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Preparation of Low-Cost Value-Added Indian Desserts

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Abstract: ***The inter-relationships between poverty and nutrition are well known; poverty restricts access to food required to meet daily requirements or ensure dietary diversity and thus leads to malnutrition, while malnutrition can adversely affect educational and economic attainments, thus perpetuating poverty. Locally available foods which contains various nutrients like carbohydrates, proteins, essential amino acids (lysine, metheonine, valine etc.), "Preparation of Low Cost Value Added Indian Desserts (Pancake)". with the objectives to determine the nutrient composition of malted wheat flour, malted barley flour, puffed amaranth seed flour, sweet potato flour, carrot flour and acceptability of value added prepared products by the incorporation of malted wheat flour, malted barley flour, puffed amaranth seed flour, sweet potato flour, carrot flour at different levels, to assess the organoleptic evaluation which were serve as treatment T_1 (30g malted wheat flour,20g malted barley flour,20g sweet potato flour,20g carrot flour,10g puffed amaranth seed flour), T_2 (25g malted wheat flour,20g malted barley flour,30g sweet potato flour,15g carrot flour,10g puffed amaranth seed flour) and T_3 (20g malted wheat flour,20g malted barley flour,40g sweet potato flour,10g carrot flour,10g puffed amaranth seed flour) respectively, and "Pancake" was served as treatment T_1 (30g malted wheat flour,20g malted barley flour,20g sweet potato flour,20g carrot flour,10g puffed amaranth seed flour), T_2 (25g malted wheat flour,20g malted barley flour,30 g sweet potato flour,15g carrot flour,10g puffed amaranth seed flour) and T_3 (20g malted wheat flour,20g malted barley flour,40g sweet potato flour,10g carrot flour,10g puffed amaranth seed flour) without incorporation of "malted wheat flour, malted barley flour, puffed amaranth seed flour, sweet potato flour, carrot flour" (T_0) served as control. They were replicated three times for all three products and orangoleptic evaluation was carried out using the nine point hedonic scale. Nutritional composition was calculated using the different chemical analysis procedure; data obtained during investigation were statiscally analyzed by using analysis of variance (ANOVA) and critical difference (CD) techniques. On the basis of findings, was concluded that in case of "Pancake" incorporation level of treatment T_2 (25g malted wheat flour, 20g malted barley flour, 30g sweet potato flour,15g carrot flour, 10g puffed amaranth seed flour) scored the best with regard to colour and appearance, body and texture, taste and flavour, overall acceptability. The cost of products based on raw materials (Rs/ 100g). The cost of the (Pancake) ranged between Rs 8.9 to Rs 11.45. Nutrient analysis of the products showed an increase in energy, protein, fat, carbohydrate, calcium and iron content when compared with control. On the basis of findings we concluded that the products for prepared by incorporating malted wheat flour, malted barley flour, puffed amaranth seed flour, sweet potato flour, carrot flour at different levels were at par with control/ conventional food products as well as improve the iron, fiber and calcium content.***
These food products are beneficial for malnourished children.
Keywords: Malted Wheat, Malted Barley, Puffed Amaranth seed, Sweet Potato, Carrot, Pancake, amino acid.

I. INTRODUCTION

A significant proportion of the world's poor live in India, as do a significant proportion of the world's malnourished children. Poverty and under nutrition coexist, and poor dietary quality is associated with poor childhood growth, as well as significant micronutrient deficiencies. Many Indian desserts are fried foods made with sugar, milk or condensed milk. Ingredients and preferred types of dessert vary by region. *Some Indian sweets are like Rasogula, Gujiya, Kaju Kattli, Raspuaa, Jalebi, Chandrakala etc.*Germination not only improves the bioavailability of the various minerals, vitamins and dietary fibers along with the nutritional profile of the seed grains, but also reduces some anti nutritional factors which reflects the beauty of this method.Sweet potato is rich in carbohydrate, dietary fiber, β-carotene, ascorbic acid, folic acid and minerals. Therefore, sweet potato is now widely used as an important human diet around the world. Carrot is richest source of -carotene precursor of vitamin A. Fresh carrot on an average contains (g/100g) 86 per cent moisture, 0.9g protein, 0.2 g fat, 1.1g total minerals, 1.2g crude fibre, 10.6 g carbohydrates, 48 kcal energy, 1890g carotene,0.08 g calcium, 0.5 g phosphorus and 0.001 g iron **(Gopalan *et al.*, 2015)**.

Whole barley grain consists of about 65% to 68% starch, 10% to 17% protein, 4% to 9% *B*-glucan, 2% to 3% free lipids and 1.5% to 2.5% minerals. Total dietary fiber ranges from 11% to34% and soluble dietary fiber from 3% to 20%. Amaranth proteins are rich in lysine (3.2-13.1 g/100 g protein) and the sulfur amino acids (cysteine and methionine in the ranges of 2.0-3.8 and 0.6-2.4 g/100 g protein, respectively). Unrefined wheat contains complex carbohydrates, dietary fiber, and a moderate amount of proteins. According to the USDA National Nutrient Database, sprouted wheat is rich in catalytic elements, mineral salts, calcium, magnesium, potassium, sulfur, chlorine, arsenic, silicon, manganese, zinc, iodine, copper, vitamin B, and vitamin E. It is abundant in antioxidants, especially in carotenoids such as beta-carotene.

Table.1 Chemical composition of the raw ingredients (per 100 g)

Composition	wheat	Barley	Sweet potato	Carrot	Amaranth
Moisture (%)	12.2	12.5	68.5	86.0	11
Protein (g)	12.1	11.5	1.2	0.9	13.56
Fat(g)	1.7	1.3	0.3	0.2	7.02
Crude fiber(g)	1.9	3.9	0.8	1.2	6.7
Energy(kcal)	341	336	120	48	371
Carbohydrate(g)	69.4	69.6	28.2	10.6	65.25
Iron (mg)	4.9	1.67	0.21	1.03	7.61
Calcium(mg)	48	26	46	80	159
Carotene (mg)	25	10	6	1890	2917
Thiamine (mg)	0.49	0.47	0.08	0.04	0.116

Gopalan *et al*., (2015)

II. LITERATURE SURVEY

USDA (1961) found that Wheat grain is a staple food used to make flour for leavened, flat and steamed breads; cookies, cakes, breakfast cereal, pasta, noodles; weaning food and for fermentation to make beer, alcohol, vodka or even bio fuel.

Akar *et al.*, (2004) found that barley is very important cereal in terms of 132 million tons production, 55 million ha acreage and 2.4 t/ha yield in the world. Barley production is generally and drastically affected by environmental and seasonal conditions. Considering the reasons, production, acreage and yield data are reported below as a-three year average. It is clearly seen from that nearly 74% of world barley production is met by ten leading countries during the last three year period.

Anonymous (2007) In India, wheat is the second most important cereal crop next to rice and a key crop of the green revolution and post green revolution era. India stands second among wheat producing countries with respect to area and production. During the crop year 2005-06, wheat was grown over an area of 26.8 m ha with production of 69.35 m t with an average productivity of 2,586 kg per ha. In Karnataka, wheat is grown over an area 2.23 lakh ha with a production of 1.25 lakh tonnes and with an average productivity of 564 kg per ha which is much lower than national average.

Silva (2010) studies that, sweet potatoes have low lipid content and no cholesterol. Each gram of sweet potatoes supplies 10% of an adult need of thiamine, niacin, vitamin B6, and folic acid, 50% of vitamin C and 10% of proteins. Sweet potatoes can be used in nature or as chips, cooked in the production of cakes and pies, like starch or powder for consumption as a food supplement or in the elaboration of several products, like bread.

Shimelis and Martha (2012) studies that amaranth has important role in actions against hunger and malnutrition that occur due to low rain fall conditions..Amaranth grain product was rich in protein with 0.5 g/10g of lysine, a limiting amino acid in cereals, and methionine, a limiting amino acid in pulses. The product had good amount 44.4 mg/100g of α- tocopherols important for infant development. The product was also rich in oleic acid (36.3 percent) and linoleic acid (35.9 percent) with some amounts of linolenic acid (3.4%) that are important for infant growth. It also had good amounts of minerals of importance such as potassium (324.4 mg/100g), phosphorous (322.8 mg/100g), calcium 189.1 (mg/100g), magnesium (219.5 mg/100g), iron (13.0 mg/100g) and zinc (4.8 mg/100g).

Sharma and Chopra (2015) Found that malting is a controlled germination process which activates the enzymes of the resting grain resulting in high bioavailability of nutrients.

Gupta and Shukla (2017) studies that carrot (Daucus carota) is an important vegetable, which has high nutritional value and utility. Carrot belongs to the family Umbelli ferae, genus Daucus, species Carota, and is one of the important root crops cultivated throughout the world for its fleshy edible roots. Carrot is known for its nutrient content viz., carotene and carotenoids, besides appreciable amounts of vitamins B1, B2, B6 and B12 vitamins and minerals.

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III. MATERIALS AND METHODS

A. Experimental Site

The present investigation was carried out in the Nutrition Research laboratory, Department of Food Nutrition and Public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj.

1) Prepration Of Amaranth Flour

Amaranth
↓
Cleaning (chaff, dirt, etc.)
↓
Convert seed in puffed seed
↓
Grinding to fine smooth flour in atta maker machine
↓
Storing in air tight container (At room temperature in dry place)

Source: (Sahai and Singh, 1991)
Fig.: Flow Diagram for preparation of Amaranth Flour

2) Preparation Of Malted Wheat Flour

Wheat grains
↓
Weighing
↓
Washing
↓
Steeping (12 hours)
↓
Malting (4days)
↓
Drying (60^{o}C)
↓
Dry milling
↓
Sieveing
↓
Malted- Wheat flour

Source: (Bolarinwa, 2015)
Fig: Flow diagram of preparation of malted wheat flour

3) Preparation Of Malted Barley Flour

Barley grains
↓
Weighing
↓
Washing
↓
Steeping (12 hours)
↓
Malting (4days)
↓
Drying (60^{o}C)
↓
Dry milling
↓
Sieving
↓
Malted- Barley flour

Source: (Bolarinwa, 2015)

Fig: Flow diagram of preparation of malted Barley flour

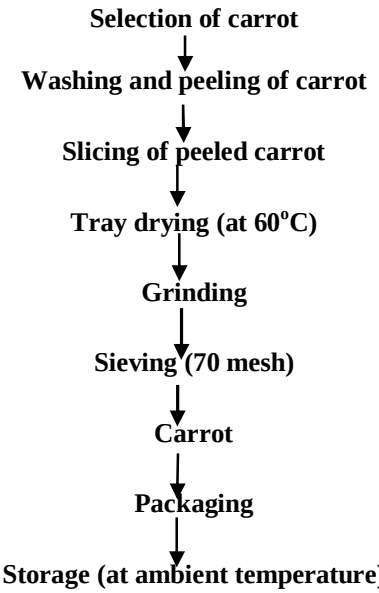
4) Preparation Of Sweet Potato Flour

Selection of sweet potato
↓
Washing and peeling of sweet potato
↓
Slicing of peeled sweet potato
↓
Tray drying (at 60^{o}C)
↓
Grinding
↓
Sieving (70 mesh)
↓
Sweet potato flour
↓
Packaging in air tight container
↓
Storage (at ambient temperature)

(Source: Srivastava et al., 2012)

Fig: Flow diagram of preparation of sweet potato flour

5) Preparation Of Carrot Flour



(Source: Srivastava et al., 2012)

Fig: Flow diagram of preparation of carrot

B. Treatments And Replications Of Products

The basic recipes was serving as control (T_0)

C. Detail of treatment of products

The basic recipes was serving as control (T_0)

Table.1. Detail of treatment of products (*Pancake)*

Food Products	Treatments				Replication
	T_0	T_1	T_2	T_3	
Pancake					3
Wheat flour	100%				
Malted wheat flour		30%	25%	20%	
Malted barley flour		20%	20%	20%	
Sweet potato flour		20%	30%	40%	
Carrot flour		20%	15%	10%	
Puffed Amaranth seed flour		10%	10%	10%	

Preparation of *Pancake* by incorporating (sweet potato, carrot, puffed amaranth seed, malted wheat, malted barley) flour –

1) *T_0 (control):* the product was prepared using only 100g wheat flour without incorporating flours.
2) *T_1:* the product was prepared using 30g malted wheat flour,20g malted barley flour,20g sweet potato flour,20g carrot flour,10gm puffed amaranth seed flour.
3) *T_2:* the product was prepared using 25g malted wheat flour,20g malted barley flour,30g sweet potato flour,15g carrot flour,10g puffed amaranth seed flour.
4) *T_3:* the product was prepared using 20g malted wheat flour,20g malted barley flour,40g sweet potato flour,10g carrot flour,10g puffed amaranth seed flour.

D. Organoleptic Evaluation Of The Products

Sensory evaluation of the food products for their acceptability was done by a panel of judges consisting of five faculty members from the Department of Food, Nutrition and Public Health, Ethelind College of Home Science. With the help of the Nine Point Hedonic Scale Score card(Appendix-A), judges were requested to score the products for different sensory attributes like colour and appearance, body and texture, taste and flavour and overall acceptability. **(Srilakshmi, 2010).**

E. Calculation Of Nutritive Value Of Prepared Products

The nutritive value obtained by the chemical analysis of the jowar flours was computed as well as food composition tables by Gopalan *et al.*, (2015) was used to determine the nutritive value of the prepared products. Nutrients such as energy, protein, carbohydrate, fat, calcium, iron, fiber, thiamine and antioxidant were calculated.

Formula:

$$\text{Nutrient/ 100g of product} = \frac{\text{Ingriedient used (g)} \times \text{Nutritive value of Ingriedient}}{100}$$

F. Determination Of Cost

Cost of the prepared products was calculated taking into account the cost of individual raw ingredients used in the preparation of food products as the prevailing market price.

IV. RESULTS AND DISCUSSION

Finding of the present study entitled "Preparation of Low Cost Value Added Indian Desserts" on different aspects as per the methodology have been tabulated and analyzed statistically. The entire experiment was undertaken to malted wheat flour, malted barley flour, sweet potato flour, carrot flour, puffed amaranth seed flour and then makes their flours for chemical analysis and prepares enriched products, i.e., healthy and nutritious product *Pancake* using different flours combination. The results obtained from the analysis are presented and discussed in the following sequence.

Table 4.1 Average sensory scores of control and treated samples of *Pancake.*

Control and Treatments	Colour and Appearance	Texture	Taste and Flavour	Overall Acceptability
T_0	7.33±0.054	7.33±0.054	7.6±0.094	7.06±0.054
T_1	7.133±0.30	7.6±0.16	7.1±0.108	7.6±0.249
T_2	8.6±0.094	8.53±0.054	8.533±0.21	8.4±0.163
T_3	6.6±0.163	6.53±0.237	6.46±0.237	7.4±0.054
F-test	S	S	S	S
C.D	0.1	0.11	0.06	0.06

Colour and Appearance

F= 19.39(4.76), Significant, P≤0.05 CD=0.1

Body and Texture

F= 15.69(4.76), Significant, P≤0.05 CD=0.11

Taste and Flavour

F= 31.32(4.76), Significant, P≤0.05 CD=0.06

Overall acceptability

F= 12.59(4.76), Significant, P≤0.05 CD=0.06

The data illustrated in the above table (4.1) pertaining to the average sensory scores of different parameters in control and treated samples of *Pancake*, clearly indicates that in terms of colour and appearance T_2 (8.6) had the highest score followed by T_0, T_1 and T_3. T_2 had the highest score in other parameters i.e. overall acceptability making it quite obvious that the *Pancake incorporated* with 25percent malted wheat flour, 20 percent malted barley flour, 15% carrot flour,30% sweet potato flour,10% puffed amaranth seed flour did have a golden and slight brown effect on the colour of *Pancake*. T_2 had the highest score in body and texture (8.53) and taste and flavour (8.53) making it obvious that the *pancake* incorporated with 25percent malted wheat flour, 20 percent malted barley flour,15% carrot flour,30% sweet potato flour,10% puffed amaranth seed flour improved taste and flavour and body and texture of the *Pancake.*

Table.4.2 Analysis of Variance data for colour and appearance of *Pancake.*

Sources of Variation	d.f.	S.S.	M.S.S.	F.cal.	F.tab. (5%)	Result
Due to treatment	3	6.463	2.154	19.39	4.76	S
Due to replication	2	0.506	0.253			
Due to error	6	0.666	0.111			
Total	11	7.63				

S = Significant ($p \leq 0.05$); NS = Non Significant

The ANOVA table 4.2 shows that calculated value of F (19.39) due to treatments is greater than the tabulated value of F (4.76) on 3, 6 degree of freedom at 5% probability level. It indicates that there was significant difference between the three treatments regarding the colour and appearance of *Pancake* and it can concluded that incorporation of malted wheat flour, malted barley flour with sweet potato, carrot and puffed amaranth seed flour improved colour and appearance of the prepared product, the colour and appearance is best till certain amount (T_2) after that is started decreasing.

Table.4.3 Comparison between the colour and appearance of the treatment of *Pancake* against C.D.

Treatment Mean value	T_0(7.33)	T_1(7.13)	T_2 (8.6)	T_3 (6.6)
T_0(7.33)		0.2*	1.3*	0.73*
T_1 (7.13)			1.4*	0.53*
T_2 (8.6)				2*
T_3 (6.6)				0

CD= 0.1; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for taste and flavour of *Pancake* against critical difference in the above table 4.3, the variation in scores for colour and appearance of *Pancake* can be seen as follows. The difference in the mean value of T_0, T1 (0.2); T_0, T_2 (1.3) , T_0,T_3 (0.73); T_1,T_2 (1.4); T_1, T_3 (0.53) and T_2,T_3 (2) were greater than C.D, (0.1) therefore the difference is significant.

Table 4.4 Analysis of Variance data for texture of *Pancake*.

Sources of Variation	d.f.	S.S.	M.S.S.	F.cal.	F.tab. (5%)	Result
Due to treatment	3	6.12	2.04	15.69	4.76	S
Due to replication	2	0.02	0.01			
Due to error	6	0.78	0.13			
Total	11	0.92				

S = Significant ($p \leq 0.05$); NS = Non Significant

The ANOVA table 4.4 shows that calculated value of F (15.69) due to treatments is greater than the tabulated value of F (4.76) on 3, 6 degree of freedom at 5% probability level. It indicates that there was significant difference between the three treatments regarding the texture of *Pancake* and it can concluded that incorporation of malted wheat flour, malted barley flour with sweet potato, carrot and puffed amaranth seed flour improved texture of the prepared product, the texture is best till certain amount (T_2) after that is started decreasing.

Table 4.5 Comparison between the texture of the treatment of *Pancake* against C.D.

Treatment Mean value	T_0(7.33)	T_1(7.6)	T_2 (8.53)	T_3 (6.53)
T_0(7.33)		0.27*	1.2*	0.8*
T_1 (7.6)			0.93*	1.07*
T_2 (8.53)				2*
T_3 (6.53)				

CD= 0.1; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for texture of *Pancake* against critical difference in the above table 4.5, the variation in scores for texture of *Pancake* can be seen as follows. The difference in the mean value of T_0,T_1 (0.27); T_0,T_2 (1.2); T_0,T_3 (0.8); T_1,T_2 (0.93) T_1,T_3 (1.07) and T_2 T_3 (2) were greater than C.D, (0.1) therefore the difference is significant.

Table 4.6 Analysis of Variance data for taste and flavour of *Pancake*

Sources of Variation	d.f.	S.S.	M.S.S.	F.cal.	F.tab. (5%)	Result
Due to treatment	3	6.786	2.26	31.32	4.76	S
Due to replication	2	0.686	0.343			
Due to error	6	0.433	0.072			
Total	11	7.90				

S = Significant ($p \leq 0.05$); NS = Non Significant

The ANOVA table 4.6 shows that calculated value of F (31.32) due to treatments is greater than the tabulated value of F (4.76) on 3, 6 degree of freedom at 5% probability level. It indicates that there was significant difference between the three treatments regarding the taste and flavour of *Pancake* and it can concluded that incorporation of malted wheat flour, malted barley flour with sweet potato, carrot and puffed amaranth seed flour improved taste and flavour of the prepared product, the taste and flavour is best till certain amount (T_2) after that is started decreasing.

Table 4.7 Comparison between the taste and flavour of the treatment of *Pancake* against C.D.

Treatment Mean value	T_0(7.6)	T_1(7.1)	T_2 (8.53)	T_3 (6.46)
T_0(7.6)		0.5*	0.93*	1.14*
T_1 (7.1)			1.43*	5.96*
T_2 (8.53)				2.02*
T_3 (6.46)				

CD= 0.06; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for taste and flavour of *Pancake* against critical difference in the above table 4.7, the variation in scores for taste and flavour of *Pancake* can be seen as follows. The difference in the mean value of T_0, T1 (0.5); T_0, T2 (0.93); T_0, T3 (1.14); T_1, T2 (1.43); T_1, T3 (5.96) and T_2,T_3 (2.02) were greater than C.D, (1.28) therefore the difference is significant.

Table 4.8 Analysis of Variance data for overall acceptability of *Pancake*

Sources of Variation	d.f.	S.S.	M.S.S.	F.cal.	F.tab. (5%)	Result
Due to treatment	3	2.813	0.937	12.597	4.76	S
Due to replication	2	0.406	0.203			
Due to error	6	0.446	0.074			
Total	11					

S = Significant ($p \leq 0.05$), NS = Non Significant

The ANOVA table 4.8 shows that calculated value of F (12.597) due to treatments is greater than the tabulated value of F (4.76) on 3, 6 degree of freedom at 5% probability level. It indicates that there was significant difference between the three treatments regarding the colour and appearance of *Pancake* and it can concluded that incorporation of malted wheat flour, malted barley flour with sweet potato, carrot and puffed amaranth seed flour improved overall acceptability of the prepared product, the overall acceptability is best till certain amount (T_1) after that is started decreasing.

Table 4.9.Comparison between the overall acceptability of the treatment of *Pancake* against C.D.

Treatment Mean value	T_0(7.06)	T_1(7.6)	T_2 (8.4)	T_3 (7.46)
T_0(7.06)		0.54*	1.34*	0.4*
T_1 (7.6)			0.8*	0.14*
T_2 (8.4)				0.94*
T_3 (7.46)				

CD= 0.06; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for overall acceptability of *Pancake* against critical difference in the above table 4.9, the variation in scores for overall acceptability of *Pancake* can be seen as follows. The difference in the mean value of T_0,T_1 (0.54); T_0,T_2 (1.34); T_1,T_3 (0.4); T_1,T_2 (0.8); T_1,T_3 (0.14) and T_2,T_3 (0.94) was greater than C.D, (0.06) therefore the difference is significant.

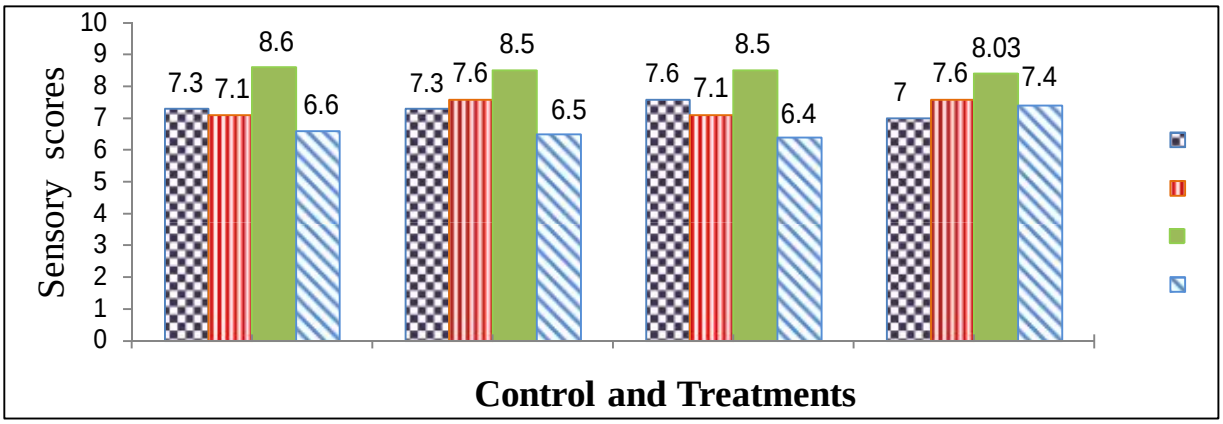


Fig.4.1: The effect of incorporation of malted wheat flour, malted barley flour, sweet potato flour, carrot flour, puffed amaranth seed flour at different levels on the sensory attributes of *Pancake*.

Table 4.10 Comparison between nutrient content of control and best treatment of *Pancake* by using t-test.

Nutrients	T_0	T_2	$T_2 - T_0$	t .cal.	t.tab. (5%)	Results
Energy	399.5	412	12.5	41.55	4.303	S
Protein	9.095	12.095	3.09	10.27	4.303	S
Fat	5	7.32	2.32	8.01	4.303	S
Carbohydrate	75.295	81.95	6.665	22.1	4.303	S
Calcium	31	41.6	10.6	35.24	4.303	S
Iron	4.9	6.2	1.3	6.549	4.303	S

On comparing the nutrient content of control and best treatment of *Pancake* by using t-test in the table 4.10, the variation in nutrient content of *Pancake* can be seen as follows. The difference in the t- calculated value of carbohydrate, fat, protein, energy, calcium and iron (T_2, T_0), was greater than t- tabulated (4.303) at 5% probability level therefore the difference was significant. Indicating that the incorporation with malted wheat flour, malted barley flour, sweet potato flour, carrot flour and puffed amaranth seed flour increased the energy, fat, carbohydrate, iron and iron content significantly more than control.

Table 4.11 Cost of the prepared products namely *Pancake.*

Ingredients	Actual rate/kg (Rs)	T_0		T_1		T_2		T_3	
		Amt. (g)	Cost (Rs)	Amt. (g)	Cost (Rs)	Amt. (g)	Cost (Rs)	Amt. (g)	Cost (Rs)
Wheat	32	100	3.2	30	0.96	25	0.8	20	0.64
Barley	40	-		20	0.8	20	0.8	20	0.8
Sweet potato	40	-		20	0.8	30	1.2	40	1.6
Carrot	25	-		20	0.5	15	0.37	10	0.25
Amaranth	250	-		10	2.5	10	2.5	10	2.5
Sugar	40	25	1	25	1	25	1	25	1
Coconut Powder	80	10	0.8	10	0.8	10	0.8	10	0.8
Ghee	300	5	1.5	5	1.5	5	1.5	5	1.5
Cardamom	800	3	2.4	3	2.4	3	2.4	3	2.4
Total cost			8.9		11.26		11.37		11.45

Table 4.11 shows that the total cost of *Pancake* per 100g of dry ingredients at the prevailing cost of the raw materials was T_0 is Rs. 8.9 for treatment, T_1 is Rs. 11.26, T_2 is Rs. 11.37 and T_3 is Rs. 11.45. It is therefore concluded that with the inclusion of malted wheat flour, malted barley flour, sweet potato flour, carrot flour, amaranth puffed seed flour there was negligible difference found between the cost of the various treatments given i.e. T_1, T_2, T_3 and T_3 was found to be having the higher cost but the increase was negligible as compared to the market price and also possessing the potential nutritional benefits i.e. increase in micronutrient composition like energy, protein and calcium. Hence, the slight increase in the cost of the treatments is well justified.

V. CONCLUSION

From the findings of the study undertaken, it is concluded that the wheat flour, malted barley flour, carrot flour, sweet potato flour and puffed amaranth seed flour enhance the nutritive value of the product specially energy, protein, fat, carbohydrate, calcium and iron. On the basis of sensory evaluation, *Pancake* prepared by the incorporation of malted wheat flour, malted barley flour, carrot flour, sweet potato flour and puffed amaranth seed flour in the different ratio for *Pancake* that was found to be highly acceptable with regard to colour and appearance, body and texture, taste and flavour and overall acceptability.The nutritional composition of best treatments in the developed products was increased in comparison with control. The nutritional value which is obtain in best product as compare to control is beneficial for malnutrition and deficiency disease in children. Cost of the prepared products ranged between for *Pancake* Rs. 11.26-11.45. The cost was found to be acceptable as compared to the control.

VI. RECOMMENDATION

Malted wheat flour, malted barley flour, carrot flour, sweet potato flour and amaranth flour enhances the overall nutritive value like dietary energy, protein, fat, carbohydrate, calcium and iron. Its splendid medicinal properties reported by other researchers, can be used against protein energy malnutrition and other deficiency disease like rickets for preschool children. Incorporation of to malted wheat flour, malted barley flour, sweet potato flour, carrot flour, amaranth seed flour can be recommended for the preparation of foods that are included in individual's daily diet. It helps to prevent malnutrition. Hence these benefits can be available to the consumers under both normal and therapeutic conditions.

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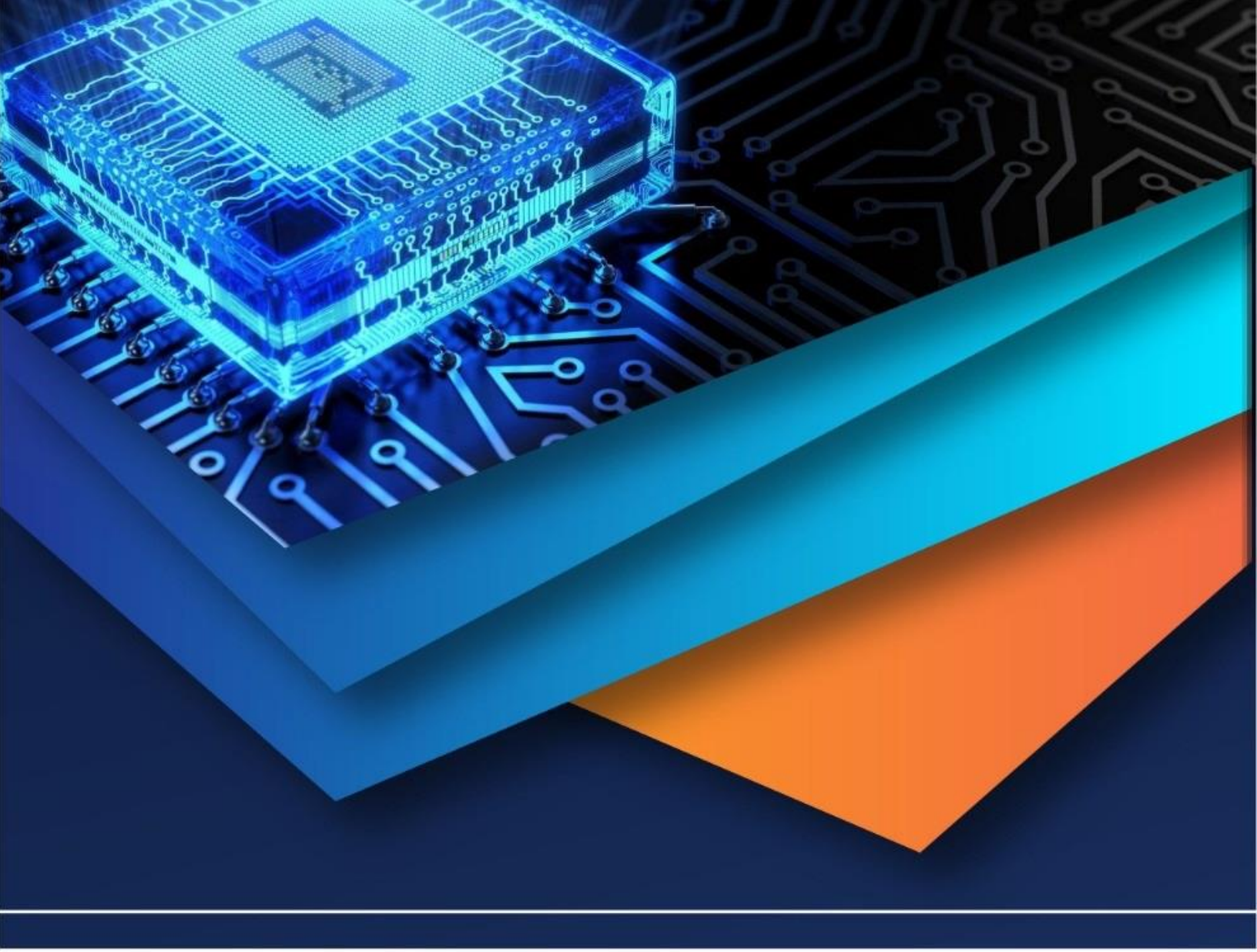

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