

Development and Organoleptic Evaluation of Flax and Mint Crackers (FLAMINT)

Ms. Sonal Katoch¹, Dr. Payal Mahajan²

¹MSc Student, Department of Nutrition and Health, SOMAS, GD Goenka University, Gurugram, Haryana, India

²Head, Department of Nutrition & Health, Department of Nutrition and Health, SOMAS, GD Goenka University, Gurugram, Haryana, India

ARTICLE INFO

Article History:

Accepted: 01 June 2023

Published: 16 June 2023

Publication Issue

Volume 10, Issue 3

May-June-2023

Page Number

866-873

ABSTRACT

Snack foods are being exploited over a longer time to improve the nutritional status of a person. India has over 1500 varieties of snack foods that are consumed by all age groups. Worldwide scientists are focusing on developing functional food products which are healthy and low in calories. Incorporating millets, seeds, and herbs into snack foods can help to develop new products along with improved nutritional value. Because of increased trend in the consumption of novel snack items, an attempt was made to develop crackers by incorporating multi millets, flaxseeds, and mint leaves to powder using baking technology like 30% millets, flaxseeds powder (2:4:6) and mint leaves powder (5:10:15) respectively. Various biochemical techniques will be used to analyze the nutritional composition of the developed product. When compared to other formulations, a sensory evaluation by 15-20 semi-trained panel members will reveal more acceptable in terms of color, flavour, taste, texture, bitterness, and overall acceptability.

Keywords - Millets, Functional Foods, Mint Leaves, Flaxseeds, Nutritional Status, Sensory Evaluation, Semi- Trained Panel

I. INTRODUCTION

Crackers are a typical snack food in the human diet. With the appropriate amounts of quinoa, oat, flaxseed, and mint leaf powder, a baked product named FLAMINT CRACKER will be produced. Bakery goods are among the most popular with consumers because of their flavour, wide availability in the form of biscuits, cookies, muffins, cakes, crackers, and more, as well as their extended shelf life. (1) In developing

countries with diets high in coarse grains, 70–80% of the dietary calories are still derived from maize, sorghum, or millet. The concept of using traditional non-wheat cereals and ethnic grains from South America, Africa, and Asia as a model for wheat, wheat-free, and gluten-free foods in developed countries corresponds to the interest in exotic foods with their previously underappreciated extra nutritional value in westernised countries. (2)

More than ever, people nowadays are concerned about their way of life and health. (4) Overeating and obesity have elevated non-communicable diseases like diabetes, cardiovascular disease, stroke, and cancer prevalence in India during the past 20 years, especially in urban areas. Major risk factors include inherited traits, sedentary lifestyles, and poor eating habits including consuming a lot of calories, skipping meals, and ingesting a lot of fat and sugar. (3) Due to customer demand for improved food products that prevent diseases connected to poor nutrition and improve physical and mental health, the market for functional foods is growing significantly. The bread industry of today employs useful additives to increase the health advantages of its products. Functional foods are largely being created to improve gastrointestinal health, immunity, weight management, control of diabetes, cancer, and cardiovascular disease, as well as mental and physical performance. Fibres, tastes, vitamins, minerals, bioactive compounds, prebiotics, and probiotics are some of the ingredients that are most frequently used to increase the value of food items. (2)

Thin, crisp, and dry baked items don't offer a location for mould to grow, and baking further lowers their low moisture content. Bread, cookies, and crackers manufactured with refined flour have significantly worse nutritional quality and don't contain enough of several macro- or micronutrients. Wheat protein also lacks the proper proportions of the crucial amino acids lysine, threonine, and valine. Numerous studies are currently being conducted on enhancing the nutritional value of bakery products by taking into account the products' protein, minerals, vitamins, and fibre content in response to the growing demands of modern dietary practices. (5) Due to simultaneous and interdependent heat and mass transfer, there are four fundamental changes in the dough that take place during baking: Gases evaporate as the temperature rises, increasing the volume of the gas cell as long as the cell wall is flexible and able to retain the gases. Starch gelatinizes to some extent when temperature

increases, depending on the availability of water in the area; proteins coagulate. The extensibility of the dough is decreased by these changes. The initial structure, which had closed gas cells separated by dough walls, transforms into a porous structure with interconnected pores is known as the dough-crumbs transition. The high temperatures at the borders cause water to vaporize in the oven's environment. In the case of dessert or bread dough, this helps to create a dry, firm crust, and depending on the product thickness and baking conditions, it may even lead to total drying in the case of biscuits and cookies. (2)

Since it is used in the food, confectionery, cosmetic, and pharmaceutical industries, mint is regarded as the most significant commercial essential oil-bearing plant. Bioactive substances like anti-oxidants, anti-mutagens, and anti-carcinogens are found in this naturally occurring plant. It also aids the tissues of the ovaries in producing follicles once more and has an anti-androgen and estrogen-like effect. (6) Flaxseeds (*Linum usitatissimum*) are increasingly identified as functional foods and used as nutraceuticals due to their medicinal and health-promoting qualities. Large levels of lignin, dietary fibre, and omega-3 linolenic acids are present in it. In addition to helping to lower blood cholesterol, these compounds also reduce the risk of inflammatory and immunological diseases, heart disease, and stroke. Even though there is a growing need for nutrient-dense and aesthetically beautiful food, flax seed consumption is still fairly low in India. This is despite the fact that people there are becoming increasingly interested in adopting healthy lives and eating habits. (7) Quinoa, a pseudocereal with a variety of nutrients, is categorised botanically as *Chenopodium quinoa*. In contrast to wheat, rice, and corn, which are low in lysine, quinoa has a balanced mix of all the essential amino acids, including methionine, cysteine, and lysine. Quinoa grains contain significant amounts of nutrients like calcium, iron, zinc, and copper. The inclusion of a high-quality, gluten-free protein makes a pseudo-

cereal a useful supplement to the diet of people with celiac disease. (8)

With the addition of numerous gluten-free alternative raw materials, including pseudocereals, other seeds, like flaxseeds, and mint leaves to improve the flavour and estrogenic impact, this has led to the development of new bakery items.

II. AIM/OBJECTIVE

- To formulate the low calorie, high fibre, high protein, nutritious crackers.
- Evaluation of sensory attributes and nutritional quality of the developed crackers.
- To determine the effect of incorporation on the quality characteristics (texture and color) and acceptability of crackers.
- To standardize the ingredients used in food product development.
- To estimate the cost of the product.

III. RESEARCH METHODOLOGY

The present study is carried out to develop and evaluate the sensory characteristics of flamin crackers using flaxseeds and mint leaves powder.

PROCUREMENT OF RAW MATERIALS

Quinoa flour, Mint leaves powder, Flaxseed powder, Oat flour, Refined oil, Salt, Pumpkin seeds, and Sesame seeds were purchased from local markets of Sohna, Gurugram.

PREPARATION OF MINT LEAF POWDER

Fresh mint leaves were washed repeatedly in Luke warm water (3–4 times), drained, and dehydrated in Microwave Drying (MD) seems to be the best option for drying heat-sensitive food products, mainly leafy vegetable products. The dried leaves were finely powdered through mortar and pestle and stored in airtight packages, until further use.

PREPARATION OF CRACKERS

Firstly all the raw materials except water were added and mixed properly for 1 minute, then, the water was

added and the dough was kneaded for 5 minutes to form. The dough was allowed to stand at room temperature for 10 minutes. After resting, the dough was thinned to 2 mm and cut into suitable shapes. Shaped sheets were baked for 20 minutes at 118° in the oven. The baked crackers were packed in plastic bags (PE/PA/EVOH/PA/PE) and stored under room conditions until analysis. The results are expressed in mg/100 g dry weight.

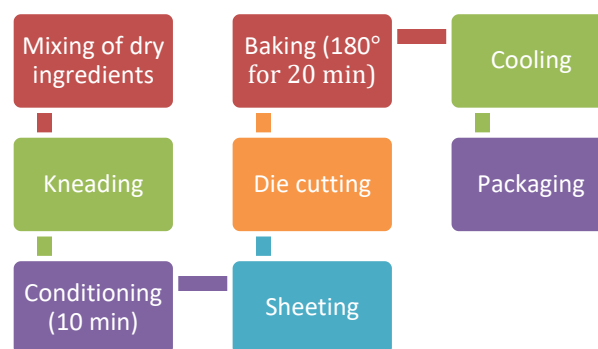


FIG.1.1 PROCESSING AND PREPARATION OF CRACKERS

FORMULATION OF COOKIES

1. Quinoa flour (30%) + Flaxseed powder (2%) + Mint leaf powder (5%)
2. Quinoa flour (30%) + Flaxseed powder (4%) + Mint leaf powder (10%)
3. Quinoa flour (30%) + Flaxseed powder (6%) + Mint leaf powder (15%)

ORGANOLEPTIC EVALUATION OF CRACKERS

The developed flamin crackers were evaluated organoleptically by a panel of 15-20 semi trained panelists from the Department of Nutrition and Health, GD Goenka University, Gurugram, Haryana. Organoleptic evaluation of sample is to be done by using Hedonic scale. This is a 9 point hedonic scale for sensory evaluation of product. Ask each panelist to taste each sample in turn and mark from 1-dislike extremely to 9-like extremely to indicate their preference. The panelist also has to make remarks about products appearance, taste, odor, texture and color. Analyse the results. Which sample received the

highest lowest scores? Which sample was preferred?

The mean scores for each treatments were calculated.

DETERMINATION OF NUTRITIONAL CONTENT OF FLAMINT CRACKERS

INGREDIENTS	AMOUNT (G)	ENERGY (KCAL)	PROTEIN (G)	CHO (G)	FATS (G)	FIBER (G)
QUINOA FLOUR	30	110	4.23	19.2	1.8	2.1
OATS FLOUR	30	121	4.4	19.7	2.7	2
WHEAT FLOUR	40	136	4.8	27.7	0.7	0.7
SESAME SEEDS	10	56.3	1.83	2.5	4.3	0.3
FLAXSEEDS POWDER	2	9	0.4	0.7	0.8	0.6
	4	18	0.8	1.4	1.6	1.2
	6	27	1.2	2.1	2.4	1.8
MINT LEAVES POWDER	5	2.4	0.24	2.9	-	-
	10	4.8	0.48	5.8	-	-
	15	7.2	0.72	8.7	-	-
OIL	15	135	-	-	15	-
TOTAL	150 G	550-600 KCAL	15-17 G	72-80 G	25-30 G	5-10 G

COST ANALYSIS

Cost of each acceptable baked product for development of flamint crackers is calculated.

RAW INGREDIENTS	AMOUNT (G)	COSTING PER 100 G	COST OF AMOUNT USED
QUINOA FLOUR	30	40 Rs	11 Rs
OATS FLOUR	30	30 Rs	8 Rs

WHEAT FLOUR	40	5 Rs	3 Rs
FLAXSEEDS FLOUR	15	35 Rs	3 Rs
MINT LEAVES	30	8 Rs	10 Rs
SESAME SEEDS	15	35 Rs	4 Rs
OIL	15	135 Rs	20 Rs
TOTAL	180 g	300 Rs	60 Rs

IV. CONCLUSION

The results of this study indicate that crackers made by enriching flaxseeds and mint leaf powder with other ingredients had acceptable sensory qualities and an improved nutritional profile in terms of macronutrients and micronutrients.

Mint is considered the most important commercial essential oil-bearing plant, most valuable for their use in food, confectioneries, cosmetic, and pharmaceutical industries. It is a natural plant, as a source of biologically active substances including antioxidants, antimutagens, and anticarcinogens. It also has antiandrogen and estrogen-like effect and restores follicular development in ovarian tissues. Flaxseeds (*Linum usitatissimum*) possess significant quantities of linolenic acids (omega-3), dietary fibres, and lignins. These compounds help in lowering blood cholesterol and reduce the risk of heart disease, stroke, immunological and inflammatory disorders. Quinoa (*Chenopodium quinoa*) unlike wheat, rice, and corn which are low in lysine, contains a balanced set of essential amino acids such as methionine, cysteine, and lysine. Quinoa grains contain large amounts of minerals like calcium, iron, zinc, and copper. A

pseudo-cereal contains gluten-free high-quality protein so it can play an important role in the diet of people suffering from celiac disease. Various researchers reported that the consumption of bakery products like biscuits is the best possible way for delivering bioactive compounds into the human diet. There is an increased demand for health-oriented functional food products such as low-calorie, sugar-free, and high-fibre products. This has led to the development of new bakery products with the addition of different gluten-free alternative raw materials like pseudocereals, various seeds like flaxseeds and mint leaves to enhance the flavour and improve estrogenic effect.

V. REFERENCES

- [1]. Han, J., Janz, J. A. M., & Gerlat, M. (2010). Development of glutenfree cracker snacks using pulse flours and fractions. *Food Research International*, 43(2), 627-633. <http://dx.doi.org/10.1016/j.foodres.2009.07.015>.
- [2]. Zhou, W., Therdthai, N., & Hui, Y. H. (2014). *Introduction to Baking and Bakery Products*. *Bakery Products Science and Technology*, 1-16.

- doi:10.1002/9781118792001.ch1
10.1002/9781118792001.ch1
- [3]. (Jethwani P, Kochhar A, Javed M. Formulation and Quality Evaluation of Antioxidant Rich Bars Enriched with Chia seed, Whole Mango, Apple and Guava. *Curr Res Nutr Food Sci* 2020; 8(3). doi : <http://dx.doi.org/10.12944/CRNFSJ.8.3.25>)
- [4]. (Gupta, Ena & Purwar, Shalini & Maurya, Neelesh & Shakyawar, Snehlata & Alok, Dr. Shashi. (2017). FORMULATION OF VALUE ADDED LOW-CALORIE, HIGH FIBRE BISCUITS USING FLAX SEEDS AND STEVIA REBAUDIANA. *International Journal of Pharmaceutical Sciences and Research*. 8. 5186-5193. 10.13040/IJPSR.0975-8232.8(12).5186-93.)
- [5]. Sabitha, N. And Yamunadevipuraikalan (2011). Development and sensory evaluation of sunflower seed fortified cookies, *International journal of scientific research* vol 3, issue:2, 214-215.
- [6]. Princess Monica Shankar, Dr. Venkatachalapathy Natarajan. Impact of microwave vacuum drying on physicochemical characteristics of mint (*Mentha spicata*. L) Leaves. *Pharma Innovation* 2022;11(10):57-61.
- [7]. Sun, J., Liu, X., Xu, Q., Zong, M., Zhang, Y., Xiao, F., Zhao, H., & Ma, Y. (2022). Acute effect of flaxseed-enriched snack bars on glycemic responses and satiety in healthy individuals. *Asia Pacific journal of clinical nutrition*, 31(3), 371–377.
[https://doi.org/10.6133/apjcn.202209_31\(3\).0005](https://doi.org/10.6133/apjcn.202209_31(3).0005)
- [8]. Bhathal, Simranpreet & Kaur, Navjot. (2018). Nutritional Analysis of Gluten Free Products from Quinoa (*Chenopodium quinoa*) Flour. 10.18782/2320-7051.2852.
- [9]. (V Pragathi .et.al (2021), Development and sensory evaluation of multi millet crackers. *The Pharma Innovation Journal* 2021; 10(8): 424-427. V Pragathi, S Suchiritha Devi, T Kamalaja and B Gayatri. Corresponding Author: S Suchiritha Devi Department of Foods and Nutrition, College of Community Science, PJTSAU, Saifabad, Hyderabad, Telangana, India.)
- [10]. Confectionery Products for Therapeutic and Preventive Purpose with Medicinal Herbs. *Annals of R.S.C.B.*, ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4126 - 4140 Received 20 January 2021; Accepted 08 February 2021. 4126 <http://annalsofrscb.ro>. Uzbekistan Rakhmonov Kakhramon Sanokulovich, Haydar-Zade Lolita Nimatovna, Kuliev Nasullo Sharifovich, Sulaymonova Gulchehra Hakimovna Bukhara Engineering Technological Institute, Bukhara, Uzbekistan.
- [11]. Development and Analysis of Sorghum Crackers . 2019 IJSRST | Volume 6 | Issue 2 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X Themed Section: Science and Technology DOI : <https://doi.org/10.32628/IJSRST196178> 26 *P. Ashwitha Reddy, G. Pranusha, G. Laxmikanth Rao, A. Naveen Reddy Department of Food Technology and management, Loyola Academy Degree and PG College, Secunderabad, Telangana, India.
- [12]. Effects of pseudocereal flours addition on chemical and physical properties of gluten free crackers. *Sinem TURK ASLAN1* □, *Fatma ISIK2** □ a Received 13 Jul., 2021 Accepted 02 Jan., 2022 1Culinary Program, Department of Hotel, Restaurant and Catering Services, Tavas Vocational School, Pamukkale University, Tavas, Denizli, Turkey 2Department of Food Engineering, Faculty of Engineering, Pamukkale University, Kinikli, Denizli, Turkey *Corresponding author: fisik@pau.edu.tr
- [13]. Effect of Substitution of Rice Flour with Quinoa Flour on the Chemical-Physical, Nutritional, Volatile and Sensory Parameters of Gluten-Free Ladyfinger Biscuits Michela Cannas, Simone Pulina, Paola Conte, Alessandra Del Caro, Pietro Paolo Urgeghe , Antonio Piga * and Costantino Fadda Dipartimento di Agraria, Università degli Studi di Sassari, Viale Italia 39/A, 07100 Sassari,

- Italy; mcannas@uniss.it (M.C.); simopulina@hotmail.it (S.P.); pconte@uniss.it (P.C.); delcaro@uniss.it (A.D.C.); paolou@uniss.it (P.P.U.); cfadda@uniss.it (C.F.) * Correspondence: pigaa@uniss.it; Tel.: +39-0792-9272 Received: 27 May 2020; Accepted: 17 June 2020; Published: 19 June 2020
- [14].Antioxidant Potential of Cookies Formulated with Date Seed Powder Zein Najjar 1 , Jaleel Kizhakkayil 2 , Hira Shakoor 2 , Carine Platat 2 , Constantinos Stathopoulos 3,* and Meththa Ranasinghe 1 1 Department of Food Science, College of Food and Agriculture, United Arab Emirates University, Al-Ain P.O. Box 15551, United Arab Emirates; zeinrnajjar@gmail.com (Z.N.); 201990013@uaeu.ac.ae (M.R.) 2 Department of Nutrition and Health, College of Medicine and Health Sciences, United Arab Emirates University, Al-Ain P.O. Box 15551, United Arab Emirates; JaleelK@uaeu.ac.ae (J.K.); 201890012@uaeu.ac.ae (H.S.); PlatatCarine@uaeu.ac.ae (C.P.) 3 Faculty of Agrobiological Sciences, University of Life Sciences Prague, 165 00 Prague, Czech Republic * Correspondence: stathopoulos@af.czu.cz
- [15].Nutritional Analysis of Gluten Free Products from Quinoa (*Chenopodium quinoa*) Flour Simranpreet Kaur Bhathal* and Navjot Kaur Department of Food and Nutrition, Punjab Agricultural University, Ludhiana, Punjab *Corresponding Author E-mail: simrankaurbhathal@yahoo.com Received: 14.04.2017 | Revised: 28.05.2017 | Accepted: 6.06.2017.
- [16].FORMULATION OF VALUE ADDED LOW-CALORIE, HIGH FIBRE BISCUITS USING FLAX SEEDS AND STEVIA REBAUDIANA , Received on 14 April, 2017; received in revised form, 12 June, 2017; accepted, 26 July, 2017; published 01 December, 2017 Ena Gupta*1, Shalini Purwar 1 , Neelesh Kumar Maurya 2 , Snehlata Shakyawar 1 and Shashi Alok 2 Centre of Biotechnology 1 , University of Allahabad, Allahabad - 211002, Uttar Pradesh, India. Department of Pharmacy 2 , Bundelkhand University, Jhansi - 284128, Uttar Pradesh, India.
- [17].Impact of microwave vacuum drying on physicochemical characteristics of mint (*Mentha spicata*. L) Leaves , ISSN (E): 2277-7695 ISSN (P): 2349-8242 NAAS Rating: 5.23 TPI 2022; 11(10): 57-61 Princess Monica Shankar and Dr. Venkatachalapathy Natarajan
- [18].Acute effect of flaxseed-enriched snack bars on glycemic responses and satiety in healthy individuals. PMID:36173209. DOI:10.6133/apjcn.202209_31(3).0005. Jianqin Sun et al. Asia Pac J Clin Nutr.2022. Asia Pac J Clin Nutr. 2022;31(3):371-377. doi: 10.6133/apjcn.202209_31(3).0005. Authors Jianqin Sun 1, Xia Liu 2 , Qi Xu 2, Min Zong 3, Yali Zhang 2 , Fei Xiao 3 , Hailei Zhao 2, Ying Ma 2 Affiliations 1 Huadong Hospital, Shanghai Medical College, Fudan University, Shanghai, China. Email: jianqins@163.com.2 School of Public Health, Shanghai University of Traditional Chinese Medicine, Shanghai, China.3 Huadong Hospital, Shanghai Medical College, Fudan University, Shanghai, China. PMID:36173209. DOI:10.6133/apjcn.202209_31(3).0005
- [19].Chemical and Mineral Composition of Defatted Flaxseed Farine Incorporated Crackers. International Journal of Food and Fermentation Technology Year : 2017, Volume : 7, Issue : 1 First page : (33) Last page : (40) Print ISSN : 2249-1570. online ISSN : 2277-9396. Article DOI :10.5958/2277-9396.2017.00004.6. Sharma Ritika, Sood Monika*, Bandral Julie D. Division of Post Harvest Technology, Faculty of Agriculture, SK University of Agricultural Sciences and Technology of Jammu, Udheywalla, Jammu, India*Corresponding author: monikasoodpht@gmail.com Online published on 4 January, 2018.

- [20]. Effect of Flaxseed Powder on Cardiovascular Risk Factor in Dyslipidemic and Hypertensive Patients. *Int J Prev Med.* 2019; 10: 218. Published online 2019 Dec 10. doi: 10.4103/ijpvm.IJPVM_563_17 PMID: 31929865 Naemeh Haghghatsiar, Gholamreza Askari, Sahar Saraf-Bank, Avat Feizi, 1 and Hasan Keshmiri 2
- [21]. Rheological and Textural Properties of Gluten Free Cookies based on Pearl Millet and Flaxseed Shubli Bashir 1 , Mifftha Yaseen 1 , Vasudha Sharma 1 , Soumya Ranjan Purohit 2 , Sheweta Barak 3 , Deepak Mudgil 3* 1 Department of Food Technology, Jamia Hamdard (Hamdard University), New Delhi-110062, India 2 Amity Institute of Food Technology, Amity University, Sector 125, Noida, India - 201313 3 Department of Dairy and Food Technology, Mansinhbhai Institute of Dairy and Food Technology, Mehsana, Gujarat 384002, India * Correspondence: dsmudgil@yahoo.com; Scopus Author ID 51864139900 Received: 25.04.2020; Revised: 11.05.2020; Accepted: 12.05.2020; Published: 14.05.2020
- [22]. Development of roasted flax seed cookies and characterization for chemical and organoleptic parameters *Pak. J. Agri. Sci.*, Vol. 57(1), 229-235; 2020 ISSN (Print) 0552-9034, ISSN (Online) 2076-0906 DOI: 10.21162/PAKJAS/20.6552 <http://www.pakjas.com.pk> Asif Ahmad 1, 2, 3, *, Sadaf Zulfiqar 3 and Zia Ahmad Chatha 4 1 Department for Management of Science and Technology Development & Faculty of Applied Sciences, Ton Duc Thang University, Ho Chi Minh City, Vietnam; 2 Faculty of Applied Sciences, Ton Duc Thang University, Ho Chi Minh City, Vietnam; 3 Department of Food Technology, PMAS-Arid Agriculture University, Rawalpindi - 46300, Pakistan; 4 Faculty of Agri. Engineering, University of Agriculture Faisalabad *Corresponding author's e-mail: asif.ahmad@tdtu.edu.vn
- [23]. Optimisation of antioxidant activity, textural and sensory characteristics of gluten-free cookies made from whole Indian quinoa flour. Khan Nadiya Jan P.S. Panesar Sukhcharn Singh. <https://doi.org/10.1016/j.lwt.2018.04.013>. Volume 93, July 2018, Pages 573-582. Department of Food Engineering and Technology, Sant Longowal Institute of Engineering & Technology, (SLIET), Longowal, Punjab, India. Received 21 December 2017, Revised 4 April 2018, Accepted 6 April 2018, Available online 7 April 2018, Version of Record 12 April 2018

Cite this article as :

Ms. Sonal Katoch, Dr. Payal Mahajan, "Development and Organoleptic Evaluation of Flax and Mint Crackers (FLAMINT)", *International Journal of Scientific Research in Science and Technology (IJSRST)*, Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 10 Issue 3, pp. 866-873, May-June 2023. Journal URL : <https://ijsrst.com/IJSRST523103152>