji Chavan, Chief-Minister of Maharashtra. It has been started with a noble aim “Tamso Ma Jyotirgamaya (Journey from Darkness to Light, Non-Realization to Realization, Avidya to Vidya) for imparting higher education to the

student belonging to educationally and economically weaker sections and backward classes in the region of Marathwada. U.G.C. has honored our college as the 'College with Potential for Excellence' Our college has got A+ grade with CGPA 3.44 in 4th cycle of NAAC reaccreditation process. It is a premier college for traditional as well as new age need based courses such as Computer Science, Information Technology, Business Administration etc. Thousands of students of this college are getting benefits of these courses

ABOUT BEED

Beed is the District head-quarter in the Marathwada region of Maharashtra State and is well connected with all major cities of Maharashtra, Mumbai (400 km), Pune(300km), Nanded(200km), Ahmednagar (150km), Chh.Sambhajinagar (135km). This historical city is situated on the bank of the Bindusara river. Many of the historical temples and holy places such as, Papneshwar, Kankaleshwar,Khandeshwari khandoba temple, Shahenshwali darga, Khajana bawdi, Bindusara Project, Yuva Shantivan etc. are present. Kapildhar and Sautada are famous for a Natural water fall in Balaghat range about 18 km. south and 40 km. west of Beed city respectively. The kankaleshwar temple is most beautiful and perhaps the oldest monument in the city. The historic and famous well called 'Khajana Bawadi' is situated about 6 km south of the city.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Vessels Study of Some Medicinal Plants

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
01-08

ABSTRACT

This study aimed that to investigate the length, width, perforation, plates, pits arrangement; end-wall and lateral wall thickening types, size, diameter etc. of *Barleriacristata*, *Barleria*prionitis and *Crossandrainfundibuliformis* through vessels study.This study also to explore the medicinal properties of some medicinal plants, focusing on their potential therapeutic effects through from plant vessels. By investigating the vessels details study of above plants, the research aims to provide valuable insights into the pharmacological aspects of medicinal plants. The findings may offer a foundation for future research in plant-based medicine and enhance our understanding of the intricate relationship between plant vascular structures and their healing properties.
Key Word: Vessels, medicinal plants, uses,

I. INTRODUCTION

As the demand for natural remedies and sustainable healthcare alternatives grows, investigating the vessels of medicinal plants provides a promising avenue for discovering novel therapeutic agents. This exploration not only contributes to the expanding field of phytochemistry but also fosters a deeper appreciation for the intricate interplay between plant vascular systems and their potential applications in human health. Through a comprehensive study of these vessels, we aspire to unveil the secrets that nature holds, unlocking new avenues for the development of effective and sustainable medicinal interventions.

baarleriacristata, *Barleriaprionitis* and *Crossandrainfundibuliformis* aremedicinal plants. 1) *Barleriacristata*L.The root and leaves used to reduce swelling (Kirtikar and Basu, 1980). The paste of fresh leaves is applied on cuts, wounds to stop bleeding (Trivedi, 2002). Root and leaves to reduce swelling, cough rheumatism, snake bite (Jayvir et. al., 2002). Plant used for fever, antiacidity, blood purification (Sharma P.V. 2005). Root is used in diarrhea; juice of leaves is used for eye and ear troubles, (S. Shanmugam, et. al., 2009). 2) *Barleriaprionitis* L: The whole plant is diuretic, tonic febrifuge and anticatarrhal. (Dastur, 1962). Cracks and lacerations of feet (Nadkarni, 1976). A root paste made of the astringent leaves and common salt is used to strengthen the gums and in toothache due to caries. (Kirtiker and Basu, 1980). Leaves against respiratory syncytial virus (Chen, et. al.,1998). Diarrhea, Diuretic, toothache, sweet producing (Naik,1998). The decoction

of the leaf is taken to nullify the effect of poison. Leaf juice mixed with honey is given to cure cough. (Maheshwary, 2000). Leaf juice used for cure Jaundice, (Das, 2002). Leaf used for Cough Dental disorders (Trivedi, 2002). Decoction of plant is given for whooping cough and toothache (Trivedi, 2002). 3) *Crossandrainfundibuliformis* (L.) Nees. Plant used as ground cover, bright orange flowers are ornamental, (http//www.Top Tropical com.). Flower applied for wounds. Plant is used for herbal medicine for the treatment of various ailments among paliyar tribes used as wounds; cuts stomach pain, diabetes, fever etc. (S. Shanmugam and et. al., 2002).

II. MATERIALS METHODS AND

Plants material was collected from Jalna district Maharashtra. Some plants of *Barleriacristata, Barleriaprionitis andCrossandrainfundibuliformis* was preserved in herbarium. For vessel studies a thin slice of root stem were treated with 5%solution of HNO3 +5 % solution of K2Cr2O7 for 12 to 24 hours. The maceration was then thoroughly washed with water and vessel elements were stained with 1 % aqueous solution of safranine and mounted in glycerine. Measurement wastalked by ocular micrometre and camera lucida and stage micrometer. Classification of Radford et. al. (1974) is followed for catgoring the vessels element.

III. CONCLUSIONS

This study delves into the intricate world of plant vessels, seeking to unravel the mysteries of their morphology, composition, and functionality within the context of medicinal properties. The significance of understanding plant vessels lies in their direct correlation to, unlocking new avenues for the development of effective and sustainable medicinal interventions avenue for discovering novel therapeutic agents. This exploration not only contributes. The production and grows, investigating the vessels of medicinal plants provides a promising to the expanding field of phytochemistry but also fosters a deeper appreciation for the intricate interplay between plant vascular systems and their potential applications in human health. Through a comprehensive study of these vessels, we aspire to unveil the secrets that nature holds

Vessel elements in *Barleriacristata* L stem.

Length of vessel elements	: 260 – 740 µ.
Average length	: 500 µ.
Diameter of vessels elements	: 20 - 110 µ.
Average diameter	: 65 µ.
Shape	: Cylindrical, tubular
Lateral wall thickening	: Simple pitted
Pits arrangement	: alternate
Perforation plate	: Simple
Shape of perforation plate	: Oval, round
Position of plate	: Oblique, transverse
Tail	: Short, blunt

(Plate No –1, table no. – 1 & 2)

Vessel elements in *Barleriacristata* L root.

Length of vessel elements	: 260 - 820 µ.
Average length	: 540 µ.
Diameter of vessels elements	: 30 - 80 µ.
Average diameter	: 55 µ.
Shape	: Tubular, cylindrical, column like
Lateral wall thickening	: Simple pitted
Pits arrangement	: Opposite, alternate
Perforation plate	: Simple
Shape of perforation plate	: Circular, oval
Position of plate	: Oblique, lateral, transverse
Tail	: Long pointed

(Plate No –1, table no. – 1 & 2)

Vessel elements in *Barleriaprionitis* L stem.

Length of vessel elements	: 260 - 420 µ.
Average length	: 340 µ.
Diameter of vessels elements	: 10 - 60 µ.
Average diameter	: 35 µ.
Shape	: Tubular, cylindrical
Lateral wall thickening	: Simple pitted
Pits arrangement	: Alternate
Perforation plate	: Simple
Shape of perforation plate	: Oval, circular
Position of plate	: Lateral, transverse
Tail	: Present short

(Plate No – 2, table no. 1 & 2)

Vessel elements in *Barleriaprionitis* L root.

Length of vessel elements	: 450 - 760 µ.
Average length	: 605 µ.
Diameter of vessels elements	: 70 - 120 µ.
Average diameter	: 145 µ.
Shape	: Spindle shaped, drum shaped
Lateral wall thickening	: Simple pitted
Pits arrangement	: Alternate, opposite
Perforation plate	: Simple
Shape of perforation plate	: Oval, circular
Position of plate	: Oblique, transverse
Tail	: Present long pointed.

(Plate No – 2, Table no. 1 & 2)

Vesselelements *in Crossandrainfundibuliformis*(L.) Nees stem.

Length of vessel elements : 290 - 760 µ.
Average length : 525 µ.
Diameter of vessels elements : 60 - 75 µ.
Average diameter : 65.5 µ.
Shape : Tubular
Lateral wall thickening : Simple pitted
Pits arrangement : Alternate, opposite
Perforation plate : Simple
Shape of perforation plate : Oval, circular
Position of plate : Lateral, transverse
Tail : Present long, pointed

(Plate No – 3.Table no. 1& 2.)

Vessel elements in *Crossandrainfundibuliformis* (L.) Nees root.

Length of vessel elements : 520 - 730 µ.
Average length : 625 µ.
Diameter of vessels elements : 60 - 70 µ.
Average diameter : 65 µ.
Shape : Tubular
Lateral wall thickening : Simple pitted
Pits arrangement : Parallel, opposite
Perforation plate : Simple
Shape of perforation plate : Oval, circular
Position of plate : Lateral, transverse
Tail : Long, blunt

(Plate No – 3.Table no. 1 &2.)

Table No – 1. Vessel elements in Stem.

Sr. No	Name of Species	Length of vessel members (µm)			Diameter of vessel members (µm)		
		Minimum length	Maximum length	Average	Minimum diameter	Maximum diameter	Average
1	*Barleriacristata*	260	740	500	20	110	65
2	*Barleriaprionitis*	260	420	340	10	60	35
3	*Crossandrainfundibuliformis*	290	760	525	60	75	65.5

Table No – 2. Vessel element in Root

Sr. N	Name of Species.	Length of vessel members (members (µm)			Diameter of vessel members (µm)		
		Minimum length	Maxximumlength	Average	Minimum diameter	Maximum diameter	Average
1	*Barleriacristata*	260	820	540	30	80	55
3	*Barleriaprionitis*	450	760	605	70	120	95
3	*Crossandrainfundibuliformis*	520	730	625	60	70	65

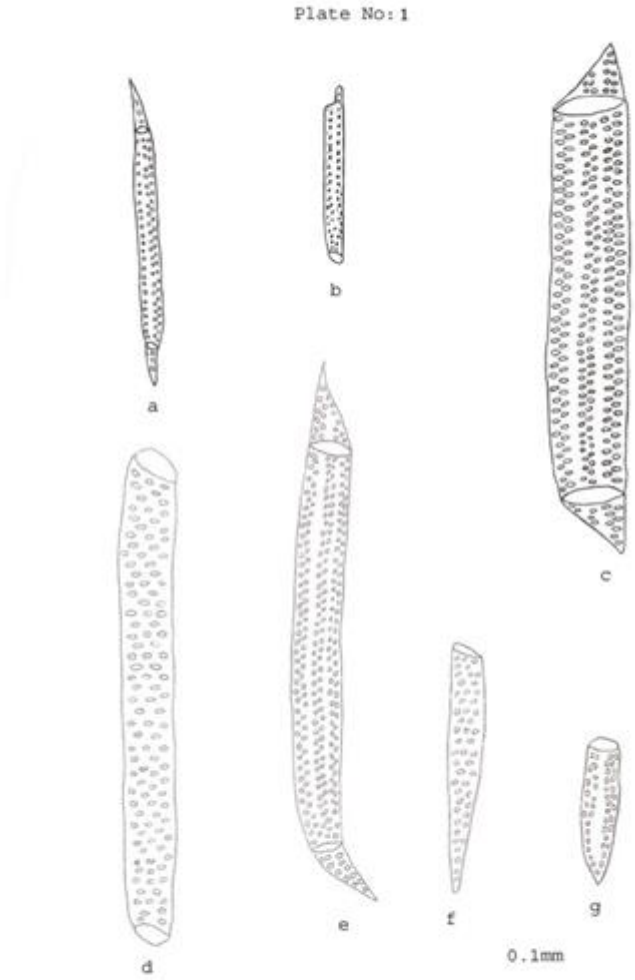

Fig:-*Barleria cristata* stem (a,b,c) and root vessels (d,e,f,g)

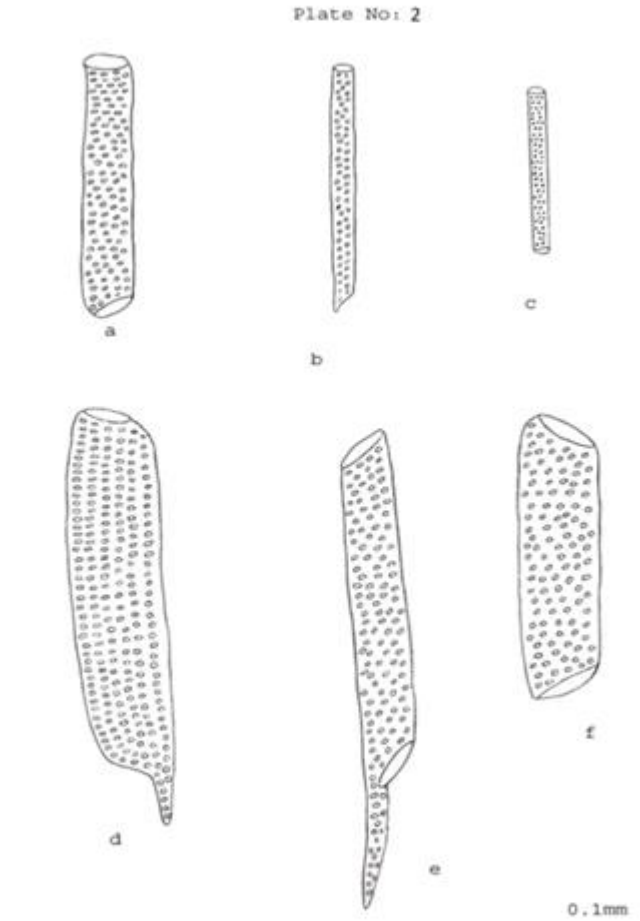

Fig:*Barleria prionitis* stem (a,b,c) vessels and root (d,e,f)vessels.

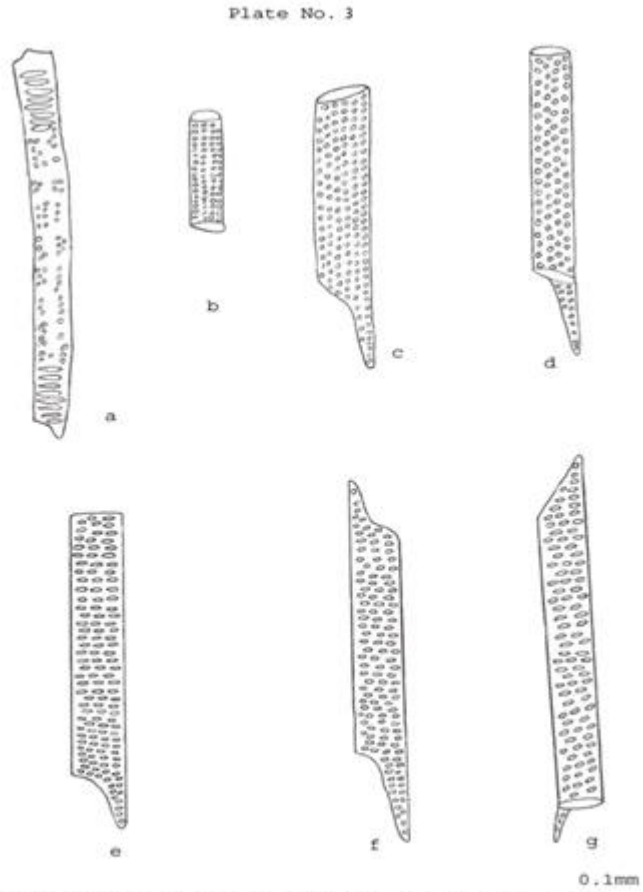

Figure: *Crossandra infundibuliformis* stem (a,b,c,d) vessels and root (e,f,g) vessels.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

A Study on Causes and Impact of Laterite Miningon Environment in Kudchire Village of Goa State

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
15-19

ABSTRACT

Men for the ages have been using the stone. First tool used by men was stone. Though there is a wide use of laterite stone we cannot neglect the negative effect of Laterite mining on environment and on the life of people in the adjoining area. The Dhangarwada is blessed by rich Biodiversity, butrecent growing population greed of making more money have destroyed the environment to the great extent. Environment is rich in flora and fauna which is not static for any organism. It keeps on changing due to human activity or natural phenomenon. The on going laterite mining have caused impact on the environment. Forun derstanding the causes and impact of laterite mining the study was undertaken in kudchire village of Goa State. The paper attempts to present both causes and impact of laterite mining on environment. Data is collected by field observation.

Keywords: Lateritemining, Environment, Causes, Impact, Biodiversity

I. INTRODUCTION

Francis Buchanan-Hamiltonfirst described and named a laterite formation in southern India in 1807.He named it laterite from the Latin word later, which means a brick; this highly compactedandcementedsoilcaneasilybecutintobrick-shapedblocksforbuilding.Laterites are mainly Laterites consist mainly of quartz, zircon, and oxides of titanium, iron, tin, aluminium, andmanganese, whichremainduringthecourseofweathering.Quartzisthemost abundant relic mineral from the parent rock. Laterites are formed from the leaching of parent sedimentary rocks (sandstone.clays, limestones); metamorphicrocks schists, gneisses, migmatitie)igneous rocks (granites, basalts, gabbros, peridotities); and mineralised protoores, iron and aluminium. The major portion of Goa is covered by lateritic soils and lateritic rocks, which are of rusty-red coloration due to high content of iron oxide. The laterite stone is used for various purposes such as construction of houses, buildings, roads, and agriculture. Objectives:

1) Toknowthe causesof lateritemining.
2) Toknowthe impact of lateritemining onenvironmentinKudchire Village.

II. REVIEW OF LITERATURE

Dr. Dadapir M. Jakati (2021) conducted a study on "Development of Mining in Goa and its environmental impacts – A Geographical Perspective". His finding are social effects, Health effects, Forest and Wildlife, pollution of ground water.

RohanJ.Lad&JayS.Samant(2012) ConductedstudyonEnvironmentalandSocialImpacts of Mining in the Western Ghats: A Case Study of Warna Basin. His findings are degradation of environment, loss of jobs.

Dr. T. K. Prasad & Dr. G.R. Parthasarathy (2018) conducted study on Effect of Laterite Mining on the Land Use of Midland Hillocks of Kannur District, Kerala - A Case Study. His findings are loss of vegetation cover.

III. STUDYAREA

The study area is a Dhangarwada situated near by (Latitude 15°35'57.6"N and Longitude 73°59'39.5"E) was covered with plants like Mango, Cashew, Jackfruit, Matti, Teak Jambhul, Legestromia parviflorea, and Terminalia paniculata. The fauna found in the study area were Leopard, Deer, Bear, Fox Snakes, Wild Pigs, Rabbits, birds like peacock etc. The laterite mining site was the traditional grazing ground for the cattle.

IV. MATERIALSANDMETHODS:

To determine the impact of laterite mining on the environment and it involved the use of the materials mobile cameras, Google Earth image, Microsoft word was used for typing.

DataandDataSources:

Theprimarydatasourceswerecomprisedoftheuseofquestionnaires fromtheDhangarwada people. Mobile Camera for photographs and Google Earth image was used to obtain the coordinate points of the study area.

V. RESULTSANDDISCUSSION:

Thecausesoflateritemining:

Urbanisation:

Inthemodernerathe construction, isthemajoractivitygoinginthecity.Thishasbeenamajor causethathasbroughtaboutlateriteexcavationbecausethelateritemineralmaterialis important for construction of houses, buildings, and roads.

Illiteracy:

TheinhabitantsofthisareabelongtoDhangarcommunity, mostlyilliteratesbelongtolow- income group. Livelihood of Dhangarwada people depends on rearing of Cattle, Goats and Sheep. Most of the people are not aware about the ill effects of laterite mining. It has been found thatthe owner of the land; contractor is involved in excavation.

Poverty:

Poverty is one the factor that has caused the laterite excavation. To increase the standard of livingandgreedtomakemoremoneyfromthemineralresourcesavailablefromthephysical environment without knowing the impact in long run. The resident or landowner have sold the mining excavation to contractor.

ImpactonEnvironment.

Loss of biodiversity:

To make this mining possible several forests are to be cleared and this leads to deforestation. The vegetation is also cleared on account of mining activity and temporary road building. Several organisms that live in these forests, with deforestation these wild animals lose their natural habitat. So, animals start looking foranewhabitat in orderto survive.Animals do not respond to the new habitat. They are very well adjusted to their existing habitat regarding availabilityoffood, waterandshelter.Thesesuddenchangesinhabitatendupindying.Every singleforestisbiosphereofitsown.Itisimpossibletocreateabiosphereartificiallyasvarious ecosystemsandfoodchainsareoperatinginit.Habitatdestructionisamajorfactorincausing a species population to decrease eventually leading to its being endangered or even to its extinction.

Largepits asa death traps.

In the process of stone cutting, the top layer stone is rejected which is soft, so they go deep in search of hard stone as a result a huge pit is formed. The unused soil is dumped as a waste whichcausesenvironmentalproblem.Thesepitsarenotfilledagainorthereisnoreclamation of pits. These pits serve as death traps for cattle's and wild animals. It becomes difficult for animalstocrossormoveinanaturalhabitat.Itmaynotcauseanyproblemtosmallanimals, but it causes problems to big animals. The herd of deer or cattle may accidentally fall in it posing threat. In rainy season pits get accumulated with rainwater leading to formation of artificial ponds. The large pits has no fencing or barricades. It is still open. It proves to be positive danger to small children, cattle's and other wild animal getting drowned.

Wastelandgeneration:

Wastegenerationisaseriousproblem.About2-3msoilneedtoberemovedtoaccessthestone. When laterite mining is stopped, the area is left with large pits; such pits are not used again. Laterite Mining has led to generation of large numberof wastelands in the Eco sensitive area. Lesseffortsaremadeforrestorationandreclamationoflandmines.Noonehasthoughttouse the discarded pits again.

Soil erosion:

Inrainyseasonthedumpedsoilgetswashedtoadjoinedareacausingsoilpollution.Dueto mining top soil has damaged. It results in the soil loss. Topography has changed due to digging of open pits and dumping of unused soil.

Affectthe foodchainandfoodweb:

The Laterite mining leads to destruction of biodiversity. Forest consists of different ecosystems. Thereareinterdependent food chains and foodwebs operating in forests. Loss of biodiversity affects the food chain and food web. First trees are cut down. The trees are the naturalhabitatofBirds, Monkeys, Insectsandotheranimals.Treesserveasashelterforsmall insects, birds and etc. Birds construct nests. Trees provides fruit which is food to animals. Cutting down of trees leads to barren land. Deforestation leads to destruction of habitat. The food cycle gets disturbed.

Lessgains

Laterite mining is a profitable business, it creates employment opportunities The Laterite miningintheDhangarwadahasnomonetarybenefittothelocals.Localpeopledonotgetany employment, insteadhastofacepollution.MostpeopleemployedarenottheGoan.

Changesin groundwater.

Miningactivitycarriedbelowthewatertabledisturbsthehydrogeologicalconditions.There is change in ground water flow patterns, lowering of water table. Water from well gets drasticallyreduced.

MigrantLabours

ThemineowneremployslabourswhichfromoutsideGoa.Allthelabourssettleatthemining site. The population also put pressure on the uses of local resources.

VI. CONCLUSION

Extractionofstoneleads todestructioninbiodiversityandformationofopenpits.Thereisno fencing of barricades for open pits. The degraded environment does not provide livelihood to the people. Stone is non-renewable natural resource. Damage caused is permanent and irreparable. It also causes damage to the soil. Removal of vegetation is destruction of natural habitat. Deforestation leads to reduction of rainfall and desertification of soil. Permanent loss in biodiversity. Mining generates wasteland.

VII.SUGGESTION AND MEASURES

RestorationandReclamationofminedland: -Effortshouldbemadeforrestorationand reclamation of the mined land to original condition. Open pits should be filled with soil.

Environmental monitoring: - Laterite Mining activity should be monitored regarding extraction of stone, storage and dumpsof unused soil and the depth up to what level stone should be extracted.

Reforestation: Planting of suitable species of trees in the waste landto create natural condition, as far as possible pre mining trees can be planted. The Local people should be involved in afforestation process.

Employment to local people: Since local people are stakeholders the preference should be given them for jobs in mining.

Leesing of mines : Since local people are worst hit by mining, they should be made part of system. Certain royalty may be given to them.

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Appendix

Goa

BicholimTaluka

GoogleEarthImageofsiteshowinglateriteminingaroundDhangarwadainKudchirevillage Laterite mining

Nearground **NearPadocem village**

Water accumulation **Lateritemining**

International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Fish Faunal Diversity in Hangarga (Tul.) Water Tank, Dist. Dharashiv (M.S.) India

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
15-19

ABSTRACT

The present study of fish fauna diversity in Hangarga (Tul.) Dist. Dharashiv (M.S.) India. The present study period during a year January 2023 to December 2023. LocationofHangarga(Tul.)Latitude17-390andLongitude74-070andmanmadeEarthen Tank. The total water storage capacity of dam 2.04 D.L.M.H. and living stock 1.876sq.m. The water tank maximum hight 10.97 m. village coming under the catchment area Hangarga, Tirath. The water tank completion 1975-76.

The present study confirms the occurrence of 09 species belongs to 04 order. The family-cyprinidaewasdominantwith6speciestobeallowedbythefamily-Channidae02 species, family-siluridae, 01 species and family-clarridae, 01 species observed in Hangarga (Tul.) water tank.

Keyword–Fishfauna,diversity,Hangarga(Tul.)watertank

I. INTRODUCTION

India is endowed with fresh water consisting45,000 k.m. seven rivers 26334 k.m. ofcanal pond and tank 2.36 million hectares and 2.05 million hectorreservoirs. Thefresh water of India has been viewed from a single perspective that of economic production. Ichthyofaunal diversity is essential for stabilization of ecosystem protection overall environmental qualityfor under sanding intrinsic worth of all species on earth. Fishes are cold blooded aquatic vertebrate which breathe by means of pharyngeal gills propelling and balancing themselves by means of fin. Some 21370 species of fish are known to inhabit water bodies of various descriptions over a thousand species of fish occur in India.

TheknowledgeoftheoccurrenceoffishinIndiadatesbacktothreemillennium B.C.(Hora1956)fishremainwithcatmarks,indicativeoftheiruseasfoodhavebeen

obtainedfrom excavationsatMohanjederoandHadappaofthe Indusvalleycivilization(2500 B. 1500BC.S Nath 1966) While Aristotle (384-327 B.C.) issaid to be the founder of Ichthyology king somesyara, The son of king Vikram Aditya VI who composed the book, Manasltara in 1127 A.D. was the first to record the common sport fishes of India grouping them into marine and fresh water riverine form (Hora -1951) The first modern written on Indian fishes According to Day(1878) was Bloch whose splendid work AustandicheFischer was published in 1785.

India's total fish production stood at 0.817 million in 1950. It registered decrease to 0.751 million in 1951 and a farther decline to 0.744 million in 1952. After 1952, it showed a steady increase up to 1.233 million in 1957. Thereafter till 1961. There after it rosesteadilybarringthe years 1976 and 1982 when slight falls in production compared to previous years Catches were noted. The production stool at its all time high of 2.82 million and in 1983.

As per economic importance and scope of fish and fisheries especially in Maharashtra but it is natural to study the distribution and availability of fish from fresh water present investigation was under taken of study of fish faunal diversity in Hangarga (Tul.) water tanks.

II. MATERIALS & METHODS

The study of fish faunal diversity in Hangarga (Tul.) water bodies fishes were collected from Hangarga (Tul.) tanks with help of Local Fisherman using different typeof net namelyof gill net, cast net, drag net and immediatelyphotograph were taken using camera fishes brought to Laboratory were present in 10% formal in solution in separate specimen are according to species. Small fishes were directlyplaced in the 10% formalin solution while large fishes were given an incision in their abdominal and preserved. The morphological character were measured and fishes were identified up to the species with helps of standard key and bood 02138 and Jhingren (1991) various system of classification of fishes have been propounded Gunther (1959-1870) day (1878-1889), Jordan (1923) Regan (1929) Berg (1940), Romer (1959) Greenwood (1966) .

III. RESULT AND DISCUSSION

TableNo.1fishfaunaldiversityofHangarga(Tul.)WaterTank(Jan.2023to Dec. 2023)

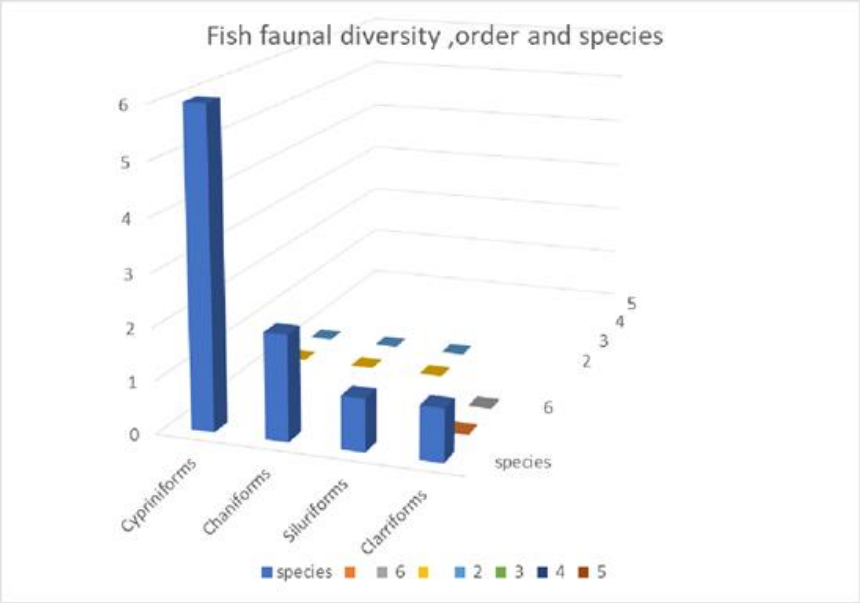
Sr. No.	Order	Family	Species	Status
1	Cypriniforms	1. Cyprinidae	1. Catla–Catla	+++
			2. Labeo–rohita	+++
			3. CirrhinaMrigala	+++
			4. SilverCarp	++
			5. GrassCarp	+
			6. PantiusChola	+

2	Channiformes	2. Channidae	1. ChannaMarulius 2. ChannaStriatus	++ ++
3	Siluriforms	3. Siluridae	1.Wallagoattu	+
4	Clarriformes	4. Clarridae	1.ClariusBatrachus	+

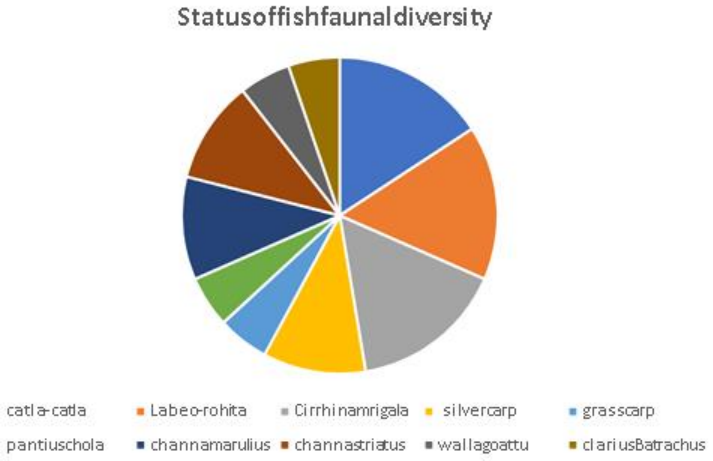
+++-Mostabundant,++Abundant,+Lessabundant

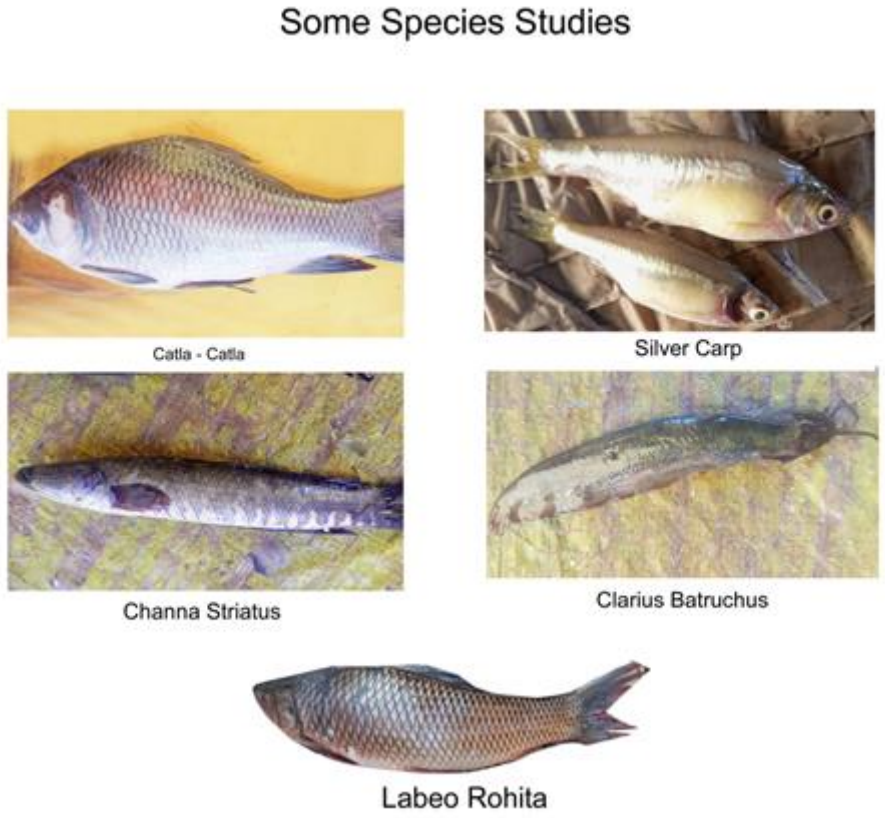
In the present fish faunal study 10 species of 04 order 04 families were recorded from Hangarga (Tul.) Water tank. The member of order cypriniformes were dominant by 06 species followed by channiform 02 species siluriformes 01 species and clarriformes 01 species.

Graphno-1 Graphicalstudyoffishfaunaldiversity inHangarga(Tul) water tank,Dist.Dharashiv(Jan2023 to Dec 2023



Graphno-2Graphicalstatusoffishfaunaldiversity inHangarga(Tul) water tank,Dist.Dharashiv(Jan2023 to Dec 2023





Family cyprinidae was dominant with 06 species in assemblage composition in which catla-catla, Labeo -rohita and cirrhina mrigala were found most abundant, sivler carp were found in abundant and grass carp, pantius chola were found in less abundant. Family channidae 02 species found in abundant from channa marulius and channa striatus, family siluridae 01 species wallago attu and family clarridae 01 species from clarias Batrachus found in less abundant shown in Table No. 01. & Graph no1,2

Local fisherman fishing operation throughout the year but fishing operation was found to be low catches in rainy season as compared to high in past monsoon andsummer season.

In some study of fish faunal of the Koyana River Western Ghats, India (Jadhav et.al 2011) they were recorded 16 family 35 geners 58 species from river. S.R. Rathod et.al (2012) studies on fresh water fishes in Godavari River at Basar Dist. Adilabad, India's they were recorded 17 fish species representing by 5 orders, 06 family inGodavari River.

The Hangarga (Tul.) water pollution is occurring here the water quality is not good for fish species. This work will provide future strategies for development and fish fauna conservation in Hangarga (Tul.) water tank. It was concluded that future studies may be done to development technique for fish culturing in Hangarga (Tul.) water tank.

IV. ACKNOWLEDGEMENT

The authors are thankful to Principal Dr. Umakant B. Chanshetti, Jawahar A.S.C.College, Anadur Tal. Tuljapur, Dist. Dharashiv and Principal Dr. D.R. Kulkarni Zoology Research Centre Shrikrushna Mahavidyalaya Gunjoti. for providing faciality Library and Laboratory.DR.BabasahebResearchandTrainingInstitute(BARTI),Puneforproviding

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Morphological Study of Hibiscus Panduriformis Burm. F. From Marathwada Maharashtra

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

20-27

ABSTRACT

The genus Hibiscus L. is belongs to Malvaceae family Available throughout India. There are 11 species are found in Marathwada (flora of marathwada by V.N. Naik). The present work is aim to study, Analyze and collect data of Hibiscus panduriformais Burm. f. from Marathwada Maharashtra through morphological study and to observe variation according to climate and geographical area with respect to old taxonomic study.

I. INTRODUCTION

Malvaceae (cotton or mallow), is a family of flowering plants estimated to contain 244 genera with 4225 known species. The largest genera's in terms of number of species include Hibiscus with 300 species, Sterculia with 250 species, Dombeya 250 species, Pavonia 200 species and Sida 200 species. Genus Hibiscus includes annual and perennial herbaceous plants, as well as woody shrubs and small trees several species are widely cultivated as ornamental plants, notably Hibiscus syriacus and Hibiscus rosa-sinensis etc

Hibiscus L. genus is quite large comprising several hundred species that are native to warm temperate, subtropical and tropical region throughout the world. Species are renowned for their large showy flowers and are commonly known as rose mallows or rose of Sharon and tropical Hibiscus.

Ecology:

Hibiscus panduriformis Burm.f. Commonly called "Yellow Hibiscus" in English, "Van Bhendi" or "Kastur Bhendi" a species of flowering plant in Malvaceae.

It is native to tropical Africa, Madagascar, Yemen, the Iindian Subcontinent and Myanmar. In india Andhra Pradesh, karnataka, Maharashtra, Madhya Pradesh, Rajasthan, Tamilndu, West Bengal.

This plant usually found on bunds farms, near ponds, streams. usually it is considered as weed. flowering and fruiting season is from October to February or March. it is distributed in all districts of Marathwada Maharashtra.

Hibiscus panduriformis Burm. f. Fl. IND. 151.1768; Mast. in Hook. f. Fl. Brit. india 1:338.1874; Borssum in Blumea, 14:79. 1966; Rakshit and Kundu in Bull. Bot. Surv. India 12:172; Naik, Fl. Osmanabad 53.1979; Paul & Nayar in Fasc. Fl. Ind. 19:142.1990.

Classification:

Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots Clade: Rosids
Order: Malvales
Family: Malvaceae
Genus: Hibiscus
Species: H. panduriformis

Synonyms:

Abelmoschus panduriformis Hassk.
Hibiscus friesii Ulbr.
Hibiscus mollis Zipp. ex Span.
Hibiscus multistipulatus Garcke
Hibiscus senegalensis Guill. & Perr.
Hibiscus setosus Wall.
Hibiscus stipularis Salisb.
Hibiscus tubulosus Cav.
Hibiscus velutinus DC.
Parita panduriformis (Burm.f.) Scop.
Triplochiton setosa Alef.

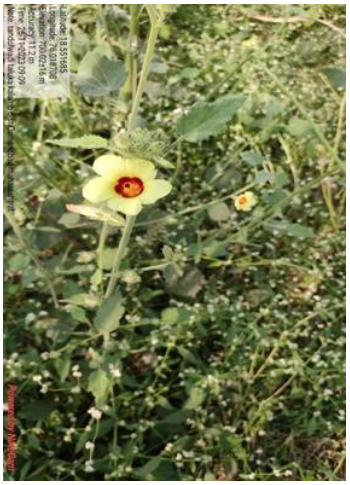

Figure 1 Plant Body

II. MATERIALS AND METHOD

- **Exploration and Collection of plant material:** Hibiscus panduriformis Burm. f. collected from Beed, Osmanabad district through survey and field visits.
- **Description:** The collected plant specimens (fresh/dried) is described in routine morphological terminology along with the morpho-variation.
- **Identification/Nomenclature:** The described plant specimen isidentified using the relevant taxonomic literature.
- **Drying, pressing and Herbarium preparation:** The collected plant specimens is properly dried, using a routine plant press and blotters.
- **Classification:** The identified and named taxa is arranged as per the classification proposed by the latest classification. The taxonomic tool like keys will be prepared accordingly.
- **Field photography:** All the species of the genus Hibiscus in Marathwada will be photographed for facilitating their identification.

Qualitative characters of Hibiscus panduriformis Burm. f.

Sr.No	Character	Qualitative Character	Expression
1	Root	Type of Root	Tap root Primary root Secondary root
2	Stem	Stem TypeShape Stem surface Branching	Aerial erect woodySolid, cylindrical Green, Hairy(prickly stellatehairs Branched
3	Leaf	Bearing of leaf Phyllotaxy Type of leaf Attachment of leaf Shape of leaf Margin of leaf Apex of leaf Surface Venation	Cauline and Ramal Alternate Simple Petiolate Ovate-cordate Serrate Acute Hairy,pubescent Reticulate multicostate.

4	Inflorescence	Type of inflorescence	Axillary, solitary raceme
5	Flower	Bract Attachment of flower Presence of floral whorls Symmetry Presence of reproductiveorgans Position of thalamus Arrangement of floral organ	Bracteate Pedicellate Complete Actinomorphic Hermaphrodite (Bisexual) HypogynousCyclic
		Color	Yellow
6	Calyx	Cohesion Aestivation Duration Color	Gamosepalous Valvate Persistent Green
7	Corolla	Cohesion Aestivation Color	Polysepalous Twisted Yellow brown at base.
8	Androecium	Cohesion Attchemnt	Monadelphous Basifixed
9	Gynoecium	Cohesion of carpels Position of ovary Placentation	Syncarpous Superior Axile
10	Fruit	Type	Dry dehiscent (Capsule)
11	Seed	Shape Texture color	Triangular or kidney shape Hairy Brown

Figure 2 Bud

Figure 3 Flower

Figure 4 Leaf

Figure 5 Stem

Figure 6 Undehisced Fruit

Figure 7 Dehisced Fruit

Figure 8 Seeds

Quantitative characters of Hibiscus panduriformis Burm. F

Sr.no	character	Quantitative character	Expression
1	Root	Length Diameter	_ _
2	Stem	Length Diameter Length of internode	About 2-3 m. 2-5 cm.8- 10cm.
3	leaf	Length Width Length of petiolStipule	5-10 cm. 6-12cm. 5-12 cm. 2-3
4	Inflorescence	No of flower	1
5	Flower	Length Length of pedicelNo. of Epicalyx	4-6 cm. 0.5 cm8- 10
6	Calyx	Length of sepals Number of sepalsWidth	1-.15 cm. 5 0.3-0.5 cm.
7	Corolla	Length of petals Number of petalsWidth	2-5cm. 5 2-3cm.
8	Androecium	No. of stamens Length	Numerous 15-25 mm.

9	Gynoecium	No. of carpels	5
10	Fruit	Size	1.5-2 cm

III. RESULT AND DISCUSSION

The region of Marathwada has vegetation and Distribution of Hibiscus panduriformis Burm. f. from genus Hibiscus of Malavaceae family.

The present work is done in beed & Osmanabad districts through Morphological study to collect data according to the climate and geographical area. Qualitative and Quantitative characters may vary as compare to other districts from Marathwada Maharshtra.

The current survey states that the variation in the climatic and geographic condition also changes the flowering and fruiting period of the species and their number from the study area

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Influence of Different Culture Media On Growth and Phycobilin Content in A Cyanobacterium Lyngbya Bipunctata Lemm

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
28-34

ABSTRACT

A cyanobacterium Lyngbya bipunctata was isolated from the collected soil samples from different locations of Ahmednagar district of Maharashtra state (India). Identification was carried out using morphological variation and taxonomical approaches according to Desikachary. The axenic culture of Lyngbya bipunctata was obtained in the laboratory. For the biomass production, different culture media were used namely BG-11, Fogg's medium, Allen and Arnon medium, Zarrouk's medium and CFTRI medium. The biomass was harvested by filtration through double layered muslin cloth and dried using air blower. After harvesting, the biomass obtained was weighed in terms of grams. Phycobilin pigments were estimated by following the method described by Bennett and Bogorad. Out of the different culture media used, BG-11 medium supported the growth of Lyngbya bipunctata properly as compared to other media used. Phycobilins content was found to be more in Lyngbya bipunctata grown in Fogg's medium followed by BG-11 medium.

Key Words- Lyngbya bipunctata, Phycobilins, BG-11, Fogg's medium, Allen and Arnon medium, Zarrouk's medium and CFTRI medium.

I. INTRODUCTION

Cyanobacteria previously called blue–green algae (BGA) are morphologically diverse group of phototrophic prokaryotes, which occur in almost every habitat on earth and useful to mankind in various ways [1]. They possess a vast potential resource in varied applications such as fuel, fertilizer, food, feed, medicine, industry and in combating pollution [1]. Until past few decades of research, cyanobacteria were of academic interests and were mostly ignored as nuisance but, now are proved as potential organisms for much biotechnological utilization [2,3,1]. The interest in these organisms as generators of pharmacologically active and industrially important compounds has been stimulated by recent results [4]. The carbohydrates produced by cyanobacteria

have important commercial uses. Since carbohydrates are non-toxic, they are desirable and used in the food industry [5]. Carbohydrates are frequently used in dietary additives for poultry and aquaculture farming [6].

A large number of marine nitrogen-fixing cyanobacteria have been tested for their nutritional value with the hybrid *Tilapia* fish fry [7]. Thajuddin and Subramanian (2005) reported that the marine cyanobacterium *Phormidium valderianum* BDU 30501 has shown to serve as a complete aquaculture feed source, based on the nutritional qualities and non-toxic nature with animal model experiments. Several micro algae such as *Chlorella*, *Scenedesmus* and *Coelastrum* have been established as good quality protein sources [8]. The main advantage of these species is their high protein content; therefore, they are used as food supplements. They also present great benefits to human health due to their antioxidant properties, their role as activator of cell regeneration, and their positive effect on kidney and memory problems [9].

Cyanobacteria possess all the known phycobilin pigments such as phycocyanin, phycoerythrin, Phycoerythrocyanin and allo-phycocyanin. Among them, Phycocyanin and phycoerythrin are commerciality valuable. Linablue, a phycocyanin product from Dainippon Ink and chemicals Inc., Japan is an odorless, non - toxic blue powder and used for coloring candy, ice-cream, dairy products and soft drinks [10]. Phycoerythrin from *Spirulina* and other cyanobacteria is used as a food colour for products like ice-cream [11]. Algae are rich in sugars/fiber, proteins/peptides, lipids/fatty acids, minerals and vitamins. They are also abundant sources of secondary metabolites such as polysaccharides, sterols, tocopherols, terpenes, polyphenols, phycobilins and phycobiliproteins (PBPs). These compounds have been shown to possess antioxidant, anticancer, anti-inflammatory, antihypertensive, anti-hyperlipidemia, immunomodulatory, neuroprotective, antiviral and antimicrobial activities [12,13,14]. C-PC is among the most studied PBPs because of its various biological and pharmacological properties [14]. Grover et al. (2021)[15] presented that C-PC exhibited immunomodulatory activities by suppressing the synthesis of pro-inflammatory cytokines, interferon-γ (IFN-γ), and tumor necrosis factor- α (TNF-α) in a dose-dependent manner in Balb/c mice.

Apart from the use of phycobilins as food grade dyes, they are also used as tools for basic research and medical diagnostics. They are used in fluorescence microscopy and fluorescence immunoassays [16,17]. Phycocyanin, the major phycobiliprotein also exhibited anti-cancer activity, stimulation of immune system and ability to treat ulcers and haemorrhoidal bleeding [2]. The present study was carried out for the estimation of growth and phycobilins content in *Lyngbya bipunctata* in different culture media.

II. METHODOLOGY

Method of collection-The soil samples from 5-10 cm deep soil layers were collected using the scalpels. Soil samples were collected in polythene bags of size 6 x 4 inches.

Isolation of cyanobacterial species-The dry soil samples were spread in petri dishes and moistened with sterilized distilled water and cultures were incubated in light. When the visible growth of cyanobacteria began to appear in the cultures, these cultures were used for the isolation of unialgal cultures of *Lyngbya bipunctata*.

Identification of the algal samples - Morpohometric studies were carried out by using ocular and stage micrometer. The identification of *Lyngbya bipunctata* was carried out using monograph and keys of Desikachary (1959) [18].

Nutrient media-The different culture media namely BG-11[19]; Fogg's medium [20, 21]; Allen and Arnon's medium [22]; CFTRI medium [23] and Zarrouk's medium [24] were used for the rich growth of *Lyngbya bipunctata*. These media were separately used in different sets.

Biomass production-For production of biomass, glass bottles (300 mL capacity) were used. The bottles were filled with 100 mL medium and autoclaved. The inoculum was ground in the sterile mortar and pestle in laminar air flow. Then the bottles were inoculated with 5 mL of unialgal suspension of *Lyngbya bipunctata* and labeled properly. All the cultures were maintained in the culture room at temperature 28±2°C under 8-h light/16-h dark photoperiod with a photosynthetic photon flux density of 40 $\mu moles^{-2}S^{-1}$ provided by cool white fluorescent tube lights. After harvesting, the biomass obtained was subjected to the growth and proteins analysis.

Estimation of phycobilins

Phycobilins were estimated by following the method described by Bennett and Bogorad (1973) [25]. Two mL cell suspension was centrifuged at 4500 rpm for 10 minutes and pellet of algal biomass was used for the estimation of total phycobilins. The pellet of biomass of *Lyngbya bipunctata* was blotted with filter papers to remove maximum quantity of water from it. The pellet thus dried was homogenized in 100 µl glycerol and placed in the dark for 3 hours. After the contents were mixed, 5 mL of 10 % ammonium sulphate containing 1mL of 3 mM sodium azide and 1mL of 10 mM Na_2EDTA [26]. The resultant cell suspension was sonicated for 10 minutes and then centrifuged at 4500 rpm for 10 minutes. Absorbance of the supernatant solution was determined at 565 nm, 620 nm and 650 nm on UV Visible spectrophotometer (Systronics, India; model 2202). The amounts of phycoerythrin, phycocyanin and allophycocyanin were calculated by using following equations (Bennett and Bogorad, 1973).

A. Amount of Phycoerythrin (PE)

$= A_{565}\text{-}2.8\,[PC]\text{-}1.34\,[APC]$ mg $ml^{-1}/12.7$

B. Amount of Phycocyanin (PC),

$= A_{620}\text{-}\ 0.7\times A_{650}$ mg $ml^{-1}/7.38$

C. Amount of allophycocyanin (APC)

$= A_{650}\ 0.19\times A_{620}$ mg $ml^{-1}/5.65$

Where, A_{565} = Absorbance of supernatant solution at 565nm,

A_{620} = Absorbance of supernatant solution at 620 nm,

A_{650} = Absorbance of supernatant solution at 650nm.

D. Sum of PE, PC and APC gives content of total phycobilins.

Amount of Phycobilins are expressed as % of dry weight basis.

III. RESULT

Out of the different culture media used, BG-11 medium was found suitable for the growth of *Lyngbya bipunctata* as compared to other media used. Allen and Arnon medium also supported growth but after 20 to 25 days, photo bleaching of biomass was observed. Other nutrient media, such as Fogg's medium and Zarrouk's medium supported the growth of *Lyngbya bipunctata* but the growth rate was very slow.

Yield of biomass is one of the direct measures of quantity of biomass produced per unit area within a specific time. Higher yield indicates higher biomass produced per unit area. Comparison of growth of *Lyngbya*

bipunctata in different media showed that highest biomass per bottle in terms of fresh and dry weight was produced in BG-11 medium followed by Allen and Arnon medium. The phycobilins content was found to be more in the *Lyngbya bipunctata* grown in Fogg's medium followed by Allen and Arnon medium. CFTRI and Zarrouk's medium showed poor response for the phycobilins content as compared to other media.

Table-1. Influence of different media on growth and phycobilins in *Lyngbya bipunctata*

S. N	Medium	Fresh wt. (g)	Dry wt. (g)	Phycobilins %
1	BG-11	1.80±0.09a	0.17±0.00[a]	5.35±0.06[b]
2	Allen & Arnon	1.64±0.02b	0.15±0.03[b]	4.55±0.06[c]
3	Fogg's Medium	1.17±0.07d	0.09±0.01[c]	5.90±0.06[a]
4	Zarrouk's Medium	1.13±0.00d	0.10±0.00[c]	4.71±0.11[c]
5	CFTRI	1.37±0.01c	0.10±0.00[c]	3.65±0.07[d]

Values are mean ±SE of three independent experiments.

Cyanobacteria are photoautotrophic bacteria and require all the essential major and minor elements. The heterocystous cyanobacteria fix atmospheric nitrogen and they can use atmospheric nitrogen as a source of nitrogen. In bottles, the medium does not come in contact with atmospheric nitrogen and the source needs to be added in the culture medium. If the culture medium is devoid of nitrogen, it results in poor growth of cyanobacteria. Similar results in different cyanobacteria were reported by Olatz (1991) [27]. Medium lacking nitrogen source, results in yellowish green color of the cells which is a characteristic of nitrogen deficiency. In the culture methods like photo- bioreactors, pure nitrogen is continuously bubbled into culture medium, [28, 29, 30] so that cultures do not get affected due to nitrogen deficiency.

IV. DISCUSSION

The growth of *Lyngbya bipunctata* was more in BG-11 medium than in other media. For optimum growth of cyanobacteria, appropriate Ka^+: Na^+ ratio is required in the cytoplasm. Adequate Na^+ is required by nitrogen fixing cyanobacteria for conversion of molecular nitrogen into ammonia [31]. BG-11 medium consists moderate concentration of Na^+ and in Allen and Arnon medium, Zarrouk's medium and CFTRI medium, there is high concentration of Na^+ while in Fogg's medium; there is no Na^+ source. *Lyngbya bipunctata* is from moist soil habitat, which may not require high concentration of Na^+ ions in the medium.

Influence of culture media on phycobilins

Phycoerythrin

The percentage of phycoerythrin was affected by the composition culture media. In all the media used, phycoerythrin was found to be highest in the Fogg's medium in *Lyngbya bipunctata*. The highest amount of phycoerythrin 1.78 % was produced in *Lyngbya bipunctata* cultured in Fogg's medium. CFTRI medium supported poorly for the production of phycoerythrin as compared to other media used.

Phycocyanin

The amount of phycocyanin varied from medium to medium. Fogg's and Allen and Arnon media were found to be the best media for the accumulation of the phycocyanin content in *Lyngbya bipunctata* species. The highest phycocyanin content was found in *Lyngbya bipunctata* cultured in Allen and Arnon medium and lowest 1.35 %

in in CFTRI medium. The quantity of phycocyanin produced in different media was found in between the range of 2.30-1.31%. In Allen and Arnon medium the content was fount 1.44 %. There was a production of average amount of phycocyanin in other culture media.

Allophycocyanin

Maximum allophycocyanin content was found in the Fogg's medium followed by the Allen and Arnon medium. Other media showed poor response for the allophycocyanin content. The maximum quantity 2.38 % was occurred in in Fogg's medium and 1.72 % cultured in Allen and Arnon medium. There was an accumulation of less amount of allophycocyanin in in CFTRI medium.

Fogg's medium was found superior for the total phycobilins content in *Lyngbya bipunctata* species studied followed by BG-11 medium. CFTRI medium shows very poor response for the total phycobilins content in *Lyngbya bipunctata* species studied. Composition and pH of the medium also affect the content of phycobilins and there is change in the colour of culture of *Lyngbya bipunctata*. The production of phycobilins is greatly affected by the pH. This indicates the inability of the cyanobacteria to maintain a constant internal pH [32].

V. CONCLUSION

There is an effect of different culture media on growth. It may be because of either composition of culture medium or pH value. The percentage of phycobilins also changed in various culture media used. BG-11 culture medium was found suitable for the proper growth and production of biomass. BG-11 and Fogg's media can be efficiently used for commercial production phycobilins pigments in a cyanobacterium *Lyngbya bipunctata.*

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

35-40Medicinal Plants: Future Source of New Drugs

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
35-40

ABSTRACT

Medicinal plants have a specific quality and can be used to treat a multitude of ailments and diseases. Medicinal plants like aloe, turmeric, Tulsi, pepper, elaichi, and ginger are commonly used in a number of Ayurvedic home remedies and are considered to be the best aids in fighting ailments related to the throat and skin. As a rich source of nutrients, antibacterial, and antioxidant properties, Ayurvedic herbs are non-toxic in nature, and so the products or remedies made using them are often recommended for their high therapeutic value. many of them are used by traditional healers and Ayurvedic practitioners. The tribunal and rural population depend upon such medicinal plants for medication. Such traditional medicinal plants research is an important source of potential use of the basic chemical compounds directly as chemotherapeutic agent, or it can be used in the production of chemotherapeutic drugs the present study includes 55+ medicinal plants present in Marathwada region

The list of Medicinal Plant is developed by Family, Common Name, Botanical Name, Uses of Recorded plants were authenticated by using standard literature like Floras and Books

Key words- Medicinal plants, Ayurveda, Home remedies,

I. INTRODUCTION

The traditional system of medicine in India dates back to the age of the Rigveda (2500to 1600B.C.) Ayurveda is the Indian indigenous system of medicine dating back to the Vedic period. The term Ayurveda means the Science of Life. The entire system of ancient Indian medicine is based on the relationship between man and Nature. With the development of science, many new drugs of synthetic origin have come into existence, and with the rapid growth of the pharmaceutical industry, the value and use of herbal medicines have declined in the recent past. The importance of Ayurveda holds true in today's life as it is based on the principle of bringing us close to nature and relying on its natural powers to cure us and keep us healthy without any side effects. Ayurvedic medicines and products today have become a symbol of safety in contrast to synthetic drugs that are

considered unsafe and hazardous to overall health One way of understanding the fundamentals of Indian Ayurveda is to spend more time with nature and observe the plants and herbs. Each plant or herb has a specific quality and can be used to treat a multitude of ailments and diseases. Medicinal plants like aloe, turmeric, Tulsi, pepper, elaichi, and ginger are commonly used in a number of Ayurvedic home remedies and are considered to be the best aids in fighting ailments related to the throat and skin. As a rich source of nutrients, antibacterial, and antioxidant properties, Ayurvedic herbs are non-toxic in nature and so the products or remedies made using them are often recommended for their high therapeutic value. Treatment with herbal medicinal plants also holds a strong ground because these plants are safe and have no side effects. Since they are in sync with nature, they hold a greater advantage over chemically treated products and synthetic medicines. As opposed to other drugs and medicines Ayurvedic herbs are known to treat the diseases from the root and thus aid in keeping you healthy and fit overall Apart from medicinal use, Ayurvedic herbs can also be used for purposes like pest control, natural dyes, and formulation of food items, teas and perfumes, among others. If we look at various research from across the world, a sudden spurt in cases of people turning to natural herbs for treatments and usage in everyday life has gone up significantly. Going back to the basics, people have realized the threat chemically treated products pose to their life and are rightly so adopting healthier ways of life by including Ayurveda and its principals as the mainstay of their life.

Sr.No.	Common Name	Botanical Name	Family	Medicinal Uses
1	Adulsa	Adhatoda vasica Nees	Acanthaceae	Cough, Asthma, Bronchitis
2	Ananas	Ananas comosus	Bromaliaceae	Sore Throat, Diabetes, Heart Disease, Obesity
3	Babul	Acacia arabica Willd	Mimosaceae	Oral Care, Bleeding Gums, Wounds
4	Kalmegh	Andrographis paniculate Nees,	Acanthaceae	Indigestion, Acne, Diarrhoea
5	Lahsun	Allium sativum	Amaryllidaceae	Ringworm, Dysentery, Wounds
6	Vridhadaru	Argyreia speciosa Sweet	Convolvulaceae	Diabetes, Skin Diseases, Wounds
7	Agarkasth	Aquilaria agallocha Roxb	Thymelaceae	Bed-Wetting, Incontinence of Urinary Bladder
8	Ankol	Alangium salvifolium	Cornaceae	Traditionally used in Snakebite, Scorpion Bite, Dog Bite
9	Badi Elaichi	Amomum subulatum Pennel	Zingiberaceae	Bronchitis, Asthma, Appetizer, Digestant
10	Aghada	Achyranthes aspera	Amaranthaceae	Indigestion, Cough, Asthma, Liver health
11	Kanghi	Abutilon indicum	Malvaceae	Nervine tonic, Joint Disorders, Increases Strength
12	Neem	Azadirachta Indica A. Juss	Meliaceae	Skin health, Eye Disorders, Bloody Nose, Intestinal Worms

13	Onion	Allium cepa Linn	Amaryllidaceae	Prostate health, Digestive,
14	Shataveri	Asparagus racemosus Willd	Liliaceae	Infertility, Uterine health, Improves Lactation
15	Ulatkambal	Abroma augusta	Sterculiaceae	Gynaecological Problems, Irregularity In Periods
16	Yavasa	Alhagi camelorum	Fabaceae	Rheumatism, Vomiting, Stomach-ache, Constipation
17	Akarkara	Anacyclus pyrethrum	Asteraceae	Toothache, Dryness of The Mouth, Throat, Catarrh,
18	Bael	Aegle marmelos Corr.	Rutaceae	Dysentery And Diabetes, Coolant, Gut health
19	Korphad	Aloe vera Linn	Liliaceae	Ulcers, Burn Injuries, Jaundice, Acne, Women's health
20	Gunj	Abrus Precatorius	Fabaceae	Joint Pains, Fungal skin infections, Alopecia
21	Shiris	Albizia lebbeck (Linn) Benth	Fabaceae	Bronchial Asthma, Detoxification
22	Bach	Acorus calamus	Acoraceae	Flatulent Colic, Atonic Dyspepsia, Ulcers
23	Saptaparni	Alstonia scholaris	Apocynaceae	Skin Ulcers, Fever, Increasing Lactation
24	Kadirkasth	Acacia catechu Willd	Fabaceae	Skin & Respiratory Problems, Oral Hygiene, Astringent
25	Meetha Vish	Aconitum ferox	Ranunculaceae	Fever, Diuretic Action, Arthritis
26	Atees	Aconitum heterophyllum Wall	Ranunculaceae	Fever, Respiratory Diseases
27	Supari	Areca catechu Linn	Palmae	Obesity, Hyperlipidaemia, Diabetes, Irregular Menstruation
28	Jimikand	Amorphophallus campanulatus	Araceae	Dysentery, Piles, Haemorrhoids
29	Kulanjan	Alpinia galanga	Zingiberaceae	Flatulence, Dyspepsia, Vomiting, Motion sickness, Catarrh
30	Brahmi	Bacopa monniera Pennel	Scrophulariaceae	Enhances Memory, Anxiety
31	Punarnava	Boerhaavia diffusa	Nyctaginaceae	Anaemia, Liver Diseases, Wounds, Kidney health
32	Palasha	Butea monosperma Kuntze	Fabaceae	Complexion of Skin, Worm Infestations, Roundworm
33	Vajradanti	Barleria prionitis Linn	Acanthaceae	Strengthens Teeth, Useful in Fever, Catarrh

34	Bhojpatra	Betula utilis D. Don	Betulaceae	Wounds, Obesity
35	Shalai Guggul	Boswellia serrata Roxb.	Burseraceae	Joint Pains, Headache, Diabetes
36	Dhaniya	Coriandrum sativum Linn	Apiaceae	Useful in Indigestion, Flatulence, Controls Spasmodic Pain
37	Nagarmotha	Cyperus rotundus Linn	Cyperaceae	Fever, Diabetes, Solar Dermatitis, Hair tonic.
38	Malakangini	Celastrus paniculatus Willd	Celastraceae	Muscle Cramps, Backache, Osteoarthritis, Hair care
39	Ketaki	Costus speciosus (Koeing) Sm.	Costaceae	Obesity, Hyperlipidaemia, Diabetes
40	Mandukparni	Centella asiatica Urban	Apiaceae	Improves memory, Brain health, Hair care,
41	Amaltas	Cassia fistula Linn	Fabaceae	Mild laxative, Ulcers, Wounds
42	Senna	Cassia angustifolia Vahl	Fabaceae	Laxative, Constipation, Irritable Bowel Syndrome, Weight Loss
43	Bharangi	Clerodendron serratum Moon	Verbenaceae	Common Cold, Chronic Sinusitis, Allergic Rhinitis
44	Guggul	Commiphora mukul Engl	Burceraceae	Joint Disorders, Heart Diseases, Hypolipidemic
45	Patha	Cissampelos pareira Linn	Menispermaceae	Ulcers, Sinuses, Skin Diseases, Poisonous Bites
46	Dalchini	Cinnamomum zeylanicum Breyn	Lauraceae	Antibacterial, Antiseptic
47	Tamalpatra	Cinnamomum tamala Nees	Lauraceae	Diabetes, Digestion, Cold
48	Varun	Crataeva nurvala Buch-Ham	Capparaceae	Kidney Stones, Bladder Stones Prostate health
49	Shalparni	Desmodium gangetium DC	Fabaceae	Analgesic, Anti-Inflammatory
50	Elaichi	Elettaria cardamomum Maton	Zingiberaceae	Nausea, Vomiting, Dry Cough
51	Amla	Emblica officinalis Linn	Euphorbiaceae	Antioxidant, Antistress, Constipation, Fever
52	Mulethi	Glycyrrhiza glabra Linn	Fabaceae	Digestive Disorders, Ulcers, Bronchitis, Skin health
53	Tulsi	Ocimum sactum Linn	Lamiaceae	Indigestion, Heart health, respiratory diseases
54	Chitrak	Plumbago zeylanica Linn	Plumbageniaceae	Arthritis, Skin Diseases, Menstrual

				Disorders, Obesity
55	Pippali	Piper longum Linn	Piperaceae	Asthma, Cough, Indigestion
56	Ashok	Saraca indica	Fabaceae	Menstrual Irregularities, Uterine Stimulant
57	Ashwagandha	Withania somnifera Dunal	Solanaceae	Stress Tolerance, Immunity, Joint Pains, Skin health

Benefits & Importance of Medicinal Plants

Ayurvedic herbs are time tested for their health and other benefits. The nutritive value that they pack are highly recommended for their healing powers. Known to induce no side effects, they have a unique aroma and flavour and when consumed regularly, they act as a perfect mechanism to bring about a balanced harmony between mind and body. They rejuvenate the whole system instead of focusing on one specific organ or body part.

- They have a holistic approach and aid in proper absorption and digestion.
- They are not disease specific but act as a preventive medicine that positively effects the overall health and well-being by boosting the immune system.
- They are at par with allopathic medicines and are at times known to be effective in treating diseases like cancer and autoimmune diseases.
- They are self-contained and nutritive holistic in nature, therefore, are non-toxic and harmless.
- It deals with the overall well-being and aims to bring harmony between mind, body and soul.
- Several metabolic and chronic conditions can be treated without any side effects using Ayurvedic medicines and treatments.

Ayurvedic Herbs/Spices & Their Medicinal Values

- Ayurvedic Herbs and spices such as black pepper, cinnamon, aloe, sandalwood, ginseng, red clover, burdock, bayberry, and safflower are used to heal the wounds, sores and boils.
- To reduce fever and the production of heat caused by the condition, certain antipyretic herbs such as Chirayta, black pepper and sandal wood are recommended.
- Sandalwood and Cinnamon are great astringents apart from being aromatic. Sandalwood is especially used in arresting the discharge of blood, mucus etc.
- Ajwain, Amalaki, Aswatha etc., serve as antacids and are recommended for healthy gastric acid flow and proper digestion
- Herbs like Cardamom and Coriander are renowned for their appetizing qualities. Other aromatic herbs such as peppermint, cloves and turmeric add a pleasant aroma to the food, thereby increasing the taste of the meal.
- Herbs like Aloe, Sandalwood, Turmeric, Sheetraj and Khare Khaskhas are commonly used as antiseptic and have extremely high medicinal values.
- Camomile, Basil, Cardamom, Ginger, Peppermint and Coriander are known to promote blood circulation in the body and keep the heart healthy.

II. CONCLUSION

Ayurvedic system of medicine is one of the age-old practices and humans have postulated and ultimately established this system, in particular, the usage of medicinal plants through empirical observation and by trial and error experiment. Even in the era of modern computational pharmacology approach, traditional medicinal plants serve as an important source and as a tool to treat various ailments in the developing countries.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Soil-Less Farming : A Need of Future Era

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
41-43

ABSTRACT

The soil-less agriculture can be defined as soil less cultivation represent a valid opportunity for the agricultural production sector. According to the 2019 Global Agricultural productivity Report, global productivity is currently only growing at an average annual rate of 1.63 %. It will need to increase to at least 1.73% to sustainably produce food, feed, fiber and bio energy for the expected 10 billion people by 2050.

Soil-less farming processes a potential method of growing plants without the use of soil, in which the nutrients required to growth are supplied through other ways. Due to the increasing population, there is the need to address the challenges in food production by seeking alternative sustainable medium.

The agricultural production remains below potential due to several factors some of the problems of soil degradation, declining soil fertility, soil erosion, flooding, and desertification due to drought and climate change.

The research paper done on soil-less farming on mostly used secondary data available from already existing studies and research work.

KEY WORDS: Soil-less, Farming, global productivity, bio-energy, and desertification

I. INTRODUCTION

Soil is the infinite source of life; it is the most abundant used growing medium which contains the typical macro and micro nutrients which are important for the growth of plant and their development. These nutrients become available to the plant roots by means of mass flow, diffusion and root interception. Due to the climate change and intensive farming the fertile soil is rapidly disappearing. Presence of disease causing micro-organisms, unfavorable soil compaction and poor drainage, soil do poses serious limitations for plant growth (Beibel,J.P1960). In this critical era, soil less farming may change the face of agriculture by providing a more sustainable and productive alternative to traditional cultivation. Some places like metropolitan cities, crop growing soil is not available also there is difficulty to hire labor for conventional open field agriculture (Butler,

J.D and Oebker,N.F. 2006). In this critical era, soil less farming may change the face of agriculture by providing a more sustainable and productive alternative to traditional cultivation. This includes Hydroponic, Aquaponics and Aeroponics. The soil less farming may change can be accessed on various types of places such as balconies, roofs, greenhouses and lands unsuitable for cultivation. In order to obtain higher productivity and higher incomes, such kind of agriculture is operated under controlled conditions. Mainly leafy vegetables, Strawberries, fruits and ornamental plants are grown by these techniques. (Von Os et al.,2019).

Hydroponic and Aquaponics

Definition of hydroponic is the cultivation of plants without soil (Beibel, J.P. 1960). In hydroponic, plants are grown in an inert medium such as rocks or coco coir fiber, and they are fed a solution containing a perfected mix of primary, secondary and micronutrients. Almost any kind of plant can be grown hydroponically, including veggies, herbs, fruits and flowers (Kazzaz et.al,2017). It is one of the most favored, hi-tech production systems having the scope to expand to agriculture development in India.

Aquaponics is the practice of raising fish and plants in the same water source where fish actually provide the fertilizer for the plants and plant roots filter the water for the fish. Naturally occurring nitrifying bacteria convert the fish waste ammonia into nitrites and eventually nitrates, which is plant food. NASA has extensive hydroponics research plans in place , which will benefit current space exploration, as well as future ,long term colonization of Mars and Moon (Von Os et al.,2019). In space aquaponics benefits the potential for a larger variety of food, and it provides a biological aspect known as bio-regenerative life support system

Aeroponics

Aeroponics is the process of growing plants in an air or moist environment without using soil media. This is an alternative method of soil less culture in growth controlled environments. Aeroponics system refers to the method of growing crop with their roots suspended in a nutrient medium. Though the clogging issues can be even worse than drip systems the emitters have very tiny holes, the roots have ample oxygen which promotes faster growth. Herbs like Mint, Oregano, Sage, Basil and Rosemary. Tomatoes and green veggies like Lettuce and Kale are commonly grown by aeroponics. The system nourish plant with nothing more than nutrient -laden mist. The concept builds off that of hydroponic systems, in which the roots are held in a soilless growing medium, such as coco coir, over which nutrient -laden water is periodically pumped. In this system seeds are planted in pieces of foam stuffed into tiny pots, which are exposed to light on one end and nutrient mist on another. In addition to this aeroponics eco-friendly reputation is to grow large quantities of food in small places .The approach is mainly employed in indoor vertical farms which are common in cities .

II. DISCUSSION

Advantages of Hydroponic-

1. Crops using hydroponic can be grow where soil is unsuitable for traditional agricultural like desert areas.
2. Plant diseases are highly reduced due to absence of soil.
3. Hydroponic uses less than $1/10^{th}$ -$1/5^{th}$ of the water used in soil cultivation.
4. Bigger and higher yields are obtained.

Disadvantages

1. Initial costs to develop hydroponic system is higher.
2. Deeper knowledge and careful study along with skilled laboring is needed.
3. Needs more attention and small mistakes many lead to many losses.

Aeroponic Advantages

1. Crops are grown close together so more crops can be grown.
2. Plants are not exposed to soil disease or bacteria, so no pesticide is needed, which means healthier crops.
3. The crop mature faster, which means there will be more harvests.

Disadvantages

1. A lot of money is needed to set up an aeroponics farm.
2. Many consumers believe that aeroponically grown plants not as nutritious as other grown plants.
3. Maintenance of an aeroponics farm is very expensive.
4. Fruiting shrubs and trees are impractical in aeroponics system due to their size.

III. CONCLUSION

India now a day's is facing the effect of climate change, desertification, land degradation, flood, erosion, among other natural disasters is affecting the yields and productivity of farmers. soil less farming is the future farming with proven competitive points over soils-space saver, effective use of plant nutrients, water–efficiency, no weeds, fewer pests and plant diseases, higher and stable food. As it has a good potential the selection of soil less cultivation techniques that are simple, convenient, low in investment, low in cost and good in application will greatly promote soil less cultivation techniques in practice.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Study of The Snake Venom, Anti-Snake Venom & Potential of Snake Venom

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
44-52

ABSTRACT

Many active secretions produced by animals have been employed in the development of new drugs to treat diseases such as hypertension and cancer. Snake venom toxins contributed significantly to the treatment of many medical conditions. Venomous snakes have a bad reputation and rightly so because of their often deadly bites. But what makes a snake's bite so deadly is the venom. Of the 3000 snake species, just over 600 are venomous. Snake venoms are made up of hundreds of different types of peptides, enzymes, and toxins. Each individual snake produces its own specific venom. There are two main types of venom viz. hemotoxins and neurotoxins. Hemotoxins target the circulatory system. They prevent clotting compounds from functioning correctly, which causes uncontrollable bleeding. Neurotoxins target the central nervous system. They stop muscles from working, which leads to suffocation. Venoms that are composed of neurotoxins are particularly deadly, as the proteins within them are able to disrupt the channels that allow ions to flow across neuron membranes. When these communication channels are disrupted, entire body systems can crash, leading to immediate death. Medicines derived from hemotoxins are used to treat heart attacks and blood disorders. These drugs also lead to decreased incidence of stroke, kidney disease, heart failure, and diabetes. Medicines derived from neurotoxins are used to treat brain injuries, strokes, and diseases such as Alzheimer's and Parkinson's. Understanding the connection between the snake venom proteins and particular receptors could have a profound impact on the development of new treatments for diseases such as Parkinson's, Alzheimer's, and various pain disorders. An attempt has been made to review snake venom, which are anti-snake venom plants & potential of snake venoms.

Keywords: Snake venom, Anti-venom, Milking process.

I. INTRODUCTION

Snake bite is a public health hazard in India. In India on an average 250000 snake bites are recorded in single year. Based on their morphological characteristics including arrangement of scales, dentition, osteology, mycology, sensory organs etc., snakes are characterized into families. The snakes found in India show great biodiversity and their length varies from 6 mm to 10 mm, while weight ranges between few grams to several kilograms. Snakes occupied deserts, forests, marshy, swampy places, lakes, streams and rivers of difficult terrains. The families of venomous snakes are Atract aspididae, Elapidae, Hydrophidae and Viperidae. The major families in the India subcontinent are Elapidae which includes common cobra, king cobra and krait, Viperidae which includes Russell's viper, pit viper and saw-scaled viper and Hydrophidae (sea snakes) of the 52 poisonous species in India, majority of bites and consequent morbidity is attributable to 5 species viz. *Ophiophagus Hannah* (king cobra), *Najanaja*(common cobra), *Daboiarusellii*(Russell's viper), *Bungaruscaeruleus*(krait) and Echiscarinatae(saw-scaled viper)

Snake Venom

Snake venoms are secretion of venomous snake which are synthesized and which are stored in venomous gland. The glands which secrete the zootoxin is a modification of the parotid salivary gland and are situated on each side of head below and behind the eye encapsulated in muscular sheath. The glands have large alveoli in which venom is stored before being conveyed by the duct to the tubular fangs, through which it is injected. Snake venom is a combination of many different proteins, peptides and enzymes and they are generally not dangerous when ingested. Snake venoms are complex mixture of enzymatic and toxic proteins, which include phospholipase A2 (PLA2s), myotoxins, hemorrhagic metalloproteinases and other proteolytic enzymes, coagulant components, cardiotoxins, cytotoxins and neurotoxins.

Composition of snake venom

Snake venom consists of protein, enzymes, neurotoxins, coagulants, anti-coagulants and substances with cytotoxic effects. It has acidic pH. Specific gravity is 1.03 and is water soluble. Phosphodiesterase A2 causes hemolysis by lysing cell membrane of RBCs. Oxidases and proteases are used for digestion. Snake venom contains inorganic cations such as sodium, potassium, magnesium and small amount of zinc, nickel, cobalt, iron. Zinc is necessary for anticholinesterase activity. Calcium is required for activation of enzyme like phospholipase. Two major classification of toxins found in snake venom include neurotoxins (those which affect nervous system) and Cyto-toxins (those that attack cells).

Type of Snake Venom

Different species have different type's venom which depends upon its species, geographical location, its habitat, climate, age etc. There are three types of venom according to its effect viz. Haemotoxic, Cytotoxic & Neurotoxic.

1) Haemo-toxic venoms are one which affects cardiovascular system
2) Cytotoxic venoms targets specific cellular sites
3) Neuro-toxic venoms harm nervous system of human body.

Enzymes present in snake venom hydrolyze protein and membrane components which lead to tissue necrosis and blood clotting

Anti-venom

The only available treatment against snake bite is the usage of anti-venom. The first anti-venom was developed by Alberte Calmette against the Indian cobra (NajaNaja). Anti-venom is made by immunizing mammals such as horse, goat, rabbit with particular snake venom and the specific immunoglobins are isolated from the blood.
The subject animal will undergo an immune response to the venom, producing antibodies against the venom's active molecule which can then be harvested from the animal's blood and used to treat envenomation. Ant venom is classified into two types. Monovalent ant venom when they are effective against a given species venom. Polyvalent when they are effective against a range of species.

Snake Milking Process

1) Snakes can be milked according to a regular schedule, depending on the species. The interval between milking varies among producers and ranges from every 2 or 3 weeks to every 3 months.
2) For very dangerous species, the use of short-acting general anesthesia or moderate cooling (15°C) during milking can be considered (e.g. inhaled sevofluorane or sevoflurane, halothane or even carbon dioxide) as it reduces the risk of accidents both to the snake and to the snake-handler.
3) For the collection of venom, the snake's head is grasped between index finger and thumb, just behind the angle of the jaw, while the snake's body is held between the trunk and the arm of the snake handler.
4) By applying gentle pressure, the snake's jaws are forced open, the fangs exposed. The fangs are pushed through a plastic/parafilm membrane hooked over the lip of a glass vessel, and venom is squeezed out.
5) Any venom sample contaminated with blood should be rejected. After venom extraction, the fangs are carefully withdrawn from the collection vessel, while preventing damage to the mouth and dentition and avoiding the snake's impaling itself with its own fangs. After each venom milking, all materials used for milking should be sterilized with a flame, and then cooled with a draught of air before the next snake is milked.
6) During milking, the wearing of protective clothing and a mask as well as vinyl gloves is recommended to prevent any accidents or infections.

Stability of anti-venom

Liquid preparations have a shelf-life of up to 3 years at 2-8 °C, and freeze-dried preparations up to 5 years, when kept in the dark at room temperature. It is highly recommended that manufacturers perform stability studies to evaluate the possibility that their preparations could be stored for a long period under non-refrigeration (for instance at 30 °C). Real-time stability tests should be performed under the expected storage conditions of the anti-venom.

Storage of anti-venom

Anti-venom should be stored at a temperature within the range that assures stability, as found by stability tests. This is particularly critical for liquid formulations, which usually require storage at between 2 and 8 °C.

Table 1: Type of snakes found and their features

Type of Snake found	Features
1)Common Krait	I) Found all across India upto assam II) The venom of this snake is neurotoxic
2) Russel's Viper	I) Found all across Indian Subcontinent II) Its venom is haemotoxic
3) Saw Scaled Viper	I) Found across Indian Subcontinent except in West Bengal. II) Its venom is haemotoxic
4) Spectacled Cobra	I) Found across Indian Subcontinent except Northeast India II) Its venom is neurotoxic

The rapeutic role of Anti-venom

Many toxins from snake venom are investigated and formulated into drugs for the treatment ofconditions such as cancer, hypertension and thrombosis. Snake venom significantly lowers the blood pressure in human victims and experimental animals.

1. **Fibrinogenolytic and fibrinolytic activity**

Snake venom enzymes remove fibrinogen from the circulation without converting it to fibrin. Venoms with anticoagulant properties are extensively studied for possible medical applications. The drug Aggrastat (tirobifan) was developed from a compound in the venom of the saw-scaled viper (Echiscarinatus), and issued as an antiplatelet drug (glycoprotein IIb/IIIa inhibitors).

2. **Cardiotonic and antiarrythmic activity**

Shermann et al observed that Malayan pit viper venom has blood thinning properties and could be effective in treating stroke patients. Gomes et al identifies a non-protein micro molecular toxin from the Indian cobra. This toxin possesses antiarrhythmic properties at microgram level

3. **Anti-Cancer activity** Calmette et al investigated the use of cobra venom in the treatment of cancer in mice. In case of in vitro study, venom showed potent cytotoxic and apoptogenic effect on human leukemic cells (U937/K562) by reducing cell proliferation rate and produced morphological alterations

4. **Muscle depolarization & Hemolysis activity** Cytotoxin or Cardiotoxin are polypeptide of 60-70 amino acid residues long found in snakes of elapid family having various pharmacological effects such as depolarization of muscles, and hemolysis.

Side effects of anti-venom:-

1) Anaphylactic reactions such as difficulty in breathing, reddening of skin, swelling of eyes and face, fever
2) Pyrogen reaction probably due to the action of high concentrations of non-immunoglobulin proteins
3) Inflammation of joints, Enlargement of lymph gland.

Plants used for Snake bite The plant constituents are used to neutralize the effects of snake venoms. The way of management of snake bites designed to control infection, stop pain, improve symptoms, correct imbalance, adjust immune system and boost energy for better health and quality of life.

1. ***Aristolochia odoratissima*** In the low lands south of Maracaibo Lake people drink an infusion of *Aristolochia odoratissima* leaves to treat snakebites.Toxicity studies showed that the aqueous extract of A. odoratissima did protect the mice against the lethal effects of Bothropsatrox venom. Nevertheless, protection was only observed at higher doses of venom (8 and 16 mg/kg), without modifying the values at the lower doses.

Aristolochia odoratissima

2. ***Tamarindus indicus*** Aqueous and alcoholic extracts of dried seed powder of *Tamarindus indicus* were tested for their antioxidant and inhibitory activity of toxic enzymes like PLA2 and proteinases of Najanaja venom. The methanolic extracts of *T. Indica*seed possess compounds, which inhibit the activity of Phospholipase A2 and Proteinases of cobra venom. It may be used as an alternative treatment to serum therapy and as a rich source of potential inhibitors of toxins involved in several pathological conditions of humans and animal diseases.

3. ***Holarrhena antidysenterica***

Jain and Srivastava have reported the use of the bark against snake bite. Prusti and Behera, in an ethno-medico-botanical study of Sundargarh District,Orissa, India, have reported the roots rubbed on a stone with a few drops of water and the paste obtained is given internally and applied externally in snakebite.

Holarrhena antidysenterica

4. ***Andrographis paniculata*** A. paniculata plant extract has anti-venom activity against *Najanaja* venom. The leaves of A. paniculata contains andrographolide, the active constituent of which is diterpene and is responsible for ASV property by modifying the actions of proteins, and enzymes also inhibit snake venom phospholipase A2 activities

Andrographis paniculate

Tests to determine anti–venom activity

The testing of plant extracts for anti-venom activity illustrates the traditional use of plants in treatment of snake bite. The variety of activity displayed by different snake venom systems requires different test systems to investigate inhibitory effects of plant extracts. A few studies were carried out where the extracts were given prior to injection of venom or after administration of venom, which is most analogous to the case of snake bite.

Table 2: Plats having anti-snake venom activity

Sr. No.	Plant	Part used	Reference
1	*Piper longum* (Piperaceae)	Fruits	21
2	*Parkia biglandulosa* (Mimosaceae)	Stem bark	22
3	*Dichrostachys cinerea*(Mimosaceae)	Root	23
4	*Strychnos nux vomica* (Loganiaceae)	Seed	24

5	*Pouzolzia indica* (Utricaceae)	Aerial parts	25
6	*Bridellia ferruginea* (Euphorbiaceae)	Leaves	26
7	*Boswellia delzielli* (Burseraceae)	Stem bark	27
8	*Securidaca longipedunculata*(Polygalceae)	Root	28
9	*Sapindus saponaria* (Sapindaceae)	Callus	29
10	*Parinari curatellifolia* (Chrysobalanaceae)	Root bark	30
11	*Tamarindus indica* (Leguminosae)	Seed	31
12	*Mucuna pruriens(Fabaceae)*	Seed	32
13	*Curcuma longa* (Zingiberaceae)	Rhizome	33
14	*Pluchea indica* (Asteraceae)	Root	34
15	*Hemidesmus indicus*(Apocynaceae)	Root	35
16	*Guiera senegalensis* (Combretaceae)	Leaves	36
17	*Acalypha indica* (Euphorbiaceae)	Leaves	37
18	*Hibiscus aethiopicus*(Malvaceae)	Whole plant	38
19	*Magnifera indica*(Anacardiaceae)	Stem bark	39
20	*Symplocos cochinchinensis* (Simplocaceae)	Leaves	40
21	*Crinum jagus* (Amyrillidaceae)	Bulb	41

Various tests to determine anti venom activity

1. In vivo animal testing

The protection of whole animals against a dose of venom by the plant extracts is impractical now-a-days because of ethical considerations. Recently mice have been used for the testing of crude extracts. A lethal dose of the venom was mixed with the varying doses of the plant extract and injected into the animal. Later the survival rate with and without extracts was determined.

2. Testing using isolated organ preparations

The test consists of measurements on nerve–muscle preparations, isolated muscles and studies on blood clotting procedures. The cobra venoms that impair neuromuscular transmission are experimentally studied using nerve muscle preparations from neck of chick (biventercervicis) and abdomen of the rat (phrenic nerve hemi diaphragm). Indirect stimulation of these preparations is inhibited by the venoms. Plant extracts containing anti-venom activity may consequently reverse these inhibitory effects. This was demonstrated with *Curcuma longa* extract against the neurotoxin from *Naja najasiamensis*. Envenomization by the Carpet viper, *Echiscarinatus* causes rapid intra - arterial clotting of blood, resulting in internal haemorrhage due to depletion of fibrinogen. *Mucuna pruriens* (Naikurana**;** Leguminosae) increased the clotting time of blood induced by *E. carinatus* venom.

3. Tests using Enzymes

The enzyme based assays were used for enzyme inhibition or enzyme activation of large numbers of plant extracts.The potassium salt of gymnemic acid isolated from *Gymnemasylvestre* (Asclepiadaceae) inhibits

ATPase from cobra and viper venom. Inhibition occurs due to competitive binding between gymnemate and ATP.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Syn-Bio The Powerful Booster for the Coming Decade

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
53-56

ABSTRACT

Synthetic Biology is a multidisciplinary field of science that combines the principles of biology and engineering to design, build, and modify biological systems for specific applications. This emerging field should play an important role in future agriculture for traditional crop improvement, but also in enabling novel bioproduction in plants. It captures basics from core biology and integrates them with concepts from other areas of study such as chemical, electrical, and computational sciences. The essence of synthetic biology is to rewire, re-program, and re-create natural biological pathways. Although it is still in its infancy, synthetic biology can face scientific and societal problems related to modern agriculture. Future agricultural development needs to solve the food security crisis caused by the global food shortage and the environmental demand for green and sustainable technology. The vigorous development of synthetic biology has brought new opportunities for modern agriculture.

Keyword's: - synthetic biology, future trends and developments, Bio design automation

I. INTRODUCTION

Synthetic biology is a multidisciplinary field of science that focuses on living systems and organisms, and it applies engineering principles to develop new biological parts, devices, and systems or to redesign existing systems found in nature. A consensus definition of Synthetic Biology was drafted by a group of European experts more than a decade ago: 'Synthetic biology is the engineering of biology: the synthesis of complex, biologically based (or inspired) systems, which display functions that do not exist in nature' (Vancompernolle & Ball, 2005). Synthetic biology has made significant progress in the areas of energy, the chemical industry, medicine, food, and the environment, also including agriculture. The application of synthetic biology in agriculture shows the potential of transforming metabolic pathways, genetic circuits, and plant architectures in crop improvement. In many recent works, researchers have effectively used CRISPR/Cas tools in plants to form heritable chromosome rearrangements in the megabase range in a controlled way, including inversions and

translocations in the genetic makeup of the source. Synthetic biology is also a proven approach to reconstitute metabolic pathways for the production of valuable chemicals. So far, microbes have been the production platform of choice, an extremely robust platform, because microbes are unicellular organisms, hindering the reconstitution of certain complex plant metabolic pathways that normally take place in multiple cellular compartments and tissue types (Zurbriggen et al., 2012). Additionally, many plants have a variety of tissues and organelles, allowing for the compartmentalization of pathways and toxic intermediates.

The domestication of crops in the past involved the fixation of favourable natural variations and took extraordinarily long or even thousands of years based on archaeological observations. India is regarded as one of the leading destinations for bio innovation and biomanufacturing and is thus recognized as a sunrise sector. In response to cost, scarcity, and ethics, synthetic biology offers new ways of producing existing foods in advanced and systematic patterns. In the transformation from agricultural production to factory production, some foods, may challenge traditional ideals of food production. In contrast, human selection could shorten the time to fix the specific alleles in modern breeding programs to several decades. However, the speed still cannot meet the multiple challenges facing today's food demand and supply. The potential of plant genetic engineering goes beyond the reconstruction of metabolic pathways. Different combinations of modular genetic parts can be used to reshape plant anatomy and development. The power of this method relies on the possibility of altering spatial patterns of gene expression in a highly controlled way. In addition to improving the synthesis path of traditional chemical pesticides, exploring pesticide compounds from active natural products as biopesticides can make them more adaptable to the environment and enhance the mode of action. Prof. Tobias Erb reported the first synthetic pathway, the crotonyl–coenzymeA (CoA)/ethylmalonyl-CoA/hydroxybutyryl-CoA (CETCH) cycle for CO_2 fixation in vitro. (Schwander T. et. al.) The overall carbon fixation efficiency is still limited by the natural metabolic pathway itself. Therefore, to increase efficiency to a great extent, it may be necessary to design a new carbon fixation pathway, but this is undoubtedly more challenging. Based on the requirements of environmental protection and sustainable agriculture, it is necessary to study vigorously and develop biopesticides which can be generally divided into biochemical pesticides, microbial pesticides, and botanical pesticides.

Synthetic fertilizer usage can be reduced by optimizing plant nitrogen and phosphorous utilization. Nitrogen and phosphorus are the most significant nutrients for crop production. Nitrogen impacts the structural components and metabolic compounds in a plant cell. Nitrogen is an indispensable part of chlorophyll, which is responsible for the photosynthesis process. A plant can get its nitrogen from the soil by mineralizing organic materials, but soil minerals do not release enough nitrogen to support the plant; therefore, fertilizing is necessary for high production. Phosphorous is one of the 17 essential nutrients for plant growth and it is interrelated to intricate energy transformations in a plant. Phosphorous contributes to the nucleic acid structure of plants. The nucleic acid is indispensable in protein synthesis regulation; therefore, phosphorous is significant in cell division and the increase of new plant tissue. We must focus on minimizing, the use of chemical fertilizers Increasing the nutritional value of food is obtainable by supplying a suitable rhizosphere microbiome for a given crop which shows dual survival. The variety of microbes linked with plant roots is huge. This plant-associated microbial community is vital for plant health. Advances in plant-microbe interactions research uncovered that plants can shape their rhizosphere microbiome. During a pathogen or insect attack, plants can recruit protective microorganisms, and improve microbial activity to overwhelm pathogens in the

rhizosphere. In an ecological context, they provide nutrition for all other forms of life. In environments, all heterotrophs depend on plants for energy and mostly organic compounds as their source of carbon.

The improvements in agriculture are now possible because, in synthetic biology, scientists typically stitch together long stretches of DNA and implant them into an organism's genome. These synthesized pieces of DNA could be genes that originate in other organisms or they could be entirely original. Rewriting genomes will play an important role in plant synthetic biology. Synthetic biology works toward the creation of new biological systems, including user-designed plants and plant cells. These systems can be used for a diversity of purposes, such as reducing crop losses by altering cellular responses to pathogens or climate change. To reach the greatest capability of plant synthetic biology, techniques are essential to provide control over the genetic code, such as enabling targeted modifications to DNA sequences within living plant cells.

Synthetic biology has shown great potential in various aspects of agriculture. Its current applications that can achieve or approach commercialization are only focused on crop breeding, microbial nitrogen fixation, biomanufacturing, etc. In comparison, the transformation of carbon fixation, nitrogen fixation, and metabolic pathways is still at the conceptual stage. The integration of biochemical components from living systems with inorganic components can lead to new materials that can sense the environment (or internal signals) and change their properties. These features could be particularly useful for improving protective clothing or building materials. Therefore, synthetic biology still has a long way to go in improving crop energy use.

As synthetic biology evolves, products with useful purposes are available to consumers across the globe and provide advantages like

- Alleviate malnutrition
- Improve human health
- Design new health products to treat diseases
- Reduce pollution
- Create new products to save natural resources
- Reduce usage of harmful chemicals
- Develop agricultural nutrients
- Create nutritive foods
- Reduce therapeutic costs
- Lessen vitamin deficiencies
- Use plant synthetic biology to create life-saving vaccines
- Find fuel substitutes

II. CONCLUSION

In all, making synthetic biology benefit the sustainable development of modern agriculture under the premise of ensuring safety is also a vital issue that needs attention in the future. The opportunities offered by Synthetic biology to mark various agronomic challenges are ‘unlimited’. However, assessing these opportunities with a realistic lens is critical. Despite the substantial efficiency and effectiveness that can be achieved through synthetic biology techniques, numerous challenges continue to limit the successful application of it. There are numerous risks, costs, regulations, and public perceptions that can limit the uptake of any new technologies. Additionally, developing Synthetic biology technologies, products, and traits requires substantial investment in

decades of research and development. Ultimately, to be feasible synthetic biology research ventures need to have a clear value proposition, be highly impactful, and have a high benefit-to-cost ratio.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Studies on Seed Borne Mycoflora of Soybean (Glycine Max)

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
57-63

ABSTRACT

Quality seed is the first and foremost important commodity for successful soybean cultivation. Seed borne pathogens are of considerable importance due to their influence on the overall health, germination and final crop stand in the field. The infected seeds may fail to germinate, transmit disease from seed to seedling or from seedling to growing plant. By considering the prevalence of seed borne fungi and their role the present research work deals with the study of seed borne mycoflora of soybean (Glycine max). Four varieties of soybean seed samples viz. JS- 335, KDS-726, MAUS-71, and MDS-1001 were selected for the experiment. Isolation of seed borne mycoflora was done by standard blotter paper method and agar plate method. Twelve seed borne mycoflora viz. Aspergillus flavus, Aspergillus niger, Alternaria sp., Chaetomium sp., Colletotrichum sp., Curvularia sp., Fusarium sp., Rhizopus sp., Rhizoctonia sp., Macrophomina sp., Nigrospora sp., Penicillium sp. Among these two methods agar plate method was found to be suitable for the maximum incidence of seed borne mycoflora, therefore agar plate method was found as the most effective in detecting seed borne mycoflora on soybean seeds. The seeds which were sterilized with fungicides had lower incidence compare to unsterilized seeds.

Key words- seed borne mycoflora, Soybean, Agar plate method, Standard blotter paper method.

I. INTRODUCTION

India is one of the world's largest producer of oilseeds with average yield production of about 29 million tons per annum following the USA, China and Brazil (Singh et al., 2017; Thapa et al., 2019). India is 4th oilseed producer as well as it also ranks second in import and third in consumption of edible oil around the world (Singh et al. 2017). The main contributors amongst all Indian oilseed crops are groundnut, soybean, rapeseed and mustard. Soybean is the third most important food after rice and corn (Bowo et al., 2016). Soybean

contains high quality of proteins (40%) and edible oil (20%) containing major essential amino acids (Raghuvanshi and Bisht, 2010). Soybean meal acting as high-quality protein source for livestock feed rations (Mary et al., 2013).

Microorganisms play an important role in affecting the quality of seed, of which fungi are the largest group and 55 fungal species has been isolated from soybean seeds. The most frequent genera were Alternaria, Diaphorte and Fusarium (Escamilla et al., 2019). Seed-borne diseases are commonly occurring during storage periods if the seeds are stored in a moist dark place" (ISTA). Disease transmitted seeds can affect seed germination, mortality in the nursery stage and the development of disease at the younger stage. Certified seeds do not guarantee to be free from seed-borne pathogens (Bishaw et al., 2013). The infected seeds failed to germinate or seedlings and plants developed in the field from infected seeds may escape the early infection but often may be infected at the later stages of the crop growth. Seed-borne pathogens are found internally or externally in seeds and have the capacity to cause diseases in plants (Gupta et al., 2017; Pedraza et al., 2018). Several pathogenic fungi like Rhizopus, Alternaria, Culvularia, Diaporthe, Mucor, Corynespora, Cercospora, Colletotrichum, Phoma, Pythium, Fusarium, Aspergillus and Cladosporium have been isolated from soybean seeds (Saylendra and Fatmawaty 2010; Kinnikar et al., 2015; Escamilla et al.,2019).

II. MATERIALS AND METHODS

Sample collection

Four different varieties of soybean seeds i.e. JS- 335, KDS-726, MAUS-71, MDS-1001 were collected from the Latur district .The seed samples were brought to the laboratory and stored in plastic containers without treatment of fungicides /insecticides at room temperature for further studies.

Isolation of seed mycoflora

The seed mycoflora was isolated by using methods such as standard blotter paper method and agar plate method as recommended by International Seed Testing Association ISTA (1966), De Tempe (1970), Neergaard (1973) and Agrawal (1976).

Standard Blotter paper method

A pair of sterile blotter papers of 8.5 cm diameter was soaked in sterile distilled water and were placed in pre-sterilized petriplates of 9 cm diameter.Seeds of each variety i.e. JS-335, KDS-726, MAUS-71, MDS-1001 were selected for the isolation of internal and external seed borne fungi. For the isolation of internal seed borne fungi the seeds were surface sterilized by dipping in 0.1% mercuric chloride for 2 minutes and washed three changes of distilled water. Eight seeds of test sample of each variety were placed on same distance on wet blotter paper in petriplate. The plates were incubated at 28º ± 2º C under diurnal conditions. On seventh day of incubation, seeds were first examined under stereoscopic microscope for determining the various fungal growths. The identification and further confirmation of seed borne fungi was made by preparing slides of the fungi.

Agar plate method

In Northern Ireland, Muskett and Malone (1941) first used this method for seed health management. In this method, 15 ml of autoclaved Potato Dextrose Agar were poured in presterilized petriplates. After cooling the

medium, eight seeds per plate of the sample to be studied were equidistantly placed aseptically. Incubation and other details of the study were same as described for blotter test method.

The various fungi appeared on seeds in blotter paper and Agar plates were isolated and maintained on PDA slants.

Identification of fungi

Detailed examination of fungal characters were doneby compound microscope and identification was confirmed with the help of identification Manual (Mathur and Kongsdal, 2003) and pictoral atlas of soil and seed fungi. (Watanabe,2002).

Table 01: Fungi Associated with Agar plate by % incidence method

Name of the fungi	JS 335		KDS-726		MAUS-71		MDS-1001	
	SS	USS	SS	USS	SS	USS	SS	USS
Aspergillus flavus	16.6	20.8	25.0	37.5	20.8	29.16	20.8	25.0
Aspergillus niger	37.5	37.5	20.8	25.0	20.8	20.8	16.6	20.8
Alternaria sp.	12.5	12.5	12.5	16.6	16.6	20.8	12.5	20.8
Chaetomium sp.	4.1	8.3	0.0	0.0	8.3	8.3	4.1	12.5
Colletotrichum sp.	4.1	8.3	4.1	4.1	4.1	8.3	8.3	12.5
Curvularia sp.	12.5	8.3	8.3	12.5	8.3	8.3	4.1	12.5
Fusarium sp.	37.5	20.8	20.8	37.5	16.6	20.8	20.8	25.0
Rhizopus sp.	20.8	8.3	0.0	20.8	8.3	16.6	4.1	12.5
Rhizoctonia sp.	0.0	12.5	8.3	8.3	0.0	8.3	4.1	12.5
Macrophomina	4.1	4.1	0.0	4.1	8.3	8.3	0.0	8.3
Nigrospora	4.1	8.3	4.1	12.5	0.0	8.3	12.5	12.5
Penicillium	4.1	8.3	8.3	12.5	16.6	16.6	12.5	16.6
Mean	13.16	13.17	9.35	15.95	10.73	14.55	10.03	15.96
SD	12.93	9.21	8.73	12.30	7.41	7.22	6.99	5.57
CV	98.28	69.98	93.34	77.11	69.09	49.63	69.68	34.90
SE	3.73	2.66	2.52	3.55	2.14	2.08	2.02	1.61

(SS: Sterilized seeds, USS-Unsterilized seeds)

Table 02: Fungi Associated with Blotter paper by % incidence method

Name of the fungi	JS 335		KDS-726		MAUS-71		MDS-1001	
	SS	USS	SS	USS	SS	USS	SS	USS
Aspergillus flavus	20.8	25.0	16.6	20.8	29.16	25.0	16.6	16.6
Aspergillus niger	29.16	37.5	41.66	50.0	33.33	50.0	25.0	29.16
Alternaria sp.	12.5	16.66	8.33	12.5	16.6	16.6	12.5	16.6
Chaetomium sp.	8.33	4.16	4.16	8.33	8.33	4.16	4.16	4.16
Colletotrichum sp.	4.16	8.33	0.0	4.16	0.0	0.0	4.16	8.33
Curvularia sp.	8.33	8.33	4.16	4.16	8.33	12.5	4.16	8.33

Fusarium sp.	12.5	12.5	12.5	16.6	16.6	25.0	12.5	16.6
Rhizopus sp.	20.8	16.6	0.0	12.5	8.33	8.33	12.5	12.5
Rhizoctonia sp.	12.5	16.66	12.5	12.5	8.33	0.0	0.0	0.0
Mean	14.34	16.19	11.10	15.73	14.33	15.73	10.18	12.48
SD	7.82	10.09	12.84	13.94	10.84	15.97	7.82	8.58
CV	54.52	62.30	115.65	88.64	75.64	101.53	76.86	68.75
SE	2.61	3.36	4.28	4.65	3.61	5.32	2.61	2.86

Fig. 01: Fungi Associated with Agar plate by % incidence method

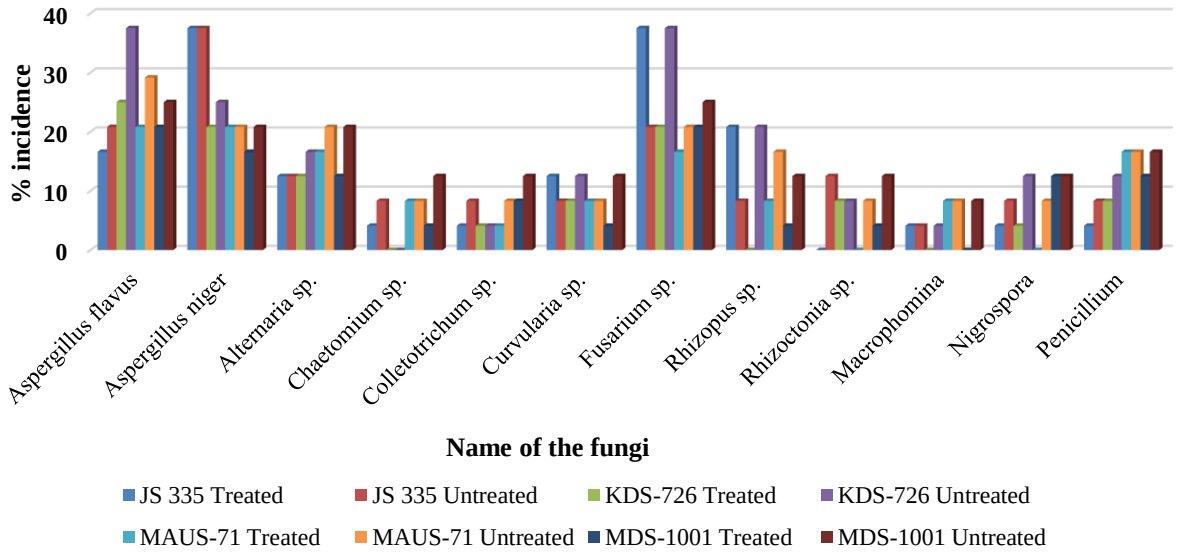
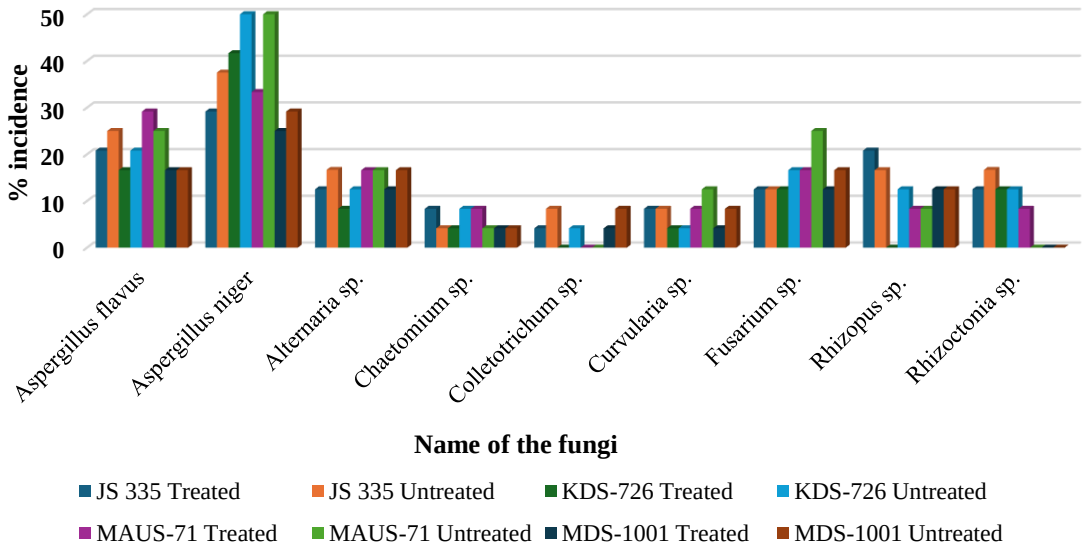


Fig. 02: Fungi Associated with Blotter Paper by % incidence method



III. RESULT AND DISCUSSION

Agar Plate Method

Table 1 depicts that total 12 fungal species were isolated from four different varieties of soybean seeds by agar plate method viz., Aspergillus flavus, Aspergillus niger, Alternaria sp., Chaetomium sp., Colletotrichum sp., Curvularia sp., Fusarium sp., Rhizopus sp., and Rhizoctonia sp., Macrophomina sp., Nigrospora sp., Penicillium sp. Total percentage of incidence of fungi on sterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 ranged from 0.0 – 37.5%, 0.0 -25.0%, 0.0% - 20.8, 0.0% - 20.8%. Aspergillus niger and Fusarium sp. (37.5%), Aspergillus flavus (25.0%), Aspergillus flavus and Aspergillus niger (20.8%), Aspergillus flavus and Fusarium (20.8%) show highest percentage of incidence on sterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 and Chaetomium sp., Colletotrichum sp., Macrophomina sp., Nigrospora sp., Penicillium sp.,(4.1%) and Rhizoctonia (0.0%) incidence on JS 335, Chaetomium sp., Rhizopus sp., Macrophomina sp.(0.0%), and Collecotrichum sp. and Nigrospora sp.(4.1%) on KDS 726. Colletotrichum sp (4.1%) on MAUS 71, Chaetomium sp., Rhizopus sp., Rhizoctonia sp. (4.1%) Show least percentage of incidence on sterilized seeds.Unsterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 show percentage of incidence of fungi ranges between 4.1% - 37.5%, 0.0% - 37.5%, 8.35% - 29.16%, 8.3% - 25.0% respectively. Aspergillus niger (20.8%), Aspergillus flavus, Fusarium sp.(37.5%), Aspergillus flavus (29.16%), Aspergillus flavus (25.0%) observed highest incidence percentage and Macrophomina sp.(4.1%),Colletotrichum sp., and Macrophomina sp.,(4.1%),Chaetomium sp., Colletotrichum sp., Curvularia sp., Rhizoctonia sp., Macrophomina sp., and Nigrospora sp.,(8.3%), Macrophomina sp.(8.3%) show mimimum percentage of incidence on JS 335, KDS 726, MAUS 71, MDS 1001 respectively.

Similar findings were reported by Pawar et al., 2015; Dhawan et al., 2019. Zanjare et al., 2020 observed seedborne fungal flora of Cowpea by using agar plate method. They reported F. oxysporium, A. alternata and Penicillium sp.

Blotter Paper Method

Significant differences in % incidence of mycoflora were observed in different varieties of soybean seeds. A total 9 fungal species found on blotter paper method viz., Aspergillus flavus, Aspergillus niger, Alternaria sp., Chaetomium sp., Colletotrichum sp., Curvularia sp., Fusarium sp., Rhizopus sp., and Rhizoctonia sp., shown in (Table 2).Total percentage incidence of fungi in sterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 ranged from 4.16% -29.16% ,0.0% - 41.66%, 0.0% - 33.33%, 0.0% - 25.0% and in unsterilized seeds ranged from 4.16% - 37.5%, 4.16% - 50.0%, 0.0% - 50.0%, 0.0% - 29.16% respectively. In sterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 Aspergillus niger show higher percentage of incidence (29.16%,41.66%, 33.33%,25.0%) respectively. Unsterilized seeds of JS 335, KDS 726, MAUS 71, MDS 1001 Chaetomium 4.16%, Colletotrichum and Curvularia 4.16%, Chaetomium 4.16% and Colletotrichum and Curvularia 0.0%, Chaetomium 4.16% and Rhizoctonia 0.0% show least percentage of incidence of fungi.

Present findings are in agreement with the findings of Soesanto et al. (2020) who studied eight Soyabean verities by using Blotter test method and isolated eight fungi namely A flavus, A. niger, F. oxysporum, C. dematium, Curvularia pallescens, Fusarium solani, Melanospora zamiae and Nigrospora spp. Sahu (2020) tested the different varieties of lentil seeds by using the blotter paper method. In this method, the local variety showed the highest frequency of mycoflora while the least frequency of mycoflora was observed in the JL-3 variety. Results of Singh et al. (2020) study also supports the finding of the present study.

IV. CONCLUSION

Among the two different isolation methods for the detection of seed borne mycoflora of four different varieties of soybean, the agar plate method was found most effective in detecting seed borne mycoflora of soybean. Twelve species of fungi were found viz. Aspergillus flavus, Aspergillus niger, Alternaria sp., Chaetomium sp., Colletotrichum sp., Curvularia sp., Fusarium sp., Rhizopus sp., and Rhizoctonia sp., Macrophomina sp., Nigrospora sp. and Penicillium sp.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Study of Extinction of Plant and Its Conservation

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

64-69

ABSTRACT

The Study of extinction of plant and its conservation of selected species is Solanum villosum L. distribution of the plant is Europe, western and south Asia, and northern Africa &North America. generally this plant are co-relation about some migrate Birds and many insect. This plant lifecycle is short days and its utilization and mass multiplication is actively contributed of research to conserve the germplasm and seed bank to recycling and conservation of Solanum villosum L. Aspect about extinction and solutions of S.villosum L. We finding and identifying the selected specimen to form the conservation strategy is a series of conservation action that collectively achieve the biological goals and objectives of the habitat Plan. It is ready to the planning and research methods developing of natural scientific classification of Benthum & Hooker System of classification and effecting climatic effect of studied Plant .

Keywords: Solanum villosum L, Conservation, extinction.

I. INTRODUCTION

India is largest country in the world about medicine and many research carried out for the medicinal plants. All plants having great medicinal value of world. This research carried out the methodology of using the endangered medicinal Plants and conservation strategies with suitable climatically conditions . Environmental changes and utilization of Selected plant *Solanum villosum L* .Belonging to *Solanaceae family.*

An annual herb, to 70 cm, slightly to densely hairy. The leaf blade is ovate, up to 8 cm long, 3–6 cm wide, entire or shallowly lobed, and petioles to 4.5 cm long. Clusters of 3–8–flowers in the inflorescence. The corolla is white or may be purple-tinged. Followed by dull light red or orange-yellow (depending on subspecies) globular berries, 5–9 mm diam. The seeds are 1.7–2.3 mm long and pale yellow. Compared to S. nigrum, aside from fruit colour the peduncles are moderate[1-6]

II. MATERIAL & METHODS

1. Characteristics

Habit:

Annual to short lived erect or weakly scrambling perennial herbs up to 0.5 m tall, subwoody at base and much branched. Stems spreading to decumbent, terete to ridged, green to purple, not hollow; new growth densely pubescent with simple, spreading, uniseriate, translucent, eglandular and/or glandular trichomes, these 3-10-celled, 0.2-2.0 mm long; older stems glabrescent.[7]

Leaves:

Leaves simple, 1.5-5.0(-10.0) cm long, 0.7-2.5(-6.5) cm wide, broadly to narrowly ovate to elliptic, membraneous, green on both sides, without smell or somewhat pleasant smelling; adaxial surfaces sparsely to densely pubescent with spreading, simple, uniseriate eglandular and/or glandular trichomes like those on stem evenly along veins and lamina; abaxial surfaces more densely pubescent on veins and lamina; major veins 4-6 pairs; base acute to truncate, short-attenuate, often asymmetric; margins sinuate-dentate to rarely entire; apex acute; petioles 0.5-3.0(-4.5) cm long, pubescent with simple uniseriate glandular and/or eglandular trichomes like those on stems.[7]

Inflorescences:

Inflorescences 0.4-2.0 cm long, internodal, simple, the flowers spaced along the rhachis, with (2-)3-5(-8) flowers clustered at the tip or more commonly spaced along the rhachis, pubescent with spreading simple glandular and/or eglandular uniseriate trichomes like those of the stems; peduncle 0.4-1.5 cm long, straight; pedicels 4-7 mm long, 0.2-0.3 mm in diameter at the base and 0.4-0.5 mm at apex, spreading, articulated at the base; pedicel scars spaced 0-1.0 mm apart. Buds globose, the corolla exserted ca. 1/5 from the calyx before anthesis.[7]

Flowers:

Flowers 5-merous, all perfect. Calyx tube 1.2-1.5 mm long, conical, lobes 0.8-1.5 mm long, 0.5-0.8 mm wide, elliptic to triangular with obtuse thickened apices and paler (almost scarious) sinuses, pubescent with spreading simple uniseriate eglandular and/or glandular trichomes like those on stem. Corolla 8-15(-20) mm in diameter, white with a yellow-green central portion near the base and occasionally with purple stripes along lobe midveins abaxially, stellate, lobed 1/2 way to the base, the lobes 2.5-4.5 mm long, 2.0-3.5 mm wide, strongly reflexed at anthesis, later spreading, densely papillate-pubescent abaxially with simple uniseriate eglandular trichomes. Stamens equal; filament tube minute, pubescent with spreading uniseriate simple eglandular trichomes adaxially; free portion of the filaments 1.0-1.3 mm long, pubescent like the tube; anthers 1.8-2.2(-2.4) mm long, 0.5-0.7 mm wide, ellipsoid, yellow, poricidal at the tips, the pores lengthening to slits with age and drying. Ovary globose, glabrous; style 2.8-3.5(-4.0) mm long, densely pubescent with 2-3-celled simple uniseriate trichomes in the lower half, exserted 0-1 mm beyond anther cone; stigma capitate, the surface minutely papillate, green in live plants.[7]

Fruits:

Fruit an ellipsoid berry, usually somewhat longer than broad, 8.5-10 mm long, 8.0-9.5 mm wide, (red-)orange to yellow at maturity, the pericarp thin, shiny and translucent; fruiting pedicels 8-14 mm long, 0.4-0.5 mm in diameter at the base, 0.7-1.5 mm at apex, strongly reflexed, becoming woody, spaced 1.0-2.0 mm apart not

falling with the fruit, remaining on the plant and always persistent on older inflorescences; fruiting calyx not accrescent, lobes 2.0-3.0 mm long, strongly reflexed in fruit. [7]

Seeds:

Seeds 20-40 per berry, 1.8-2.2 mm long, 1.5-1.7 mm wide, flattened and tear-drop shaped with a subapical hilum, brown, the surfaces minutely pitted, the testal cells pentagonal in outline. Stone cells absent, but occasionally 1-2 found in North African and Arabian material, ca. 0.5 mm in diameter. [7]

2. Climate and Conservation strategies:

I. Maintenance of essential ecological processes and life-support systems:

Plant is important of life but the plant also taking one maintenance of essential ecological process of life support to recycling by different way as artificial or Natural dispose the himself to creating balancing of earth natural system of nature. The *Solanum villosum* is the boundary line to extinction and make them conservation strategies to hid population. *S. villosum* wild and rare to looking over there in rural and urban areas. This plant more importance of the nature for migrated Birds & Insect. Recently research article says this plant become good for reducing sugar agent. That article who read and asking where we get the plant. The human being becomes use large scale of the natural palnt but not thinks about this plant become recycle or not.

II. Preservation of genetic diversity:

Solanum villosum is wild varieties of *Solanum* Genus and *Solanaceae* family as we carried out to find this species and collecting the specimen with the Germplasm and multiplying mass of the species *Solanum villosum.* The preservation of *Solanum villosum* seed bank and recycling of genetic diversity of *Solanum genus* to another species which is belonging to extinction.

III. Sustainable utilization of species and ecosystems:

The *Solanum villosum L.* Plant species having better test and its sustainability is important to avoid the extinction of *villosum Species* of *Solanum genus.* India is largest ecosystem of Plant species. The given plant species restoration and making a mass multiplication of given plant species to germination and utilizing protocol changing pattern were carried out to taking large scale production and make them stable of population of *Solanum villosum L.* And use natural resources at a rate that the earth can renew them.

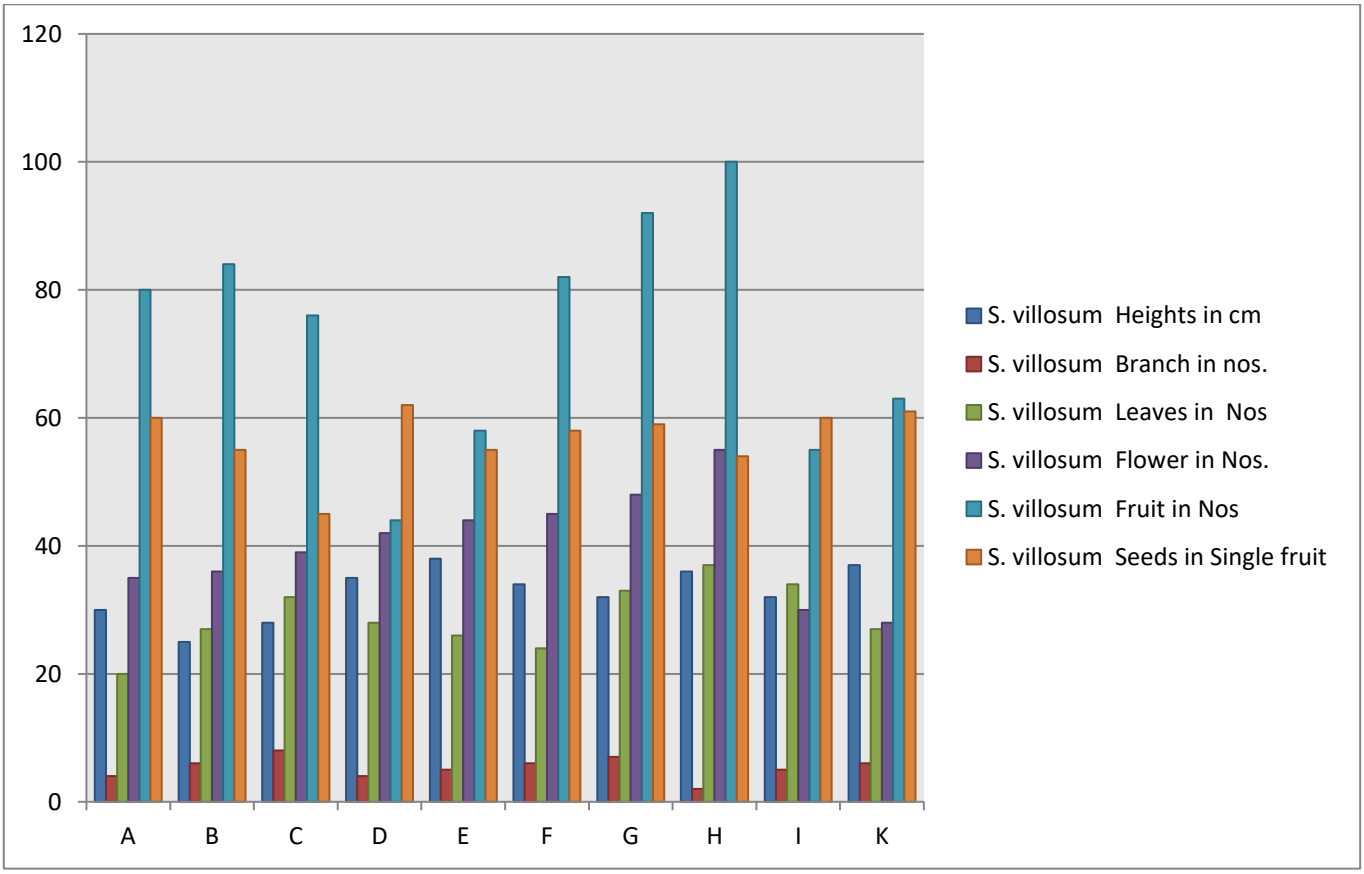
III. RESULT

The present study carried out *Solanum villosum L.*Plant species study of extinction of plant and its conservation were taking a all type of tabulated data finding and going to conserve strategies to maintain the sustainable utilization and recycling by natural and germplasm saving to upcoming generation and comfortable life to all living organism as well as human being to his utilizing as a medicinal purpose and avoid the excess of use stop them and conserve the nature and nature stable condition to make behaviour like conservation strategies.

Specimen	Heights in cm	Branch in nos.	Leaves in Nos	Flower in Nos.	Fruit in Nos	Seeds in Single fruit
A	30	4	20	35	80	60

B	25	6	27	36	84	55
C	28	8	32	39	76	45
D	35	4	28	42	44	62
E	38	5	26	44	58	55
F	34	6	24	45	82	58
G	32	7	33	48	92	59
H	36	2	37	55	100	54
I	32	5	34	30	55	60
K	37	6	27	28	63	61

Table No. 01 showing analysing character for finding *Solanum villosum L*



Graph no 01. Showing analysing character for finding *Solanum villosum L*

Entire Plant	Entire plant Height	Close view of fruit

Leaves in different size

Leaves venation

Flower and green & raped fruit

Upper view of green & raped fruit of *Solanum villosum*


Unraped fruit and counting of flower

Measure Size of leaf

Measure Size of Stem

Thikness of stem

IV. CONCLUSION

The present work concluded that the *Solanum villosum L.* Conservation, utilization, mass multiplication, claimatic condition and it all type informative sources to finding and their importance of nature and it multiplying the plant species were selected germplasm and making a seed bank (Gene bank).

V. ACKNOWLEDGMENT

The present research work acknowledgment of the Institution Head Principal, Shankarrao Patil Mahavidyalaya, Bhoom, Dharashiv. All teaching staff and non teaching staff and available facilities to laboratory and Instrumentation for the research work during completion of work.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Role of Seaweed in Agriculture as Fertilizer

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
70-74

ABSTRACT

The use of chemical fertilizers, the structure of the soil diminishes soil fertility, and the production purity is adversely affected. Because of this, the use of environmentally friendly organic fertilizers and biofertilizer production has increased in recent years. Seaweed plays a vital role in the marine ecosystem and grows in large amounts in the sea. Seaweed can regarded as a potential source of bio-fertilizer in dried or fresh form; it helps to enhance biochemical constituents like carbohydrates, lipids, proteins, fibers, ash, phenol, dietary fiber, etc. in plants.

This technology implemented in the form of organic farming for sustainable agriculture. Total yield was also notably increased due to soil addition of biofertilizer and foliar spraying of the inorganic fertilizer and algal extract compared to the control. Biofertilizer, seaweed, and inorganic fertilization affected the N, P, and K content in lettuce leaves. For sustainable production in greenhouse lettuce, it is possible to obtain higher head weight,.

Seaweed biofertilizers result is high yeild, which are considered eco-friendly. The seaweed is also a good source of micro & macro elements required for plant nutrition. Seaweed extract is effective for improving soil productivity and productivity and reaching nutrition value of soil.

KEY WORDS: Organic fertilizer, Biofertilizer, Chemical fertilization, Plant nutrition, yield production, seaweed extract.

I. INTRODUCTION

Certain minerals and plant nutrients are need in the environment. These minerals are present naturally in the soil and are taken up from the soil by the roots of the plants. Most soil usually has enough of these minerals to keep plants healthy. However, plants have absorbed some nutrients from the soil and need to be replace to maintain optimal growth and development of the plants. The most common mineral nutrients that need

replacing are N, P, and K. Fertilizers are manufacture by mixtures of products that contain N, P, K, and other necessary nutrients. The fertilizers are adding to the soil because the nutrients in the soil get used up due to repeated cultivation of the plant. The crop yield also starts decreasing, recover soil fertility, fertilizers are necessary. Fertilizers are dividing into two types: (1) Chemical fertilizers and (2) Organic fertilizers. The excessive use of chemical fertilizers (synthetic composition) in agriculture is costly adverse effects on the physico-chemical properties of soils, plant, animal, and human life. Chemical fertilizers are more resistant to the environment, which in some cases is harmful to the environment, especially on soil fertility and are causing large amounts of soil and land degradation (Liu et al., 2009) because most of the microorganisms The rapid increase in the world population, on the other hand, along with the decrease in agricultural lands and the loss of yields due to various stress factors bring the problem of nutrition and food safety to the agenda. Get maximum yield and best quality from the plants, it is essential to carry out a correct fertilization program for plants as well as provide convenient ecological factors for each type. However, to get maximum yield, it is crucial to get sustainable agricultural production and save the environment and human health while establishing this fertilization program (Soylemez, 2021). There is an intensive use of inorganic fertilizers to increase the yield obtained from the unit area. Excessive use of inorganic fertilizers disrupts the soil structure, causes environmental pollution, and adversely affects product yield and quality. Therefore, researchers have focused on use environmentally friendly organic fertilizers such as biofertilizers and seaweed, which thought to be healthier.

Biofertilizers are natural substances containing the living cells of several species of beneficial bacteria and fungi, which applied as a substitute for minimizing the application of harmful inorganic fertilizers. Strength of biofertilizer products proved by their ability to give optimum growth and productivity for plants.

II. REVIEW OF LITERATURE

Mounir et al., (2015) were experimented the effect of seaweed extract (SWE) from two microalgae species such as Ulva rigida and Fucus spiralis on drought stress tolerance in green bean plants (Phaseolus vulgaris L.). In their study, examination of growth parameters and some physiological and biochemical parameters showed that SWE extract enhanced vegetative growth with and without under drought stress condition in bean plant. Maximum plant height and dry weight were observed with 25 % of U. rigida and F. spiralis extract.

Rosalba Mireya Hernández-Herrera et al. (2014) have experimented the effect of different concentration of (0.2, 0.4, and 1.0 %) liquid seaweed extracts (LSEs) made from two green seaweed viz. Ulva lactuca, Caulerpa sertularioides and two brown seaweed viz. Padina gymnospora, and Sargassum liebmannii as biostimulants on the germination and growth of tomato (Solanum lycopersicum) under greenhouse and in laboratory conditions using two application of foliar spray and soil drench of LSEs. Ulva lactuca and Padina gymnospora at lower concentration (2%) showed better germination. The better germination response in germination rate related with lower mean germination time, maximum germination index and germination energy, and accordingly greater plumule and radicle length and seedling vigour. Application of foliar spray was found to be less effective in plant height (75cm) than the soil drench (up to 79cm). Sivasangari Ramya et al. (2015) studied the effect on growth, biochemical and yield of brinjal by using liquid extracts of brown marine alga Stoechospermum marginatum. The different concentrations of liquid extracts were prepared and applied as foliar spray on the brinjal seedlings, raised in pots experimental with maintained under natural conditions. Their results revealed

that the number of fruits and fruit weight were increased at lower concentration only (1.5 %). In contrast, liquid extracts at high concentration (5%) was found to have inhibitory effect on brinjal plants as compared to the control sprayed with water.

Sutharsan et al., (2014) were experimented the effect of foliar application of Sargasssum crassifolium extract at different concentration (concentration (10%, 20%, 50% and 100%) to apply on tomato plants at five times from 3weeks after transplanting and the results was recorded after two weeks. At 20% of root dry weight (81.57%), shoot dry weight (80.92%), fruit number (57.87%) and fruit yield per hectare (58.70%), along with fruit total acidity (76.95%) and total soluble solids content (25.71%) of fruit significantly increased as compare to control, while all mentioned parameters reduced at 100% of foliar application. Therefore, it concluded 20% concentration of seaweed extract can be used to enhance the growth.

Nerissa Ali et al., (2016) observed the effect on grown under tropical field conditions with an alkaline seaweed extract made from Ascophyllum nodosum (ASWE) on tomato plants (Lycopersicum esculentum Mill). In this study, two field experiments and one greenhouse experiment were conducted to evaluate methods of application, dosage, the impact of each on plant growth parameters, the quality and yield of fruit. The higher concentration of ASWE resulted in a significant increase in plant height (37 %) and plant fruit yield (63 %) compared to control plants.

Emmanuel et al., (2015) were determined the impact of seaweed liquid extract (SLE) of Laurencia pinnatifida,Surgassum duplicatum and Caulerpa scalpelliformis on seed germination and growth of the legume crop of Vignamungo. The effect on growth parameters of different concentrations (5, 10, 20, 40, 60, 80 and 100 %; v/v) of SLE and the highest growth parameter was reported at 10 % concentration.

Mounir et al., (2015) were experimented the effect of seaweed extract (SWE) from two microalgae species such as Ulva rigida and Fucus spiralis on drought stress tolerance in green bean plants (Phaseolus vulgaris L.). In their study, examination of growth parameters and some physiological and biochemical parameters showed that SWE extract enhanced vegetative growth with and without under drought stress condition in bean plant. Maximum plant height and dry weight were observed with 25 % of U. rigida and F. spiralis extract.

Fatma et al., (2014) were conducted the efficiency of using seaweeds (Padina vickersiae, Enteromorpha compressa,Ulva fasciata, Gelidium crinale, Jania rubens and Laurencia obtusa) as biofertilizers for improving growth and grain quality of maize (Zea maize L.) plants. Thus, using algae as biofertilizer improved growth, yieldand grain quality of maize plants.

Safinaz and Ragaa, (2013) observed the effect of three species of red marine algae (Laurencia obtusa, Corallinaelongata and Jania rubens) and it's mixture to use as biofertilizer to enhance growth of Maize (Zea mays L.) plants. The results indicated that the application of Laurencia obtusa + Jania rubens caused 48.21% increase in plan length, 61.84% increase in potassium content and increase in number of leaves

Ayun Vinuba et al., (2008) were found the beneficial effects of liquid seaweed fertilizer (LSF) made from Gracilaria corticata on seedling growth and biochemical parameters of pulses and cereals. LSF at 20% concentration increased the morphological parameters such as the lengths of shoot and root fresh and dry weight, the pigment of chlorophyll and protein contents Vigna mungo (black gram).

Rajasulochana et al., (2008) were found the effect of Ulva lactuca extract on the growth of Brassica juncea Hook. F, Phaseolus mungo L. and Thomas and Trigonella foenum graceum L. In this experiment, positive response showed in Phaseolus mungo and to promote over all seedling growth of the three test plants. The application of extract was found to promote over all seedling growth of the three test plants.

Thirumaran et al., (2009) were experimented the effect of seaweed liquid fertilizer (SLF) of Rosenvigea intricate alone or mixing with synthetic NPK chemical fertilizer on seedling growth parameters, pigment contents, yield and soil characters of „Ladies finger" [Abelmoschus esculentus (L) Medikus]. Before sowing, the seeds of selected.

Plant were soaked in SLF of different concentrations (10 to 100%) for 12 hrs. The result shows that SLF of low concentration 20 % promoted seedling growth, fruit yield and pigment contents and at higher concentrations of SLF was noted minimum improvement in growth parameters

Chitra and Sreeja (2013) studied the effect of Caulerpa peltata and Gracillaria corticata liquid extracts on seed germination, growth and pigment content of green gram (Vigna radiata (L.). At low level of seaweed liquid fertilizer application was promoted the seed germination and Gracillaria corticata extract was better than Caulerpa peltataat 4% concentration of growth and pigment content.

Zodape et al., (2011) have determined the effect of Kappaphycus alvarezii sap (seaweed) with 5% concentration by foliar spray on growth and yield of tomato in field during Kharif season of 2006-07. The result was reported to increase in number of fruits per plant, size of fruit and yield of tomato fruit (60.89%) as compared to control.

III. DISCUSSION

Seaweed extract effect on seed germination, growth of plant, yeild of crop. The seaweed extract increased the seed germination, seedling growth and yield of crop in many territories. The possible ways of seaweeds' exploitation in modern agriculture have been extensively explore. Various types of varieties of these seaweeds used for preparations of liquid fertilizer and algal manures. Seaweed extracts are better tolerance in relation to abiotic stresses, including drought, ion toxicity, freezing, and temperature, humidity Different methods occur for seaweed extract:

1. Supercritical fluid extraction,
2. Sophisticated extraction methods,
3. Pressurized liquid extraction,
4. Enzyme-assisted extraction. A wide range of phytohormones is present in microalgae extracts like Abscisic acid, Auxins, Betaine, Gibberellins, and Polyamines, along with micronutrients, trace elements act as a regulator of plant growth and enhance the crop reap when applied exogenously.

Below Table represent the nutrient N.P.K mg/ g in different s Type of seaweed

Nameof seaweed	Type	N mg/g	P mg/g	K mg/g	Reference
Dictyotadichotoma	B	174.02	44.78	73.84	K.Sasikumaretal., 2011
Laurencia obtuse	R	3.8	3.0	2	Safinazand Ragaaet al.,2013
Padinapavonica	B	0.01090	0.00926	0.16013	Chabanietal.,2013
Janiarubens	R	4	3.5	1.6	SafinazandRagaaet al.,2013
Sargassumcrassifolium	B	0.4	0.009	1.520	S.Sutharsanet al.,2014
Ulva lactuca	G	174.02	45.56	75.83	K. Divyaetal.,2015
Padinapavonica	B	0.07985	0.00069	0.00278	Chabanietal.,2015
Ulva lactuca	G	0.12609	0.00300	0.01634	Chabanietal.,2015
Sargassumwightii	B	174.02	45.56	72.83	K. Divyaet al.,2015

IV. CONCLUSION

The seaweed is the best source of plant nutrients likes nitrogen (N), phosphorus (P), potash (K) & micronutrients, carbohydrates, and Growth promoting substances. Application of seaweed extract as an organic and biofertilizer, these biofertilizers and soil applied recommended doses improved the growth traits crop, plant's physiological & biochemical parameters, addition to these advantages, vigorous development and control of disease, Biofertilizers are also comparatively cheaper than chemical fertilizers and have a high commercial profit with eco-friendly.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Investigation of Fungal Spores of Tomato field at Beed, Dist. Beed

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
75-79

ABSTRACT

Fungal survey was carried out in the Tomato field (Solanum lycopersicum) for a period of Rabbi Seasons from 10th July 2019 to 12th October 2019. For trapping the fungal spores, Tilak air sampler was used. During the investigation the aeromicroflora population includes large number of fungal spores, pollen grains, inscect parts etc. The result showed incidence of varieties of fungal spores in the environment. In this investigation 62 spores were identified during the period of survey. In this seasons the most dominant spores were Cladosporiun (26.44%) Alternaria (10.64%), Cercospora (1.96%), Curvularia (8.24%), Helminthosporium (7.98%), Periconia (2.11%), Pithomyces (2.76%), Rust spores (6.15%), Nigrospora (8.32%), Smut spore (5.94%), Rhizopus (3.96%).

Key word : Tomato (Solanum lycopersicum) field, Tilak air sampler, fungal spores.

I. INTRODUCTION

The aerobiological studies are recent origin in India. In Maharashtra and Marathwada credit for developing the aerobiological research work goes to prof. Tilak S.T. Very few crops have been investigated so far. In Marathwada region, the climate is relatively moderate, average rainfall is 650 mm in monsoon. Temperature ranges from 20^0c to 38^0c, relative humidity varies from 30 to 70 % .For effective management of crop diseases, it is desirable to study the prevalence of air spora in this region. This is achieved by aerobiological study. Hence this observation could be helpful for the treatment of diseases (allergic as well as agriculture).

Crop diseases caused by airborne mycosporophytes constitute another important aspect of agriculture. Our agriculture crops, however continuously influence from various diseases, out of which fungal diseases are dominant in this region. In a study of airspora of Tomato fields, observed different types. Among them the *Alternaria, Cladosporium, Cercospora*, *Curvularia, Rust* spores, *Helminthosporium*, *Periconia*, *Rhizopus*,

Nigrospora , hyphal fragments, Pollen grains and insect parts were dominant ones. In view of the above facts qualitative and quantitative airborne spores was worked out.

II. MATERIAL AND METHOD

In the present study, Tilak Air sampler was implemented to find out the availability of casual microbes of blight and leaf spot diseases in the Tomato field of 5 acres of land area. Tilak air sampler is an electrically operated machine which runs on electric power supply of (AC 230 V) & provides a continuous air sampling data for eight days. Sampler was kept with its orifice at constant height of 1 meter above the ground in the Tomato field. The air was sampled at the rate of 5 liters for minute & the transparent cellophane tape was fixed on the drum, coated uniformly with white petroleum jelly as adhesive. These cellophane brought to the laboratory, slides were made and scanned. Fungal spores isolation was made from these slides over Tomato Field.

Scanning

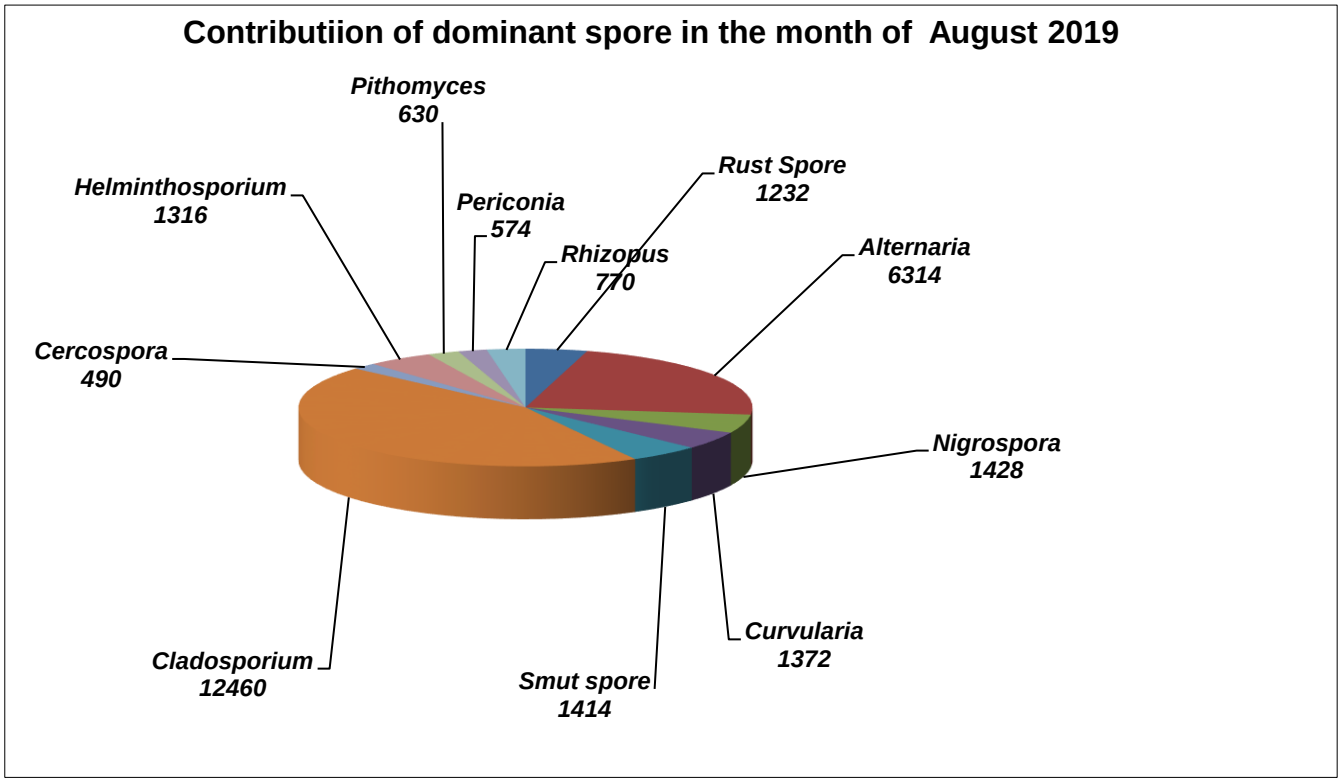
Loaded tape on each slide was divided into six equal divisions by marking it over cover slip with a pointed ball pen. Each division representing two hours air sampling. Scanning of slides was carried out under the binocular research microscope using 10X X 45 x magnification, as per the procedure mentioned by (Tilak and Kulkarni, 1970). The identification of fungal spore type was made on the basis of size, shape septation of spores using standard keys and available authentic literature.

Statistical Analysis

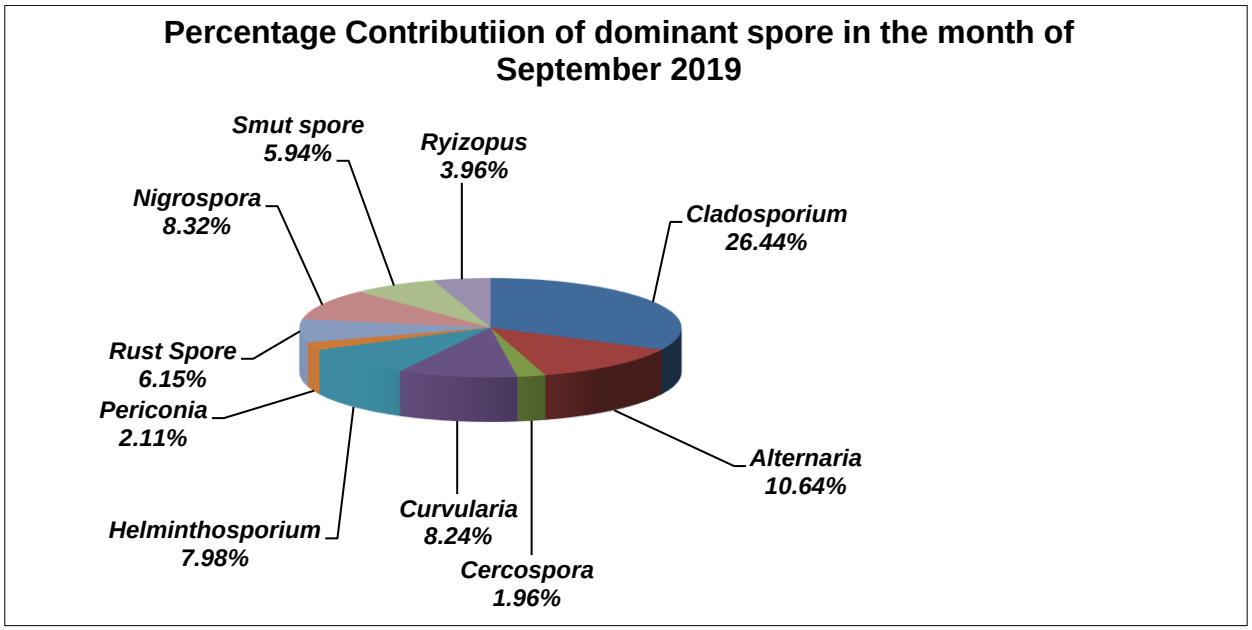
The total spores counted per day. The counted spores were multiplied by conversion factor 14 of Tilak Air Sampler.

III. RESULT AND DISCUSSION

Total 61 spores of different fungal spores were noted in August 2019 month. The abundant spores observed in the month of August 2019 were *Alternaria* (6314), *Nigrospora* (1428), *Cercosoprs (490) Curvularia* (1372), *Smut spores (1414), Cladosporium (12460), Helminthosporium* (1316), *Rust spore (1232), Pithomyces* (630), *Periconia (574*), *Rhizopus* (770). The Figure below revealed dominant spores found in August 2019 month.



In the month of September 2019, total 62 different spores were observed. The abundant spores found in September 2019 were *Rust spore* (6.15%), *Alternaria (10.64%), Nigrospora (8.32%*), *Curvularia* (8.24%), *Smut spores* (5.94%), *Cladosporium (26.44%), Cercospora (1.96%), Helminthosporium (7.98*%), *Rhizopus* (3.96%), *Periconia* (2.11%). The dominant spores types found in the month of September 2019 are shown in figure below. And most were *Alternaria,Cladosporium, Nigrospora, Rhizopus* and smut spores.



Cladosporuim as an allergen was at the top most in concentration and percentage contribution. Agarwal and Shivpuri (1974) reported role of *Cladosporium* bioaerosols in etiology of respiratory allergic disorders. *Alternaria, Curvularia, Periconia, Helminthosporium* and *Nigrospora* are known to be potentially allergenic. Allergenic diseases due to *Aspergilla* and *Penicillin* are recorded by Singh & Singh (1994).

In most of aeromycological survey, *Cladosporium* was as one of the most abundant aerospora reported all over world (oliveira et al., 2007). The abundance of *Cladosporium* throughout the year may be attributed to the structural features of the spores such as small size and smooth wall which favors and facilitate the transport of airborne spores.

During the present investigation the 3 fungal spores belonged to other types viz. hyphal fragments, Pollen grains and insect parts. These three types are well known aeroallergens responsible for nasobronchial allergy, respiratory allergy and cause allergenic reactions (Nair 1978, Kulkarni 1981, Shivpuri 1980). This study points out the prevalence of large percentage of aeroallergens which may be responsible for inducing allergenic reactions to sensitive individuals.

This investigations carried out indicates the significant allergenic nature of *Rhizopus, Cheotomium, Pleaspora, Alternaria, Aspergilles, Cladosporium, Curvularia, Epicoccum, Cercospora, Nigrospora, Helminthosporium, Heterosporium and* hyphal fragments (Tilak 1989). In the India significant allergenic fungi are *Curvularia, Alternaria, Helminthosporium, Cladosporium, Aspergillus* and *Rhizopus* (Shivpuri 1982).

A variation in the temperature, humidity, rainfall and wind was noted during the investigation period. *Cladosporium* species lives as sporophyte or parasite on many kinds of plants. Dry spores produced in excessive quantities can be transported over wide areas and during rainy season its concentration was low (Ebner et al., 1989).

In European countries, *Alternaria* varies between 20,000-30000 spores/year (Oliveira et al., 2007) to more than 200,000, only exceeding the levels of 300000 spores quoted for the north–western Iberian Peninsula in some areas (Mediavilla et al., 1997). In several Italian cities, high quantities of *Cladosporium* and *Alternaria* are found from May to October, reaching their maximum levels in September (Zanca, 2003). However, in areas at lower latitudes where precipitation and humidity are limiting factors, but not temperature, the spores increase in the months before and after summer (Manoharachary et al., 2005).

The month wise percentage contribution of each spore group to the total airspora revealed Deuteromycotina as highest, followed by Basidiomycotina, Ascomycotina and lowest was Zygomycotina.

The diurnal periodicity studies shows that *Chaetomium* and *Basidiospores* belongs to night spora group. The peak observed between 22 to 24 hrs in case of *Chaetomium* and 18 to 20, 22 to 24 hrs peak in case of Basidiospore. Patil (1985), while studying its circadian periodicity has showed that the *Chaetomium* was maximum at night. Hence, he was placed them " night spora" group. He was also reported 6.14 % basidiospores to be maximum in wet season. Thus, it belongs to "wet spora" group. Mishra and Kamal (1971) reported *Chaetomium globosum* during winter only.

IV. CONCLUSION

Aerobiological studies are very important in relation to disease forecasting, so it must be carried out continuously year round in order to study transport of plant pathogenic spores type from place to place and their ultimate role in inciting plant diseases. Pathogenic spores like *Alternaria*, *Cladosporium, Cuvularia, Cercospora, Rust spore, Rhizopus and Helminthosporium* were observed in sufficiently high concentrations which were responsible for deterioration in Tomato field etc.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Green Algae of Waghur Dam from Jalgaon District of Maharashtra

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
01-10

ABSTRACT

Microalgae is one of the important bio component of air. Phytoplankton survey has been conducted in order to isolate the various micro algal forms from the atmosphere of Waghur dam . Algae are natural inhabitants of water and serve as indicator of water quality in various ways . Though earlier workers have paid attention on Algal flora in Maharashtra but Waghur dam is unexplored regarding to Algal flora .

Algae have been the object of little applied research because they do not cause as many problems for man kind as do bacteria and fungi . But in future this situation is likely to change as human and algae interact more often in desirable and undesirable change .

The following member of green algae recorded from the aquatic system of Waghur dam are as follows : Lyngbya , Closterium , Chroococcus , Pediastrum , Oscillatoria , Cosmarium , Staurastrum , Spirogyra , Zygnemopsis etc.

Keywords = Green Algae ,Waghur dam Maharashtra .

I. INTRODUCTION

In the atmosphere of earth different types of bioparticles such as pollen grains , fungal spores , bacteria , algal spores and filaments , hyphal fragments , insect scales , microscopic fragments of plant and animal origin etc ., are present .

Algae occur in water of low salinity called as fresh water algae are called as phytoplanktons . They are the most interesting and water algae beautiful microflora of microscopic world ; morphologically they range from unicellular to huge multicellular thalli with functionally and structurally distinctive tissues and organs . They vary considerably in size , shape, colour , and growth forms and are simple aquatic plants which perform the maximum quantity of photosynthetic activity than any other living organisms in aquatic world. Algae play an important role in biosynthesis of organic matter in an aquatic ecosystem , which directly or indirectly serves for

all living organisms of water body as food as and constitutes an important source of food in an culture of fresh water fishes and crustaceans.

Algae occurs as bio-films on sub aerophytic habitat like soil , tree barks , building facades, monuments, caves , various extreme environments like hot spring , alpine lakes, glacial bed (snow surfaces) and also in symbiotic association with other living organisms.

II. MATERIALS AND METHODS

In order to understand the diversity of microalgae the Waghur river flow its source near Ajanta through the Khandesh region. Work on this major irrigation project was taken up by the Water Resources Department of Maharashtra and begin construction in 1978. The dam's main purpose is to supply water for irrigation purpose in downstream area . Canals were built along the left and right banks of river to meet irrigation needs. In 2006 , record rainfall in the catchment area of waghur was recorded. Nearly 40 TMC of water spilled over the dam . As of 2008 , the dams reservoir had storage capacity of 8.5 TMC. Twenty additional spill gates wee planned for the dam , increasing storage capacity by 1.5 TMC. The project was to supply drinking water needs of roughly 500 thousand people and will irrigate approximately 64,000 acres (260 km2) of drought prone fields .

Early in the morning I have taken these algal samples from different places of waghur dam .The names of 5 different stations are as follows :-

1. Chinchkhede .
2. Neri Waghur – Neri Jalgaon Road.
3. Satara Pool – Neri Jamner Road
4. Gangapuri – Jamner Bhusawal Road
5. Kandari – Bhusawal Raod .

The sampling sites will be selected carefully , so as to get maximum number of algal forms growing in varied habitat. Another important aim is to preserve the material into 4% formalin and 96% distilled water in bottle. Take the sample in lab, and observe it carefully under microscope .

Some of the species that I have been found by identifying the samples are as follows :-

Lyngbya , Closterium , Chroococcus, Pediastrum , Oscillatoria , Cosmarium , Spirogyra , Zygnemopsis etc.

Samples were preserved as described earlier .

1.Lyngbya lagerheimii (Mob.) Gomont

(Pl. 1,Fig. 1)

Pl. 48, Fig. 6 & Pl. 53 , Fig. 2

Filaments single, or entangled with one another , in irregularly spirally coiled or occasionally straight ;sheath thin , colourless ; trichome about 2 µ broad ; cells 1.2-3µ long not constricted at the cross wall , with or without a single granule on either side , pale blue-green ; end cell rounded, not attenuated .

2. Lyngbya gardneri (Setchell et Gardner) Geitler

(Pl. 1, Fig. 2)

Pl. 49 , Fig.

Filaments 1-2 mm long , attached by a basal cell , forming a thick or dense, straight or slightly bent, 2.6-3µ broad ; trichome 1.3 -1.6 µ broad, slightly constricted at a cross wall ; sheath indistinct , colourless , smooth ; cells quadrate or somewhat longer or shorter than broad; end cells rounded .

3. Lyngbya limnetica Lemmermann

(Pl. 1 , Fig . 3)

Pl. 50, Fig. 11

Filaments straight or slightly curved or coiled , single , free-floating, 1-2µ broad , sheath , thin or narrow , colourless , not coloured blue by chlor-zinc – iodide ; cell 1 -1.5µ broad quadrate to 1/3 rarely 1/8 as long as broad , 1-3µ long not constricted at the cross- walls , with or without a granule at the cross- wall , pale blue – green ; end cells not attenuated , rounded .

4. Lyngbya confervoids C. Ag . ex Gomont

(Pl . 1,Fig. 4)

Pl.49 ,fig . 9 and Pl. 52 , Fig. 13

Thallus caespitose , fasciculate ,up to 5 cm in height , yellowish brown or dull green , when dried often violet ;filment at the base decumbent , above ascending and entangled, straight ; sheath colourless, when old lamellated, outside rough up to 5µ thick , not coloured violet by chlor-zinc-iodide ;trichome olive-green or blue-green , not constricted at a cross-wall , cross-walls commonly granulated , not attenuated at a apices , 9-25µ mostly 10-16 µ broad ;cells 1/3 -1/8 times as long as broad , 2-4µ long ; end cell rotund , calyptra absent .

5. Lyngbya majuscule Harvey ex Gomont

(Pl. 1 , Fig . 5)

Pl . 48 , Fig . 7 , Pl . 49 ,Fig . 12 and Pl. 52 , Fig . 10

Thallus expanded , up to 3cm long , dull bule-green to brown or yellowish brown ; filaments very long , curved or seldom only slightly coiled ; sheath colourless , lamellated up to 11 µ thick , outside often rough, not coloured violet by chlor-zinc-iodide ;trichome blue-green , brownish green, or grey violet not constricted at the cross-walls , not attenuated at the ends , 16-60 µ (or up to 80µ)broad , mostly 20-40 µ broad ; cells very short 1/6-1/5 times as long as broad , 2-4 µ long , cross-walls not granulated ; end cells rotund , calyptra absent .

6. Lyngbya chaetomorphae Iyengar et Desikachary

(Pl. 1 , Fig . 6)

Pl. 49 , Fig . 3

Trichome erect , light blue – green in colour , short up to 26.2 µ long , usually about 1.3µ broad ;apex rounded , not calyptrate , not constricted at the cross- wall , cross – walls not granulated ; sheath very thin and hyaline , closely investing the trichome , cells shorter than broad .

1. Closterium dianae Ehr . var.dianae f.dianae Ehr.

(Pl. 2 , Fig . 1)

Pl .1 , Fig . 3

Cell medium size , outer margins strongly curved 112-125 degrees of arc, inner slightly tumid ; cell gradually attenuated to acute or subacute apices; cell wall smooth ; chloroplast with 6-8 pyrenoids , arranged in a row . Cell 209 µm long 24.0 µm broad , apex 4.6µm wide

2. Chroococcus minutus (Kuetz.) Naeg.

(Pl. 2 , Fig . 2)

Pl . 24 , Fig . 4 and Pl. 26 , Fig . 4,15.

Cells spherical or oblong single or in groups of 2-4 , blue – green without sheath 4.1 – 6.0µm in diameter ; colonies 16.5 – 20.2 µm in diameter , sheath not lamellated colourless .

3. Chroococcus turgidus (Kuetz.) Naeg.

(Pl. 2 , Fig . 3)

Pl. 26 , Fig . 6

Cells spherical or ellipsoidal , single or in groups of mostly 2-4 , very seldom many blue- green , without sheath 7.1- 10.5µm in diameter , 8.2-12.0µm long , sheath colourless , not lamellated .

4. Chroococcus tenax (Kirch) Hieron

(Pl. 2 , Fig . 4)

Pl. 26 , Figs . 7,16

Cells mostly in groups of in 2-4 ,blue – green , without sheath , 13.5 – 24.9 µm in diameter , with sheath 15.3 – 26.8µm in diameter , sheath colourless , very thick , distinctly lamellated , 3-4 lamellae.

5. Pediastrum simplex Meyen var.biwaense Fukushima

(Pl. 2 , Fig . 5)

Pl – 1 , Figs -6 and 7.

Colonies 16-32 or more celled circular , large intercellular spaces or a single central space with the cells arranged in a ring at the periphery . Inner face of a marginal cells concave, outer face prolonged into a single tapering processes ; side of marginal cells concave on nearly straight ; inner cells similar to marginal cells but short in processes . Cell wall smooth or slightly punctuate . Cells 5.6-9.3µm broad and 13. 5 – 19.8 µm long, 16 celled colony up to 46.5 – 70.1 µm in diameter .

6. Oscillatoria willei Gardner em . Drouet .

(Pl . 2 , Fig. 6)

Pl- 38 , Fig – 4 and 5 .

Trichome bent at the ends , 2.2µm broad , not constricted at cross walls , ends not attenuated cell 1.8 µm long , cell rounded without a thickened membrane .

1. Oscillatoria annae Van Goor

(Pl. 3 , Fig . 1)

Pl. 38 , Fig . 13

Filaments solitary , straight , yellowish blue green in colour , constricted at the cross walls, cells 7.8µm broad and 2.2 µm long, end cell rounded calyptra absent; cell content homogenous .

2. Cosmarium subspeciosum Nordst var. validius Nordst.

(Pl. 3 , Fig .2)

Pl. 2 , Fig . 28 a,b

Cells longer than broad , deeply constricted , sinus dilated towards the apices ; semicells pyramidal , slightly undulations on lateral margin ; in side view circular , in end view broadly elliptic, six verticals rows of granules on the cemtral tumor ; chloroplast with the pyrenoids in each semicell

3. Staurastrum dicodom Bruhl and Biswas.

(Pl. 3, Fig . 3)

P. 67 , Fig . 77

Cells 27.0µm broad with arms and 20.2 µm broad without arms and 25.8µm long and isthmus 4.5µm.

4. Spirogyra porticalis (MULLER) CLEVE

(Pl. 3 , Fig . 4)

Pl. 5 , Fig. 8 – 9

Conjugation scalariform ; tubes formed by both gametangia ; fertile cell cylindric or enlarged , zygospores mostly ovoid to globose-ovoid , 38-50 x 50-83 μ; median spore wall yellow , smooth.

5.Zygnemopsis tambaramensis Iyengar

(Pl. 3 , Fig . 5)

Fig. 140B ,a-b

Conjugation scalariform ; gametangia geniculate ; zygospores perfectly round, extending fully into the gametangia , zygospores 20-25 μ broad median spore- wall dark violet brown and scrobiculate with rounded pits about 2-3 μ in diameter and about the same distance apart .

6.Zygnemopsis orientalis (CARTER) .

(Pl. 3 , Fig . 6)

Fig. 117 ,a-b

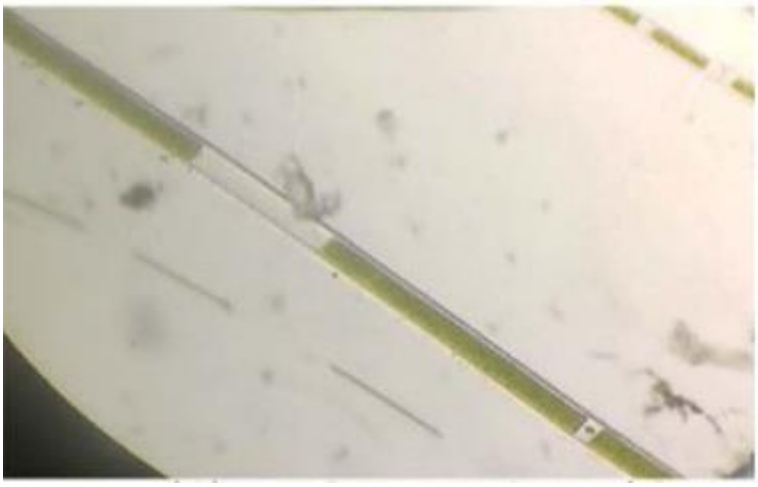
Conjugation scalarifrm , zygospores quadrangular , pillow – form , 20-25 μon aside , filling the broad tubes and dividing the gametangia ; median spore wall golden – brown (whether smooth or punctuate not stated).

PLATE 1

1.Lyngbya lagerheimii (Mob.) Gomont

(2)Lyngbya gardneri (Setchell et Gardner) Geitler

(3)Lyngbya limnetica lemmermann



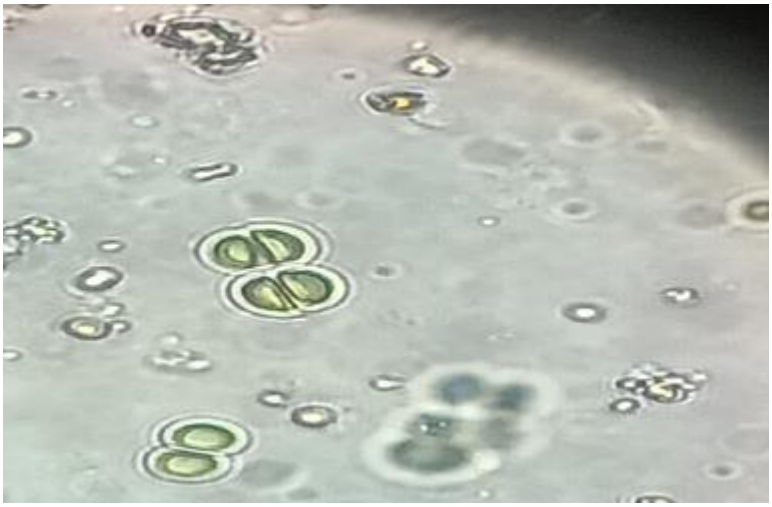
(4) Lyngbya confervoids C. Ag . ex Gomont

5) Lyngbya majuscula Harvex ex Gomont

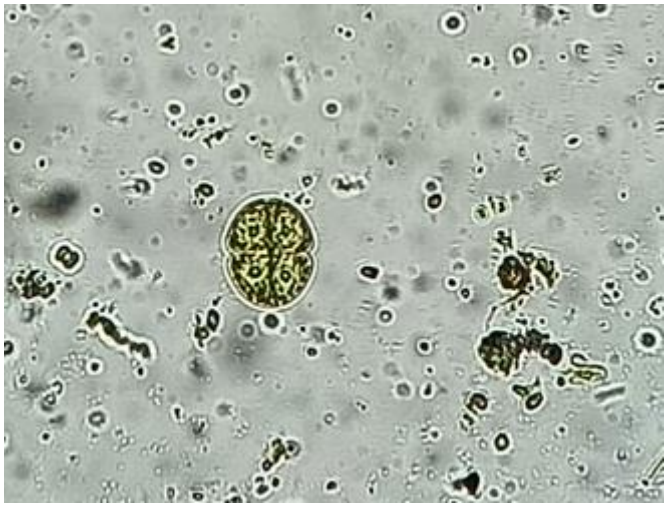
6) Lyngbya chaetomorphae Iyengar et

PLATE No. 2

(1)Closterium dianae Ehr . var.dianae f.dianae Ehr.

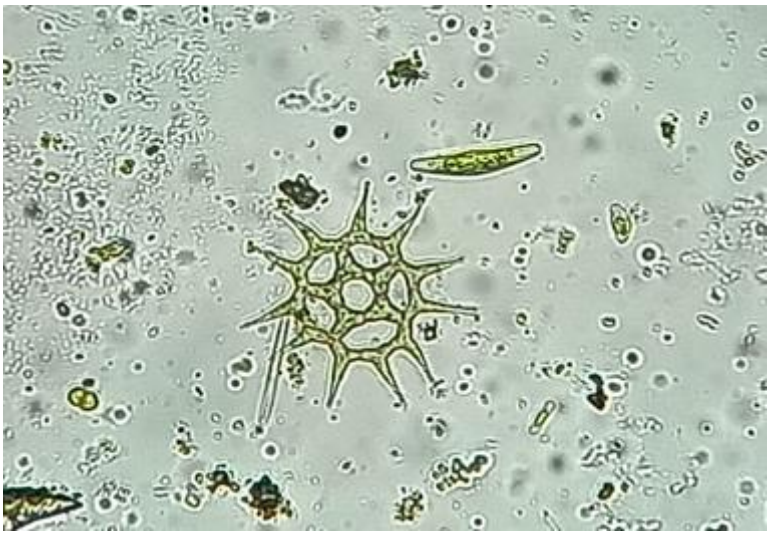


(2) Chroococcus minutus (*Kuetz*) Naeg.

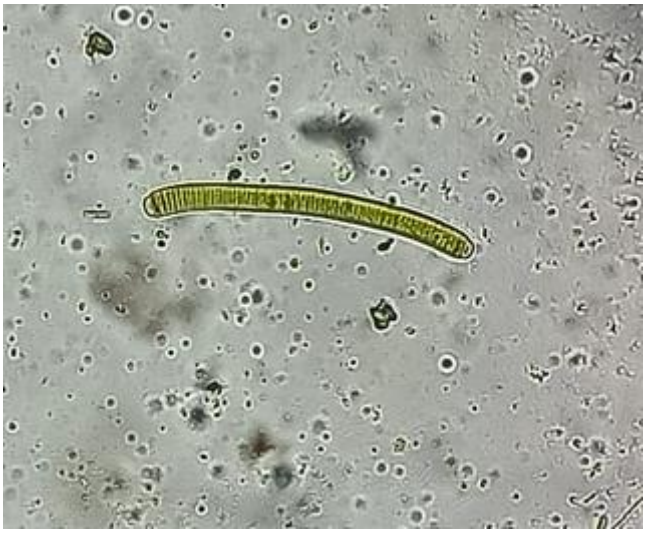


3) Chroococcus turgidus (*Kuetz*) Naeg.

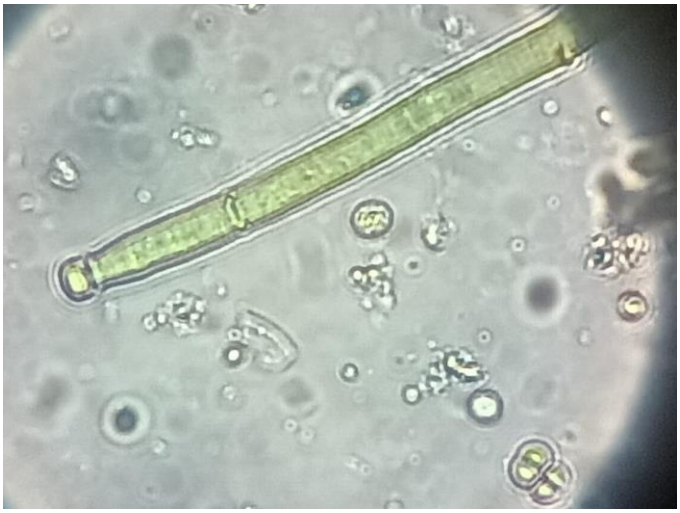
(4)Chroococcus tenax (*Kirch*) Hieron



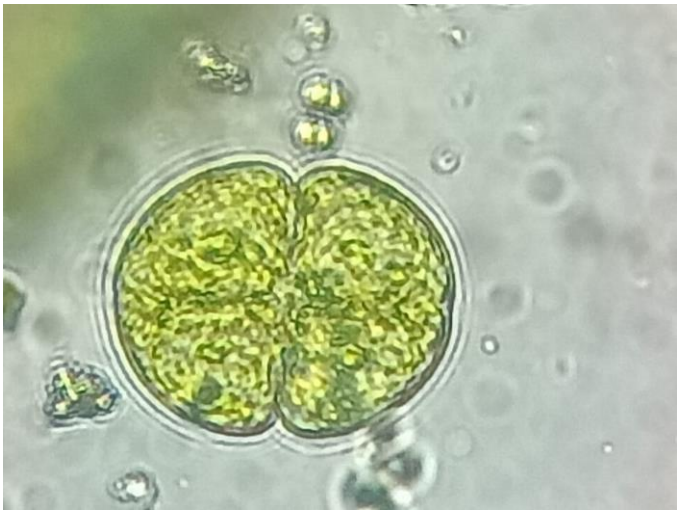
(5)Pediastrum simplex Meyen var . biwaense Fukushima .



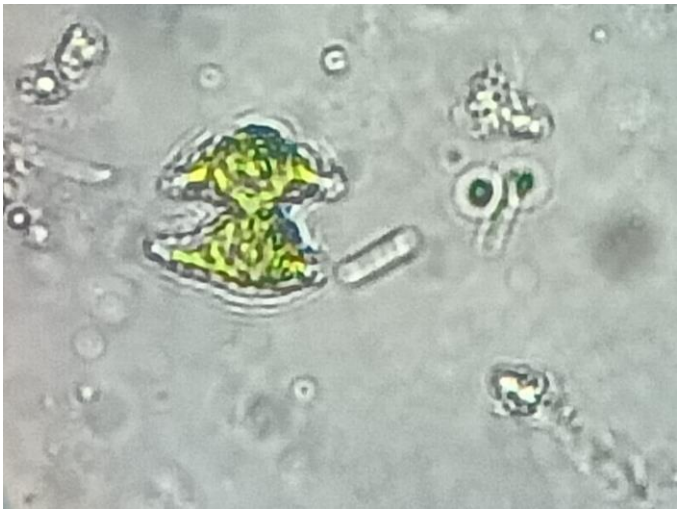
(6) Oscillatoria willei Gardner em Drouet .



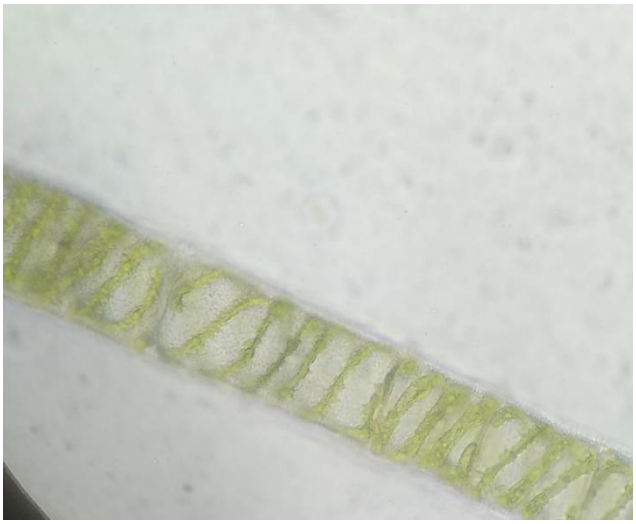
1)Oscillatoria annae *Van Goor.*



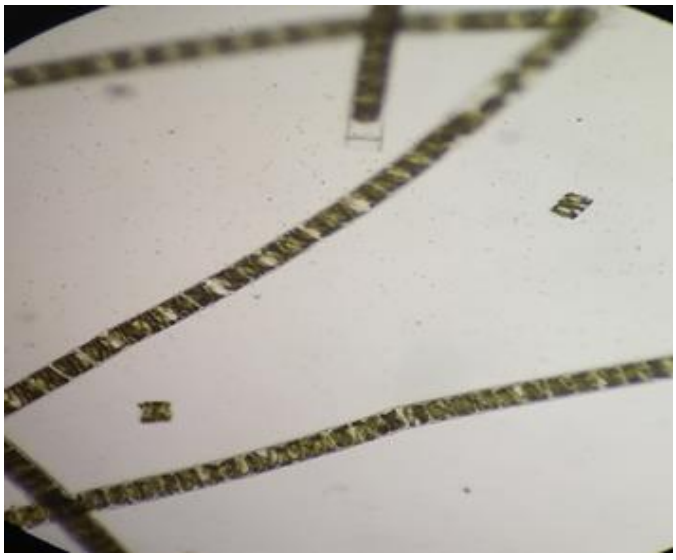
2) Cosmarium subspeciosum Nordst *var. validius Nordst.*



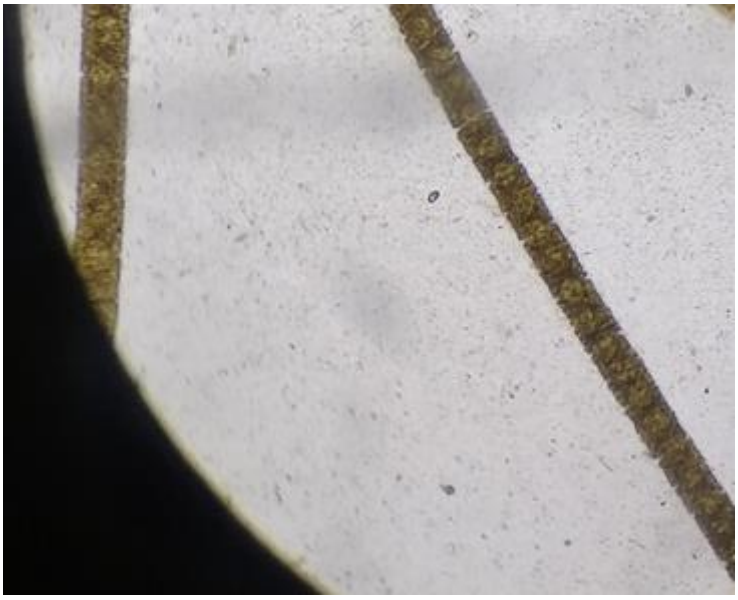
3)Staurastrum dicodom Bruhl and Biswas.



4)Spirogyra porticalis *(MULLER) CLEVE*



5)Zygnemopsis tambaramensis *Iyengar*



6)Zygnemopsis orientalis *(CARTER)* .

III. SUMMARY AND CONCLUSION

The conclusion of present study reveals that the water in the Waghur dam area is so far in good condition harbouring the ecologically important desmidian flora. The present study reveals that water in Waghur dam of Jalgaon district, Maharashtra is still very clean and pollution free water body which should be protected in future in changing environment.

This research work help us to know type of algal flora in the Waghur dam and the data gathered serves as base line data for planning utilization and conservation strategies of algal diversity.

The present investigation will enrich the knowledge of future research worker who specially work in on algal flora of North Maharashtra region and Jalgaon district in Maharashtra to some extent.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Effect of Nitrogen Fertilizer on Soyabean Crops

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

92-95

ABSTRACT

This research paper has examine and designed a novel way to increase the flow of nitrogen, an essential nutrient, from specialized bacteria in soyabean root nodules to the seed-producing organs. Also found the increased rate of nitrogen transport kicked the plants into overdrive, and increased the amount of seeds they produced.

Soyabean has emerged as an important cash crop for farmers. This crop is suitable for inter-cropping and double cropping. To increase the production of soyabean, it is necessary to adopt things like selection of right variety, seeding process, planting at right time and at right depth, use of right amount of fertilizers, inter-cropping, weed control, use of insecticide/fungicide at right time for pest and disease protection.

Keywords : soyabean, nitrogen, fertilizer, protection, production, fungal disease etc.

I. INTRODUCTION

The world population is consistently increasing, and it is over 7 billion in 2012, while the land area for agricultural use is limited. Therefore, the increase in crop production per area is very important. South Dakota is a major soyabean producing state in the US. During the 2016 growing season, 5.17 million acres of South Dakota crop land had soyabean harvested. Producers generally rotate soyabean with corn or occasionally wheat and nitrogen fertilizer management is usually performed on the corn or wheat prior to or succeeding the soyabean crop.

Nitrogen (N) is often the most limiting factor in crop production. Hence, application of fertilizer nitrogen results in higher biomass yields and protein yield and concentration in plant tissue is commonly increased. Nitrogen often affects amino acid composition of protein and in turn its nutritional quality. In cereals, abundant supply of nitrogen decreases the relative proportion of lysine and threonine, thus, reducing the biological value of the

protein. Increasing nitrogen supply generally improves kernel integrity and strength, resulting in better milling properties of the grain. In oil seed crops, protein levels are increased upon nitrogen fertilization, whereas oil concentration is decreased. Effects of nitrogen fertilization on oil composition and quality are inconsistent. In sugarbeet production, abundant supply of nitrogen results in a reduction of sucrose concentration per unit fresh matter and to an increase in impurities (alpha-amino-nitrogen, invert sugars, and lime salts), which negatively affect efficiency of sucrose extraction. Nitrogen supply to potatoes primarily influences tuber size, dry matter, and sugar contents. Nitrogen supply is managed according to market classes (table stock, French fries, and potato chips), which require different quality parameters.

- **Soyabean and Nitrogen:**

Nitrogen (N) is one of the primary nutrients that crops require for optimal growth and grain production. Soyabean seeds are high in protein (~40%) and have relatively high nitrogen requirement to produce the high-protein grain and stover. Nitrogen is added from external source/s on other major crops such as corn, wheat, etc., however, since soybeans are a legume plant, they possess the capability to fix their own N from the atmosphere through a symbiotic relationship with rhizobium bacteria. Soybean nitrogen requirement can reach almost 325 lb/a for 70 bu/a yield with about 50-60% of the N coming from nitrogen fixation. The remaining N requirement (i.e.130-160 lb/a) must come from either soil inorganic N, mineralization of soil organic matter or breakdown of previous years residue. Producers and scientific community are generating questions concerning the ability of soybeans to fix adequate nitrogen in high yield environments, especially above 70 bu/a. Other researchers have shown that increased level of nitrate-N in the soil can inhibit the N fixation process that is physiologically high energy demanding.

Effects On Soybean Yields

Nitrogen and Urea at 500 lbs/a rate was applied at two leaf (early season) and pod set (late season) stages and compared with 'check' plots that did not receive any N fertilizer. The study was established at the jalna district of maharashtra in a Farm and four on-farm cooperators' fields in Clark, Kingsbury, and Minnehaha (2 sites) counties. At each site, the 'check' and the two fertilizer rate treatments were arranged in a Randomized design with four replications. Plot size at all sites was 10' x 20'.

Grain yield analyses did not show any significant statistical differences between the treatments at any site, which suggested that plots without N fertilizer were able to fix adequate N to produce grain yields comparable to plots that received N. Numerically, treatment plots that received late-season N yielded the highest at three of the five sites. Likewise, check plot yields were lowest at four out of five test sites. There were no strong statistical trend/s from the treatments tested during 2016 growing season. However, there is a need for additional investigation in topic particularly different N rates applied at different growth stages to confirm the relationship between added N fertilizer and overall soyabean yields.

II. METHODS AND MATERIAL

Soyabean nitrogen requirement can reach almost 325 lb/a for 70 bu/a yield with about 50-60% of the N coming from nitrogen fixation. The remaining N requirement (i.e.130-160 lb/a) must come from either soil inorganic N, mineralization of soil organic matter or breakdown of previous years residue.

Soybean seed contains an extraordinary high concentration of protein about 35-40% based on the seed weight. Many field researches showed the soybean seed yield is proportional to the total assimilated N in plants.The relationship between total amounts of N in soybean shoot at the R7 stage and seed yield in rotated paddy field in Nagakura from 1989-1991 [21]. The seed yield exhibited a linear correlation (r=0.855) with the amount of nitrogen accumulation.

The field experiment on soyabean plant was conducted in jalna mahindra seed Research Center of Agriculture and Natural Resources of Jalna. This station is located in the southern city of mantha, the longitude 53 degrees and 13 minutes east and latitude 36 degrees and 46 minutes north and its height from sea level is 4 meters. This is a major work zone in district. The study carried out in a complete block design as a split plot with 3 repetitions. The main plot (based on the project plan) is composed of management treatments (conservation tillage and no-tillage systems) and subsidiary plot consist of N fertilizer treatments (N fertilizer rates). Conservation tillage consisted of chisel ploughing in autumn and followed by seed bed preparation in spring. Preparing the proper substrate, the farm was left to rest until end of Esfand or the early Farvardin. Balancing C: N ratio of plant remains meanwhile about 60 to 75 Kg N was spread; hard disk operation was performed for leveling plowed ground, clod crushing and mixing fertilizer or green manure prior to planting. Leveling plowed ground has been done second half of Farvardin. In no-tillage system the farm was plowed at the end of spring before planting. Before applying fertilizer treatments, surface composite sampling of the farm was conducted. The samples were analyzed by common method for soil texture, organic matter, electrical conductivity, phosphorus and potassium. These tests were carried out in the Soil and Water Research Institute (appendix). After making plots, fertilizer treatments were applied. N starter fertilizer rate treatment was applied in sub-plot. N levels included 0, 16, 32 and 64 Kg per hectare. Based on the soil test, providing the soil phosphorus and potassium, triple super phosphate (36%) mixed with potassium chloride (60%) was applied. All the fertilizers were applied at stripe planting (5 cm under the planting strips and 5 cm next to the planting strips). Seeds were treated with Rhizobium at planting.Active bentazon 42% and active pinaccole 25 % were applied in turn 0.29 per hectare and 0.003 per hectare, before germination in all plots. The size of given plots was about 4*3 meter and seeds were planted in rows which were located at a distance of 45 cm from each other. Sampling has done three times during a planting season; soybean harvested and gathered from one meter of each row. First sampling carried out in V3 –V4 stage (third node to fourth node);second sampling carried out in R1 stage (beginning of flowering); third sampling carried out in R3 (beginning of pod-filling). Drying the samples, all of them kept in oven at 60 ° C for 120 hours. A 2-mm sieve was used to sift the samples. Then the N concentration of all the samples was measured(Schepers 1989).By harvesting 15 meter of the center two rows in each plot, and seed yields were also measured. The moisture and weight of grain were adjusted to 13%moisture. Samples dried in oven at 60 ° C and were sifted by a 2-mm sieve. Then the N concentration of all the samples was measured by applying dry burning method. Data were finally analyzed by SAS software.

III. RESULT AND DISCUSSION

As results showed soybean yield in conservation tillage system was higher than in no-tillage system. Because of district climate, soil temperature is low at planting. In addition by applying no-tillage method soil warming is delayed. So N in starter fertilizer, in no-tillage method was more useful than in conservation method.

Researchers believed that in unfavorable environmental conditions applying low level N fertilizer next to seeds could increase soybean initial growth.

IV. CONCLUSIONS

By increasing N2 fixation, P application to soybean was able to increase N balance. Positive N contributions are attainable in a soybean–cereal cropping system when the soybean variety is late maturing. This is because long duration allowed the late varieties to fix more N2 than the early and medium varieties. To maximize the benefits of N accumulated through biological N2 fixation and avoid the depletion of soil N, the return of soybean residue is important and this will improve the quality

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

HPLC Method for Quantification of Berberine in Wild and Tinospora Cordifolia – An Important Medicinal Plant

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

96-99

ABSTRACT

A sensitive, simple and accurate HPLC method has been developed for the quantification of berberine, an isoquinoline alkaloid in dry stem of (wild) Miers. ex-Hook.f. and Thoms. Chromatographic analysis was performed using methanol extract, on using a solvent system, comprising of Water containing 0.02 M o-phosphoric acid: ACN (Gradient Run) (V/V) as mobile phase at a flow rate of 1ml/min. And 346 nm gives good separation of berberine at Rt 12.277 min. The maximum of berberine content was observed in methanol extract when compared to other test samples. The proposed HPLC method is rapid and accurate for quantitative monitoring of berberine in Tinospora cordifolia.

Keywords: Tinospora cordifolia, berberine, HPLC.

I. INTRODUCTION

All over the world scientists investigate plants, microorganisms and many other forms of life for biologically active compounds. Research is directed towards interactions between organisms that can be attributed to a chemical substance present in at least one of the species concerned. Of greatest interest is the effect of extracts from tribal plants on human physiology and human pathology, since this is very relevant to the discovery of new drugs for treating diseases of human beings and other mammals. Most of the earliest pharmaceuticals were plant materials. A number of investigations have evolved into a search for new biochemical targets, the development of bio-assays, and high throughput screening of as many compounds as possible to find chemical structures for drug development. [1] The effect on human health and activity following the ingestion or application of plant products is known in most societies and the use of plants for treating diseases started before written history.

Tinospora cordifolia which commonly known as Guduchi has a long history of use in traditional medicine, has recently been shown to have efficacy in the treatment of diabetes. [2] and has been used in Ayurvedic

preparations for the treatment of various disorders throughout the centuries. It is used as an ancient medicine to improve the immune system and body resistance against infections. The whole plant is used medicinally; however, the stem is approved for use in medicine as listed by the Ayurvedic Pharmacopoeia of India. The alcoholic extracts of *Tinospora cordifolia* are reported to have beneficial effects on liver damage either by Kuffer cells stimulation or by other means. [3,4,5] and have also been tested successfully for their immune modulatory activity [6,7] as well as anti-arthritis activity. [8.9]

These medicinal values are often due to higher alkaloid content out of which recently identified amritosides A, B, C and D (clerodane furano diterpene glucosides) have been isolated as their acetates from stems.[10] Other components such as diterpenoid lactones, glycosides, polysaccharides, steroids, sesquiterpenoid, phenolics, aliphatic and aromatic compounds. Leaves of this plant contain protein (11.2%), calcium and phosphorus.[11] One of such well known bioactive component is Berberine (Figure 1) which is found in large amount in *T. cordifolia* stem extract.

Berberine has been shown activity against fungal infections, *Candida albicans*, yeast, parasites along with bacterial and viral infections Berberine seems to exert synergistic effects with fluconazole even in drug resistant C. albicans infections. Some research has been conducted in search for possible use against methicillin-resistant *Staphylococcus aureus* infections. Berberine is considered as potent antibiotic. when applied in vitro and in combination with methoxy hydnocarpin, an inhibitor of multidrug resistance pumps. Berberine inhibits growth of some gram-positive bacteria *Pseudomonas aeruginosa* and *Staphylococcus aureus* and a toxic cyanobacterium *Microcystis aeruginosa*. Berberine is a useful medicine in the treatment of leishmaniasis.

II. MATERIAL AND METHODS

The plant was authenticated by Department of Botany, Faculty of Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. After authentication, fresh and healthy stem of Tinospora cordifolia were collected from the plants grown in herbal garden of Dr. Babasaheb Ambedkar Marathwada University. The stem was shade dried and powdered. Powdered material of plant extracted with methanol solvent [10]. The solvent extract was filtered and concentrated in rotary evaporator. The extract of stem of *Tinospora cordifolia* plants is used for HPLC analysis to quantify the alkaloid (Berberine) content present in *Tinospora cordifolia*.

Preparation of extract from *Tinospora cordifolia*

The dried powdered stem of *Tinospora cordifolia* was allowed to pass through ss sieve (20 mesh). It was extracted and then to exhaustion (Soxhlet) with methanol solvent. The solvent was removed under vacuum to get solid mass and use further analysis.

Preparation of standard solution

A stock solution of standard berberine was prepared in 5ml volumetric flask by dissolving 5 ug/ml in MeOH of accurate weighed berberine standard in about 3ml of solvent Water containing 0.02 M o-phosphoric acid : ACN (Gradient Run) followed by sonication for 5min. and finally making the volume up to mark with solvent.

Preparation of sample solution

Stock solution of sample was prepared by transferring 3.8mg of accurately weighed; 2.8mg of methanol extract in 1ml solvent, of *Tinospora cordifolia* stem powder in the volumetric flasks and then sonicated for 15min. at room temperature. The content of the flask was filtered thought whattman filter paper No.41. The filtrate was collected and use further analysis.

Chemical materials

Acetonitrile, o-phosphoric acid, methanol, was used of AR grade (Omkar Traders, Hi Media, Fine chemicals, Aurangabad.) and standard berberine from Sisco Research Laboratories, Mumbai.

Chromatographic conditions. [11,12]

Injection volume - 2µl

Flow rate – 1ml/min.

Mobile phase – Water containing 0.02 M o-phosphoric acid : ACN (Gradient Run)

Detection wave length – 346 nm

Column: C-18, 250 x 4.6 mm, 5 um, Kromasil

Oven Temp: 40 Degree Celsius

Retention time (Rt) – berberine 12.277 min

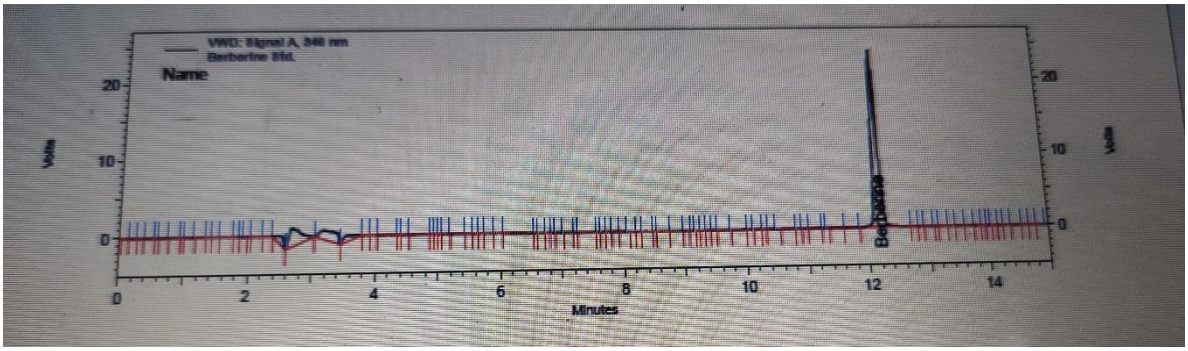

Figure 1. HPLC chromatogram of standard berberine. Berberine peak at the Rt 12.193 min. detected at a wavelength of 346 nm.

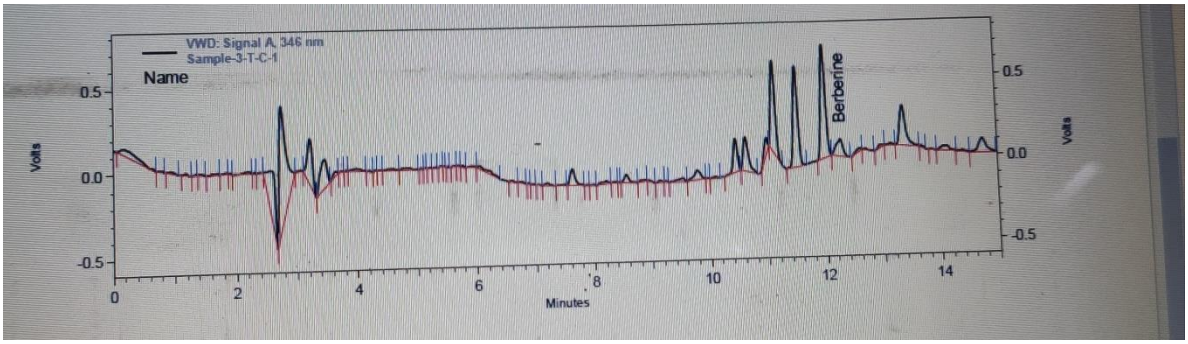

Figure 2. HPLC chromatogram of Methanol extract of *Tinospora cordifolia* peak at the Rt 12.277 min. correspond to berberine detected at a wavelength of 346 nm.

III. RESULT AND DISCUSSION

The present method was conducted to identifying and quantifying the berberine from *Tinospora cordifolia* medicinal plants stem various different fractions. Berberine peaks from solutions of various extract like methanol was identified by their Rt values with these obtained by chromatography of the standard under the same conditions. The peaks of Rt 12.277 min. were observed in the chromatograms obtained from fractions like methanol, the chromatograms of standards and test sample are shown in Fig 1, 2 respectively. The more amount of berberine was present in methanol extract.

IV. CONCLUSION

The HPLC technique is quiet, simple, accurate, precise, reproducible and sensitive. This method can be used for routing analysis of berberine in cured drugs and prepared formulations and also it's used for standardization and quality control of herbal products of traditional medicine containing *Tinospora cordifolia* as an ingredient can be explored.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Studies on Tissue Culture Techniques on Traditional Medicinal Plants

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

100-108

ABSTRACT

The Marathwada has a very rich plant biodiversity, many of which are medicinally useful. The rich resource is disappearing at an alarming rate as a result of over-exploitation. Rapid agricultural development, population growth, urbanization and the indiscriminate collection of traditional medicinal plants from the wild is resulted in an over-exploitation of naturalresources. The conventional meansofpropagationtakesalongtimeformultiplication and also clonal nonuniform. Plant in vitro regeneration is a biotechnological tool that offers a tremendous potential solution for the propagation of endangered and superior genotypes of medicinalplantswhichcouldbereleasedtotheirnaturalhabitatorcultivatedonalargescale for the pharmaceutical product of interest. After the last few years of intensive research programs in our laboratory, we are able to micro propagate some of the endangered and valuable medicinal plants species of this region.

Keywords: Medicinalplants,tissueculture,Marathwada

I. INTRODUCTION

Biodiversity is the store house of species richness and acts as a cushion against potentially dangerous environmental changes and economic reforms. Plant genetic resources are the major biological basis of the world food security. In all means they support the livelihoods of every life on planet earth. Hence, conservation of such a buffer is considered fundamental and providedpriorityinallsectorsofglobaldevelopment(Tandonetal.,2009).AsdefinedbyWHO, healthisastateofcompletephysical,mental,andsocialwell-beingandnotmerelytheabsence of disease or infirmity. Medicinalplants,sincetimesimmemorial,havebeenusedvirtuallyallculturesasasourceof medicine. It is estimated that 70-80% people worldwide relay chiefly on traditional, largely herbal, medicines to meet their primary health care needs (Srivastava et al., 1995).

Approximately85%oftraditionalmedicinepreparationsinvolvetheuseofplantsorplant extracts (Vieira and Skorupa, 1993).

India has 2.4% of world's area with 8% of global bio-diversity. It is one of the 12 mega-diversity hot-spot regions of the world. Across the country, the forests are estimated to harbour 90% of India's total medicinal plants diversity. Only about 10% of the known medicinal plants of India are restricted to nonforest habitats (Wakdikar, 2004). According to Schippmann et al. (1990), one fifth of all the plants found in India are used for medicinal purpose. The world average standsat12.5%whileIndiahas20%plantspeciesofmedicinalvalueandwhichareinuse.But accordingtoHamilton(2003),Indiahasabout44%offlora,whichisusedmedicinally.Although itisdifficulttoestimatethetotalnumberofmedicinalplantspresentworldwide,thefactremains truethatIndiawithrichbiodiversityranksfirstinpercentflora,whichcontainactivemedicinal ingredient (Mandal, 1999).

Medicinal plants are an integral component of ethno-veterinary medicine also. Farmers and pastoralists in several countries use medicinal plants in the maintenance and conservation of the healthcare of livestock. Intestinal disorders in cows, in Mexico, are treated with herbal extracts of Polakowskia tacacco. Dietary supplements such as vitamin A in poultry feeds in Uganda are supplied through enrichments of amaranth (Amaranthus sp.). In fact, interest of such use in the veterinary sector has resulted primarily from the increasing cost of livestock maintenanceandtheintroductionofnewtechnologyintheproductionofveterinarymedicines and vaccines (Hoareau and DaSilva, 1999).

In the past few decades, there has been an ever-increasing global inclination towards herbal medicine,followedbyabelatedgrowthininternationalawarenessaboutthedwindlingsupplyof the world's medicinal plants (Bodeker, 2002). The plants used in the phyto- pharmaceutical preparations are obtained mainly from the naturally growing areas. The genetic diversity of medicinal plants in the world is getting endangered at alarming rate because of ruinous harvesting practices and over-harvesting for production of medicines, with little or no regard to the future. Also, extensive destruction of the plant-rich habitat as a result of forest degradation, agricultural encroachment, urbanization etc. are other factors, thus challenging their existence (Gupta et al., 1998).

Alargesumofmoneyispumpedeveryyeartoreplenishthelostbiodiversityandlargenumbers of protocols are available at present. Unfortunately, we are not witnessing any improvement in the status of these plant species in nature and the number of threatened plant species is increasing gradually (Tripathi, 2008). Therefore, the management of traditional medicinal plant resources has become the matter of urgency. To cope up with alarming situation, Biotechnological tools have been increasingly applied for mass propagation, conservation of germplasm, study and production of bioactive compounds and for genetic improvement of the medicinal plants. Tissue culture is useful for multiplying and conserving the species, which are difficulttoregeneratebyconventionalmethodsandsavethemfromextinction.Micropropagation has superiority over conventional method of propagation because of high multiplication rate.

Most of the plant raised through seeds are highly heterozygous and show great variations in growth, habit and yield and may have to be discarded because of poor quality of products for their commercial release. Likewise, majority of plants are not amenable to vegetative propagation through cutting and grafting. Moreover many plants propagated by vegetative

meanscontainsystemicbacteria,fungiandviruses(Murchetal.,2000).Theinvitropropagated medicinal plants are genetically pure elite. Micropropagation techniques are must for conservation of an endangered medicinally important species within short period and limited space. The plants produced from this method are independent of climatic changes or soil conditions.

TraditionalMedicinalPlants-

Efforts have been devoted for in vitro mass multiplication of valuable medicinal herbs, Aegle marmelos, Acorus calamus, Celastrus paniculatus, Commiphora mukul, Peganum harmala, Prosopiscineraria,Simmondsiachinensis,Spilanthesacmella,Steviarebaudiana,Sapindus mukorossi. A thorough understanding of economic and ecological importance of the above mentioned important endangered medicinal plants are as follows:

Aeglemarmelos(L.)Corr.,(Rutaceae)commonlyknownas"BaelTree"isapopularvulnerable medicinalplantmostlyfoundintropicalandsubtropicalregions.Almostallpartsofthetreeare used in preparing herbal medicine for treating diarrhea, dysentery, dyspepsia, malaria, fever, jaundice,andskindiseasessuchasulcers,urticaria,andeczema.Theplantisrichinalkaloids, among which aegline, marmesin, marmin, and marmelosin are the major ones (Kala, 2006).

Acorus calamus Linn. (family Araceae) commonly known as "sweet flag" or "Bach" is an important endangered medicinal plant. It is a semiaquatic herb with creeping rhizomes and swordshapedlongleaves.Therhizomespossessanti-spasmodic,carminativeandanthelmintic propertiesandalsousedfortreatmentofepilepsy,mentalailments,chronicdiarrhea,dysentery, bronchial catarrh, intermittent fevers and tumors (Anonymous, 2000).

Celastrus paniculatus Willd. (Celastraceae) commonly known as Malkangni, Jyotishmati, Bitter sweetisarareandendangeredimportantmedicinalplantbelievedtosharpenthememoryand alsousedtocureanumberofdiseases.Itisalarge,woody,unarmedclimbingshruboccurring naturally in hilly parts of India up to an altitude of 1200 m. This plant is widely used to cure depression, paralysis, leprosy, fever, abdominal disorders and cancerous tumors. Chemical constituents of seeds as revealed by phytochemical analysis were sesquiterpene alkaloids like celapagine, celapanigine and celapanine (Sharma et al., 2001).

Commiphora mukul (Hook. ex Stocks) Engl. (Burseraceae), popularly known as "Guggul", is an importantendangeredmedicinalplantspecies.ItiswidelydistributedintropicalregionsofAfrica and Asia. It grows wild in the arid, rocky tracts of north- western regions of India. The plant exudes a medicinal oleo-gum resin ('Guggul') from incisions made on the bark in cold season.

The latex oozes out through the wound as a yellow fluid which slowly hardens to form the oleo-gumresin.Gumisbitter,acrid,aromatic,pungent,carminativeandstomachicstimulating the appetite and improving digestion. It is astringent, expectorant, anthelmintic, antispasmodic, anti-inflammatory, diuretic, depurative, anodyne, vulnerary, themogenic, antiseptic, nervine tonic, aphrodisiac, stimulant, emmenagogue and diaphoretic (Sosa et al., 1993). It also possesesstrongpurifyingandrejuvenatingpropertiesandissaidtobeauterinestimulant.The main constituents of guggul include phytosterols, gugulipids and the ketonic steroid compound (guggulsterones) mainly E and Z gugguisterones. These are responsible for the lipid lowering effects of guggul (Singh et al., 1997).

PeganumharmalaL.(SyrianRue),amedicinallyimportantperennialherboffamilyNitrariaceae, distributed over semi-arid areas of North-West India, North-Africa and central Asia. Medicinally the fruits and seeds of this plant are digestive, diuretic, hallucinogenic, hypnotic, antipyretic, antispasmodic, nauseant, emetic, narcotic and uterine stimulant (Chatterjee, 1997). A red dye
obtained from seeds is widely used in Turkey and Iran for colouring carpets. Leaves are useful in asthma, colic, dysmenorrhea, hiccup, hysteria, neuralgia and rheumatism. The plant has also beenusedasantimicrobial,antitumoral,incuringmalariaandhasinsecticidalpotential(Kiritikar, 1995).

Table1.Listofthesomeoftheendangeredandeconomicallyimportantmedicinalplantsmicro propagated in our laboratory

Sr. No.	Scientific(Local)name& Family	PartUsed	Flowering& fruiting	Medicinaluses
1.	Veroniacinerea(L.)(Mar-Sahadevi)Asteraceae	Leavesand flower	July-March	Wholeplantwithitssmallflowersusedperspirationinfebrileaffections,inmalerialfever, Seedsusedinalexiphrimicandanthelmintic,alternativeinleprosyandchronicskindiseases.
2	Ecliptaprostrata(L.)(Mar–Maka)Asteraceae	Leavesand roots	July-Feb	Itisusedfevertonic,jaundice,panda,scabies,complexin,laxative,goodforeyes,braintonic, hairtonic,dandruff,wholeplantusedas hepatoprotective.
3	SpilanthespaniculataDC.(Mar–Akkalkara)Asteraceae	Rootsand flowers heads	Oct.-March	Itisusedaspowerfulstimulant.Inreleasetoothacheandalsoheadache,paralysisoftongue. itisalsousedinThroat,gumandcough.It releasespainandswelling.
4	TridaxprocumbensL. (Mar - DagadiPala)Asteraceae	Whole plant	Throughouttheyear	hepatoprotectiveandleafisusedindysentery, cuts,wounds,bronchialcatarrh,menorrhagia, leucorrhoea.
5	PlumbagozeylanicaL.(Mar-Chitrak)Plumbainaceae	Root	July - October	Digestionandappetite.Stimulantofcontrolnervessystem.controlinginbloodpressure.Also useindyspepsia,piles,diarrhoeaandskin diseases.
6	Enicostema axillare(Lam.)Raynal(Mar–Nai)GentianaceaeJuss.	Leaves	Sept.toJan.	

Theleavesareusedindiabetes.usedinstomach-ache,thepowderofplantmixedwithhoneyacts asabloodpurifierandgivenindropsy, abdominal
ulcers,herniaandrheumatism. 7
Catharanthusroseus(L.)(Mar-Sadaphuli)Apocynaceae Root & Leaves
Throughouttheyear
Rootisusedininsomnia,cancer,diabetes,stomachic,menorrhagia,bloodpressure,cardio tonic, tranquiliser and sadetive. leaf is used in menorrhagia,waspstring,dysmenorrhoea, diabetes.
8
NeriumindicumMill.Gard.(Marathi–Kaner)Apocynaceae Root
Throughouttheyear
Root&rootbarkarediureticandcardiactonic.Rootpasteisusedappliedtohaemorrhoids,in cancers, ulcerations and also in leprosy.It is also usefulinscorpionstingsandsnakebites,ring worm.
9
Calotropisprocera(Ait.) R.Br.
(Mar – Rai) Asclepiadaceae Root,leaves &flower Aug-Dec
Rootsisusedinsnakebite,toothache.driedrootpowderusedindysentery.itisusedastonic and stomachic for debility.
10
Gymnema sylvesire (Retz.) R. Br.(Mar - Aphumari) Asclepiadaceae
Leaves April-Oct.

LeavesareusedasantidiabeticagentsalongwithseedpowderofKarelaandJambhulin1:1:1 proportions. It lowers sugar immediately. Leaf powder is used in relieving stomach pain.
11
Pergularia daemia(Forks.)Choiv.Res.(Mar–Utarand) Asclepiadaceae
Wholeplant July-Feb
Theextractofwholeplantusefulinuterineandmenstrualtrouble.Thedecoctionofleafisusedin Asthma.Leafjuiceisgivendiarrhoea,rheumatic
swellingandinhealingofwounds. 12
HemidesmusindicusR.Br.(Mar-KawalichyaMulya)PeriplocadeaeSchlecht. Root
Aug-Dec
Adecoctionofrootisgivenincaseoflossofappetiteaftertyphoid.Decoctionofrootisalso given in rheumatism.The root is diuretic, improvesurination.Rootpowderwithhoney givenforbloodpurification.

Ageneraloverviewofbeginningofmicropropagationofmedicinalplants

In vitro culture is one of the key tools of plant biotechnology that exploits the totipotency nature of plant cells (Haberlandt, 1902) and unequivocally demonstrated for the first time in plants by Steward et al. (1964). Beyond the discovery of kinetin (Miller et al., 1955), the major work on in vitro regeneration has been centered around tobacco (Nicotiana tabacum L.) tissue culture, culminating in the first convincing demonstration of the control of differentiation of shoots or roots or both by the kinetin-auxin ratio (Skoog and Miller, 1957) followed by carrot (Daucus carotaL.)tissueculture and birth of the concept of totipotency of plant cell with the regeneration of complete flowering plants of carrot from its phloem cells (Steward et al., 1964). Thus, the micropropagation of

medicinal plants remained neglected till complete plants of Rauvolfia serpentine (L.) Benth., were produced from its somatic callus tissue (Mitra and Chaturvedi, 1970).

Planttissueculturereferstogrowingandmultiplicationofcells,tissuesandorgansofplantson defined solid or liquid media under aseptic and controlled environment. The commercial technologyisprimarilybasedonmicropropagation,inwhichrapidproliferationisachievedfrom tiny stem cuttings, axillary buds, and to a limited extent from somatic embryos. The process of micropropagation is usually divided into several stages i.e., prepropagation, initiation of explants, subculture of explants for proliferation, shooting and rooting, and hardening. These stages are universally applicable in large-scale multiplication of plants.

The field performance of these tissue cultured plants depends on the selection of the initial material,mediacomposition,growthregulators,cultivarandenvironmentalfactors(Changetal., 1994). The effects of auxins and cytokinins on shoot multiplication of various medicinal plants have been reported by Skirvin et al. (1990). Lal and Ahuja (1996) observed a rapid proliferation rateinPicrorhizakurroausingkinetinat1.0–5.0mg/l.BarnaandWakhlu(1998)hasindicated that the production of multiple shoots is higher in Plantago ovata on a medium having kinetin along with NAA. Faria and Illg (1995) have also shown that the number of shoots per explant depends on concentrations of the growth regulators and the particular genotypes. The nature and condition of explants has also been shown to have a significant influence on the multiplication rate. Mao et al. (1995) reported that the actively growing materials were more responsivetoshootinductionthandormantbudsinClerodendrumcolebrookianum.Also,BAP was proved superior to 6- purine (2ip) and TDZ for multiple shoot induction.

The cultured cells and tissue can take several pathways to produce a complete plant. Among these, the pathways that lead to the production of trueto-type plants in large numbers are the popularandpreferredonesforcommercialmultiplication(BhojwaniandRazdan,1983;Pierik, 1989).

Regenerationandorganogenesis

In this pathway, groups of cells of the apical meristem in the shoot apex, axillary buds, root tips, and floral buds are stimulated to differentiate and grow into shoots and ultimately into complete plants. The explants cultured on relatively high amounts of auxin form an unorganized mass of cells, called callus. The induction of callus growth and subsequent differentiation and organogenesis is accomplished by the differential application of growth regulators and the controlofconditionsintheculturemedium.Withthestimulusofendogenousgrowthsubstances or by addition of exogenous growth regulators to the nutrient medium, cell division, cell growth and tissue differentiation are induced. There are many reports on the regeneration of various medicinal plants via callus culture. Pande et al. (2002) have reported the successful in-vitro regeneration of Lepidium sativum from various explants on MS medium supplemented with 4.0 mg/l BAP and NAA.

SomaticEmbryogenesis

Inthispathway,groupsofsomaticcells/tissuesleadtotheformationofsomaticembryoswhich resemblethezygoticembryosofintactseedsandcangrowintoseedlingsonsuitablemedium.

Theprimarysomaticembryosarealsocapableofproducingmoreembryosthroughsecondary somatic embryogenesis. Plant regeneration via somatic embryogenesis from single cells, that can be induced to produce an embryo and then a complete plant, has been demonstrated in many medicinal plant species (Tripathi and Tripathi, 2003).

Arumugam and Bhojwani (1990) noted the development of somatic embryos from zygotic embryos of Podophyllum hexandrum on MS medium containing BAP and IAA. Efficient development and germination of somatic embryos are prerequisites for commercial plantlet production. Chand and Sahrawat (2002) reported the somatic embryogenesis of Psoralea corylifolia L. from root explants on medium supplemented with NAA and BAP. Rooting of shoots was best achieved using different concentrations of auxins. In A.maemelos, MS half strength medium supplemented with IAA proved better (Yadav and Singh, 2011). In P. cineraria, rooting was achieved on half strength MS medium supplemented with 3.0mg/lIBA(KumarandSingh,2009),whileinL.leucocephala,NAAresultedinbetterroot formation.

AcclimatizationandTransferofmicropropagatedplantletstothesoil

Complete regenerated plantlets with sufficient roots were taken were gradually pulled out from the medium and immersed in water to remove the remains of agar-agar particles sticking to the rootsystembyusingafinebrush.Theseplantletsweretransferredtopotscontainingmixtureof sterilized soil and sand (3:1). The potted plantlets were covered with a transparent polythene bag to ensure high humidity around the plants. The pots were supplied with MS (half strength) salt solution on alternate days. After about two weeks the polythene bags were removed for 3-4 hours daily to expose the plants to the conditions of natural humidity for acclimatization. These plants were shifted to bigger pots after one month of its transfer and were maintained under greenhouse conditions. Successful acclimatization and field transfer of the in vitro regenerated plantlets have also been reported.

Exvitrofieldevaluationofacclimatedplants

These recent advances in plant tissue culture have resulted in the development of protocols for micropropagation of many important medicinal plants, but the process of transplantation and acclimatization of micropropagated plants to soil environment continues to be a major bottleneck in the micropropagation of medicinal plants. Acclimatization of a micropropagated plant to a green house or field environment is essential because anatomical and physiological characteristics of in vitro plantlets necessitate that they should be gradually acclimatized to the field environment (Hazarika, 2003). Successful acclimatization minimizes the percentage of deadordamagedplants,enhancingtheplantgrowthandestablishment(ShaValliKhan,2003). Dynamics of the process are related to the acclimatized plant species and both in vitro and ex vitro culture conditions (Pospisilova et al., 1999). Now days, mycorrhizal technology can be applied to reduce transplantation shock during acclimatization, thus increasing plant survival and establishment rates of micropropagated medicinal plant species.

II. CONCLUSION

Medicinal herbs as potential source of therapeutics aids has attained a significant role in health system all over the world for both humans and animals not only in the diseased condition but also as potential material for maintaining proper health. Fresh strategies of afforestation management and restoration of depleting natural resources blending with modern technologies arealsorequired.Biotechnologyisamotoroftechnologicaladvancementinboththedeveloped and developing countries though at different levels in scope and content. In recent years, tissue

culturehasemergedasapromisingtechniquetoobtaingeneticallypureelitepopulationsunder in vitro conditions rather than have indifferent populations. Thus in vitro cell and tissue culture methodology is envisaged as a mean for germplasm conservation to ensure the survival of endangered plant species, rapid mass propagation for large scale revegetation and for genetic manipulationstudies.Tissueculturepro tocolshavebeendevelopedforseveralplantsbutthere are many other species, which are over exploited in pharmaceutical industries and need conservation.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Histopathological Examination of Fresh Water Fish Infected with Cestode Parasite from Beed District (M.S.) India

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
109-112

ABSTRACT

The fresh water fish *Mastacembelus armatus* (Lecepede, 1800) collected from Beed district and after dissection their intestinal passage was examined for cestode parasites. The cestode *Circumoncobothrium* Sp., Shinde G.B. (1968) was recovered from intestine. The histopathological examination were carried out and observation clearly shows that the parasites, *Circumoncobothrium* Sp. approaching the intestinal villi embedded in fibroblast cell, plasma cell and are attach to the intestinal villi. The histopathological studies of cestode *Circumoncobothrium* sp. have been studied to find the pathological changes & extend the damage of the intestinal layers of *Mastacembelus armatus*.

Keywords: - Beed, Cestode, *Circumoncobothrium* Sp., *Mastacembelus armatus*,

I. INTRODUCTION

Histopathology is the microscopic study of tissue affected by disease. Histological and anatomical changes in parasitized organism have been studied in various ways and by a number of workers. And yet a detailed cytological study of the effect of parasitism upon the host is nearly a virgin field (H. P. Kjbrschow Agersborg, 1924).

Fish diseases and histopathology, with a broad range of causes, are increasingly being used as indicators of environmental stress since they provide a definite biological end point of histological exposure, it is a mechanism which can provide an indication of fish health by determining early injury to cells and can therefore be considered an important tool to determine the effect of parasites on fish tissue.

Histopathology of infected intestine of fresh water fish is relatively a neglected field of study specially caused by helminth parasites. Although, there are several studies particularly those related to the parasite morphology but histopathological investigations on most helminth species that had been described are still scarce. Hall and Bellwood, (1995) stated that, the histological analysis of the digestive system is recognised a good indicator of the nutritional status of fish.

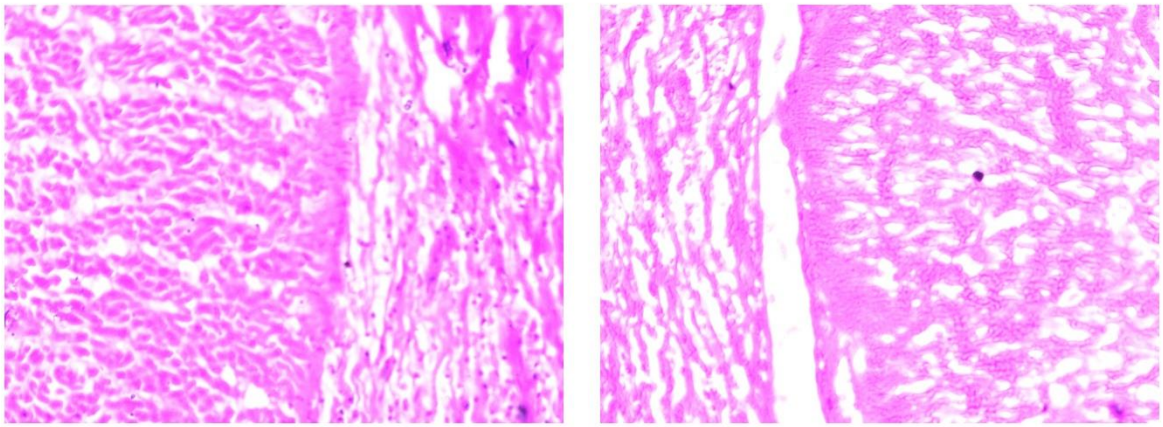
In the present investigation clearly reveals that cestode parasites cause considerable damage and therefore great economic losses to the fishermen. Thus, these groups of parasites require attention of parasitologists to develop an integrated control programme.

II. MATERIAL AND METHODS

For the histopathological examinition, fresh water fish *Mastacembelus armatus* were dissected to observe the rate of infection. Some fishes were found to be infected and some normal. Both infected and normal hosts intestine were cut in to small pieces and were fixed in Bouin's fluid to study histopathogical changes. The fixative inhibits the post mortem changes of the tissues. Then tissues were washed dehydrated through alcoholic grades, cleared in xylene and embedded in paraffin wax (58-62 ^{0}C). the blocks were cut at 7 µ and slides were stained in Eosin Hematoxylin double staining method. Best slides or sections were selected and observed under the microscope for histopathology study.

III. RESULT AND DISCUSSIONS

After cestode parasite infection there is a drastic alteration which leads to the destruction of the internal anatomy, resulting in the total change of its appearance. Normal intestine showed, healthy villi and all layers are clearly observed. Infected fish intestine includes shortening of villi, thickening of the muscle layer, destruction of the villi, hold fast penetration of the mucosa and the damage of both the mucous and submucous membranes.



A. T.S. of non infected Intestine of *Mastacembelus armatus.* **B. T.S. of infected Intestine of *Mastacembelus armatus.***

Plate-1:- The host parasite relationship between *Mastacembelus armatus* and *Circumoncobothrium* Sp.

Plate- 1:- The host parasite relationship between *Mastacembelus armatus* and *Circumoncobothrium* Sp.

A. T.S. of non infected Intestine of *Mastacembelus armatus.*

B. T.S. of infected Intestine of *Mastacembelus armatus.*

In T.S. of intestine of *Mastacembelus armatus* it has observed that the cestode is having penetrative type of scolex and there is no doubt that they cause heavy mechanical tissue scratch to their host. Scolex of worm deeply penetrated through layers causing heavy mechanical injury to mucosa, sub mucosa, come to lie near the

muscularis mucosa. The intestinal villi encircle the scolex of worm and intestinal structural design gets destructed and also it forms cyst like structure, pad formation took place.

IV. CONCLUSION

Above histopathological conversation it can be concluded that cestode parasites i.e. *Circumoncobothrium* Sp. finds nutritive material from the intestine of hosts i.e. *Mastacembelus armatus* which is crucial for their nourishment and development.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Some Important Traditional Medicinal Plants Used to Cure Child Health Illnesses

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
113-117

ABSTRACT

India has an abundant source of medicinal herbs. Plant-based medications have been used for traditional healthcare since prehistoric times due to its ease of use and cost-effectiveness. Based on traditional healers or practitioners who use their invaluable knowledge to treat plant-based traditional treatments for child health care. The information gathered from traditional practices was also cross-checked to ensure its legitimacy. Traditional healers typically utilize leaves, flowers, fruits, seeds, and bark in the form of a decoction, paste, extract, juice, ash, or infusion to treat a variety of diseases. The current study found that plant-based traditional information was collected and documented from many traditional healers of the Parali tahasil using questionnaires and personal interviews. The practitioners use common therapeutic plant materials such as Gulvel, Aghada, and Halad. The most popular plants utilized by practitioners are herbs, followed by shrubs, trees, and climbers. This study found that documenting ethnobotanical knowledge in the administration of local health care is the first step toward opening new doors for researchers in the field of child health care.

Keywords: Researchers, Child health care, Medicinal herbs.

I. INTRODUCTION

Information about medicinal plants in India has been acquired over many centuries based on numerous archaic restorative systems, such as ayurveda, unani, and siddha (Lone and Bhardwaj, 2013). According to the World Health Organization, traditional medicine serves over 80% of the world's population, either directly or indirectly (Rath *et al.*, 2009; Pattnaik *et al.*, 2006). India is one of the world's most biodiverse regions, with diverse ethnic, linguistic, socioeconomic, and cultural zones. Thus, it is reasonable to anticipate this country to have firsthand knowledge of therapeutic herbs and their usage in the treatment of a wide range of illnesses. In rural India, 70% of inhabitants rely on conventional medicine (Rao and Laxmi, 2012). The annual global market

for herbal medicines reached more than $60 billion in 2000, and it is continuously increasing at a pace of 15 to 25 percent (WHO, 2008). In India, healthcare prices have risen considerably during the previous decade. According to a Towers Watson research (based on data from top global insurance companies), India witnessed 22% increase in health care expenses in 2006. It reaches 12% in 2009 and is anticipated to rise again to 13% in 2012. People are looking for easy and cost-effective medicines to improve their quality of life (Biswas, 2012). The steep rise in health-care costs, combined with the threat of increasing side-effect risks from synthetic medicine, is convincing the public to believe in low-cost alternative medicines with few or no side effects, such as Ayurveda, Homoeopathy, Siddha, Unani, Yoga, Naturopathy, and others which provide a wide range of preventive and remedial treatments that are both cost-effective and efficient.

Parli Vaijnath is a city and municipal council in Beed district, Maharashtra. It serves as the administrative center for the Parli taluka in Beed district. It is one of 11 Talukas in Bid district. Parli Taluka consists of 105 villages and one town. As per the Census India 2011, Parli Taluka has 57806 homes, population of 287208 of which 149421 are males and 137787 are females. Children aged 0 to 6 account for 39846 of the total population, or 13.87%. Prior to independence, it was a part of the former Hyderabad state. It was included in the State of Maharashtra in 1960. Topographically, the parali taluka divided into two deferent region e.g. Godavari valley and Balaghat range. In now day's majority of this region's land has been turned to agricultural use. Environmental degradation, deforestation, and agricultural development are all contributing to the decline of traditional knowledge. Therefore, acquiring information about therapeutic plants is an essential need. Thus, the goal of this research was to interact with local traditional healers and document their knowledge of medicinal plants, their practice, and the treatment of various maladies.

II. MATERIALS AND METHODS

2.1. Ethno Botanical Survey:

The practice of plant based medicinal system is widespread among the ethnic people of Parali Taluka, and it is intensely rooted in their socioeconomic traditions. Though, the documentation of local medicinal practices is conspicuously missing for the region. Considering the immense cultural and ethno-linguistic diversity of the tribal people of the taluka, several field interviews in the form of semi-structured questionnaire were designed to cover as in Parli municipal as possible, in order to take full advantage of the diversity of knowledge and the plant species used in conventional therapy. Collected information is useful to curing several ailments on child health care by using different medicinal plants. Take several visits for ethnic places in different seasons when plants get flowering. Informants getting the information about local names, used plant parts, formulation and dosages were also documented. The aims of this investigation were systematically clarified to all the informants before the interview (Cunningham, 2001).

2.2. Collection and Identification of Medicinal Plant:

Fresh and healthy plant materials of medicinal herbs were collected in the month of August- 2020 to November- 2020 from different location of Parli taluka of Beed district. Identification of plant species were confirmed using Flora of Marathwada by Naik *et al.*, 1998. Collected plant materials were pressed, dried, and mounted on herbarium sheet for further study.

III. RESULT AND DISCUSSION

Most of preparation was arranged from fresh and healthy plant material in the form of a decoction, powder and paste. Nearly all used approach of medication administration is oral ingestion, followed by external use. A large amount of diseases and pains were usually treated either with a single plant or a mixture of plant parts. In some cases, ointments like mustered oil, ghee (a remedy from milk) etc. and other ingredients such as black peeper, ginger, tulsi, etc. were also used to make ethnic formulations along with the parts of plant species. In children diseases the highest use report in the present study were documented for *Ocimum sanctum, Azardricta indica*, *Terminalia bellirica, Terminalia chebula, Phyllanthus emblica, Adhatoda vasica, Acacia nilotica* etc. Present study aims was undertaken to explore the plant based traditional remedies, and local health care practioner from Parali taluka of Maharashtra state. For this purpose series of field surveys were carried out. The information on traditional medicinal plants was collected through conversations, questionnaires etc. with local traditional healers (Baidyas, Ojhas, Traditional healer, aged knowledgeable persons). The information collected from the informants along with the medicinal plants, their local names, plant parts used as a medicine, formulation and doses has been given in Table 1. Traditional medicines are easily available and safe to cure various health problems. In recent era almost every nation of the world used it. Hence it is a best choice for alternative medicine due to its huge demand (Aziz *et al.,* 2018). In several formulations, number of part was used. Such as Leaves, rhizomes, roots, and the whole plant, it is most important hazards in the restoration of the medicinal plants (Ahmad *et al.*, 2009).

Table 1: Plant based herbal remedies practiced for child health

Sr. No.	Remedies	Disease treated	Name of healer
1.	Some small pieces of stem of Gulvel boiled with one glass of water up to remaining half glass then filter it and used an empty stomach at early morning.	Fever (Hadi tap)	Mr. Govind Manik Solanke
2.	Drink ½ cup of leaf juice of *Achyranthes aspera* (Aghada) in early morning with empty stomach.	To increase Appetite	Ms. Rukmini Dharmraj Tambud
3.	Burn the leaves of *Ficus religiosa* ash and few powder of urmeric is mixed with water take orally.	Vomiting	Mr. Kulkarni Mama Bhisegaokar
4.	Take bitter gourd juice, turmeric and pinch of salt mix it well and lick with honey.	Stomach ache	Ms. Anu Balaji Chaure
5.	Take a decoction of Leaf juice of *Tinospora cardifolia* twice a day for 3 days.	Fever	Mr. Sopan Limbaji Mundhe
6.	4-5 Fruits of *Ficus carica* (anjir) given twice a day.	Cough, Constipation	Mr. Vitthal Dharmraj Tambud
7.	1 cup of *Melia azedarach* decoction is used orally before breakfast.	Diabetes	Mr. Vitthal Dharmraj Tambud
8.	5-6 Seeed of *Embelia ribes* boiled with 1 cup of water up to 1/3 and drink it after cooled down for 7 days.	Remove worm, constipation	Mr. Ramesh Balasaheb Shinde

9.	Boiled 8-10 curry leaves in water then add trifala powder and amla powder in 1:1 ratio mix well take it at bed time for 7 weeks.	Early greying hair, Hairfall	Mr. Ankush Bhimrao Mundhe
10.	Take some turmeric powder with jiggery powder boil it with some water and drink before bed.	Cold, Dry cough	Mr. Abhay Vithal Lonikar
11.	Take 1 glass of water and add it 2 spoon of sugar and pinch of salt mixed well and give it for several intervals.	Loose motion	Mr. Hanumant Namdev Nagargoje
12.	Take roasted white sesame seeds, black sesame seeds and flax seeds grind them with the help of grinder then add it jaggery powder and make ladoos give it early morning.	Calcium Deficiency	Ms. Mandakini Jarichand Mundhe

IV. CONCLUSION

In this study revealed that how different interviewing procedures facilitate to gather the information concerning the name of the diseases treated plants and their usage, with their mode of direction. Total of 12 types of local ailments was treated with 12 phyto-therapeutic uses in this district. The manufacturing process of herbal preparation is yet a secret and passed on generation after generation vocally. Appropriate examination of herbal formulations and phyto-constituents of used plants can open new entrance for the researchers. However, ethno-botanical facts is the basis of further justification of practices and plant uses in the context of a professional approach to develop new herbal drug (Muhammad *et al.*, 2005).

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Extracts of Green Alga Cladophora Sp. And Its Role in Seed Germination of Urd Bean

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

118-123

ABSTRACT

Algae contains different growth promoting substances which has definite impact on growth and yield of plants . Since historical time algae are used as biofertilizers in the form of extracts or manure to promote growth of plants . Algal extracts prepared in different solvents plays a significant role in seed germination . In present research work role of green alga Cladophora sp. in seed germination of Urd bean (Vigna mungo (L .) Hepper) have been studied in detail by preparing extracts in different solvents . The alga was collected in bulk and in pure form from Murambi lake located in Ambajogai tehsil area of Beed district in Maharastra. Algal extracts were prepared in different solvents such as cold water , hot water, acetone , methanol , ethanol and chloroform . Urd bean seeds treated with hot water and cold water extracts showed highest percentage of seed germination with increase in shoot and root length . In methanol and chloroform algal extracts, germination of seed was not occur. Less number of seeds were germinated in ethanol and acetone algal extracts. Aqueous extracts of Cladophora sp. shows encouraging results . Effective biostimulants can be produced from green alga Cladophora sp. for better germination and growth of plants.

Key words: Algal extracts , seed germination , urd bean

I. INTRODUCTION

Algae have been recognized as biofertilizers in the form of extracts and manure. Since historical time algae are used as fertilizers to promote growth of plant. Algae are proved to contain various biomolecules such as growth hormones amino acids , antibiotics ,vitamins, micro and macroelements promoting seed germination and plant

growth. Algal extracts prepared in different solvents plays a significant role in seed germination. The bioactive compounds present in algae enhances all physiological reaction that lead to good growth of plants (Fayza and Zenaib, 2008). Fouly et. al. (1992) and Mahmood (2001) observed that algae contain high percentage of macronutrients, considerable amount of micronutrients and amino acids. In present century use of algae in agriculture has become a modern concept in sustainable agriculture development . The main objective of present research work was to study effects of extracts of green alga *Cladophora* sp. on seed germination of urd bean.

Urd bean (*Vigna mungo* (L.) Hepper) is one of the important pulse crop grown throughout in India. It is also known as black gram. Urd bean holds high protein value than most of the legumes. It is also used as green manure crop . In India urd bean farmed in Rabbi and Kharif seasons. In Maharshtra this crop is extensively grown in Kharif season . Extracts in different solvents of green alga *Cladophora* sp.were tested in germination of urd bean. In India work on use of algal extracts in seed germination has been started in 1964 by Gupta. He studied accelerated germination in paddy seeds treated with algal extracts. Gupta and Shukla (1969) used water and other extracts of blue green algae in germination of rice seeds which shows marked seed germination. Adam (1991) worked on effect of extracts of *Nostoc muscorum* on seed germination of sorghum wheat and maize. Pingle and Abhang (2007) studied effect of fresh water algal extracts on seed germination of vegetable crops. Kamble (2008) worked on role of algal extracts in seed germination of sorghum , mothbean and sesamum. Jadhav and Borkhade (2015) studied effect extract of algal biomass on seed germination of wheat . Mahadik and Jadhav (2014 , 2015 and 2020) extensively worked on effects at extract of *Cladophora crispata* and Chara fragilis on mung bean and of *Spirogyra jugalis* on tomato. Yadav (2017) observed effect of *Phormidium* extracts on germination of soyabean . Sangekar and Jadhav (2023) studied role of extracts of *Spirogyra* and *Oscillotoria* on germination of mung bean seeds.

II. MATERIALS AND METHODS

Collection of algal material and preparation of fine powder: Green alga *Cladophora* is abundantly grows in Murambi lake located in Ambajogai Tahsil area of Beed district of Maharashtra. Alga was collected in bulk and pure form in the month of November 2023. It is identified by microscopic observations. After identification algal material was washed thoroughly with fresh water to remove unwanted impurities, epiphytes and adhering sand particles and mud. Algal material dried in shade at room temperature for four days, followed by oven drying at 40^{O} c for 8 hours. Dried algal material was grind to a fine powder and stored in air tight bottles.

Preparation of algal extracts in different solvents: Algal extracts in different solvents such as cold water, hot water, acetone, methanol, ethanol and chloroform were prepared. For the preparation of cold water extracts 1 gm of fine algal powder was taken in 100 ml conical flask . 25 ml cool sterile distilled water added to it, flask plugged with cotton and kept it overnight. Next day it has been filtered through Whatman filter paper No.1 and coloured filtrate obtained and used for soaking of seeds. Hot water extracts was obtained by taking 1 gm. of fine algal powder in 100 ml conical flask. 50 ml sterile distilled water added to it and boiled for 10 to 15 minutes , cooled it and filtered . Filtrate obtained used for soaking of seeds . Extract in acetone was prepared by taking 1 gm of fine algal powder in 100 ml conical flask . 20 ml acetone added to it and flask was plugged with cotton and kept overnight in cool and dry place. The volume was restored and content were centrifuged to collect maximum supernatant. The content was filtered through Whatman filter paper No.1 and filtrate was

allowed to dry at room temperature. 20 ml of sterile distilled water was added to it and used for soaking of seeds. In similar way algal extracts in different solvents were prepared separately.

Treatment of seeds with algal extracts: Healthy seeds of urd bean were obtained from authorised seed distributor. To avoid microbial contamination, selected seeds were surface sterilized with 0.1 % $Hgcl_2$ solution. Surface sterilized 10 seeds were soaked in algal extracts for 4 hours. Seeds soaked in water served as control. The soaked seeds were placed on moist germinating paper for germination in sterilized petriplates. Percent germination, root length and shoot length of seedlings were measured after 7 days of germination at room temperature.

III. RESULTS AND DISCUSSION

Treatment of urd bean seeds with extracts of green alga *Cladophora* shows interesting results. The results have been summarized in Table 1. In control 70% seeds were germinated with 8.3 cm. shoot and 4.2 cm in root length. Cold water extract showed 90% seeds germination with 9.8 cm shoot and 5.1 cm root length. In hot water extract seed germination was 100% with 11.7 cm shoot and 6.2 cm root length. Acetone extract showed 30% germination with 7.3 cm shoot and 5.0 cm root length. In ethanol extract 10% seeds were germinated with 3.2 cm shoot and 1.2 cm root length. In methanol and chloroform extracts seeds of urd bean were not germinated. Cold water and hot water extracts of *Cladophora* showed stimulatory effects in seed germination of urd bean with higher shoot and root length. Similar kind of results were obtained by Kambale (2008) and Mahadik and Jadhav (2020) and Pingle and Abhang (2007) Found that aqueous extracts of *Nostoc a*nd *Lyngbya* increases shoot and root length of tomato, chili and fenugreek. Jadhav and Borkhade (2015) and Jadhav and Mahadik (2022) recorded similar kind of observations while studying effect of algal extracts on seed germination of wheat and Sunflower. Recently Sangekar and Jadhav (2023) worked on the role of extracts of *Oscillatoria* and *Spirogyra* in seed germination of mung bean and reported that aqueous algal extracts shows stimulatory effects on seed germination with enhancement in shoot and root length .Use of aqueous extracts of algae in seed germination is a promising method in sustainable agriculture development.

Table 1: Effect of different solvent extracts of *Cladophora* sp in seed germination of urd bean seeds.

Sr. No.	Solvent used	Percentage of seed germination %	Shoot Length cm	Root Length Cm
1	Cold water	90	9.8	5.1
2	Hot Water	100	11.7	6.2
3	Acetone	30	3.7	5
4	Methanol	00	00	00
5	Ethanol	10	3.2	1.2
6	Chloroform	00	00	00
7	Control	70	8.3	4.2

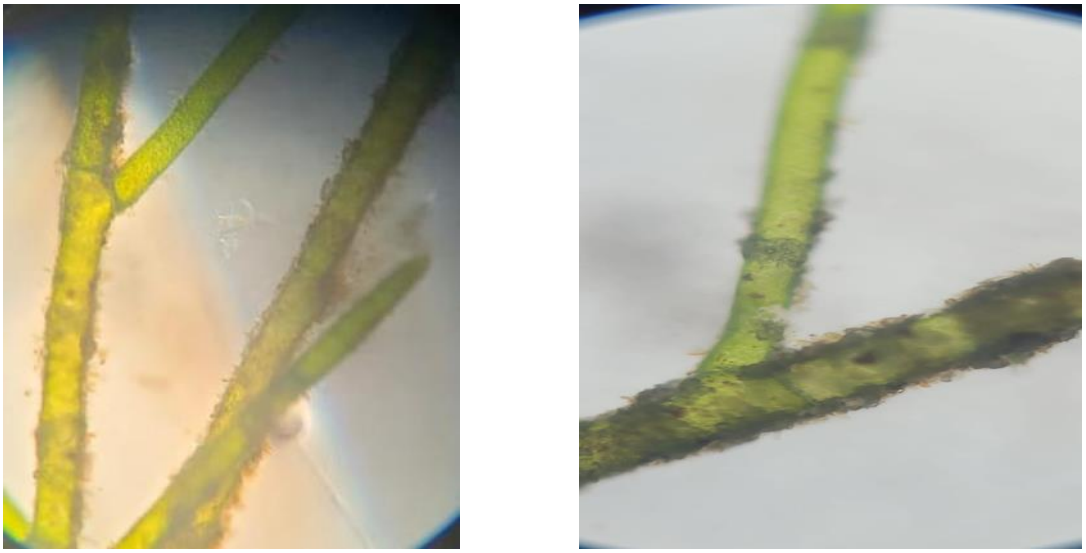

Fig. 1 Microphotograph of *Cladophora* sp.

Fig. 2 Fine powder of *Cladophora* sp.

Fig. 3 Preparation of algal extracts in different solvents.

Fig. 4 Effect of algal extracts in seed germination of urd bean.

IV. CONCLUSION

On the basis of overall result of present research work, it is concluded that urd bean seeds treated with aqueous extracts of *Cladophora* sp. show stimulatory effects on seed germination with increase in shoot and root length. It is found that green alga *Cladophora* sp. contains growth promoting compounds especially growth regulators which stimulate seed germination. This alga can be used in the production of effective biostimulants. Such practice can be recommended to the farmers for attaining better germination and growth.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

The Taxonomic Aspects, Anatomy and Histochemical Analysis of Morinda Citrifolia L. of Family Rubiaceae

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ARTICLEINFO

Article History:

Accepted: 03 Feb 2024

Published: 10 Feb 2024

Publication Issue :

Volume 11, Issue 12

Jan-Feb 2024

Page Number :

124-131

ABSTRACT

Morinda citrifolia L. is important medicinal genus of family Rubiaceae. This genus has 11 species distributed in India. The plant is commonly found in South- East Asia and Austrilia. The plant is commonly known as Noni plant. The plant prefereed tropical, subtropical and monsoonal climatic condition. The plant also able to survive in drought and harsh environmental condition. The present research study focuses on the taxonomical characters of plants where it is small tree or shrub of about 3 to 11 m height, root,stem and leaves very well developed and arranged well.the flowers are complete, perfect, white colored corolla tetramerous with 5- stamens. The shape of leaves, color of flower fruit odor and such different characters of plant were studied through this work. Along with anatomical characters of leaf, petiole, midrib, lamina and stem were studied. This work also reveals the presence of metabolite compounds by histochemical analysis of this plant. As this plant has great traditional and medicinal importance this study helpful for its actual conservation strategies and awareness of this plants importance amondg the people.

Keywords:- *Climate, Drought, Taxonomical, tetramerous*

I. INTRODUCTION

Morinda citrifolia L. belongs to family Rubiaceae shows 11 species in India. It is native to South-East Asia and to Australia. It is commonly called as Indian mulberry or Noni. It is small tree or consider as shrub with of about 3-11m height after fully maturation. The plant grows on sandy soil or rocky shores, the plant also tolerate drought condition. The plant is known for its extreme tolerance for wide range of environmental tolerance. The arrangements of leaves are opposite; flowers complete and fruits are yellowish to white fleshy and soft.

All plant parts are traditionally useful from root, bark, leaves, fruits etc. the plant has both medicinal and traditional applications though the plant still does not have scientific support upto the mark. Now a day, developed countries demands the product derived from the plant part. (Dahivya SM et.al, 2017) . For any plants when we study its external features it is called morphological study and when we study internal plants structure it refers as anatomical study. The microscopic studies is most cheapest and simplest method for correct identity of materials (Kumar S.et.al., 2011).

Taxonomic Aspects: -

The botanical genus name *M.citrifolia* L. is derived from two Latin word 'Morus' means 'mulberry' and 'indicus' as 'Indian'. The plant is found native of South-East Asia and Austrilia.The plant survives in drought and very wide range of soil and also harsh environmental condition. It mostly preferred tropical, subtropical and monsoonal condition of climate. The plant is small tree or shrub with about 3 to 10 m of height.

As plant can able to survive in harsh environmental condition hence they have extensive lateral tap root system with deep penetration. The stem of plant is woody, circular, branched. The leaves of plant are arranged opposite with pinnately veined. The margin of leaves is elliptic to ovate 20-45cm long and 7-25cm weadth.petiolae stout with entire apex.

Flowers are complete, bisexual, peduncle 10-30 mm long, calyx and corolla distinct, 5-lobed corolla, stamens 5, flowers 4-merous. The type of fruit present is syncarpous, greenish white at young and become yellowish at maturity. The fruit is 5-10 cm long and about 3-4 cm in diameter and become soft when ripe. The pulp of fruit is juicy and gelatinous upon ripening of fruit.

The seeds have air chamber and able to remain viable even after floating in water. The wood of *M. citrifolia* is yellowish colored and fruit when ripe have unique and distinct disagreeable odor. The flowering and fruiting remains continuous throughout year but sometimes it may get disturbed due to climatic condition like temperature, rainfall, sunlight, duration etc.

Scientific classification:

Kingdom: - Plantae
Division-Embryophyta
Superdivision: - Spermatophyta
Class:-Magnoliopsida
Superorder:-Asteranae
Order:-Gentianale
Family:-Rubiaceae
Genus:- Morinda
Species:-*M.citrifolia* L.

II. MATERIALS AND METHODS

Study Area and Plant Collection-

M. citrifolia L. is the large populating the areas of Bhoom place which is located in Dharashiv District and Maharashtra state in India. The study was started with the collection of Fresh leaves and stems of *M. citrifolia L.* were collected the study area from *Bagalwadi, Bedarwadi, Jaiwantnagar, Anandwadi, Ambi Tal. Bhoom, dist. Dharashiv)*. The collection occurs when it is in flowering and fruiting season from natural habitat. All

morphological characters like location, habitat, habit, height, floral and fruit characters were observed at the time of collection of material. The plant was identified and with the help of flora of Marathwada by V.N.Naik as followed by taxonomic evidences as likewise Herbarium, specimen slide and photos.

Anatomical Characters:-

For anatomical study of the *M.citrifolia* freehand sections of plant part taken place. The taken thin,entire sections were mounted in glycerin and stained in safranin. The specimen was stained in Safranin, Toluidine blue (Obrien et.al, 1964).

For anatomical studies fresh and healthy leaves with petiole was separated from plant, washed under running water to remove the impurities (Singh H.et.al.2015). The T.S. of leaves, petioles and midrib regions of the plant were taken after clearing the material for their microscopic studies (Sharmila S.et.al.2016). In detail descriptive terms of anatomical characters taken from the standard anatomy book (EasuK. 1964).

Histochemical study:-

For the present investigation temporary mounting of sections were taken and treated with different chemical reagents. For histochemical test standard solutions were used. Molish reagent used for carbohydrates (Kokate CK,*et. al.*, 2014). Potassium ferro cyanide, gllaciall Acetic acid for protein (Johansen, 1940), for alkaloids Johansens 1940 method used, concentrated sulphuric acid reveals saponins (Cavalcanti AC *et.,al* 2014). For lipids iodine water was used (Khandelwal KR., *et.,al*)sodium carbonate used to stain tannins (Krishnamurthy KV 1988). The photographs were taken to study the anatomical description of section of plant parts taken.

III. RESULT AND DISCUSSION

Microscopical investigation of *M.citrifolia* leaves reveals the presence of different tissues, cells and internal structure. In the leaf there was upper and lower epidermis with paracytic stomata and glandular trichomes observed. The ground tissue gets separated into outer smaller collenchymatous cells and remaining large, circular thin walled parenchymatous cell. The vascular system shows wide bowl-shaped strand with adaxial bent loop like structure. Very prominent, circular xylem elements and masses of phloem were observed. The epidermis is single layered, narrow, rectangular cells with thick cuticle.

The anatomical study of petiole is semicircular with two short, thick lateral wings. The epidermis is thin walled, single layered with rectangular cells. In the ground tissue there are homogenous parenchymatous cells present. The vascular system is V shaped collateral with angular, thick walled xylem and masses of phloem.

The lamina smooth evenly thick. Epidermis is thick with cuticle. The anatomical observation of petiole shows semicircular structure with two thick lateral wings on sides. Epidermis of petiole is thick walled cells below to which is ground tissue which are homogeneous parenchymatous. The vascular system is V shaped with curved ends. Thick walled xylem elements with prominent masses of phloem strands is observed.

Histochemical Analysis:-

Histochemical analysis is one of the cheap and simplest method to identify present compounds in tissues and cells of plant (EasuK., et.al.,1979). The result of the histochemical analysis was predicted in Table 3. Presence of carbohydrate in the ground tissue of *M.citrifolia* was observed with pink coloration after Fehlings treatment to the stem. The presence of starch test performed by using Iodine and potassium iodide (Johansen, 1940 and Gurrr 1965). . Presence of starch granules found to be essential for taxon identification (Gerlach J. 1996) . the presence of alkaloids from the plant part was tested by following Johansen (1940) method of using Iodine

solution . 10% Ferric chloride reagent used for observation of Tannins which colors blue color to ground tissues. The blue color also observed when ground tissues treated with Conc.sulphuric acid for presence of saponins. Whereas the reaction with iodine water found to be positive for presence of lipids.

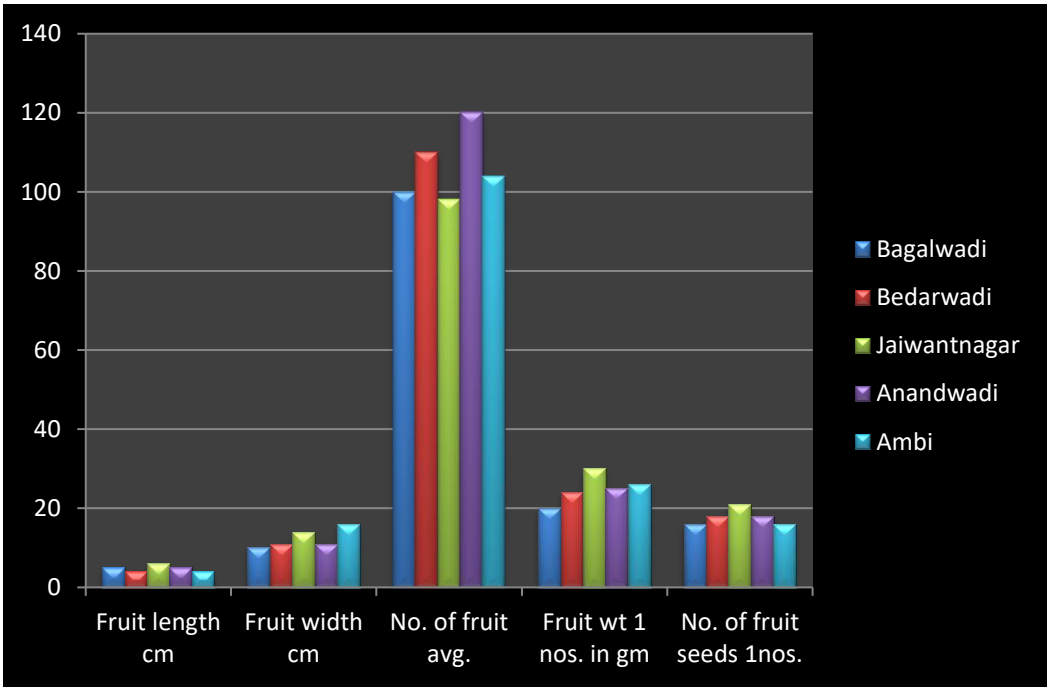
These metabolic compounds present in stem of *M.citrifolia* get identified by reacting with different reagents hence such simple, cheap histochemical tests can be found helpful for giving quality control measures.

Table 1. Qualitative and Quantitative data of plant *M. citifolia L.*

Plant	Qualitative Data			Quantitative data	
	Plant height in Fits	Stem circumference C=2πr in cm	Stem color	Bark	canopy
1	15	19.42cm	Light green	rough	irregular
2	20	27.54cm	Light green	rough	irregular
3	23	18.05cm	Light green	rough	irregular
4	22	16.42cm	Light green	rough	irregular
5	27	29.35cm	Light green	rough	irregular

Table.2. Qualitative and Quantitative data

Area	Quantitative data					Qualitative data			
	Fruit length cm	Fruit width cm	No. of fruit avg.	Fruit wt 1 nos. in gm	No. of fruit seeds 1nos.	Fruit shape	Young fruit color	Ripe fruit color	Fruit texture
1	5	10	100	20	16	Oval	green	yellow	Rough
2	4	11	110	24	18	Oval	green	yellow	Rough
3	6	14	098	30	21	Oval	green	yellow	Rough
4	5	11	120	25	18	Oval	green	yellow	Rough
5	4	16	104	26	16	Oval	green	yellow	Rough



Graph no. 01 Qualitative Data of Different location of study area.

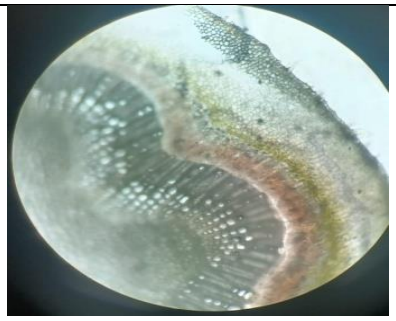
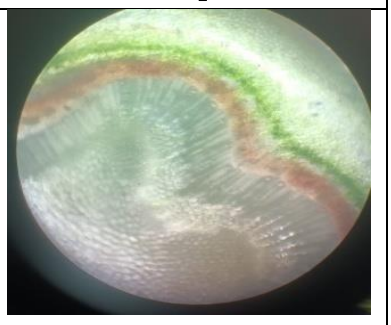
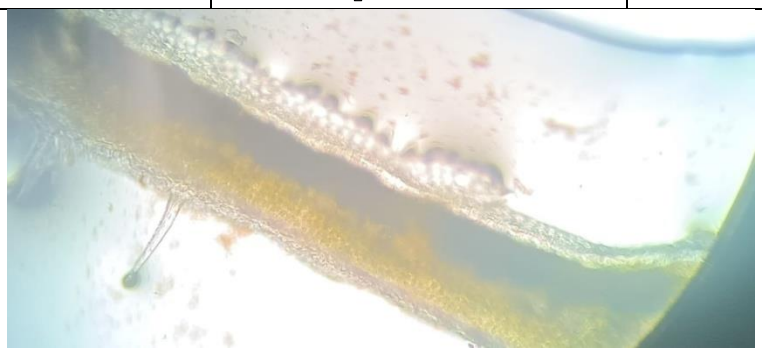
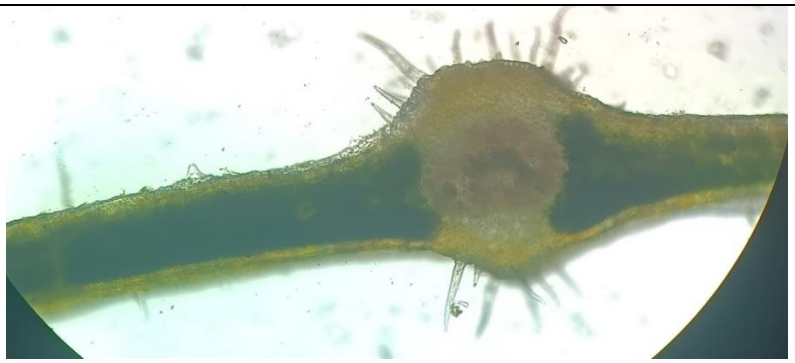
Table 3. Histochemical Analysis of various metabolites in *Morinda Citrifolia*

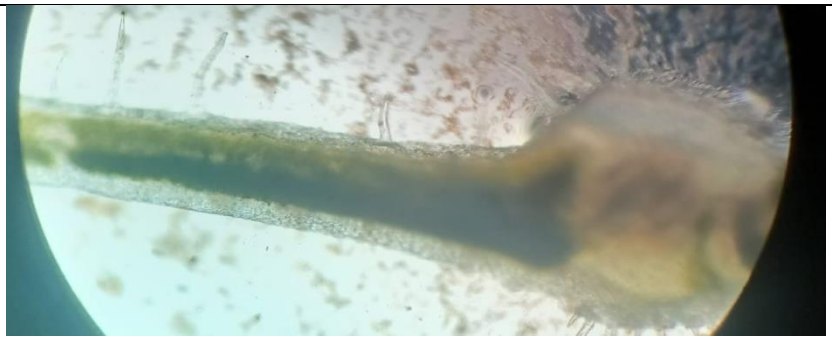
Sr.no.	Compound observed	Reagents used	Color observed
1	Carbohydrates	Fehlings Reagent	Pink
2	Starch	Iodine, Potassium Iodide sol.	Blue violet
3	Alkaloids	Iodine solution	Golden yellow
4	Tannins	10% Ferric Chloride	Dark blue
5	Saponins	Conc. Sulphuric acid	Bluish black
6	Lipids	Iodine water	Yellow

Habitat of Plant

Twing of plant

Fruit & leaf of plant

		
Young fruit bering of plant	Diff. germplasm of plant	Mature fruit of plant
		
T. S Of petiole	Test for Saponin	Test for carbohydrate
		
Test for Flavonoids		
		
Test for Protein		



Test for tannin

Importance:-

1. Whole plant (Root, Stem, Leaves and Fruit) are medicinally important hence it needs to be protect and conserved. The young leaves of the plant are used as vegetables and eaten with Rice while mature leaves are covered around fish before cooking and then eaten with cooked fish.
2. Dried leaves and fruits are used to make teas, and it used for malaria, analgesic, laxative etc. treatments.
3. Decoction is made from bark of stem used in jaundice, extract of leave, bark and fruit used in hypertension.
4. The fruit of plant has great medicinal value such as decreases leg pain, reduce inflammation, lower stress and blood pressure and also reduce bacterial formation.
5. Now a days, *M. citrifolia* used as dietary supplement to prevent cancer, high blood pressure.
6. The plant have antioxidant, anti-inflammatory, antibacterial, antiulcer properties.
1. It means that the plant has chemical compounds that are effective in treating various diseases.

IV. CONCLUSION

The plant *M. citrifolia* commonly found in Indonesia and Austrilia but in Tal.Bhoom , Dist. Dharashiv also shows number of plants as the area also comes under drought , harsh condition. The macroscopic and microscopic study of the plant shows presence of different characters. According to (WHO) World Health Organization such medicinally important plants needs to be study in detail before any tests of the plant can be undertaken. The plant has very muchimportance in treatment of different health related problems. As the plant has to much importance it needs to be conserved and would be helpful for further scientific studies on this plant.

V. ACKNOWLEDGMENT

The present research work acknowledgment of the Institution Head Principal, Shankarrao Patil Mahavidyalaya, Bhoom, Dharashiv. All teaching staff and non teaching staff and available facilities to laboratory and Instrumentation for the research work during completion of work.

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Tomato Anthracnose Disease Caused by Colletotrichum Species

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
132-136

ABSTRACT

Anthracnose disease is one of the major economic constraints to Tomato production worldwide, especially in tropical and subtropical regions. Accurate taxonomic information is necessary for effective disease control management. In the Colletotrichum patho-system, different Colletotrichum species can be associated with anthracnose of the same host. Little information is known concerning the interactions of the species associated with the Tomato anthracnose although several Colletotrichum species have been reported as causal agents of Tomato anthracnose disease worldwide. Although the management and control of anthracnose disease are still being extensively researched, commercial cultivars of Colletotrichum coccodes that are resistant to the pathogens that cause tomato anthracnose have not yet been developed.Colletotrichum gloeosporioides, Colletotrichum Phomoides, Colletotrichum coccodes, andColletotrichum dematium are the four main species of Colletotrichum that cause tomatoanthracnose.

Keywords: Anthracnose; Tomato; Colletotrichum Coccodes,C.Phomoides; Identification

I. INTRODUCTION

Anthracnose, derived from a Greek word meaning ‘coal’, is the common name for plant diseasescharacterized by very dark, sunken lesions, containing spores (Isaac, 1992).Typical fruit symptoms include dark, sunken, and circular lesion with orange conidial masses. Pathogen isolates were obtained from a diseased tomato fruits, on PDA medium forming a white to gray colonies. The cultures developed black acervuli around the center of the colony. Conidia were hyaline, aseptate, and fusiform or rarely cylindrical. Appressoria were smooth, simple, clavate to ovate, and varied from light to dark brown. Pathogenicity tests with representative isolates were conducted on symptomless, detached tomato fruits.

The genus *Colletotrichum*(*teleomorph Glomerella*)contains an extremely diverse number of fungi includingboth plant pathogens and saprophytes. Plant pathogenicspecies are important worldwide, causing diseasescommonly known as anthracnose of grasses, legumes,vegetables, fruits, and perennial tree crops. Thedisease can occur on leaves, stems, and fruits of hostplant (Sutton, 1992). Anthracnose diseases appear inboth developing and mature plant tissues. Two distincttypes of diseases are: those affecting developing fruitin the field (preharvest) and those damaging maturefruit during storage (postharvest). The ability to causelatent or quiescent infections has grouped *Colletotrichum*among the most important postharvest pathogens(Bailey et al., 1992).Anthracnose disease caused by several *Colletotrichum*spp. is a significant economic constraint on tomato(*Lycopersicon esculentum*Mill.) production worldwide.

In the *Colletotrichum* patho-system, different *Colletotrichum* species can be associated with anthracnose of the same host (Simmonds, 1965; Freeman et al., 1998; Cannon et al., 2000). Anthracnose disease can occur on leaves, stems, and both pre- and post-harvest fruits (Isaac, 1992).*Colletotrichum gloeosporioides*(Penz.) Penz. &Sacc., *Colletotrichum coccodes*(Wallr.) S.J. Hughes, and*Colletotrichumdematium*(Pers. ex Fr.) Grove are threemain species of *Colletotrichum*that cause tomato anthracnosein the United States (Dillard, 1989; Byrne etal., 1997; Sanogo et al., 1997; LeBoeuf, 2007). In Bulgaria,*Colletotrichum acutatum*J.H. Simmonds has beenreported as a causal agent of tomato fruit anthracnose(Jelev et al., 2008). The corky root of tomato caused by*Colletotrichum atramentarium*(Bert. et Br.) Taubenh.,(synonym of C. *coccodes)* has also been found in Croatia(Panjan and Lušin, 1963). Correct and accurate identification will thus ultimately lead to more effective disease control and management, e.g., selecting appropriate fungicides, or long lasting resistant cultivars (Whitelaw-Weckert et al., 2007).

Anthracnose of tomato is primarily a disease of ripe and over-ripe fruit. If left unchecked, the disease can cause serious losses in yield and marketability. Caused by several species of the fungus *Colletotrichum*, the disease is widespread and common in areas where moisture conditions promote disease development. Anthracnose also affects eggplant, pepper, and potato. *C. coccoides* is the most common pathogen of tomato fruit. *Colletotrichum* species are known as broad range pathogens as a single species is capable of infecting diverse hosts and numerous species infect a single host (*Freeman S, Katan T, Shabi E.*1998)

Morphological and culturalcharacteristics:

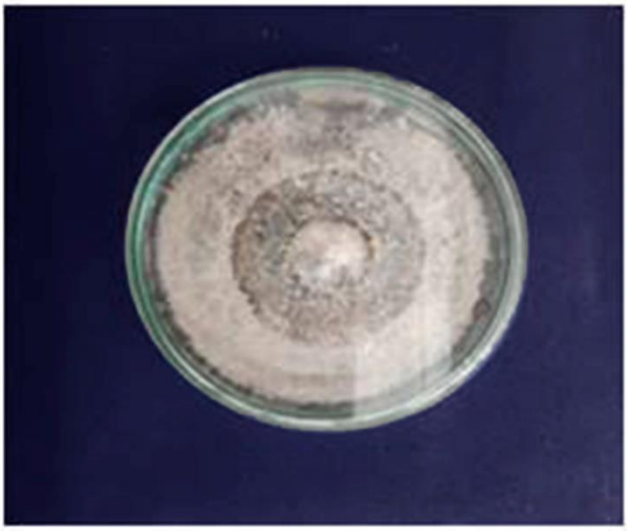
The isolates were cultured on potato dextrose agarPDA in darkness at 25oC. The appearance of the colonies,the occurrence of sectors, and the vegetative andreproductive structures were described after 10 daysof incubation. The conidia were taken from activelygrowing colonies and suspended in sterile water. Lengthand width were measured for 100 conidia, and conidial shape was recorded using the light and scanningelectronic microscopy. Appressoria were producedusing a slide culture technique, in which 10 mm2 squaresof PDA were placed in an empty Petri plate. Theedge of the agar was inoculated with spores taken froma sporulating culture, and a sterile cover slip was placedover the inoculated agar (Johnston and Jones, 1997).After 5 days, the shape and size of the 100 appressoriaformed across the underside of the cover slip were examinedmicroscopically. Morphological characteristicsof conidia and appressoria of tomato isolates werecompared with reference isolates of *C. Coccodes*and*C. gloeosporioides*.

II. RESULTS

Disease symptoms

Fruit symptoms begin as small, dark, sunken lesionsthat have a water-soaked appearance, which increasein diameter and coalesce, leaving a large sunken softarea. Under favorable temperatures, lesions on ripefruit become visible within 5 to 6 days after infection. Orange conidial masses may occur scattered or inconcentric rings on the lesion (Figure 1a). Black acervuliare produced just beneath the skin of the infectedfruit (Figure 1b).

Figure 1. Anthracnose symptoms on tomato fruit: (a) sunken necrotic lesion with orange conidial masses; (b) black acervuli on the infected fruit.



Growth of *C. coccoide* in PDA

Setae and conidia of *C. coccoide*

III. CONTROL

Select seed from anthracnose-free fruit or treat seedswith a fungicide. Hot water treatment is recommendedto destroy seed-borne fungi. Soak seed at 50 °C for 25minutes. Following treatment, plunge the hot seeds intocold water, dry on paper, and dust with thiram. Freshlyharvested seed withstands heat treatment better thanone- or two-year-old seed.Use healthy transplants. Sanitize flats if reusingthem for transplant production. Broad-spectrumfumigants can be applied to soil in seedbeds to controlthe pathogens.Rotate with nonhost crops and avoid potato,soybean, pepper, eggplant, and cucurbits. Avoiddamaging tomato roots when cultivating. Stake plantsto improve air circulation and to reduce leaf and fruitwetness. Mulch to reduce soil splash onto fruit andlower leaves. Minimize or avoid overhead irrigation toreduce periods of wetness on tomato fruit. Harvest fruitpromptly since anthracnose develops more readily asthe fruit ages. Allow infested crop debris to decomposecompletely before planting again. Weed regularly.Apply protectant fungicides to plants starting whenthe first fruit are set. This will prevent or minimize theoccurrence of latent infections. Resistant varieties areavailable.

AVRDC

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Effect of Higher Concentration Aqueous Extracts of Enteromorpha Flexusa on Germination and Seedling Growth of Test Plant Raphanus Sativus var. Japani

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
137-140

ABSTRACT

Seaweed extracts have been marketed for several years as fertilizer additives. Different forms of seaweed preparation such as liquid Seaweed fertilizers and either whole or finally chopped powdered algal manure has been used and all of them have been reported to produce beneficial effects on cereals, pulses and flowering plants. Liquid extracts of brown algae are being sold as bio-stimulants or biofertilizers under various brand names.

To find out the effect of different concentration of fresh aqueous extract of an alga Enteromorpha flexusa extract of different concentration viz. 2.5%, 5.0%, 7.5% increased the root growth, shoot growth, and total seedling growth of the test plant Raphanus sativus var. Japani seedling growth promotion was co – related with extract concentration.

Keywords : Enteromorpha flexusa, Raphanus sativus, biofertilizers, seaweed.

I. INTRODUCTION

Medcalf et al (1975) worked on seasonal variation in yield of water-soluble polysaccharides, ash, sulfate, uronic acid, and neutral sugar contents of Ulva lactuca. Maximum production of polysaccharide yield was highest during June and July.

Brantsevich (1975) treated cabbage and tomato crop plants with blue green algae as organic fertilizer and recorded an increase in ammonium and nitrate nitrogen contents of soil, leaf nitrate reductase activity and crop yield.

Yamaguchi (1976) listed symbiotic and non-symbiotic microorganisms capable of fixing nitrogen and occurring in paddy fields and their contribution to their nitrogen supply in soil. He recorded increase in rice yield by 15 – 25% by inoculating blue green algae (eg. Tolypothrix) in paddy fields He also suggested enhancement of microbial nitrogen fixation by liming.

Crawford (1977) studied chemical, physical and biological changes associated with Chara succession in ponds. Analysis of Chara-dominated pond water revealed lower free CO2, bicarbonate alkalinity and total hardness. He also recorded high dissolved O2 and low phosphates.

Griffiths (1978) investigated specific blue green algal carotenoids in sediments of Esthwaite lake water. Maximum carotenoids viz. Oscillaxanthin and Myxoxanthophyll were found in the sediments correlated to maximal growth of Oscillatoria species in the lake water.

Dave and Parekh (1978) detected amino acids in protein hydrolyzates of Ulva fasciata, Ulva lactuca, Ulva profunda, Ulva rigida, and Ulva stenophylla from different parts of Saurashtra coast of India. They used two-dimensional paper Chromatography technique for separating and estimating amino acids. They recorded maximum aspartic acid in all samples. Tryptophan and Cysteic acids were detected for the first time in marine algae.

Bhogale (1979) reported species of Cyanophyceae from Jowar, cotton, wheat, paddy and sugar cane fields irrigated with various water sources. He reported Microcystis, Chroococcus, Gloeoocapsa, Gloeothece, Aphanocapsa, Aphanothece, Spirulina, Oscillatoria, Phormidium, Lyngbya, Microcoleus, Cylindrospermum, Nostoc, Anabana, Aulosira, Scytonema, Tolypothrix, Microchaete and Calothrix.

II. MATERIALS AND METHOD

Enteromorpha flexusa L. was collected from Konkan Harnai, Kolthare and Alibag growing in shallow tide pools and rock pools, attached to stones or rocks and even on open rock surfaces. The
collected material was washed with tap water. Make extract of Enteromorpha flexusa with different Higher concentration viz. 2.5%, 5.0%, 7.5% were prepared in distilled water.

Seeds of test plants Raphanus sativus var. Japani procured from local market were surface sterilized with 0.1% mercuric chloride and washed thoroughly. 30 seeds were placed in three Petri dishes. Germinating paper was used 10 ml of aqueous extract Enteromorpha flexusa was added in every Petri plate. Seeds were allowed to geminate in the laboratory conditions. On 5th day measurements of seedling growth were taken. Percentage inhibition or stimulation over control and ANOVA variance was calculated.

% Inhibition or stimulation: (C-T /C) X100 (Where C: control, T: treatment).

Effect of Higher concentration of aqueous extract Enteromorpha flexusa on germination and seedling growth of test crop plant Raphanus sativus var. Japani

Plant material	Paramete	Control	2.50%	5%	7.50%	P-value
Enteromorpha flexusa	Rg	5.15	10.53 [104.46]	11.08 [115.14]	11.34 [120.19]	1.86 E-06
	Sg	4.14	4.97 [20.04]	5.52 [33.33]	5.77 [39.37]	0.032037
	TSg	9.29	15.5 [66.84]	16.6 [78.68]	17.11 [84.17]	1.73E -05
	Ger %	96.67	90 -6.89	93.33 -3.45	100 3.44	

Data presented are means of three replicates; values within the same row with different letters are significantly different at 0.05% P-level by Single factor ANOVA test followed by CD & Tukey's test

Fig. Effect of Higher concentration of aqueous extract Enteromorpha flexusa on germination and seedling growth of test crop plant Raphanus sativus var. Japani

III. REASULT AND DISCUSION

The aqueous extract of Enteromorpha flexuosa (Wulfen) J. Agardh., exerted stimulatory effect on root, shoot and total seedling growth. Higher extract concentrations (2.5 % to 7.5 %) promoted 'Rg' (root growth) by 104.46 to 120.19 %. In comparison, shoot growth (Sg) was less promoted (by 20.04 to 39.37 over control. Overall total seedling growth (TSg) recorded was promoted by 66.84 to 84.17% over control. Seed germination was slightly inhibited from -6.89 to 3.44 over control. Root growth & shoot growth is increase with increasing the concentration of aqueous Enteromorpha flexuosa that means algae used as good biofertilizer in feature

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International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST

Botanical and Medicinal Aspects of Indian Spices Plants : A Review Research

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ARTICLEINFO

Article History:
Accepted: 03 Feb 2024
Published: 10 Feb 2024

Publication Issue :
Volume 11, Issue 12
Jan-Feb 2024
Page Number :
141-145

ABSTRACT

Spices cultivated in India are considered as importantnutraceutical crop from many centuries. Biochemical components especially phenolic compounds are important for food and pharmaceutical industries. Present study was pertained for the botanical, phytochemical and biological potential of Indian spices. More than 50 species of plant from more than 35 families are reported and cultivated as spices plant. Phytochemical constituents belonging to phenolic group like salicylic acid, gallic acid, hesperidine, naringenin, caffeic acid; etc are abundantly present in spices plants. Due to presence of such phytochemical constituent's, spices are used as food additive and food preservative as it possesses anti-bacterial and anti-fungal properties. Indian spices are also have well known biological potential like anti-diabetic, anti-inflammatory, analgesic, anti-cancer activity. Indian spices have a wide variety of bio-functions and their synergistic actions which protect the human body. Present study will useful for the food and pharmaceutical sector as well as researchers working on spices phytochemistry.

Keywords : Spices, Nutraceutical, Phenolics, Phytochemical, Biological Potential

I. INTRODUCTION

In India, the medicinal plants are now widely used by most of the people in different indigenous system of medicine like Siddha, Ayurveda, and Unani (Ravishankar and Shukla, 2007). About 4.5 million of plant species are found in India and among them only 250,000-500,000 plant species have been examined phytochemically for pharmaceutical or pharmacological activities (Singh and Kumar, 2017). The phytochemicals or plant extract could be used to treat different diseases and new formulation for the drug discovery in pharmaceuticals (Singh et al., 2017). Medicinal plants play an important role in the continuation of livelihood improvement, especially women in an environmentally sustainable manner while maintaining the biodiversity of these natural products (Sharma et al., 2017). World Health Organization has reported that about 80% of the world's population

depends on traditional medicine for their preliminary healthcare needs. The presence of various active chemical substances in medicinal plants defines their medicinal value (Yadav et al., 2017). Various kinds of primary and secondary metabolites are present in plants. Due to the presence of these bioactive compounds or secondary metabolites plants show various pharmacological activities such as anti-oxidative, antiallergic, antibiotic, hypoglycaemic and anti- carcinogenic. The body cells from any type of damage caused by free radicals are protected by these bioactive components (Krishnamachari and Nithyalakshmi, 2017). Therefore, there is a need to search for plants of medicinal value (Chavan, 2016). Present review is based on phytochemical and biological revision of Cinnamomum tamala and Acorus calamus; important Indian spices. Concept:

A. Cinnamomum tamala (Family: Lauraceae):

Botanical Description: The genus Cinnamomum has about 270 tropical tree and shrub species, of which 20 species occur in India only (Anon. 1950). C. tamala is an important species occurring in the transitional shady moist habitats in evergreen broadleaf forests of India (Arunachal Pradesh, Uttaranchal, Himachal Pradesh, Assam, Meghalaya, Mizoram, Sikkim, West Bengal); Bangladesh; Bhutan; Myanmar; Nepal; Thailand within altitude of 300-2400 m (IUCN 2019). Traditional Uses: Cinnamomum tamala is also known as Tejpatta and Indian Bay leaf. Tejpatta is utilized to impact a characteristic flavor in various dishes. In India, it is used in various cuisines because of its peppery, clove-cinnamon like flavor. The plant species is also beneficial for various medicinal uses. Some Ayurvedic studies reported that Tejpatta is useful for diabetes as it helps to manage blood glucose levels by enhancing insulin secretion due to its antioxidant property. According to Ayurveda, diabetes is caused due to an aggravation of Vata (Air compound) and impaired digestion. Impaired digestion leads to an accumulation of Ama (toxic remains in the body due to improper digestion) in the pancreatic cells and impairs the function of insulin. Tejpatta has hot potency that promotes healthy digestion and reduces Ama (fire produced in the stomach) (Upadhyay, 2017; Shah and Panchal, 2010).

Phytochemical Constituents: Cinnamomum tamala leaves are rich in Terpenoids, Tannins, Phenol/Polyphenols, Flavonoids, Alkaloids, and Saponin like phytochemicals. The major component of Cinnamomum tamala oil is eugenol (4-hydroxy-3-methoxy-allylbenzene), βcaryophyllene (6.6%), sabinene (4.8%), germacrene D (4.6%) and curcumenol (2.3%). The leaf oil is characterized by a high content of sesquiterpenoids (96.8%), dominated mainly by furanosesquiterpenoids (79.3%) viz. furanodienone (46.6%), curzerenone (17.6%), furanodiene (1.8%) and curzerene (1.2%)(Sharma et al, 2009; Dighe et al, 2005). The main chemical constituents of Cinnamom guatemala species leaves are camphene, myrcene, limonene, methyl ether of eugenol and alfapinene. Its bark possesses cinnamaldehyde which is responsible for its aroma but the other constituent impart the characteristics odour and flavour. Medicinally Cinnamomum tamala oil used as anti-flatulent, diuretic and carminative (SDhah and Panchal, 2010). Various workers performed GC-MS analyses of the oils and the following chemicals were isolated; α-Thujene, αPinene, Camphene, Benzaldehyde, β-Pinene, β-Myrcene, α-Phellendrene, δ-

3-Carene, p-Cymene, Limonene, 1,8-Cineole, cisOcimene, γ-Terpinene, α-Terpinolene, Linalool, p-Cymen-8-ol, α-Terpineol, Cinnamaldehyde (Z), Benzenepropanol, Linalyl acetate, Cinnamaldehyde (E), Eugenol, α-

Ylangene, β-Elemene, trans-Caryophyllene, Aromadendrene, Cinnamyl acetate, αHumulene, Valencene, α-Muurolene, trans-β-Guaiene, Eugenyl acetate, Caryophyllene oxide, β-Copaen-4-α-ol, Viridiflorol, Tetradecanal, Cubenol, γ-Eudesmol, epi-α- Cadinol, α-Muurolol, α-Cadinol.

B. Acorus calamus (Family: Acoraceae):

Botanical Description: It is a tall perennial wetland monocot with scented leaves and rhizomes which have been used medicinally It is believed to be indigenous to India. Acorus calamus has a single prominent midvein and then on both sides slightly raised secondary veins (with a diameter less than half the midvein) and many, fine tertiary veins. The leaves are between 0.7 and 1.7 cm wide, with average of 1 cm. The sympodial leaf of Acorus calamus is somewhat shorter than the vegetative leaves. The margin is curly-edged or undulate. The spadix, at the time of expansion, can reach a length between 4.9 and 8.9 cm. The flowers are longer, between 3 and 4 mm. Acorus calamus is infertile and shows an abortive ovary with a shriveled appearance (Koul et al, 1990). Traditional Uses: A. calamus rhizome has a long history of usage in many countries: at least 2000 years in China and India. Native American tribes were familiar with calamus and it was used as an anesthetic for toothache and headaches. The ancient Chinese used it to lessen swelling and for constipation. The rhizome was also used by the ancient Greeks and included in the traditional remedies of many other European cultures. A. calamus is used for the treatment of various ailments like appetite loss, bronchitis, chest pain, colic, cramps, diarrhea, digestive disorders, flatulence, gas, indigestion, nervous disorders, rheumatism, sedative, and vascular disorders (Kirtikar and Basu 1987). In the Ayurvedic system of medicine, the rhizomes of A. calamus are considered to possess aromatic, stimulant, bitter tonic, emetic, expectorant, emmenagogue, aphrodisiac, laxative, diuretic, antispasmodic, carminative, and anthelmintic properties. It is found to be effective in various disorders like chronic diarrhea, dysentery, bronchial catarrh, intermittent fevers, tympanitis, colic, otitis media, cough, asthma, and glandular and abdominal tumors (Anonymous 2001). In Western herbal medicine, the herb is chiefly employed for digestive problems such as gas, bloating, colic, and poor digestive function. Calamus helps distended and uncomfortable stomachs and headaches associated with weak digestion. Small amounts are thought to reduce stomach acidity, while larger doses increase deficient acid production. They are also employed for kidney and liver troubles, rheumatism, and eczema. In acidity, it is taken with honey and jaggary. In indigestion, vacha is taken with salt and water leads to emesis. In Vamana therapy, it is used as emetic (Vantikrut) while in dyspepsia, it is employed as an appetizer (Vanhikrut) (Chunekar and Pandey 1998). It is widely used as a carminative (Vibandhanhara, Adhmanahara) in distension. It exerts antispasmodic (Shulaghni) effect by relieving abdominal pain. It removes stools (i.e. Shukrut Vishodhini) from body as well as improves its quality. It is also employed as mild diuretic (Mutravishodhini) which improves quality of urine. Vacha in combination with milk and water is useful in obstructive urinary disorders particularly in distended urinary bladder (Bangasen 1984). The decoction or powder of rhizome has been given in various pediatric aliments like cough, fever, abdominal pain, epilepsy etc. (Ignacimuthu et al. 2006; Chellaiah et al. 2006).

Phytochemical constituents: According to Imam et al. (2013), photochemical studies have reported the presence of glycosides, flavonoids, saponins, tannins, polyphenolic compounds, mucilage, volatile oil and bitter principle. The plant has been reported for the presence of glucoside, alkaloid and essential oil containing calamen, clamenol, calameon, asarone and sesquiterpenes. It also contains a bitter glycoside named acorine

along with eugenol, pinene and camphene. The plant has been extensively investigated and a number of chemical constituents from the rhizomes, leave and roots of the plant have previously reported which includes β- asarone, α- asarone, elemicine, cisisoelemicine, cis and trans isoeugenol and their methyl ethers, camphene, P- cymene, α- selinene, bgurjunene, β- cadinene, camphor, terpinen- 4- ol, aterpineol and a calacorene, acorone, acrenone, acoragermacrone, 2- deca -4,7 dienol, shyobunones, linalool and preisocalamendiol are also present. Acoradin, galangin, 2, 4, 5- trimethoxy benzaldehyde, 2, 5 dimethoxy benzoquinone, calamendiol, spathulenol and sitosterol have been isolated from Acorus calamus. Dong et al., (2010) isolated three new sesquiterpenes, 1 β, 7 α(H)- cadinane- 4α, 6 α,10α- triol (1), 1α,5 β- guaiane- 10α- O- ethyl 4β,6 β- diol (2), and 6β,7β(H)- cadinane- 1α, 4α, 10α- triol (3), together with other chemicals. A. calamus were characterized by a higher percentage of β- asarone (11%), which was the main compound, followed by higher percentages of camphene (2.27%), enriched (E)- β- ocimene (3.28%), camphor (1.54%), calarene (1.42%), α- selinene (5.02%) and s- cadinol (2.00%), when compared to the diploid A. calamus. The latter had higher percentages of isoshyobunone (8.62%), bsesquiphellandrene (3.28%), preiso calamendiol (22.81%) and acorone (26.33%). (Paithankar et al., 2011, Singh et al., 2011 and Raja et al., 2009). Other compounds that are identified in A. calamus were 4- Terpineol, 2-Allyl-5-ethoxy-4- methoxyphenol, Epieudesmin, Lysidine, Spathulenol, Borneol, Furylethyl ketone, Nonanoic Acid, 2,2,5,5-Tetramethyl-3-hexanol, Bornyl acetate, Galgravin, Retusin, (9E,12E,15E)-9,12,15- Octadecatrien-1- ol, Butyl Butanoate, Geranylacetate, Sakuranin, Acetic acid, Camphor, Isoelemicin, a-Ursolic acid,Acetophenone, Dehydroabietic acid, Isoeugenol methylether, Apigenin 4',7-dimethyl ether, dehydrodiisoeugenol, Linalool, Elemicin, Linolenic acid (Balakumbahan et al., 2010).

II. Conclusion

This systematic review contains specific time bound data completion of isolated constituents and other class of natural compounds form Cinnamomum tamala and Acorus calamus and fairly useful for research aspirates working on this plant.

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National Conference on
Research Methodology in Life Science
[NCRMLS-2024]

Organized By

Department of Botany, M.S.P. Mandal's Balbhim Arts, Science and Commerce College, Beed – 431122, Maharashtra, India

Publisher

Technoscience Academy

Website : www.technoscienceacademy.com

Email : editor@ijsrst.com Website : http://ijsrst.com