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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN Number
International Research Journal of Humanities and Interdisciplinary Studies	Mrs. Yogita R. Mirajkar	B.Sc. Food Science & Technology	Development & Standardization of Nutribar for Post Recovery of Immune-Deficient Covid Affected Patients	2021	2582-8568
International Research Journal of Humanities and Interdisciplinary Studies	Mrs. Shweta Patil, Mrs. Yogita R. Mirajkar	B.Sc. Food Science & Technology	Development & Standardization of Low Calories Rasogulla by using Artificial Sweeteners	2021	2349-6002
International Research Journal of Humanities and Interdisciplinary Studies	Dr. Neelam Jirage, Mrs. Shweta Patil	B.Sc. Food Science & Technology	Indian spices: Packages of Antioxidants with Potential Use in Rehabilitation Process From Covid-19	2021	2582-8568
International Research Journal of Humanities and Interdisciplinary Studies	Mrs. Ashwini Raibagkar	B.Sc. Food Science & Technology	Formulation of Horse Gram Cookies with Incorporation of Niger Seeds As A Functional Ingredients	2021	2582-8568


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DEVELOPMENT & STANDARDIZATION OF NUTRIBAR FOR POST RECOVERY OF IMMUNE DEFICIENT COVID AFFECTED PATIENTS

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Abstract:

The severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) and its mitigation responses are severely impacting people's lives and livelihood at an unpredictable scale. Existing nutritional challenges especially in Low- and middle-income group have been amplified due to pandemic situation. Present study aims at developing and standardizing nutribar for the post recovery of immune deficient Covid affected patients, Nutribar were formulated using different proportions of Oats, Cornflakes and honey along with various other ingredients such as Milk powder, Flax seeds, Almonds, ghee Gum acacia (edible gum) and Black raisins. The prepared samples were assessed for proximate analysis and sensory evaluation. From this assessment it was found that sample S2 was acceptable as compared to all other formulated samples. The proximate composition of S2 sample is Moisture 7.81 %, Protein 15.61 %, Fat 3.0 % Carbohydrate 64.38 %, Iron 3.9 %, Calcium 228.69 mg and Fiber 3.3 %. Hence it can be found that nutribar can be easily formulated using oats, cornflakes and honey by simple processing techniques which is packed with essential nutrients.

Introduction:

The recent outbreak of corona virus caused by SARS -CoV 2 (severe acute respiratory syndrome) is rapidly increasing the number of infected patients worldwide. The SARS -CoV 2 induced immune abnormalities may lead to infections by microorganisms, septic shock, and severe multiple organ disinflection. It has been shown that SARS-CoV-2 disrupts normal immune responses,

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Development & Standardization of Low Calorie Rasogulla by using Artificial Sweeteners

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Abstract - Rasogulla is a popular Indian confectionary product made from coagulating milk by citric acid. The experiment was carried out with the aim to formulate low calorie Rasogulla by using artificial sweeteners such as sorbitol and sucralose. Milk samples were standardized by using combination of skim milk & toned milk viz. 0% fat, 1.5% fat, 2% fat, 2.5% fat & 4% fat. Experimental samples and control samples of rasogulla are analyzed for physicochemical and sensory properties. The study was conducted to lower the calories in rasogulla by formulating sucralose and sorbitol content of 0, 25, 50, 75, and 100g for both sweeteners. From formulation of sorbitol content rasogulla sample 2 was selected according to physicochemical and sensory analysis as it contains 50% sorbitol and 50% sugar. From sucralose formulation sample 2 was selected according to physicochemical & sensory analysis as it contains 50% sucralose and 50% sugar. Rasogulla prepared from sucralose provides 163.5 kCal / 100g and sorbitol rasogulla provides 172.34 kCal / 100g whereas control rasogulla made from cow's milk provide 213 kCal / 100g. Low calorie Rasgulla with acceptable quality can be prepared with 50:50 ratio of sorbitol to sugar & also 50:50 ratio of sucralose to sugar.

Index Terms - Artificial sweetener, Physico-chemical properties, Rasogulla, Sensory Analysis, Sorbitol, Sucralose.

I. INTRODUCTION

Among the indigenous dairy products, chhana is a well-known coagulated milk product obtained by acid coagulation of hot milk, which is extensively used as a base material for preparation of variety of Indian delicacies. Cow milk is usually preferred since it yields a product with soft body and smooth texture, the quality of which varies depending upon type and composition of milk, conditions of coagulation, the

amount of solids lost in whey and the moisture retained in the product.[3].

Channa, Indian counter part of soft cottage cheese, is a milk product obtained by acid coagulation of hot milk followed by drainage whey. It is a rich source of milk fat, protein, carbohydrate and vitamins A and vitamin D [9]. In the preparation of channa, the recovery of total milk solid and yield of channa is influenced by the heat treatment given to milk prior to acidification, acidity of milk acid mixture at the time of coagulation and residence time of coagulum before separation of milk solids, besides the type of milk and its initial composition [4]. Heating causes denaturation of whey protein and they get associated with casein micelles. The degree of denatured whey proteins depend on the time-temperature combination during the heating and is mainly determined by the maximum temperature to which milk is heated [12]. Rasogulla is the most important pleasant and charming foods to most of the people of the Indian In Eid, Puja, birthday, marriage ceremony and in any party or any kind of entertainment either in domestic or national level, rasogulla [14]. Varieties of rasogolla are available in the market. Each type differs from the other with respect to taste, body and texture, method of preparation and packaging. Canned rasogulla usually is made for sale to distant places and export purpose [11].

Rasogulla faces a problem of high sugar content (that is about 50%) as diabetic people cannot enjoy the sweet. Nonetheless, consumers who want the taste of sweeteners without added energy may select non-nutritive sweeteners to assist in the management of weight, diabetes and cardiovascular diseases [4]. Hence for diabetic and health-conscious consumers reformulation of rasogulla is required [11].

II. MATERIAL & METHODS

The experimental work on "Low calorie Rasgolla" was carried out in the laboratory of Department of food science and technology, Shivaji University, Kolhapur. Toned milk, skim milk powder, maida, baking powder, sugar, citric acid, sorbitol and sucralose were purchased from local market.

STANDARDIZATION OF MILK

Standardization of milk is done by using Pearson's square method [6]. Five samples of milk were prepared viz. Skim milk (~0% fat), 2% fat milk, 2.5% fat milk and 3% toned milk was shown in table 1.

Table 1: Standardization of milk

Samples	Toned milk (ml)	Skim milk (ml)	Fat % of milk
(M ₁) skim milk	-	100	0.007%
(M ₂) 1.5% fat milk	50	50	1.5%
(M ₃) 2.0% fat milk	66.66	33.33	2%
(M ₄) 2.5% fat milk	83.33	16.66	2.5%

III. PREPARATION OF RASOGULLA

Experimental channa and rasogulla was prepared by the method as shown in figure no 1^[11], while control rasogulla was prepared in the same manner except that the milk fat was standardized to 4%.

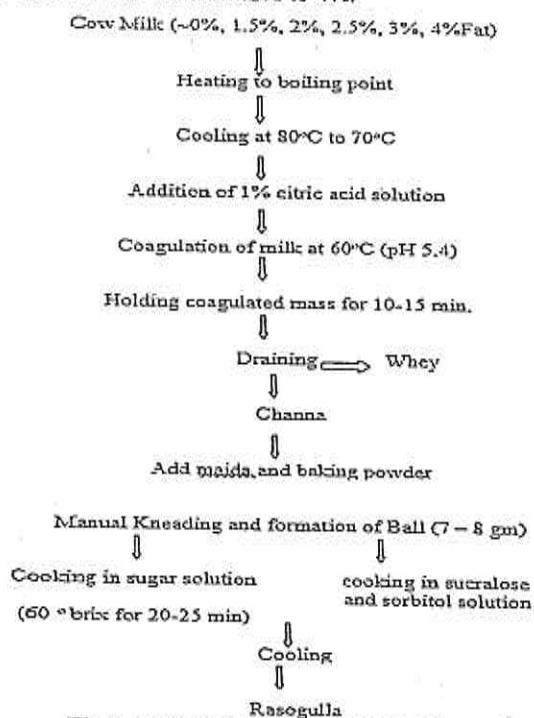


Fig.1: Flow diagram for preparation of rasogulla

IV. PHYSICO-CHEMICAL ANALYSIS OF STANDARDIZED CHANNA

Channa was prepared by using standardized milk samples. The amount of moisture content of all the four formulated samples was higher than that of control sample.

The protein content sample C₁ - 17.70 was higher than control C₀ -11.34, because of the C₁ contains 100% skim milk which was rich source of protein. As sample C₂ contains 14.26 % protein which was due to incorporation of 50% toned milk and 50% skim milk, but it was higher than control sample. Sample C₃-12.01 was higher than control sample C₀ -11.34, because it contains 66.66% toned milk and 33.333% skim milk. The sample C₄ contains 11.69 % protein which was near to the control sample C₀ 11.34% protein due to it contains 83.33%tonned milk and 16.66% skim milk.

The fat content sample C₁ - 1.5 was lower than control C₀ -6.8, because of the C₁ contains 100% skim milk which was poor source of fat. As sample C₂ contains 3% fat which was due to incorporation of 50% toned milk and 50% skim milk, but it was lower than control sample. Sample C₃-3.58 was lower than control sample C₀ -6.8, because it contains 66.66% toned milk and 33.33% skim milk. The sample C₄ contains 4.2 % fat which was near to the control sample C₀ 6.8% fat due to it contains 83.33%tonned milk and 16.66% skim milk.

Carbohydrate content of formulated samples was lower than control C₀ sample and the values were 23.67%, 28.14%, 32.75%, 29.98% and 36.87%.

Ash content of four formulated samples was lower than control C₀ sample and the values were 0.73%, 1.2%, 0.9%, 0.88% and 1.39%. And values were given in table 2.

Table 2: Physico-chemical analysis of standardized channa

Sample	Moisture (%)	Protein (%)	Fat (%)	Carbohydrate (%)	Ash (%)
C ₀	43.60	11.34	6.8	36.87	1.39
C ₁	56.4	17.70	0.1	23.67	0.73
C ₂	53.4	14.26	3	28.14	1.2
C ₃	50.76	12.01	3.58	32.75	0.9
C ₄	53.25	11.69	4.2	29.98	0.88

Physico-chemical analysis of standardized Rasogulla: The values given in table 3 shows that the moisture content of rasogulla sample R₁ 55.44% and R₂ 59.50% were compared with control R₀ 54.86% samples it was observed that there was slight increase in the values of moisture content, but the sample R₃ and R₄ contains 50.74% and 53.23% moisture was lower than control sample R₀- 54.86%.

The protein content of different rasogulla samples varied significantly the protein content of all four samples were higher than control sample that is R₁, R₂, R₃, R₄ and control R₀ was 17.76%, 18.65%, 21.31%, 23.09% and 8.56% and these reported values are nearby previous research [11].

There was significant difference among the fat content of different types of rasogulla samples observed table 3 it was observed that control sample R₀ had the highest fat content because it content more fat than that of toned milk and skim milk.

The sample R₁ (1.5%) rasogulla has lowest fat content as compared control R₀ (7.16%) sample as it was made up of 100% skim milk. The sample R₂ (3.5%) rasogulla has lowest fat content as compared to control sample R₀ (7.16%) as it was made up of 50% skim mil 50% toned milk. The sample R₃ (4%) rasogulla has lowest fat content as compared to control sample R₀ (7.16%) as it was made up of 33.33% skim mil 66.66% toned milk. The sample R₄ (4.6%) rasogulla has lowest fat content as compared to control sample R₀ (7.16%) as it was made up of 16.66% skim milk 83.33% toned milk.

The carbohydrate content of rasogulla sample R₂ - 17.35% and R₄ -18.28%, was lower than control sample R₀-28.58% because R₂ sample content was being increased due to moisture content (59.50%) and sample R₄ content higher protein (23.09%) which may affect the carbohydrate content. The sample R₁ (24.57%) and R₃ (23.35%) were near by the control R₀ (28.58%).

The ash content control R₂-1 % was found higher than control and other experimental samples.

Table 3: Physico-chemical analysis of standardized rasogulla

Sample	Moisture (%)	Protein (%)	Fat (%)	Carbohydrate (%)	Ash (%)
R ₀	54.86	8.56	7.16	28.58	0.84
R ₁	55.44	17.76	1.5	24.57	0.73
R ₂	59.50	18.65	3.5	17.35	1
R ₃	50.74	21.31	4	23.35	0.6
R ₄	53.23	23.09	4.6	18.28	0.8

Average sensory evaluation of standardized Rasogulla
1. Color

It was not differed among three samples (R₀, R₃, and R₃- 8.42) of rasogolla stastically though it was little low in R₄ -7.14. The variation in the color was probably due to formulations of milk samples. The sample R₁-7.42 scored low as control R₀-8.42 due to it is made from 100% skim milk.

2. Taste

There was no significant difference among the taste score of samples R₀-8.14, R₂-8, and R₃-8.14. the sample R₁-6.14 and R₄-6.42 shows lower score than control R₀-8.14.

3. Texture

The highest score was found for sample R₃-8 due to soft body and smooth texture. As sample R₁-6 and R₄-5.71 was found poor in texture as compared to Control sample R₀-7.5. The sample R₂-7.21 was slightly soft in texture.

4. Mouthfeel

The highest score was found for R₂- 8.14. The sample R₁-5.57 and R₄-5.57 scores very low as compared to control R₀-7.5. the sample R₃-7.85 score was slightly higher to the control R₀-7.5.

5. Overall acceptability

Although there was little difference among all samples, but all the samples were accepted by the panelist and stastically difference within overall score of different sample were not significant.

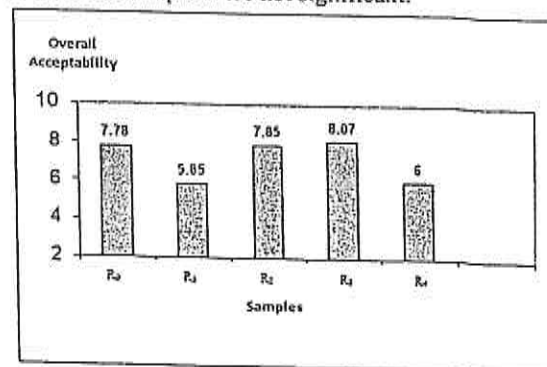


Figure 2: Graphical representation of sensory scores of standardized Rasogulla

V. FORMULATION OF SUCRALOSE AND SORBITOL

For low calorie rasogulla, sugar was replaced with sucralose and sorbitol

Table 4: Formulation of Sucralose

Sample	Sucralose (g)	Sugar (g)
R ₀	-	100
Su ₁	25	75
Su ₂	50	50
Su ₃	75	25
Su ₄	100	-

Table 5: Formulation of Sorbitol

Sample	Sorbitol (g)	Sugar (g)
R ₀	-	100
So ₁	25	75
So ₂	50	50
So ₃	75	25
So ₄	100	-

Average sensory analysis of low calorie rasgulla with sorbitol

1. Color

It was found that sample So₄ -8.45, So₂ 8.57 and So₁ 8.5 were relatively same in color as compared to control sample 8.5. But the sample So₃ varies with all the experimental sample as well as control sample. As sorbitol content increases there was decrease in sugar content.

2. Taste

There was no significant difference among the first two samples and control sample R₀. The value of So₁ 8.14 and So₂ 8.35 and control sample R₀ 8. But the sample So₃ 6.25 and sample So₄ 7.28 were very low than R₀ 8.

3. Texture

The texture properties of experimental values of rasgulla with sorbitol were nearby the control sample R₀ 8. But sample So₂ 7.9 was quite good in texture as compared to other experimental sample and it was most acceptable by the panel members.

4. Mouthfeel

No significant difference was found in the respect of Mouthfeel score of different rasgulla sample although the score was slightly higher sample So₂ 8.21 than control sample R₀ 8.

5. Overall acceptability

Graph showed that So₂ 8 had the higher score of overall acceptability and the sample So 6.9 was very low as compared to other experimental sample as well as control sample although there was little difference among sample So₃ 7.64 and So₄ 7.42 then control sample R₀.

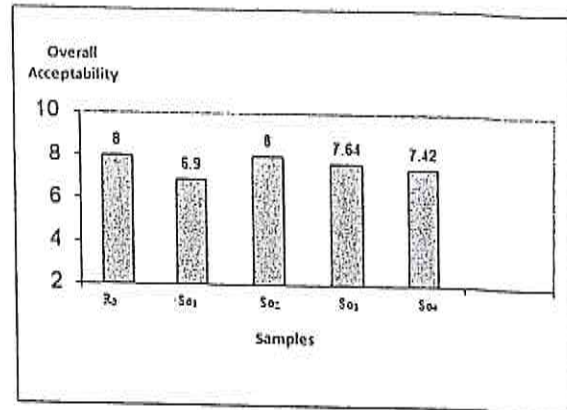


Figure 3: Graphical representation of sensory scores of Rasogulla with sorbitol

From the above average sensory evaluation it was observed that sample So₂ and So₃ were nearby values of control sample, but mostly selected sample So₂ was scored as same as R₀.

Average sensory analysis of low calorie rasgulla with sucralose

1. Color

The variation in the color varies as per the sugar content decreases and sucralose content increases. As sample Su₁-7.7, Su₂-8, Su₄-7.2 was similar to the control sample R₀- 8.5. The Su₃-6.9 samples was very low as compared to control sample.

2. Taste

There was significant difference among the experimental samples as compared to control sample. Sample Su₂-7.8 and Su₃- 7 were similar in taste as that of control sample. The sample Su₁-6.42 and Su₃-6.5 was low and poor in taste as compared control R₀-8. Due to variation in the ratio of sugar and sucralose content.

3. Texture

Sample Su₂-8 was as same as control sample R₀-8. The sample Su₁-7 was quite good in texture. For Su₃-6.5, Su₄-6.6 was very poor in texture as compared to control sampler R₀-8.

4. Mouthfeel

The sample Su₂-7.5 and Su₄-7.2 was similar value to the control sample R₀-8, but Su₁-7 and Su₃-6.5 was lower than control value.

5. Overall acceptability

Graph showed that Su₂-8 was as same as control sample R₀-8 and other samples Su₁-7.9, Su₃-6.5 and Su₄- 6.4 were less acceptable by the panel members.

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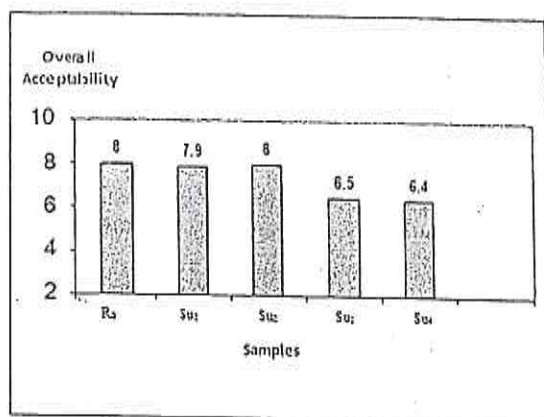


Figure 4: Graphical representation of sensory scores of rasogulla with Sucralose

VI. CONCLUSION

Rasogulla faces a problem of high sugar content (that is about 50%) as diabetic people cannot enjoy the sweet; therefore use of artificial sweeteners was used in the preparation of rasogulla. Rasogulla made from formulated standardized milk sample shows low fat content than rasogulla made from 100% cow milk. The fat was reduced up to 3% by using 50% toned milk and 50% skim milk which was mostly accepted by the panel members. Sucralose and sorbitol were used during preparation of low calorie rasogulla; the sample 2 was selected from both sweeteners because it contains 50% sweetener and 50% sugar. These sweeteners assist in the management of weight, diabetes and cardiovascular diseases. Rasogulla prepared from sucralose provides 163.5 kCal / 100g and sorbitol rasogulla provides 172.34 kCal / 100g whereas control rasogulla made from cow's milk provide 213 kCal / 100g. A calorie reduction is possible as compared to control sample without affecting the acceptability in terms of organoleptic properties.

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INDIAN SPICES: PACKAGES OF ANTIOXIDANTS WITH POTENTIAL USE IN REHABILITATION PROCESS FROM COVID-19

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ABSTRACT:

India is known for its varied Food System all over the globe. Though the difference lies in staple foods of different parts of India, one common thing in Indian cuisine is nothing but the use of Spices. Indian spices are always a centre of attraction particularly for western people. In Indian Kitchens, spices are basically used for enhancing colour, odour, taste and flavour of a particular food prepared. Spices are used medicinally since ancient times. India is the largest producer of spices. There are almost 80 varieties of spices grown all over the world. And around 50 varieties are grown in India. Since last decade, the Indian spices are gaining too much popularity for its medicinal values because of their physiological and pharmacological properties. The antioxidant properties exhibited by the active ingredients of spices are vital in terms of disease prevention, treatment as well as rehabilitation. Since last year the world is facing the pandemic situation due to COVID-19. Recovery period from COVID-19 and the health related consequences during and after recovery phase depends upon the health and nutritional status of an individual. Post COVID complications are deteriorating for the health and so the quality of life of the affected ones. Health and Nutritional status relies on the Food consumption pattern. Food is the major factor to be considered which when carefully planned can help to recover and rehabilitate from COVID-19 infection. The present review focuses on some of the Indian spices with their potential applications in Rehabilitation process from COVID-19. The study includes following spices- Turmeric, Ginger, Garlic, Basil Leaves, Cinnamon, Cardamom, Bay Leaf, Celery Leaves.

Keywords: Food system, Indian Cuisine, Indian Spices, Medicinal properties, antioxidant, rehabilitation, pandemic, Post COVID complications.

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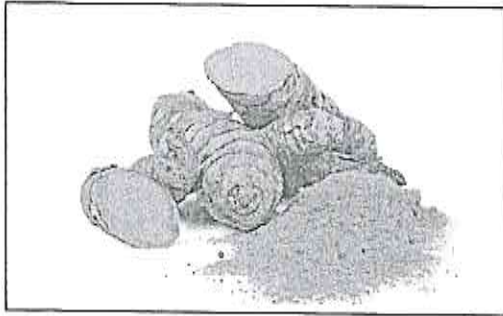
INTRODUCTION:

India is widely known for its diversity in food. Due to geographical and climatic differences, the locally grown crops and animals grazed on them are different in different regions of the country. So the major differences are seen in staple foods, food consumption pattern, eating habits, food preferences and choices. Despite of having all these differences, Indian cuisine has one thing in common i.e. use of spices. Indian spices gives unique identity to the Indian food and varied meal preparations. There are almost 80 varieties of spices grown throughout the world. Amongst them, almost 50 are grown in India. So India is one of the largest producers of Spices. Spices are basically used in the food preparations to enhance its colour, odour, aroma and taste. Spices are the inseparable part of Indian Kitchens since ancient time. Indian medicine system i.e. Ayurveda also emphasizes the medicinal properties of spices which can be used as diuretic, eccoprotic, carminative aperients, expectorant and many more.

Since last two years world is facing pandemic situation due to COVID-19 virus. The overall mortality rate is increasing since second wave has been approached. When it comes to morbidity, it is the main factor which is responsible to deteriorate health of an affected one. Morbidity hampers quality of life. It is the reason the individual relies on medications for longer duration. The side effects imposed by medications are detrimental to health. This also reduces the productivity of an individual and puts extra economic burden. Individual with good health and nutritional status recovers early and rehabilitation process requires less use of medications. Thus minimizing the subsequent side effects.

Indian spices are originally known for their physiological and pharmacological properties. The active ingredients present in the spices are known for different beneficial effects on health. Some spices contain the active ingredients with antioxidant properties. Antioxidants prevents the damage caused by free radicals by neutralizing them. They give protection to the body cells. Systemic inflammation is observed in the body in many pathological processes. This damages the body cells. Viral infection is one of the major cause behind systemic inflammation. It is evident by increased C-reactive protein values in COVID affected individuals. And thus the individual's immune system gets suppressed making that individual susceptible to many of secondary bacterial infections. The severity of the post COVID infections depends upon the strong antioxidant system present in one's body. Also it can be enhanced by properly managed diet plan with inclusion of potentially useful antioxidants in the diet. Spices group is one of the major group which possess antioxidant properties. Some of the critical spices are discussed here with subsequent role in COVID rehabilitation.

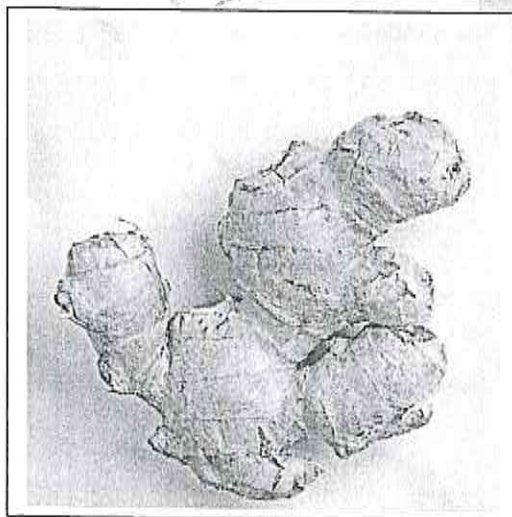
TURMERIC:



The major compounds found in turmeric are saponins, alkaloids, sterol, tannin, flavonoids, phytic acid and phenol. It is mainly used as anti-inflammatory agent. It is also used in the diet for its healing and antibacterial, anti-septic properties. Turmeric possesses antioxidant properties and thus is the dominant inhibitor of tissue injury and swelling. One of the major properties of turmeric is anti-proliferative. Thus turmeric has many therapeutic uses too like for example- to treat ulcers, parasitic contaminations, different skin infections, against resistant illness and restoring the manifestations of colds and flus. The pharmacological properties have been mainly attributed to the presence of curcumin in the turmeric. The two related compounds present are demethoxycurcumin and bisdemethoxycurcumin. The mitigating impact of curcumin incorporates the hindrance of TNF-instigated actuation of NFkB. A few examinations have demonstrated that curcumin can adjust the capacity of human lymphocytes i.e. T cells and B cells.

Thus turmeric should be used daily in meal preparations to maintain immune status. A cup of hot milk along with a pinch of turmeric if taken daily, can help to maintain health of respiratory system. So the people with proper use of turmeric in every-day's diet probably suffer less and survive promptly in COVID 19 infection.

GINGER:



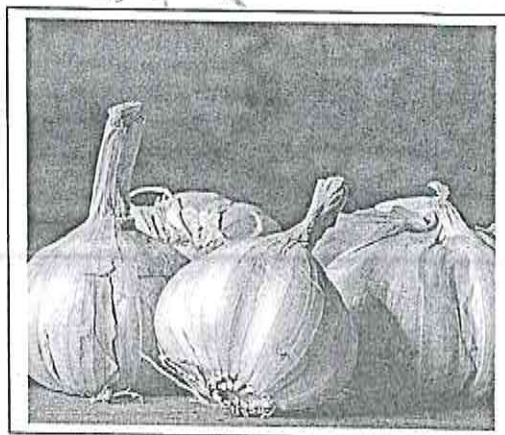
Ginger is one of the most common condiments consumed throughout the world. At least 115 constituents have been identified in fresh as well as in dry ginger. The most common bioactive compound present in ginger is gingerol, a pungent ingredient known for its varied pharmacological and physiological activities. The therapeutic use of ginger is known to mankind since long time. It is used to treat thousands of ailments from cold to cancer. There is scientific evidence for the effectiveness of ginger as an antioxidant agent. The presence of oxidative stress is associated with many diseases. Ginger was reported to decrease this oxidative stress. Ginger root contains high level of (3.85 mmol/100g) total antioxidants. Many reports indicate that ginger

suppresses lipid peroxidation and protects reduced level of glutathione. A dried ginger extract is reported to exhibit analgesic and potent anti-inflammatory effects. Antiemetic effect of ginger is attributed to its carminative property, which helps to break up and expel intestinal gas and thereby reducing the nausea and vomiting.

Research suggests that administration of 120 mg of ginger extract daily for up to 21 days increases the number of days without ventilator support and reduces the time spent in intensive care units in individuals with respiratory distress. Nausea, vomiting imposed by the medications can be reduced with the ingestion of ginger. Early research shows that taking ginger by mouth might help reduce pain and improve wound healing.

GARLIC:

Garlic is a popular spice and a remedy for a variety of ailments. Garlic has played important dietary and therapeutic roles since ancient times. Potentially active chemical constituents of garlic are: sulphur compounds, enzymes like allinase, peroxidase, myrosinase and others; amino acids and their glycosides like arginine; Minerals like -Se, Ge, Te and other trace minerals. The principal bioactive component present in garlic is allicin. When the garlic is crushed or chopped; allinase enzyme is activated and produce allicin from alliin. Research has proven the antimicrobial, antifungal, anti-atherosclerotic, anti-diabetic, anti-tumour, anti-protozoal and anti-viral effects of garlic. A single trial suggested that garlic may prevent occurrence of common cold. Whole garlic and garlic extract exhibit direct antioxidant effects and increase the serum levels of antioxidant enzymes like catalase and glutathione peroxidase. Allicin present in garlic can efficiently scavenge exogenously generated hydroxyl radicals. A recent study suggests that aged garlic extract inhibits formation of glycation end products (AGE) in vitro and formation of glycation-derived free radicals. Garlic and its constituents protect tissue against oxidative damage and improve organ functions in various animal models.



Daily use of garlic in meal preparations helps to strengthen immune power of COVID affected ones. The garlic cloves can be chewed on daily basis (1 clove per day) by COVID affected individuals during convalescence phase for early recovery.

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BASIL LEAVES:



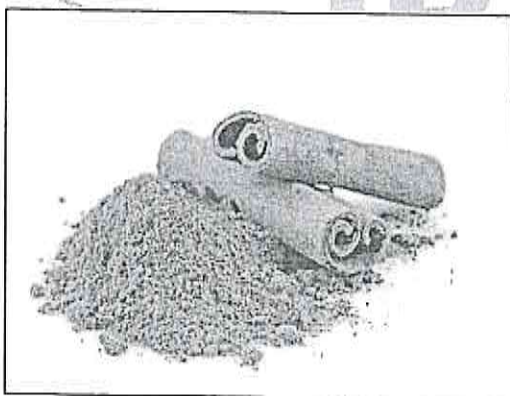
Basil leaves is an essential ingredient in many cooking practices and traditions. Basil leaves are known for its aroma. The vitamin A content of basil leaves is significantly high. i.e. 2.5 gms of basil leaves (five fresh leaves) contains 96.6 IU vitamin A. Also is a good source of calcium, potassium and vitamin C. Basil leaves contains volatile oils comprised of phenols, terpenes and aldehydes. Besides these oils, plant also contains alkaloids, glycosides, saponins and tannins. Basil leaves contains high levels of antioxidants and minerals. Thus, imposing many health benefits. There are no standards or recommendations for amounts to be used. Basil leaves has many properties like insecticidal, prophylactic agent, anti-cancer activity, anti-microbial activity, anti-pyretic activity, anti-diabetic activity and so on.

Eugenol, present in basil leaves is responsible for anti-inflammatory response of basil leaves. It diminish inflammation by stopping the release of pro-inflammatory cytokines.

The essential oils of basil leaves alter the humoral immune response which is responsible to antigen-antibody reaction. Basil bolsters immune reaction by improving both cellular and humoral immunity. The phenolics that is flavonoids [orientin and vicenin] present in basil leaves are responsible for anti-oxidant effect.

Basil leaves can be incorporated in soups, stews and stuffings. It can also be used in fish and meat preparations. Basil tea is one of the best beverage can be taken on daily basis by COVID patients for good results.

CINNEMON:



Cinnamon leaves and bark are widely used as spices in food or to produce essential oils. Research have proven the antioxidant, antimicrobial and antidiarrhoeal activity of the Cinnamon. The active ingredients present in Cinnamon are Rutin, Catechin, Quercetin, Kempferol and isorhamnetin. Cinnamon has flavonoids and polyphenols that have free radical quenching capacity.

There are several studies indicating the anti-inflammatory activity of the cinnamon and its essential oils. The several flavonoid compounds like

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gossypin, gnaphalin, hesperidin, hibifolin, hypolaetin, oroxindin, and quercetin present in the cinnamon have been noted with anti-inflammatory effects.

COVID infection is responsible for the generation of proinflammatory cytokines and chemokines and also the complement protein activation. Thus the diet with regular inclusion of spices like cinnamon with antioxidant and anti-inflammatory activity will speed up the process of rehabilitation in COVID patients.

CARDAMOM:



The active ingredient present in Cardamom is Cineole. The Cineole is known for its antiseptic property and widely used to treat the variety of ailments including acute respiratory disorders, sore throat, colds, fever, bronchitis.

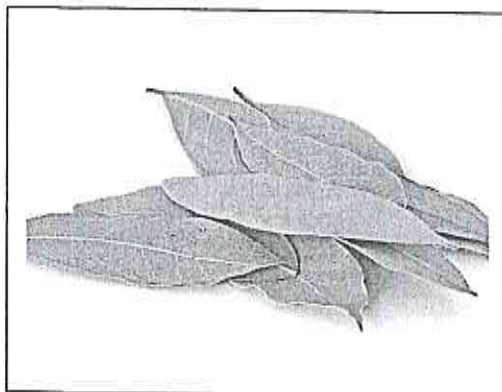
The most proven health benefit of Cardamom is its antibacterial activity. The essential oil of cardamom shows the potent antibacterial activity against Staphylococcus aureus, Bacillus cereus, Escherichia coli, and Salmonella typhi microorganisms. The antifungal activity of cinnamon is also been proven against food borne Aspergillus terreus.

Secondary bacterial infections as well as fungal infections are commonly seen in COVID patients. To overcome these secondary infections, dietary inclusion of spices like cardamom is crucial. Rehabilitation process speeds up with inclusion of such bioactive components in the daily diet of COVID patients. Cardamom can be incorporated in wide meal preparations; both vegetarian and non-vegetarian.

BAY LEAF:

Bay leaf contains following compounds as active ingredients- eucalyptol, terpenes, terpinyl acetate, sesquiterpenes, methyleugenol and other alpha and beta pinenes, phellandrene, linalool, geraniol, terpineol and lauric acid. Antioxidant

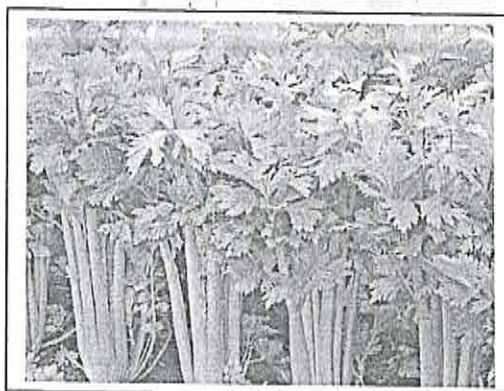
properties of bay leaf extract are imposed by the phenolic compounds present in it.



The health benefits of bay leaf are attributed to the presence of phenolic compounds and certain minerals. Researchers do not have any particular recommendations about the specific amount to be consumed to get the good results. Bay tea is commonly consumed to clear up the mucus in the lungs, colds and sore throat. Bay leaf decoction can be used on daily basis to strengthen immune power to prevent or minimize infections. No data is available on its exact

dose or amount to be consumed. But tea or decoction in combination with other spices like cinnamon may help to enhance the antioxidant effect and can be advised for the easy rehabilitation of COVID patients.

CELERY LEAVES:



Celery leaves possess a strong antioxidant activity and several health benefits because of the bioactive ingredients present in it. i.e. caffeic acid, p-coumaric acid, ferulic acid, apigenin, luteolin, tannin, saponin and kampferol. The phenolic compounds present in celery leaves are the great source of antioxidants. They exhibit an anti-inflammatory effect too. Many researches on celery leaves have shown its action on production of cytokines in the body during

infections. It helps to reduce the production of inflammatory cytokines. The effects are evident due to presence of phenolic compounds in the celery leaves. This also attributes the wide application of celery leaves in nutraceutical industry.

Celery leaves can be incorporated in variety of meals, both vegetarian and non-vegetarian. Soups of celery leaves can be prepared. The salad can be made by using celery leaves. It can be mixed with the breakfast shake. It also can be added to the beans, egg preparations and so on. Everyday celery decoction can be helpful in COVID patients in rehabilitation process.

CONCLUSION:

The Indian spices are traditionally known for its culinary as well as therapeutic uses. The bioactive components present in the spices impose many health benefits. Antioxidant and anti-inflammatory properties of spices suffice its application in rehabilitation process of COVID patients.

Secondary bacterial infection, compromised immunity, deranged health and nutritional status can prolong the recovery of COVID patients. To achieve proper rehabilitation and to reduce subsequent morbidity, the foods with antioxidant and anti-inflammatory effects can be included in the daily diets of COVID patients. Spices are the abundant source of antioxidants and thus can be used in different meal preparations of COVID patients to get desired health benefits.

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FORMULATION OF HORSE GRAM COOKIES WITH INCORPORATION OF NIGER SEEDS AS A FUNCTIONAL INGREDIENTS

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Abstract:

Improper nutrition is one of the important causative factor that leads to increased susceptibility to bacterial, viral and parasitic infections The World Health Organization (WHO) has announced dietary guidelines during the COVID-19 outbreak stressing the importance of a balanced diet to maintain a strong immune system and to minimize susceptibility to infections. Thus administration of proper diet is thus leading factor for preventing COVID-19 pandemic. The research study was conducted to develop nutritious cookies. The product was developed by using Whole wheat flour, Horse gram flour and Oats flour and incorporating it with Sesame seeds, Niger seeds and Almond powder. The cookies were baked at 160^oc for 15 minutes in oven. Proximate analysis and Sensory evaluation of cookies were conducted by standard methods. The results of proximate analysis revealed Moisture 0.32%, Total minerals 1.84gm%, Crude protein,13.27gm, Crude fat 33.59 gm, Crude fiber 0.81gm, Carbohydrate 50.17gm,calcium 179.05 mg, Iron 3.84mg and Energy 556.07kcal/100gm. High content of protein, calcium and iron were found in modified cookies compared to the locally available market cookies. The cookies were found to be acceptable in sensory evaluation and nutritionally superior compared to the locally available market cookies.

Keywords: Horse Gram, Oats, Niger seeds, Sesame seeds, Protein, Iron, Calcium

1. INTRODUCTION:

Cookies are one of the best known snack product. The main ingredients used for cookies are refined wheat flour, sugar, shortening agents, leavening agents and flavour. In the present study we developed nutritious cookies by using Whole wheat flour. Horse gram flour and Oats flour and

further incorporation of sesame seeds, niger seeds and almond powder into the cookies in order to develop cookies rich in energy, protein, calcium and iron. Horse gram is an inexpensive source of protein and is also rich in minerals such as calcium, phosphorus, iron and vitamins such as carotenes, thiamine, riboflavin, niacin and L-ascorbic acid. Niger seeds are also called as nigella seeds and are an extremely rich source of Iron which is 56.7 g/100 g. Niger seeds help to strengthen immune system, improves heart health and functioning of digestive system. Wheat is considered good source of protein, minerals, B- group vitamin and dietary fiber. The loss of vitamin and mineral in the refined wheat flour has led to widespread prevalence of constipation and other digestive disturbances and nutritional disorders. Raw oats are rich in a powerful soluble fiber called beta-glucan and are also a relatively good source of protein. Butter is rich in vitamin A and calcium. Sesame seeds are excellent source of phosphorous, iron, magnesium, calcium, manganese, copper & zinc. Almonds naturally contain monounsaturated and polyunsaturated fatty acids, proteins and fibers and variety of essential nutrients including vitamin E and several trace elements.

There lies a big challenge in front of whole world to fight against Covid-19 pandemic. Optimal nutrition and dietary nutrient intake impact the immune system. Therefore the only sustainable way to survive in current situation is to strengthen the immune system by proper nutrition.

MATERIALS AND METHOD:

The present study was conducted at the Department of Food Technology and Management, College of Non Conventional Vocational Courses For Women, CSIBER, Kolhapur.

2.1 PROCUREMENT OF MATERIAL:

For the present investigation, ingredients namely .Horse gram flour, Whole Wheat flour, Oats flour, Butter, Sugar, Almond powder, Niger seeds, Sesame seeds, Baking powder were procured from the local market of Kolhapur city.

2.2 PREPARATION OF RAW MATERIAL:

2.2.1 Flour Preparation:

The flours i.e. Whole wheat flour and Horse gram flour, Oats flour were sieved two times to remove bran particles and other foreign particles.

2.2.2 Butter Preparation:

Butter was beaten by using beater for 15-20 minutes.

2.2.3 Other Material Preparation:

All ingredients were weighed by using weighing machine.

2.3 FORMULATION OF COOKIES:

2.3.1 Standardization of control sample

Different combinations were conducted for preparation of control. Three combination such as sample A1, sample A2 and sample A3 of wheat flour and niger seeds in ratio of 30:5, 25:10 and 20:15 were prepared and remaining ingredients like oats flour, butter, sugar, almond powder, sesame seeds, baking powder were added as shown in table to increase the overall acceptance of control sample of cookies

Ingredient	Sample A1 (%)	Sample A2 (%)	Sample A3 (%)
Whole wheat flour	30	25	20
Niger Seeds	05	10	15
Oats flour	10	10	10
Butter	30	30	30
Sugar	15	15	15
Almond powder	05	05	05
Sesame seeds	05	05	05
Baking powder	0.3	0.3	0.3

Table No 1 - Formulation of control sample

1.3.2 Formulation of test sample

Different combinations were conducted for preparation of test samples. Three combination such as sample B1, sample B2 and sample B3 of wheat flour, and horse gram flour in the ratio of 25:5, 20:10 and 15:15 were prepared and other different ingredients like oats flour, butter, sugar, almond powder, niger seeds, sesame seeds, baking powder were added in as shown in table.

Ingredient	Sample B1%	Sample B2%	Sample B3%
Whole wheat flour	25	20	15
Horse Gram flour	5	10	15
Oats flour	10	10	10
Butter	30	30	30
Sugar	15	15	15
Almond powder	05	05	05
Niger seeds	05	05	05
Sesame seeds	05	05	05
Baking powder	0.3	0.3	0.3

Table No 2- Formulation of test samples

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2.3.3 Process for preparation of Cookies

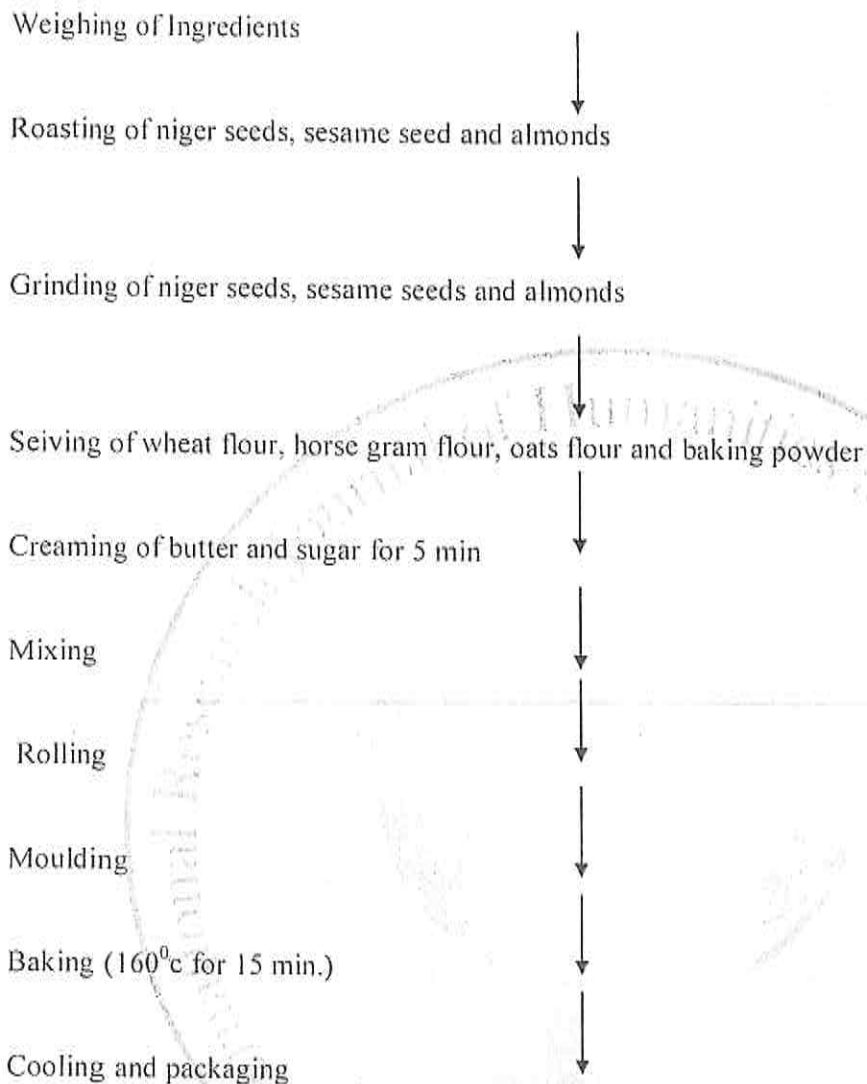


Figure No.1 Process for preparation of Cookies

2.3.4 SENSORY ANALYSIS

The control and test samples were evaluated for sensory attributes such as appearance, flavour, taste, texture, mouth feel and overall acceptability using Hedonic test, by semi-trained panel members.

2.3.5. CHEMICAL ANALYSIS

Chemical analysis of selected test sample was carried out for the estimation of Energy, Proteins, Carbohydrates, Fat, Moisture, Fiber, Ash, Calcium and Iron as per the approved AOAC methods.

3 RESULT AND DISCUSSION:

3.1 Sensory Evaluation of the Control Sample:

Hedonic rating test was carried out to check for acceptability of cookies. Among the 3 samples Sample A1 was selected. The Sample A1 containing 30 g Whole wheat flour, 10 g Oats flour, 30 g Butter, 15 g Sugar, 5 g Almond powder, 5g Niger seed, 5g Sesame seed, 0.3g Baking powder, gave better overall acceptability as compared to sample A2 and Sample A3. Sample A1 was finalized as control Sample.

Sr.No.	Test	Sample A1	Sample A2	Sample A3
1	Appearance	8.1	7	7
2	Flavour	7.5	7	7.5
3	Taste	8	7.5	7.5
4	Texture	8.5	7	7
5	Mouthfeel	7.8	7	7
6	Overall acceptability	7.8	7	7

Table No 3. Sensory analysis of Control Sample

3.2 Sensory Evaluation of the Test Sample:

Hedonic rating test was carried out to check for acceptability of cookies. Among the 3 samples Sample B3 was selected. The Sample B3 containing 15 g Whole wheat flour, 15 g Horse gram flour, 10 g Oats flour, 30 g Butter, 15 g Sugar, 5 g Almond powder, 5 g Niger seed, 5g Sesame seed, 0.3 g Baking powder gave highest overall acceptability by the panel members. Sample B3 has scored greater marks in all parameters such as appearance, flavor, taste, texture, mouth feel and overall acceptability.

After sensory evaluation the selected sample B3 was evaluated for chemical analysis.

Sr.No	Test	Control	Sample B1	Sample B2	Sample B3
1.	Appearance	8.1	7	7.6	7.2
2.	Flavor	7.5	7.2	7.7	7.3
3.	Taste	8	6	8	6.8

4.	Texture	8.5	7.3	7.5	7.2
5.	Mouth feel	7.8	6.2	6.8	6.2
6.	Overall acceptability	7.8	7	7.7	8.0

Table No.4 Sensory Analysis of Test sample

3.3 Chemical analysis of the Test Sample:

After completing the sensory evaluation of cookies samples, the best acceptable sample, Sample B3 is evaluated for chemical analysis. The cookies were analyzed for moisture, crude protein, crude fat, crude fibers, carbohydrate calcium and iron.

Sr.No.	PARAMETERS	Sample B3 Values Per 100 gm
a.	Moisture	00.32 gm
b.	Total Minerals	01.84gm
c.	Crude Protein	13.27 gm
d.	Crude Fat	33.59 gm
e.	Crude Fiber	00.81 gm
f.	Carbohydrate	50.17 gm
g.	Energy	556.07 kcal
h.	Iron	03.84 mg
i.	Calcium	179.05 mg

Table no.5 Chemical Analysis of selected test sample

4. CONCLUSION:

Healthy ingredients like horse gram flour, wheat flour, oats flour, niger seed, sesame seed, almond powder, butter are used to make cookies. The main aim was to formulate cookies with high nutritional quality. The chemical analysis of sample B3 revealed that, 100 gm of cookies contains 13.27 gm of protein, 179 mg calcium and 3.84 mg iron. Thus healthy cookies in place of refined flour cookies will definitely serve as best choice for enhancing overall health and immunity.

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Festivals In Uttarayan And Their Impact On Health

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Introduction:

Festivals play a very important role in our life. Festivals are mainly related to religion, environment and many deities are worshipped during the festivals. Hindu festivals depict the culture of India thoroughly since ancient times and up till modern era. Festivals promote harmony among the people. Festivals help to preserve our heritage and culture. Festivals promote a positive effect on health of people. Food made during the Festivals is highly nutritious and as it is eaten during social gatherings, it provides a psychological impact i.e. peace of mind. However, there are some bad effects of festivals on environment and human health. Noise pollution, may cause hearing losses, sleeplessness, high stress levels etc. Air pollution may cause respiratory problems like asthma, heart blocks etc. Water pollution may lead to many gastrointestinal diseases. High wastage during festivals may have negative impact on rag pickers and people living near dump yards. If only the positive impacts are taken into consideration and all negative impacts are overcome, then festivals in true sense will bring harmony.

India is a land of Unity in diversity that occupies the greater part of South Asia. India is a home to innumerable castes, tribes, religions as well as a more than a hundreds of minor linguistic groups. In India Festivals are categorised according to the path of Sun around the Earth ie. Uttarayan and Dakshinayan. In Uttarayan Sun travels from Capricorn (Makar rashi) to Cancer (KarkaRashi) that is from South to North. It is six months long period. During Uttarayan days are longer and nights are shorter. Uttarayana is considered to be a symbol of positivity. Some festivals welcome the seasons of the year, the harvest, the rains, or the full moon. Others celebrate religious occasions, the birthdays of saints or the advent of the New Year. A number of these festivals are common to most parts of India. However, they may be called by different names in various parts of the country or may be celebrated in a different fashion.

Festivals in Uttarayan:

On January 14, Uttarayan period i.e. Makar Sankranti starts and ends at Karka Sankranti i.e. 16 July. The festivals are designed as per six Indian seasons that are Vasant, Grishma, Varsha, Sharad, Hemant and Shishir. The festivals include Lohri, Republic day, Vasant Panchami, Pongal, Makar Sankranti, Holi, Kite festival and Gudi Padwa. During these festivals traditionally different types of recipes are prepared and consumed by the people since ancient times and according to Ayurveda, these recipes provide many health impacts on human body. These will be discussed according to the festival.

Lohri:

Lohri is the festival of North India i.e. Haryana and Punjab, celebrated by Hindus and Sikhs. It is celebrated a day before Sankranti in the paush month of Hindu calendar. It is celebrated to show gratitude towards God for abundance of harvest. People light bonfire and enjoy Lohri night by singing songs and dancing. The songs are sung to thank God for good harvest and also to commemorate the warrior Dulla Bhatti of Punjab. There are social gatherings and people enjoy dinner with sarson kasaag and makkhi di roti. Sweets called gajak (chikki made from sesame seeds, groundnuts and jaggery) are distributed among each other. Gajak is rich in carbohydrates, fats, proteins, calcium, iron. Makkhi di roti is made from coarse maize flour. It is rich in carbohydrates, vitamin C, fibre and anti-oxidants. Sarson kasaag is rich in dietary fibres, Vitamin C, Calcium and Iron.

Sesame seeds, groundnuts and jaggery present in Gajak increases the rate of metabolism and keeps the body warm during winter.

Rewadi gives instant energy, reduces cholesterol, improves blood pressure, balances hormones, fights against cancer, burns body fat and boosts absorption of nutrients.

Maize reduces risk of anaemia, increases weight, lowers blood sugar and cholesterol, preserves healthy skin.

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Republic Day:

On 26th January 1950 constitution of India has come into actual effect with parliamentary implementation and India became a republic nation. Republic day is celebrated in schools, colleges and all Government offices. It is celebrated for the inception of constitution of India. Sweets like Jalebi is distributed among children. Parade is organised in school and in front of government officers, ministers and President of India.

Jalebi is rich in carbohydrates and fats. Jalebi is useful in migraine, headache, hyperacidity, gastritis, sexual debility, oligospermia and reduced sexual libido.

Vasant Panchami:

It is celebrated on fifth day of Magh. It is celebrated in different parts of India. It is the birthday of goddess Saraswati who is considered to be the goddess of language, art, dance and music. Vasant Panchami is also the day which indicates the onset of spring season. People wear yellow coloured clothes. And also the fields are blossomed with yellow flowers of mustard. Yellow colour thus signifies the beauty of nature.

Kesar Halwa is prepared which is made of moong dal flour, milk, sugar, nuts, kesar and cardamom powder. It is rich in carbohydrates, protein, fibre, vitamin B1 and calcium. Moong dal Halwa maintains healthy state of body, good for eyes, reduces fever, energiser and nourishing, useful in weight gain, coolant, absorbent and can be recommended in post fever debility.

Pongal:

It is also called Thai Pongal. Thai means season in January and February in Tamil. This is celebrated in South India mostly in Tamil Nadu. This festival is four days long when crops like turmeric, sugarcane and rice are harvested. Pongal means to boil.

Pongal rice dish is food of this festival which is prepared with rice and moong dal to make sweet or savoury dish and seasoned with ghee. Pongal is rich in carbohydrates, protein, vitamin B1, magnesium, folic acid, antioxidants and dietary fibre. It is good for cough and cold, ginger in it fights with infection and boosts digestion, controls nausea.

Makar Sankranti:

It is primarily a harvest festival that is dedicated to Sun God. Makar Sankranti marks the beginning of Uttarayan. It is celebrated on 14th or 15th January. On Makar Sankranti the sun rays are very healthy for the body and skin. Makar Sankranti is celebrated in different parts of India by different names. In Andhra Pradesh, Makar Sankranti is known as Pedda Panduga and it is celebrated for welcoming harvesting season in India. In Karnataka the Makar Sankranti is the Suggi or harvest festival. This ritual is called "Ellu Birodhu." 'Ellu' means sesame seeds and 'bella' means jaggery. In Punjab, Haryana and Himachal Pradesh the festival is as known as Maghi. They perform Bhangra to welcome the New Year on Maghi. The special dish of the day is kheer cooked in sugarcane juice. In Assam, it is celebrated as Magh Bihu. This festival marks the end of the harvesting season when there is abundance of everything.

In Maharashtra, people celebrate Makar Sankranti by sharing multi-coloured tilguds (a sweet dish made from sesame seeds and jaggery) and til laddus. Gul poli is the special dish on this day that is made from wheat flour chapati stuffed with a mixture of roasted ground sesame seeds and groundnuts with jaggery. People greet each other by saying 'til-gulghya, god god bola', which means 'accept the sweets and speak sweet words'. On Bhogi, i.e. on 13th January people (previous day of Sankranti) make Brinjalsabji with carrots, beans, peas, potatoes and onions along with bajribhakri with white butter on it. Moong Khichadi is made on this day instead of plain rice. Tilgulladdu, tilgulpoli are rich in carbohydrates, fats, proteins, calcium and iron. Bajra is high in protein, insoluble fibre and is gluten free. Moong Khichadi is rich in carbohydrates, protein, vitamin B1, magnesium and folic acid. Bajra aids in digestion, lowers the risk of gall stones and helps to prevent cancer. Brinjal controls blood sugar, reduces risk of heart diseases, helps in weight loss and acts as anti-cancer agent. Carrots are good sources of carotenes, fibres, vitamin K, potassium and anti-oxidants. It lowers the cholesterol level, helps in weight loss, improves eye health and acts as anti-cancer agent.

Holi:

It is celebrated on full moon day in the month of Phalgun. Holi is the festival of colour and love. The celebration includes bonfire on previous night where people gather and sing and dance. Lighting of bonfire means triumph of good over bad. On second day people colour each other with different colours to show love and respect towards closer ones.

People make puranpoli as a special dish and is served with ghee. Bhang an intoxicating drink from cannabis leaves and flowers, milk and spices and consumed. Puranpoli is rich in calories, proteins, carbohydrates, folic acid, iron and fibre. Ghee is rich in calories, fat soluble vitamins and medium chain fatty acids. Puranpoli increases red blood cells and helps in weight loss.

The holikadahan includes burning of big trees which is not environment friendly and produces harmful smoke that causes air pollution and bonfire may prove threat to participants.

Indian International Kite festival:

In the state of Gujarat International kite Festival is celebrated in grand form. Many months before this festival, in homes of Gujarat manufacturing of kites starts. It is celebrated in mid-January. It signifies Uttarayan that means winter begins to turn into summer according to Indian calendar. In 2012 this festival entered in the Guinness Book of World of records as a participant. This festival aims at awakening of god from deep sleep. Traditionally it is celebrated by kings and nawabs as entertaining sports, then later on it reached to masses in the form of festival.

Flying with sports spirit and enthusiasm impacts very positively on mental health, removes depression and changes one's attitude towards life being socially active. It creates playfulness in life, decreases anxiety and depression. It improves brain and heart function. It improves distant eyesight.

The dishes made during this festival include, Undiyo which is a mixed vegetable including brinjal, potato, raw banana, yam, peas and beans, Sesame seeds Chikki and Jalebi. These are distributed in community. Undiyo aids in digestion and relieves constipation.

But it may prove dangerous for birds as the threads can cause injury to them and the thread may also cause injury to kite flyer. Kite flying may lead to accidents such as falling from heights.

Gudi Padwa:

It is the starting of spring festival and also the starting of Marathi new year Chaitra i.e in the month of March. It is mainly celebrated in Maharashtra and Goa. It is called as Ugadi in south India. It is celebrated as victory of Lord Rama over Ravana and welcoming ceremony of Rama-Sita back to Ayodhya after a great battle of Ramayana and coronation of Shri Rama after 14 years of exile. Reaping of rabi crops is also celebrated through it in the month of Chaitra. Special flag generally yellow or red colour is made with garlanded flowers, mango neem leaves and upturned silver or copper vessel signifies victory and achievement. It is believed to remove all evil, invite prosperity and good luck into the house.

The dietary special dish in the festival includes shrikhand-puri, pooran-poli, sweet rice etc. Shrikhand is rich in riboflavin, folic acid, vitamin B₁₂, calcium and phosphorus which is also good for people with lactose intolerance. Shrikhand is also good for skin, aids in digestion, improves intestinal health in colitis, prevents intestinal cancer, helps in diarrhoea, dysentery and helps in weight gain. Sweet rice helps in digestion and prevents constipation, cleanses liver by flushing out toxins from the body, produces cooling and soothing effect on body so useful in early summer.

Conclusion :

Celebrating pattern and particular diet in each and every festival of India provides many positive as well as negative impacts on human health and environment.

Festivals provide harmony in community. They carry message of past generation to present and future generation. They predominantly help to preserve heritage and culture. Festivals help in socialisation of people. Enthusiastic environment in festival helps to overcome mental disorders like depression and anxiety and reduce the mental distress. Various dietary patterns give positive impact on physical health also. But along with the positive impact there are some negative effects of festivals that affect environment and human health also due to noise pollution, air pollution and water pollution.

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CONCEPTUAL FRAMEWORK ON SUCCESS FACTORS RELATED TO CLOUD COMPUTING

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ABSTRACT

Our study examines the effect of relational, managerial and technical IT-based capabilities on cloud computing success, and analyzes how this success impacts firm performance with respect to the processes and operations supported by cloud computing. Additionally, we investigated the complex relationships that exist between IT capabilities and the public, private and hybrid cloud delivery models. The aim of this study is to identify the critical success factors that impact the organization to use cloud computing in their business processes. The author conduct a literature review study to identify the factors by collecting thirty papers from reputable database journal such as emerald, science direct, IEEE and Google Scholar. The author was using "cloud computing" as a keyword. The author found that cost reducing, flexible, redundancy and reliability, scalability, collaboration, efficiency, virtually and availability as critical success factors as the impact of the use of cloud computing for organizations. Further research can be conducted to validate this finding by developing an instrument and take a survey of organizations. Furthermore, an evaluation of the interrelationships indicates that the public and hybrid cloud delivery models may be more dependent on relational IT capabilities for cloud success while the flexibility and agility of the firm's internal IT (technical IT capability) facilitates the public cloud. We discuss how IT-based capabilities may be used to leverage cloud delivery models to positively influence the successful implementation of cloud computing, and ultimately, firm performance for the processes and operations supported by the cloud.

KEYWORDS: IT capabilities, Public cloud, Hybrid cloud, Private cloud, Firm performance.

INTRODUCTION

Cloud computing is a technology that has been adopted by organizations because of its dynamic, scalability and availability of its resources so that users can use it virtually. Other author stated cloud computing is a new

technology in an IT that make change, how, internet and information system to operate all over the world. The early concept of cloud computing was to provide software and hardware resources which can be accessed by organizations and individu. As the next generation of data center, cloud computing has virtual services like hardware, user-interface and logic application with a variety of QoS (Quality of Service) depend on the need of the user. These services can be spread through the internet. Cloud computing can be the new alternative for companies to maintain their data. One of cloud computing services is data management application. This application will reduce the cost of the company to maintain the hardware in their office. Although people in an organization already know about the benefit of cloud computing, the use cloud computing still has obstacles. This is because the organization does not understand how cloud computing can affect the way they are working.

Cloud computing is quickly changing the nature of business and represents a projected \$3.3 trillion transformation in the computing environment (Ballmer, 2010). A large number of organizations and government agencies are expected to rely on the cloud for more than half of their IT services by 2020 (Gartner, 2011). About 90% of business and technology leaders expect to implement some type of cloud computing by 2015 (Berman, Kesterson-Townes, Marshall, & Srivathsa, 2012) leaving many organizations scrambling to develop coherent plans for successful cloud deployment (Windstream, 2014). Cloud computing represents a transformational shift in IT that is rapidly changing the way in which organizations manage and deliver IT services over the internet (Shawish & Salama, 2014). As cloud computing becomes mainstream with a broad set of enterprise applications, the role of IT in organizations is strategically shifting toward reliance on external suppliers of infrastructure, software and services (Fauscette, 2013).

Innovative technology adoptions such as cloud computing present challenges to the organization's bottom line (Zhuang, 2005). To this point, Lim and Oh (2012), claim that cloud delivery models may impact differently the effects of IT capabilities on cloud success. Therefore, research that focuses on how a firm uses its capabilities to successfully meet those challenges will inform others about the specific IT capabilities that will more likely lead to cloud success. The research questions addressed in our study include: (1) What is the distinct influence of relational, technical and managerial IT capabilities on cloud implementation success? (2) How do the relationships in the model differ according to the cloud delivery structure that is chosen? The research model is tested using data collected from a global sample of 302 organizations that have adopted one of three general types of cloud delivery structures: public cloud, private cloud, or hybrid cloud. The empirical results indicate that, in general, relational IT capabilities are the most influential in cloud success. However, the results also show the specific ways in which firms combine their IT capabilities to best facilitate public, private or hybrid cloud delivery structures. While relational IT capability offers advantages for private and hybrid cloud delivery, technical IT capabilities are an important facilitator of the public cloud, and managerial IT capability is fundamental in any cloud delivery approach.


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CLOUD COMPUTING

Cloud computing is a pool of configurable computing network (e.g., networks, servers, storage, applications, and service) that is accessible as an on-demand network with minimal management effort or service provider interaction. In another article the author mention that a cloud computing is a virtual and distributed computing over internet using web and software services. Cloud computing also refers to the use of computing resources as a service, over a network. For accessing of services, the tenants should pay for it. From all of definitions of cloud computing above, the author can conclude cloud computing is on-demand computing with services that can be accessed through the internet. All of services are virtually, because the consumers only access those services every time they are needed for using it. There three services that covered by cloud computing providers:

- a. **SaaS:** an application that can be used by hosts and managers in their own data center. Those users will access this application over the web. SaaS providers also combine its service with PaaS or IaaS as their expanding services.
- b. **PaaS:** The occupants are using this application to develop and deploy their website. They do not need to worry about the infrastructure to develop a website. This service is able to support the complete life cycle of building and delivering web applications and services completely available from the internet.
- c. **IaaS:** as its name, this service provides hardware (server, storage and network) and software (operating system, virtualization technology, file system) as a service. The tenants save their money and time. This service has been created to replace a traditional hosting system that does not require any long term commitment. Users only use this service on demand.

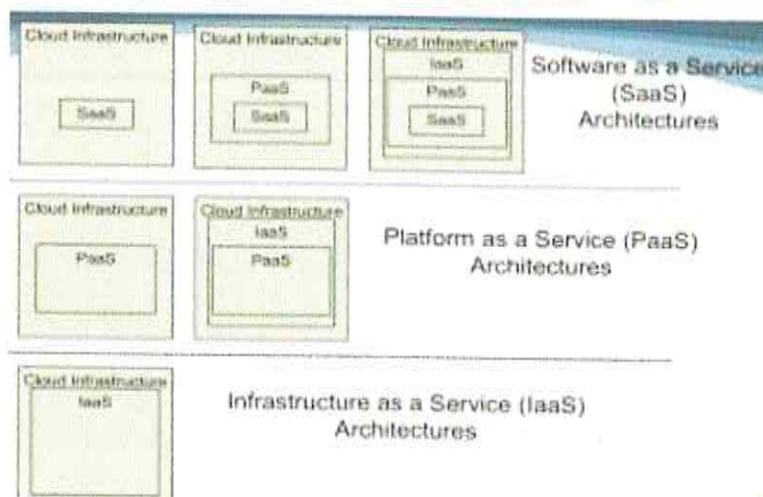


Fig 1. Service Model Architecture

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There three models of cloud computing. Applications that can be accessed through the web page called by the public cloud, for example social network, email services and sharing photos and document application. If cloud computing services only can be accessed in private networks, this service called private cloud. The hybrid cloud is also running on physical servers and ensures the proper function of other variants. Another part of cloud computing is its architecture. There are two layers of its architecture, lower layer which is placed for physical resources such as storage servers and application servers. This layer management separately by virtual level to share services, storage capacity and security context.

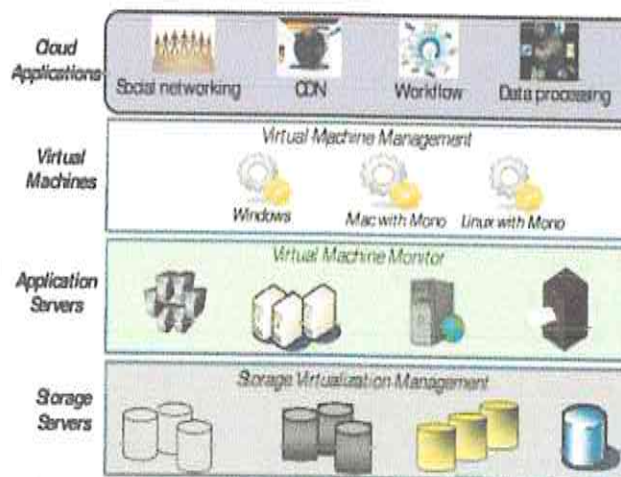


Fig 2. Typical Data Center

ORGANIZATIONS USE CLOUD COMPUTING

A. Cost Reducing

The profits that cloud computing providers get are from the cost which is paid by the consumers for accessing these services. In other hand, consumers, such as enterprise, are enamored by the chance to reduce costs because of the cloud computing providers reserve "in-house" provision of these services, another benefit of cloud computing pays only for what you use. This motto means, the consumers charged by single service that they use, when they access computing services. In addition, consumers no longer need to put a lot of money to build and maintain IT infrastructure. At any time they can use computer utilities that are sold by the providers. Moreover, servers from cloud computing are capable to do multi-tasking of the computation so that the consumers can get results as quickly as they expect. Pay separately per resource is another aspect of reducing cost of cloud computing because most applications do not make equal of computation, storage, and network bandwidth, some are CPU-bound, others network-bound, and so on, and may saturate one resource while underutilizing others.

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B. Flexible

Flexibility of cloud computing services can be achieved by providing ability to access its services on any kind of device. It does not matter what kind of hardware and software that providers use. It is because the providers isolate the user's devices from its infrastructure. As the business grows enough for the first time, providers can add their infrastructure such as hardware resources without notification to their consumers and the consumers do not realize it. To increase the speed of their services, the providers use different interfaces to their compute resources utilizing varied architectures and implementation technologies for consumers. Based on their need, users can increase or decrease the level of use of the computing resources and services flexibly and easily.

C. Redundancy and reliability

By placing their infrastructures around the world, the cloud computing providers are avoiding site failures and provide redundancy also ensure reliability. Dividing the workload to multiple clouds in many places can save time and more reliable from consumer perspective.

D. Scalability

Most of interface of cloud computing is user-friendly. Therefore, scalability can be achieved by expanding computing infrastructure. As a center of platform, the application-content makes user can adapt between content items and their needs.

E. Collaboration

Because of the similarity and flexibility of architecture, facilities, collaboration can be done among cloud computing providers. Another aspect of collaboration is a homogenous manner of management of computer resources from different cloud computing providers. From the consumer side, with proper application, members of group that using cloud computing services can share their documents without afraid of outsiders who can access their documents and discuss any topic in that group.

F. Efficiency

Using email services that provided by email providers such as yahoo.com, MSN Hotmail, Windows Live Hotmail and Gmail are an example of efficiency of cloud computing. For receiving professional mail, the company can count on mail providers, with the result that the company does not to buy equipments to provide mail server for their employees. Moreover, the company does not need to buy software to create mail server. Those are done by cloud mail system providers. Efficiency can be achieved because of users can access all services everywhere without considering the computer type and its storage, etc.


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G. Virtually

Using VMs (Virtual Machines), consumers are able to install their own application in their devices. Any applications run by the consumer have to be virtual towards computation, storage and communication model to cover up the implementation of cloud computing infrastructure. Another fact of virtual of cloud computing is user do not need any background of the services because all of the resources are virtual that can be shared by the users.

H. Availability

Providers of cloud computing, manage the infrastructure of it. The providers have control to the contents of cloud computing services in any aspect of study and available to the consumers whenever they request. To access these contents, a new application is created by the application developers. Many kinds of services are cloud-based applications and can be accessed by the consumers like social network, file sharing, website and online video viewers. Each of these application types has a different composition, configuration, and deployment requirements. A large cloud computing providers with data centers scattered around the world have the ability to provide a high level of fault tolerance by replicating data across vast geographic distances.

IT-BASED CAPABILITIES AND RESOURCE-BASED THEORY

In general, capabilities represent the ability of the organization to combine resources (i.e., physical and human capital) in ways that result in greater performance. Capabilities also describe the ability to combine unique competencies with firm resources to diversify the firm from competitors. A variety of IT-based capabilities have been identified and include managerial IT skills, technical IT skills and IT infrastructure, IT-enabled processes, and relationship infrastructure and IT business experience. IT capabilities encompass both IT-based assets and routines. A common finding among the research examining IT capabilities is the significant positive relationship between different IT capabilities and performance or competitive advantage. Since capabilities are considered organizationally embedded, non-transferable and firm-specific, they have the attributes that, when leveraged, may lead to firm level competitive advantage. IT-based capabilities are commonly studied using resource-based theory (RBV) which views the firm in terms of its available resources and how those resources may be combined in effective growth strategies and firm diversification. Management researchers state that firm performance originates from firm-specific capabilities and assets that, along with isolating mechanisms, helped to establish and sustain competitive advantage. The resource-based approach in explaining the sources of competitive advantage in the firm often highlights firm-level efficiency advantages, which may be achieved when IT capabilities are sufficiently leveraged. It has been noted that direct effects models in prior research clearly show that IT capabilities contribute to firm advantage; however, due to their simplicity they fall short in explaining the complexities that underlie the relationship. Recent research on resource-based (i.e., business and managerial) and process-based (technical and behavioral) IT capabilities concluded that different structural

mechanisms are responsible for determining the value of different IT capabilities. For example, while technical and behavioral capabilities did not directly influence IT-based competitive advantage, they had a significant indirect influence via their effect on physical and managerial capabilities this supports the notion that the value of different IT capabilities may result from more complex interrelationships and causally ambiguous processes. While RBV is fundamental to establishing the link between IT capabilities and performance or advantage, research that examines IT capabilities in more complex relationships will clarify the strategic value of IT.


CONCLUSION

Overall, our study results indicate that organizations employ specific IT-based capabilities for a specific cloud delivery model in order to meet performance objectives. Relational, managerial and technical IT capabilities are uniquely employed in the cloud implementation to facilitate positive outcomes such as IT economies of scale, cost reductions and access to professional skills. The combination of firm-specific IT capabilities and the three specific cloud delivery structures implies that cloud success may be dependent on matching the IT capabilities. In a practical sense, our findings clarify the prominent role of relational IT capabilities in the public and hybrid cloud structures as well as the importance of technical IT capabilities for the public cloud. Additionally, organizations that effectively employ the hybrid cloud may be poised to realize the greatest advantages. Management researchers have acknowledged that firm performance originates from firm-specific capabilities and assets that, along with isolating mechanisms, help to establish and sustain firm-level advantages. We surmise that the strategic value of IT-based capabilities may lie with how they are combined and how distinct combinations of relational, managerial and technical capabilities interact with internal and external IT assets to create competitive advantage.

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**PHYSICO-CHEMICAL ANALYSIS AND IDENTIFICATION OF SOURCES OF
WATER POLLUTION AT RANKALA LAKE IN KOLHAPUR,
MAHARASHTRA, INDIA****Angha Raut*¹, Parag Panchabhai*²**^{*1}Student, Department Of Environment Science, Shivaji University, Kolhapur, Maharashtra, India.^{*2}Director, Pruthvi Molachi Foundation, Dondaicha, Maharashtra, India.**ABSTRACT**

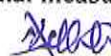
Without wetlands, our natural environment would be incomplete. Along with shielding our beaches from wave action, they mitigate the effects of floods by absorbing pollutants and enhancing water quality. In their natural habitats, animals, plants, and a diverse array of life-supporting plants and animals may be found. Wetlands are vital because they act as a nursery for species. Floodwater containment, pollution filtering, wind buffer/shield, tourism, recreation, carbon sink, and job centres. Additionally, they protect and improve the quality of water, offer habitat for fish and animals, store flood waters, and manage surface water flow during dry years, all of which contribute to their significance. We have detailed our research of Rankala Lake in Kolhapur, Maharashtra, in this article. It examines the lake's seasonal physicochemical features, the causes and risks to the lake's water quality, the influence of religious activity on the lake's water quality, and remedial ways to reduce Rankala Lake water pollution.

Keywords: Water Pollution, Wetland, Sources Of Pollution, Rankala Lake, Physicochemical Features.

I. INTRODUCTION

Water is essential for the existence and flourishing of all species on the planet. Oceans of liquid water and polar areas coated in solid water make up the majority of Earth's surface area. Natural, man-made, and ephemeral lakes are all referred to as "lakes" by the term "Lake." Pollution (particularly acid rain), eutrophication, and overdevelopment of the coastline are major risks to lake fertility. In fresh water, life forms normally prefer alkaline (basic, non-acidic) conditions, yet lake fertility is usually rather stable down to a pH of six. Acid rain has a devastating impact on living forms when the pH dips below five. Species of plants, plankton, insects, and even certain microbes perish as a result of climate change. Eutrophication caused by humans has the potential to reduce lake oxygen levels, killing out the majority of the lake's fish. If any foreign material enters natural water and makes it unsuitable for human consumption, the term "water pollution" has been coined. This is how we define contamination of the water. World Health Organization definition: "any foreign material, whether from natural or other sources that may contaminate the water supply and make it harmful to life, as a result of their toxicity, reduces the normal oxygen level of water, causes aesthetically unpalatable effects, and contributes to the spread of epidemic diseases." Toxic substances, such as chemicals or microbes, enter waterways and degrade the water's quality and make it unsafe for people or the environment. Waters such as rivers and lakes may get infested with the disease. Our natural habitat would be incomplete without wetlands. In addition to protecting our coasts from wave action, they lessen flooding's effect by absorbing pollutants and improving water quality. Animals, plants, and a broad variety of life-supporting plants and animals may be found in their natural environments. Wetlands are significant because they serve as a wildlife nursery. Containment of flood waters, Pollution filter, Wind buffer/shield, Tourism, Recreation, Carbon sink, Employment centres. In addition, they preserve and enhance water quality, provide habitat for fish and animals, store flood waters, and regulate surface water flow during dry years, all of which contribute to their importance.

In this paper, we have discussed about our study of Rankala Lake in Kolhapur, Maharashtra. It discusses the seasonal Physico-chemical characteristics of the lake, identification of the sources and threats of pollution for the lake, the impact of religious activity on the water quality and suggestions on remedial measures to control Rankala Lake water pollution.

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II. METHODOLOGY

Water Sampling

For physico-chemical analysis of the water, water from seven pre-designated sites from the Rankala lake was collected. Sampling of all sites were collected in morning between 8 to 9 am. Water samples were collected in clean bottles. Water temperature at each sampling point was recorded on the day of collection using a thermometer and GPS co-ordinates are noted and depicted in the Table 2.2.2.

Table 1. GPS co-ordinates of selected sites of Rankala Lake

Sr.No.	Sites	Coordinates
1	Rajghat	Lat:N16°6943.37" Long:E74°2144.96
2	D-Mart	Lat:N16°6928.52" Long:E74°2089.30
3	Shalini Palace	Lat:N16°6929.8" Long:E74°7229
4	Irani Khan	Lat:N16°6821.17" Long:E74°2107.25
5	Pataudi Ghat	Lat:N16°6800.08" Long:E74°2087.06
6	Tambat Kaman	Lat:16°6874.69" Long:E74°2158.80
7	Sandhya Math	Lat:N16°6913.65" Long:E74°2154.53

Physico-chemical analysis was carried out within 24 hrs. after collection of samples. Proper care was taken during sampling with due consideration to the material of the container, gases exchange, sample analysis time, preservation requires etc. The sample containers were washed properly in the laboratory. During the sample collection, containers were rinsed 2 to 3 times with the sample to be analyzed before filling. The containers were directly dipped into the water and filled. The container was tightly capped and carried to the laboratory for analysis. In the laboratory it was kept in refrigerator at 4oC for further analysis. For field parameters glassware and reagents were carefully taken to the field without contamination and test were carried out. The samples were collects monthly to detect noticeable changes in the quality of lake waters.

Physico-Chemical Parameters:

It is very essential and important to test the water before it is used for drinking, domestic, agricultural or industrial purpose. Water must be tested with different physico-chemical parameters. Selection of parameters for testing of water is solely depends upon for what purpose we going to use that water and what extent we need its quality and purity. Water does content different types of floating, dissolved, suspended and microbiological as well as bacteriological impurities. Some physical test should be performed for testing of its physical appearance such as temperature, color, odor, pH, turbidity, TDS etc., while chemical tests should be performed for its BOD, COD, dissolved oxygen, hardness and other characters. For obtaining more and more quality and purity of water, it should be tested for its trace metal, heavy metal contents and organic i.e., pesticide residue. It is obvious that drinking water should pass these entire tests and it should contently require amount of mineral level. Only in the developed countries all these criteria are strictly monitored. Due to very low concentration of heavy metal and organic pesticide impurities present in water it needs highly sophisticated analytical instruments and well-trained manpower. Following different physico-chemical parameters are tested regularly for monitoring quality of water.

Table 2. Parameters and their methods

Parameter	Method
pH	Electrometric Method
EC	Electrometric Method
Temperature	By Thermometer
Chlorides	Mohr's method
Hardness	EDTA Titrimetric Method

Dissolved Oxygen	Winkler's method
BOD	Dilution method
COD	Closed Reflux Digestion Method
Total Solids	Gravimetric method
Total Dissolved Solids	Gravimetric method
Total Suspended Solids	Gravimetric method
Nitrate	Spectrophotometric Method
Sulphate	Spectrophotometric Method
Phosphate	Spectrophotometric Method

(APHA,2001)

III. OBSERVATIONS

Rankala lake is one of the most important lakes in Kolhapur district in western India, but Rankala lake is not used as drinking water source. Rajghat, Tambat Kaman and Sandhya math on these sites domestic activities like washing of clothes, vehicles, bathing etc. are carried out. Swimming and fishing activities are observed in lake. Due to such activities Rankala lake has become more vulnerable to pollution. Major treats to the lake are untreated domestic sewage coming from upstream of the Rankala lake. The observations of physico-chemical analysis of Rankala lake water samples of seven sites are given below. The results are compared with CPCB standards.

Table 3. Study of Physico-Chemical Parameters of water from Rankala lake during month of August

Sr. No	Parameters	Rajghat	D-Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp.(°C)	25	24	25	25	25	24	25
2	pH	6.3	6.2	6.6	6.4	6.5	6.7	6.3
3	EC (mho/cm)	310	320	340	1210	290	360	320
4	TDS (mg/lit.)	169	146	150	174	152	132	162
5	TSS (mg/lit.)	24.5	24	23.9	28	22.3	24.6	25
6	TS (mg/lit.)	193.5	170	173.9	202	174.3	156.6	187
7	DO (mg/lit.)	8.8	7.2	7.4	6.2	8.6	4.4	5.8
8	COD (mg/lit.)	206	180	220	140	218	178	210
9	BOD (mg/lit.)	57.33	53.33	40	60.6	43.33	56.34	46.66
10	Hardness (mg/lit.)	120	130	140	115	100	160	170
11	Chlorides (mg/lit.)	24.85	19.88	21.30	16.74	11.56	26.67	14.91
12	Nitrate (mg/lit.)	15.17	12.49	11.41	14.14	9.64	13.03	14.50

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13	Sulphate (mg/lit.)	4.7	3.9	3.6	2.9	4.2	3.4	4.3
14	Phosphate (mg/lit)	3.09	2.15	2.12	4.11	1.07	3.13	4.12

Table 4. Study of Physico-Chemical Parameters of water from Rankala lake during month of September

Sr. No.	Parameters	Rajghat	D- Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp.(°C)	23	24	24	24	24	23	23
2	pH	7.4	7.3	7.4	7.5	6.8	6.5	6.1
3	EC (mho/cm)	390	340	420	1650	360	400	370
4	TDS (mg/lit.)	187	198	183	232	179	222	190
5	TSS (mg/lit.)	32	30.7	34	29.3	28	31	32
6	TS(mg/lit.)	219	228.7	217	261.3	207	253	219
7	DO(mg/lit.)	6.8	7.4	5.3	5.4	7.4	8	5.4
8	COD (mg/lit.)	224	165	170	152	200	222	154
9	BOD (mg/lit.)	63.33	68.33	60	75.6	53.33	70	65.33
10	Hardness (mg/lit.)	159	140	137	146	127	150	167
11	Chlorides (mg/lit.)	13.94	14.97	12.94	19.88	16.91	20.94	22.29
12	Nitrate (mg/lit.)	24.13	23.26	23.31	26.16	18.06	24.24	25.31
13	Sulphate (mg/lit)	5.3	4.1	4.5	3.7	6.3	7.4	7.2
14	Phosphate (mg/lit)	6.65	4.98	5.08	7.94	3.30	6.04	7.21

Table 5. Study of Physico-Chemical Parameters of water from Rankala lake during month of October

Sr. No.	Parameters	Rajghat	D- Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp. (°C)	22	23	23	24	23	22	22
2	pH	7.2	6.8	6.9	7.5	7.3	6.8	7.4
3	EC (mho/cm)	265	259	250	970	240	272	275
4	TDS (mg/lit.)	165	175	154	190	148	180	173
5	TSS (mg/lit.)	26	26.5	27	25.4	25	24.5	28.6

6	TS (mg/lit.)	191	201.5	181	215.4	173	204.5	201.6
7	DO (mg/lit.)	5.4	6.2	4.6	5.7	6.6	4.4	4.9
8	COD (mg/lit.)	220	213	235	214	196	219	187
9	BOD (mg/lit.)	62	66	58	73	50	68	63
10	Hardness (mg/lit.)	130	150	145	105	135	100	160
11	Chlorides (mg/lit.)	10	8.2	11.8	12.4	9.6	17	15
12	Nitrate (mg/lit.)	15.12	17.8	14.0	23.4	12.1	16.3	22.6
13	Sulphate (mg/lit.)	7.5	6.1	6.9	6.2	8.1	7.0	8.3
14	Phosphate (mg/lit.)	4.4	3.1	4.5	5.2	3.8	5.9	4.8

Table 6. Study of Physico-Chemical Parameters of water from Rankala lake during month of December

Sr. No.	Parameters	Rajghat	D-Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp.(°C)	23	24	24	24	24	23	23
2	pH	7.5	7.3	7.4	7.1	8	7.5	7.4
3	EC (mho/cm)	162	156	158	955	150	160	165
4	TDS(mg/lit.)	165	150	154	168	156	164	162
5	TSS(mg/lit.)	32.1	29.3	35.6	28.2	33.6	31	30.4
6	TS(mg/lit.)	197.1	179.3	189.6	196.2	189.6	195	192.4
7	DO(mg/lit.)	7	7.3	6.1	5.9	7.9	7.7	4.6
8	COD (mg/lit.)	219	131	164	138	120	146	110
9	BOD (mg/lit.)	59	60	48	65	45	63	59
10	Hardness (mg/lit.)	115	140	110	95	135	118	125
11	Chlorides (mg/lit.)	11.21	9.24	8.28	14.40	10.84	7.43	6.23
12	Nitrate (mg/lit.)	23.19	16.94	18.11	23.92	13.9	21.35	22.80
13	Sulphate (mg/lit.)	4.9	3.8	4.2	3.1	5.9	7.1	6.9
14	Phosphate (mg/lit.)	3.12	4.98	5.94	6.01	3.48	4.64	5.51


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Table 7. Study of Physico-Chemical Parameters of water from Rankala lake during month of January

Sr. No.	Parameters	Rajghat	D- Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp.(°C)	18	18	18	19	19	17	17
2	pH	6.9	6.8	7.0	7.2	6.2	7.8	6.7
3	EC (mho/cm)	156	132	147	972	114	132	146
4	TDS (mg/lit.)	168	173	182	175	189	164	186
5	TSS (mg/lit.)	30.8	33.6	32.1	35.6	37.8	33.1	32.9
6	TS(mg/lit.)	198.8	206.6	214.1	210.6	226.8	197.1	218.9
7	DO (mg/lit.)	6.8	6.4	5.9	5.5	6.8	7.3	5.4
8	COD (mg/lit.)	154	166	159	174	189	210	196
9	BOD (mg/lit.)	57	54	45	63	43	60	54
10	Hardness (mg/lit.)	142	134	124	148	136	154	163
11	Chlorides (mg/lit.)	7.9	12.1	8.4	9.11	14.2	7.4	8.9
12	Nitrate (mg/lit.)	19.4	13.9	12.8	23.6	12.7	21.2	24.6
13	Sulphate (mg/lit.)	5.6	6.8	3.9	6.2	4.8	5.2	7.3
14	Phosphate (mg/lit.)	2.5	3.8	4.6	6.8	2.9	6.2	4.6

Table 8. Study of Physico-Chemical Parameters of water from Rankala lake during month of February.

Sr. No.	Parameters	Rajghat	D- Mart	Shalini Palace	Irani Khan	Pataudi Ghat	Tambat Kaman	Sandhya Math
1	Temp.(°C)	19	19	19	20	20	18	18
2	pH	7.3	6.8	7.4	8.3	7.6	7.6	7.8
3	EC (mho/cm)	144	139	144	987	107	125	137
4	TDS (mg/lit.)	198	204	174	199	169	184	173
5	TSS (mg/lit.)	36.2	40	41.6	37.6	42.8	34.5	37.2
6	TS(mg/lit.)	234.2	244	215.6	236.6	211.8	218.5	210.2
7	DO(mg/lit.)	6.4	4.2	6.2	5.2	5.8	7.4	5.6

8	COD (mg/lit.)	194	180	164	178	162	199	219
9	BOD (mg/lit.)	55	52	43	60	40	58	57
10	Hardness (mg/lit.)	139	150	120	130	121	150	142
11	Chlorides (mg/lit.)	15	20	18	23	19	10	13
12	Nitrate (mg/lit.)	14.9	12.3	15.4	24.4	11.7	25.8	16.2
13	Sulphate (mg/lit.)	4.3	5.2	4.9	5.6	6.1	4.7	5.8
14	Phosphate (mg/lit.)	3.5	3.1	5.6	6.9	3.7	5.2	4.9

Table 9. Monthly average of Physico-chemical parameters of water from Rankala Lake

Parameters	Aug	Sept	Oct	Dec	Jan	Feb	Standard
pH(°C)	6.4	7	7.1	7.4	6.9	7.5	8.5
EC (mho/cm)	307.1	561.4	361.5	272.2	257	254.4	300
TDS (mg/lit.)	155	198.7	172.1	159.8	177.5	185.85	500
TSS (mg/lit.)	24.6	31	30	31.7	33	38.55	100
DO (mg/lit.)	6.9	6.5	5.4	6.6	6.3	5.8	6
COD (mg/lit.)	193.1	183.85	212	146.85	178.28	185.1	250
BOD (mg/lit.)	52.37	65.13	62.8	57	53.7	52.1	30
Hardness (mg/lit.)	133.5	146.5	132.1	119	143	137	200
Chlorides (mg/lit.)	19.41	17.41	12.11	9.66	9.71	16.8	250
Nitrate (mg/lit.)	12.9	23.48	17.33	20	18.31	17.24	10
Sulphate (mg/lit.)	3.85	5.5	7.15	5.12	5.68	5.22	400
Phosphate (mg/lit.)	2.82	5.88	4.5	4.81	4.48	4.7	5

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IV. RESULTS AND DISCUSSION

The water quality of system depends on its physical, chemical and bacterial constituent's. The results are revealed that there was significant seasonal variation in some Physico-chemical parameters. Temperature is a key factor in aquatic life. Water temperature is a physical property expressing how hot or cold water is. As hot and cold are both arbitrary terms, temperature can further be defined as a measurement of the average thermal energy of a substance. Temperature of air and water was monitored month wise. The minimum temperature (20°C) was observed in month of January at Rankala Lake. (<https://www.fondriest.com>) [15] Several natural and artificial causes are responsible for an existing water color. The most favorable environments for high coloration include elevated organic activity with algal growth and presence of soluble minerals in the vicinity of a water body. The color of water from Rankala is slightly greenish. The greenish color of water developed in lake due to growth of phytoplankton and algae. There is possibility of entering sewage water which promotes growth of aquatic weeds. (<https://www.waterboards.ca.gov.pdf>) [16]

The pH is one of the important indications of lake water. pH is a measure of how acidic/basic water is. pH is measurement of potential activity of hydrogen ions in the sample. The pH value is varied from 6.9 to 7.5 in summer, 7.1 to 7.4 in winter and 6.4 to 7.0 in rainy season. The sample shows variation of in different seasons of the year. Maximum pH is observed during month of February (7.5) and minimum pH is observed in month of August (6.4). pH of lakes becomes alkaline due to increasing concentration of domestic sewage from nearby area. These pH values are supporting the phytoplankton growth. (Prakash D. Raut et al;2011) [6]

EC refers to the electrical conductivity of the water solution. When the water is pure without any dissolved solutes, it conducts electricity naturally. The amount of electricity that can pass through water is influenced by how many ions are dissolved in the water solution. By measuring EC, we can get an idea of how much ionic nutrients are in the water. Electrical conductivity in water is due to ionization of dissolved inorganic solids. EC is an indicator of TDS, which is measure of salinity that affects the taste of potable water (WHO,1984). In present study EC was observed maximum at Erani site (955 to 1650 mho/cm). The highest electrical conductivity was recorded in the month of September (just after rainy season), because during the study period mainly organic matter were introduced by anthropogenic activities not inorganic substances. (Mathur et. al; 2008) [2]

Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides, and sulfates) and some small amounts of organic matter that are dissolved in water. DS is simply the sum of cations and anions concentration expressed in mg/lit. The TDS is the number of dissolved solids present in water determines its suitability for domestic use. The maximum TDS was observed in month of September 2018, the range was 196.14mg/lit. The minimum TDS was recorded in month of December 2018 that is 157.8mg/lit. (<https://www.water-research.net>) [17]

Total suspended solids, on the other hand, are a total quantity measurement of solid material per volume of water. This means that TSS is a specific measurement of all suspended solids, organic and inorganic, by mass. Total suspended solids (TSS) is the dry-weight of suspended particles, that are not dissolved, in a sample of water that can be trapped by a filter that is analyzed using a filtration apparatus. It is a water quality parameter used to assess the quality of a specimen of any type of water or water body, The maximum TSS was recorded in month of February (38.55) and the minimum was observed in month of August (24.6). (<https://www.fondriest.com>) [18]

Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water. The monthly variation of mean DO concentration of surface water were between 5.2 to 6.9 mg/lit. with lower values in October and higher values in August. The maximum value was observed during the month of August at Rankala Lake because of growth of aquatic weeds. D.O of all sites are slightly beyond the limits of CPCB except month of October and February. (Patil et al;2012) [6]

The COD and BOD values are more in all seasons that reveals excess organic load in form, of sewage is added to water and high oxygen consumption by heterotrophic organisms. It is observed that maximum BOD is in September while the minimum BOD is observed during month of August.

Chemical Oxygen Demand is an important water quality parameter because, similar to BOD, it provides an index to assess the effect discharged wastewater will have on the receiving environment. Higher COD levels mean a greater amount of oxidizable organic material in the sample, which will reduce dissolved oxygen (DO) levels. A reduction in DO can lead to anaerobic conditions, which is deleterious to higher aquatic life forms. The COD test is often used as an alternate to BOD due to shorter length of testing time. Chemical oxygen demand determines the amount of oxygen required for chemical oxidation of organic and inorganic matter. The COD level are more at Tambat Kaman, while it is minimum at D-Mart site. COD fluctuating from October to February, it may be due to seasonal change. The higher values of COD indicate pollution due to oxidizable organic matter. (Prakash D. Raut et al;2011) [6]

Biochemical Oxygen Demand or Biological Oxygen Demand, is a measurement of the amount of dissolved oxygen (DO) that is used by aerobic microorganisms when decomposing organic matter in water. The BOD is defined as the amount of oxygen required by bacteria in decomposing organic material. The BOD level more at Tambat Kaman and less at Salini Palace site. Seasonally, it was high during summer, being in conformity with the observation of Chatterjee (1992) [11]

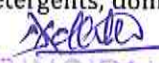
The simple definition of water hardness is the amount of dissolved calcium and magnesium in the water. Total hardness mainly depends upon dissolved salts present in water, hardness of water is due to presence of calcium and magnate ions. Water containing hardness concentration up to 60 mg/lit are called 'soft' water and those containing 120-180mg/lit as 'hard' water. The maximum hardness observed during month of September 146.5 mg/lit. and minimum in December that is 119 mg/lit. If there is increase in hardness content becomes uncongenial for fish production because of higher p H. The source of hardness in Rankala Lake is mainly due to the addition of calcium and magnesium through surface run-off from agricultural and other catchment areas during rainy season. So, the highest value of total hardness is observed in September (post monsoon season). (Mathur et. al;2008) [2]

Chlorides are salts resulting from the combination of the gas chlorine with a metal. The maximum Chloride was observed in August at Erani Khan (18.21 mg/lit.) while minimum at Tambat Kaman (7.45 mg/lit.) The maximum value of chloride are observed due to anthropogenic activities like washing, bathing, idol immersion etc. (<http://www.state.ky.us/nrepc/water/ramp/rmcl.htm>) [19]

Nitrogen is essential for all living things as it is a component of protein. Nitrogen exists in the environment in many forms and changes forms as it moves through the nitrogen cycle. Nitrate is the highest oxidizable form of nitrogen occurs in trace quantities in surface waters but may attain high level in some ground water. Nitrate is important plant nutrient that causes eutrophication in receiving water bodies. Nitrate have greater affinity for hemoglobin in blood stream that replace the needed oxygen and causes the condition known as "Methemoglobinemia". Concentration of nitrate is indication of level of micro nutrients in water bodies and has ability to support plant growth and also feverous growth of phytoplankton. The maximum nitrate was observed in month of September and minimum in August. (<https://www.water-research.net>) [20]

Sulphate (SO₄) can be found in almost all-natural water. The origin of most sulfate compounds is the oxidation of sulfite ores, the presence of shales, or the industrial wastes. Sulphate is naturally occurring substance that contains Sulphur and oxygen. It is present in various mineral salt that are found in soil. The sulphate forms salts with variety of elements including Barium, Calcium, Magnesium, Potassium and Sodium. The maximum sulphate was recorded in month of October (7.2 mg/lit.), while minimum in February (5.2 mg/lit.) (<https://www.lennotech.com/sulfates.htm>) [21]

Phosphorus is a common constituent of agricultural fertilizers, manure, and organic wastes in sewage and industrial effluent. It is an essential element for plant life, but when there is too much of it in water, it can speed up eutrophication of rivers and lakes. Phosphate contain in a lake may be due to release of phosphate from bottom sediment and organic load of water, this helps in growth of phytoplankton and weeds in the lake. The maximum value observed was in month of September (5.8 mg/lit), while minimum was observed in August (1.82 mg/lit.). The reason for increase the level of phosphate may be household detergents, domestic sewage, fertilizers. (Prakash D. Raut et al;2011) [6]


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V. CONCLUSION

From the study of Physico-chemical characters of Rankala Lake water, following conclusion can be drawn:

1. Washing of clothes, vehicles, bathing, cattle washing are responsible for the change in physical and chemical properties of Rankala Lake.
2. Near the site of Rajghat, Tambat Kaman, Sandhya Math people wash clothes and cattle. Increase in phosphate and nitrate is observed due to use of detergents, which ultimately causes increase in growth of algae that is "Eutrophication"
3. In the catchment area of Rankala Lake disposal of untreated domestic sewage is major reason for Rankala Lake pollution.
4. The study of Rankala lake pollution allowed to assess the level of pollution in lake due to inflow of various activities that lead to it.
5. Household detergents, domestic sewage, leaching of phosphate may be reason of increase in level of phosphate.
6. The BOD values increase with increase in number of metabolic activities present in water.
7. Seasonal variations and some of the anthropogenic activities contribute for the changes occurring in parameters.

VI. RECOMMENDATIONS

To keep the Rankala catchment area clean, waste water from the catchment area has to be redirected and treated. Residents' drainage systems should be improved and inspected on a regular basis. It's a smart idea to irrigate using treated waste water. Keep the lake's fresh water clear. Do your laundry, wash your vehicle, and take care of your pets at a separate place. Certain controls should be put in place to ensure that restrictions on activities like bathing or cleaning clothes or vehicles are adhered to. To ensure that rules are effectively executed, authorities should be responsible. Pooja offerings, Ganesh idol immersion, and garbage dumping at lake places should be regulated or prohibited. There has been an increase in public awareness of the lake's aesthetic and environmental attributes as a means of limiting and reducing human activities on the body of water.

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Review on Utilization of Radio Frequency Pasteurization on Different Raw Food

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Abstract: Recent analysis indicate that certain micro organism can survive at minimum moisture containing food for example various food powders, and ready to eat food mixes. To overcome from this Radio frequency pasteurization is an answer to them. Radio frequency pasteurization is used as an alternative for pasteurization technology in food processing industry. Especially for those who have minimum moisture content. The principle behind radio frequency pasteurization is dielectric heating of food material. It is low cost, have rapid heating power and have deep thermal penetration capacity causes better quality and extend the shelf life of food product. In this review paper various raw food material for example corn grains, black pepper, almonds, peanuts and eggs which have been treated with radio frequency pasteurization and shows there methods and extended shelf life.

Keywords: Dielectric heating, radio frequency, pasteurization, shelf life

1. Introduction

Radio frequency (RF) heating has been used in several industries and has a great potential to be used as an alternative pasteurization technology in the food industry. Efforts have been undertaken to develop uniform heating throughout the food to ensure product safety and extend its shelf life. Among the food products, food powder is a large category of low moisture foods and generally considered as microbiologically safe due to their low water activity. However, recent outbreaks indicate that certain microbial species can survive for a significant time period in contaminated low moisture foods. For this reason, the development of effective pasteurization techniques for low moisture foods has become more of an issue. [1]

Fresh foods, such as vegetables, fruits, and aquatic products, have high water activity and are highly heat-sensitive. Thermal processing of fresh foods is often employed to extend shelf-life without chemical treatment in order to avoid any chemical residues in the preserved food. Radio frequency (RF) heating is one of the most promising heating methods applicable to fresh foods due to rapid heating, low cost, deep thermal penetration, and possibility of better quality control. This paper reviews the recent literature on applications of RF heating in fresh food processing, including cooking, microorganism reduction, disinfection, thawing, and blanching. The heating efficiency and product quality of aforementioned applications were further discussed. Moreover, recommendations were made for future research on RF to effectively achieve enhanced thermal processing and reliable scale-up. The present study provides some useful information for the use of RF heating in industry and the future study of RF application in fresh food processing. [2]

The shelf life of foods is usually limited due to the frequent contamination by pests and microorganisms. Although low risk of pathogen contamination and no growth potential compared to those in high water activity animal-or vegetal-derived products, the low-moisture food has still significantly contributed to the total number of foodborne infections and outbreaks. Radio frequency (RF) treatments

can be classified as a dielectric heating, which is a promising technology for achieving effective food pasteurization and disinfections because of the associated rapid and volumetric heating with large penetration depth. The RF technique could be applied at low-moisture food as both the dipole dispersion and ionic conductivity may play effective roles. It can selectively heat and kill the microorganisms/pests without damaging the agricultural product because of the large difference of dielectric loss factors between target microorganisms/pests and host foods. In this article, the low-moisture foods sterilized and disinfested by RF energy are reviewed through basic theories, dielectric properties, heating effect, and uniformity. The potential research directions for further RF heating applications are finally recommended in low-moisture foods. [4]

Basic Science behind radio frequency pasteurization-

RF processing uses dielectric heating to thermally process foods using electromagnetic waves. RF wavelengths cover the range of the electromagnetic spectrum from 3 kHz to 300 MHz. Only frequencies of 13.56 MHz, 27.12 MHz, and 40.68 MHz are permitted for use in the United States. During RF processing, dielectric materials are placed in an alternating electric field. RF energy is generated by a triode valve and applied to the food via a pair of electrodes. Dielectric heat energy is generated in the food by molecular friction as high-frequency electric fields alternate. Unlike conventional heating, dielectric heating is fast and volumetric.

RF processing can be used to process any dielectric material and most food products are dielectric. Foods contain polar molecules such as water, and these molecules have dipole moments, positive and negative charge centers that do not coincide. When placed in an electric field, polar molecules align with the field via the dipole moment phenomenon. In this way, polar molecules rotate continuously to align with the field as the field is alternated. Friction is created between the molecules, converting electromagnetic energy into heat and increasing the temperature of the food. Dissociative ions in foods also produce heat through ionic conduction whereby the ions oscillate forward and backward in the food creating friction and heat.

The electromagnetic characteristics of the food are important in determining process parameters. The two important properties are permeability and permittivity. Permeability has a very small contribution to dielectric heating and is therefore not usually considered. Permittivity is the parameter most commonly used to describe the dielectric properties of foods. It relates the reflection of electromagnetic waves at interfaces and the attenuation of the wave energy within the food. Dielectric properties of many foods have been studied by researchers and can be found in the literature. The three most popular methods to measure dielectric properties are transmission line, open-ended coaxial probe, and the resonant cavity method. It is important to remember that dielectric properties are dependent on temperature and frequency as well as the density, structure, composition, and moisture content of the food. [9]

Utilization of Radio Frequency Pasteurization on different food-

Corn Grains

Radio frequency (RF) heating has been proposed and tested to achieve a required anti-fungal efficacy on various food samples due to its advantage of deeper penetration depth and better heating uniformity. Applications of RF treatments on corn grains for controlling *Aspergillus parasiticus* while maintaining product quality. A pilot-scale, 27.12 MHz, 6 kW RF heating system together with hot air heating was used to rapidly pasteurize 3.0 kg corn samples. Results showed that the pasteurizing effect of RF heating on *Aspergillus parasiticus* increased with increasing heating temperature and holding time, and RF heating at 70 °C holding in hot air for at least 12 min resulted in 5–6 log reduction of *Aspergillus parasiticus* in corn samples with the moisture content of 15.0% w. b. Furthermore, thermal resistance of *Aspergillus parasiticus* decreased with increasing moisture content (MC) of corn samples. Quality (MC, water activity – aw, protein, starch, ash, fat, fatty acid, color, electrical conductivity and germination rate) of RF treated corn met the required quality standard used in cereal industry. Therefore, RF treatments can provide an effective and rapid heating method to control *Aspergillus parasiticus* and maintain acceptable corn quality. [5]

Black Pepper

Salmonella persistence in ground black pepper has caused several foodborne outbreaks and created public concern about the safety of low water activity (aw) foods. In this study, radiofrequency (RF) processing was evaluated for pasteurization of ground black pepper. Stability and homogeneity tests were done for both *Salmonella* spp. and *E. faecium* during moisture equilibration before RF heating to evaluate the inoculation method. Moisture content of samples were conditioned such that the final moisture content after RF heating reached the optimal storage moisture. RF heating was shown to provide more than 5.98 log CFU/g reduction for *Salmonella* spp. and the reduction of 3.89 log CFU/g for *E. faecium* with a 130 s of treatment time. The higher thermal resistance of *E. faecium* indicated its suitability as surrogate for *Salmonella* spp. during RF heating of ground black pepper. Piperine, total phenolics, volatile compounds, and antioxidant activity were assessed

as quality parameters for ground black pepper. The results demonstrated that the RF processing provided effective inactivation of *Salmonella* spp. with insignificant ($p > 0.05$) quality deterioration. [6]

Almonds

Radio frequency (RF) treatment holds potential as a pasteurization method to control *Salmonella* in almonds without causing a substantial loss of product quality. Thermal resistance of *Salmonella* can be reduced by increasing water activity, thus a soaking process was designed prior to RF treatments. A pilot-scale 27 MHz, 6 kW RF heating system was used to rapidly heat 1.7 kg washed in-shell almonds with hot air heating at 55 °C. To achieve appropriate heating rate, constant drying temperature and short time cooling, the RF treatment protocol was obtained using an electrode gap of 13 cm for heating, 14 cm for drying, and followed by forced room air cooling of 5-cm thick samples. The results showed that almond temperatures above 75 °C at 23% moisture contents for 2–4 min RF heating could meet the requirements to achieve 5-log reduction of *Salmonella*. The RF treatment process for 20 min reduced the moisture content to 5.7% w. b. Peroxide value, fatty acids values and kernel colors of the RF treated almonds met good quality standard used by nut industry. [6]

Peanuts

In recent years, radio frequency (RF) heating is getting popular as an alternative pasteurization method for agricultural commodities and low moisture foods. Computer simulation is an effective way to help understand RF interactions with food components and predict temperature distributions among food samples after RF treatments. In this study, a computer model based on Joule heating and thermal inactivation kinetic of *A. flavus* was established to predict both temperature distribution and microbial reduction among peanut kernels after RF processing. For the process validation, three 2-g peanut samples inoculated with 40 µL *A. flavus* were placed at three representative locations among 2.17 kg peanut kernels and subjected to various processing conditions in a 27.12 MHz, 6 kW RF heating unit together with hot air system. Results showed that the average difference of the sample temperature and microbial reduction between simulation and experiment was small with RMSE values of 0.009 °C and 0.012 °C, and 0.31 log CFU/g and 0.42 log CFU/g for peanut moisture contents of 7.56% and 12.02% w. b., respectively. Nonuniform RF heating resulted in the least lethality of *A. flavus* at the cold spot. The validated computer model was further used to estimate microbial reduction distributions at other target temperatures based on predicted temperature profiles. This computer model may help design the RF pasteurization protocols for peanut kernels without extensive experiments in food industry [7].

Eggs

Eggs are one of the most nutritious foods available in nature. This rich nutritive environment attracts microbes to invade, feed and multiply. *Salmonella enteritidis* is one such microbe that is highly pathogenic and is the causative agent for the disease salmonellosis. To ensure safety of eggs, processing them without affecting their unique physical

tomato fruit gain. As compared to chemical fertilizers azolla compost gives better result as it has excellent C&N ratio & gives highly increasing yield.

The application of compost increase organic matter & triggers the growth and multiplication of soil microbes. It is cost effective and eco-friendly so we can directly apply on plant.

The result of the present study shows that azolla compost had a significant impact on soil microbial C&N value. Different fertilizer treatments, had significant effect on the soil water soluble organic carbon content at all four growing plants. In most of cases, the compost treatment had highest the soil water soluble organic carbon content.

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Figure:3 Plant with azolla compost



Figure:4 Plant with FYM Figure: 5 Plant with chemical fertilizers

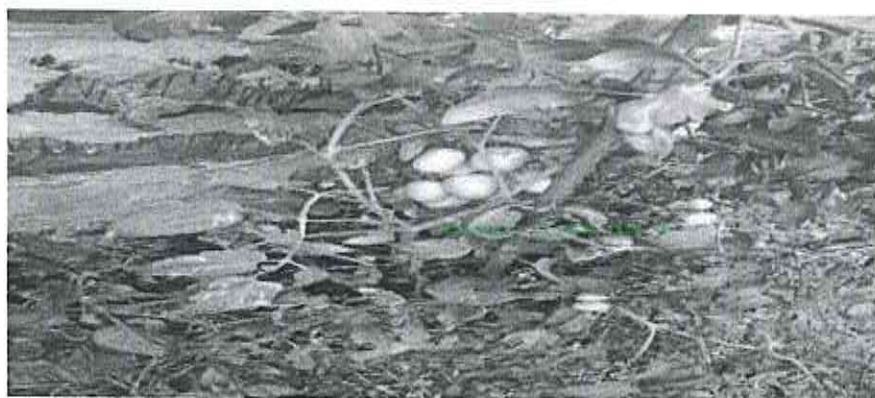


Figure: 6 Plant without any fertilizers

III. RESULTS AND DISCUSSION

In the present study, the organic fertilizers had the significant influence on the plant growth, yield and quality of studied tomato varieties and the results are presented in Figure Nos. 3 to 6 and Table No1 showed the significant differences between effects of fertilizers on tomato plant height, tomato fruits count and life period of plants. The

results revealed that Azolla compost had the best effect as compared to other two fertilizers on plant height and tomato yield.

IV. CONCLUSION:

Application of Azolla Compost, shows very effective result. It shows the high degree effect on tomato stem height, growth, life span &

•After 2 week the Compost is directly apply on tomato plant.

Period of study:

For Azolla growth: 13thJun 2018 – 11thJuly 2018.
 For tomato plant: 29thSep 2018 – 17thDec 2018

Tomato variety:

TO-1057 were selected based on available in the markets of theKolhapur district.

Study site-

The experiment was conducted in our farm during 2020-2021 at Honyali village.

Experimental Design-

Treatment of Azolla compost 4 tomato plants was taken for the experiment --
 1st plant was grown with Azolla compost at the rate of 100g per week
 2nd plant was grown with FYM rate of 100g per week
 3rd plant was grown with any inorganic fertilizer rate of 100g per week
 4th plant was grown without any fertilizers

Measurement of plant growth parameters–

Vegetative growth of the studied tomato plants (viz., plant height, stem diameter, number of branches and leaves per plant) were evaluated. The plant height was measured from the soil level to the tip of the shoot and expressed in foot.

Measurement of yield parameters-

Tomato fruits were harvested twice weekly at the pink to red-ripe stage. Weekly yields were determined by pooling the two weekly harvests. Measured yield parameters included number of flowers per plant, number of fruits per plant and yield per plant.

Expected outcome:

1. It gives 25% more yield.
2. As compared to chemical fertilizers it has a lower cost so farmers can save his money.
3. It is eco-friendly and no hazards for humans and animals.
4. The bacteria *Anabaena* is isolated in compost and these bacteria can help for degradation of azolla

Observation Table: 1

Plants number	Type of Fertilizers	Height of Plants	Fruits per day	Life period of plants
1 st plant	Azolla compost	5.7 feet	13 fruits	170 days
2 nd plant	Farm Yard Manure	5 feet	9 fruits	166 days
3 rd plant	Chemical fertilizers	4.4 feet	6 fruits	152 days
4 th plant	No any fertilizer	3.9 feet	2-3 fruits	122 days

Observation:

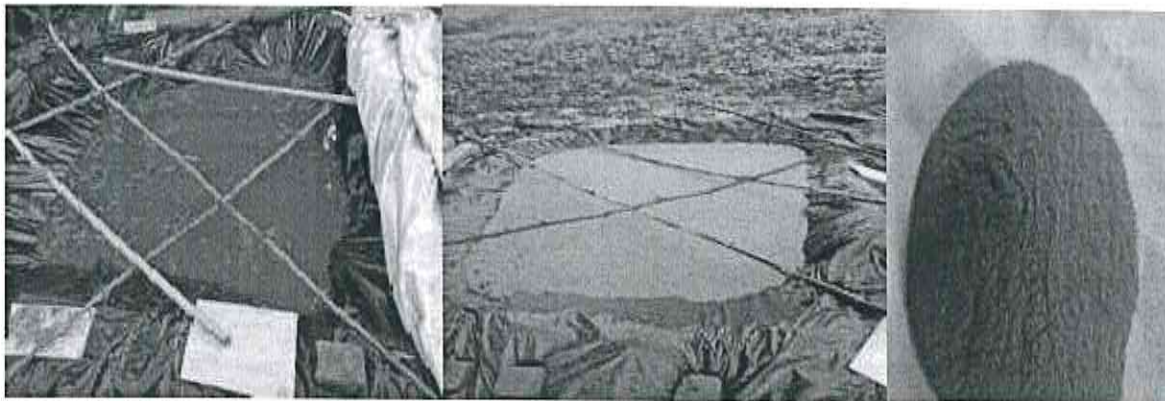


Figure :1 Mass production of Azolla

Figure:2 Azolla compost

Growth response and production of tomato plant with application of Azolla Composting.

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ABSTRACT: In the present study, a field experiment was conducted to study the effect of azolla compost and other 3 fertilizers on same variety of tomato for its growth, yield and fruits sensory. Azolla compost is used as microbial inoculant or biofertilizer and promotes the growth and increase the yield by 20-30%. Beside acting as N₂ fixing for rice production. Azolla compost also contains other nutrient i.e., N, P, K content. Four types of fertilization regimes were compared. (1) Azolla compost (2) Inorganic fertilizer (3) FYM (4) no fertilizer. The effect of plant growth, yield was investigated.

The main result showed that: (1) Azolla compost and FYM more effectively promoted plant growth, number of fruits and height of plant with other fertilizer treatments. We conclude that Azolla compost can be recommended as a fertilizer to improve tomato fruit quality and yield.

I. INTRODUCTION:

Azolla is a free-floating aquatic fern mostly found on moist soils. Azolla can symbiotically associate with Anabaena. Azolla is very appropriate as a substitute for organic fertilizer with rapid growth of this plant has organic productivity. With compost. We were able to grow different kinds of vegetables like tomatoes, potatoes, onions etc. Azolla compost has highest N, P, K content. i.e N -3.68 %, P - 20%, K - 0.15% as compared to other organic sources experiments conducted at IRRI, Philippines showed that conversion of compost from Azolla was rather quick but further research is required to evaluate the exact potential. Fresh Azolla collected from field and ponds were used in compost preparation and since it has an excellent C: N ratio it decomposes quickly and accelerates the decomposition of other organic residues inside the compost pit. Our main objective was to investigate the effect of Azolla compost application on tomato plant growth, yield and fruit quantity.

Now a days the rise of food production is the major challenges to meet the food requirements of growing population in agriculture and it will be remained essential in the future due to the pressure of inhabitants. Many factors influence the crop quality in food production and one of the main factors is the fertilization system. Because, soil fertility is one of the major problems limiting crop production [7]. The growth and yield of vegetable crops are mainly depending on the quality and quantity of fertilizers used [8]. So, to accumulate the soil fertility and yield azolla compost are often used. Frequent and high-rate uses of inorganic fertilizer have been associated with some environmental pollution, alteration in soil textures and physical property of the soil. Moreover, the nutritional value of the crops will be affected seriously by the continuous use of synthetic fertilizer [9] also inorganic fertilizers will increase the cost of crop production. Now, throughout the world, the demand for organic foods is increased among the consumers that are good for environment and health. Furthermore, consumers often look upon the taste of organic products and it should be healthier one than the conventional one. Apart from the release of nutrient in slow manner, the application of organic fertilizers, which are made from animal excreta or other agricultural wastes is usually used to improve the structure and stability of the soil and in addition to enhancing the yield and quality of the crop plants [8,9]

II. MATERIALS AND METHODS

- Preparation of Azolla compost:
- 2 kg of Azolla plant material was collected and washed with water for 3 times and dried.
- The fired biomass was placed in a black plastic bucket and add 250 kg cow dung + 10 kg ash was added then the bucket was tightly covered with black plastic
- The Composting process continued for 2 weeks.

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R. M. Desai

Editor in Chief, International Journal of Science and Research, India



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We are please to inform you that your Paper ID: SR22303081115 titled "Review on Utilization of Radio Frequency Pasteurization on Different Raw Food" is published in Volume 11 Issue 3, March 2022 of International Journal of Science and Research (IJSR), Online ISSN: 2319-7064

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Paper ID: SR22303081115

Paper Title: Review on Utilization of Radio Frequency Pasteurization on Different Raw Food

Reviewer Report

Evaluation Criteria	Score (0-10)
Relevance of Topic	9
Scholarly Quality	8
English Usage	9
Use of Theory	8
Novelty and Originality of the idea	9
Technical Content and Correctness	9
Critical Qualities	8
Clarity of Conclusions	9
Use / Quality of Contents	9
Other Aspects	9
Total Score	87

Reviewer Decision

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properties is essential. In this study, the impact of radiofrequency (RF) heating on the dielectric properties (dielectric constant and dielectric loss factor) of the egg at varying temperatures (5°C-56°C) and frequency (10 MHz-3 GHz) is evaluated. This study on the dielectric parameters is essential to devise a better heating paradigm wherein there is minimal detrimental effect to the egg components. Based on the dielectric study, the heating process parameters were determined. The effect of such heat treatment on the physical properties viz. Viscosity, foam density, foam stability and turbidity of the egg white were also studied. This study was conducted to provide sufficient literature and experimental background for employing RF in pasteurization of in-shell eggs. This study showed that if careful process parameter optimization and meticulous equipment design is done, RF heating can be successfully employed to pasteurize in-shell eggs. [8]

2. Conclusions

Radio Frequency Pasteurization used in different food products which have minimum moisture content for example corn grains, black pepper, almonds, peanuts and eggs. By using radio frequency pasteurization shelf life of food products gets extend. This technique requires minimum cost, have good penetration capacity and gives safe and high quality food products as well as it is substitute for pasteurization.

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