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Preparation of low cost value added Indian desserts

Mausam Kumari and Dr. Ritu Prakash Dubey

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 (*Halwa*)". 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 *"Halwa"* 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,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) 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 staticsally analyzed by using analysis of variance (ANOVA) and critical difference (CD) techniques. On the basis of findings, was concluded that in case of "*Halwa*" 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 (Halwa) 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 jowar 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, panjeeri, pancake, halwa, amino acid

Introduction

Poverty and under nutrition coexist, and poor dietary quality is associated with poor childhood growth, as well as significant micronutrient deficiencies. Food security is particularly vulnerable to changes in the economic scenario and to inequities in wealth distribution. Migration from rural to urban settings with a large informal employment sector also ensures that migrants continue to live in food insecure situations. While food production has for the most part kept pace with the increasing population, it has been with regard to cereal rather than of pulses and millet production. Oil seeds, sugar cane and horticultural crops, along with non-food crops are also being promoted, which do not address nutrition security, and, coupled with the increase in the consumption of prepared food, may indeed predispose towards the double burden of malnutrition. Access to food is also particularly susceptible to poverty and inequality. Many strategies and policies have been proposed to counter under nutrition in India, but their implementation has not been uniform, and it is still too early to assess their lasting impact at scale (Varadharajan *et al.*, 2013) [10].

Germination of cereals has been used for centuries to soften the kernel structure, to increase nutrient content and availability; to decrease the content of antinutritive compounds, and to add new flavors without knowing the biochemistry behind these phenomena. Germination of seeds is one of the best methods to be utilized in the improvement of the nutritional profile of the seed grains and which will be used for the development of various food products, and as in the present scenario people is more health conscious. So, the germination of cereals is important both from nutritional as well as functional point of view. 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.

Wheat, any of several species of cereal grasses of the genus *Triticum* (family Poaceae) and their edible grains. 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. Wheat is an important source of carbohydrates. Globally, it is the leading source of vegetal protein in human food, having a protein content of about 13%, which is relatively high compared to other major cereals but relatively low in protein quality for supplying essential amino acids. When eaten as the whole grain, wheat is a source of multiple nutrients and dietary fiber.

One such important cereal grain not used mostly by youngsters is barley. It is a good old grain with so many health benefits. Barley has received attention from health professionals for its fiber content, particularly β-glucan, which has been shown like weight reduction, decreasing blood pressure, blood cholesterol, and blood glucose in Type 2 diabetes and preventing colon cancer. It is easily available and cheap grain. It contains both soluble and insoluble fiber, protein, vitamins B and E, minerals, selenium, magnesium and iron, copper, flavonoids and anthocynins. Barley contains soluble fiber; *beta*-glucan binds to bile acids in the intestines and thereby decreasing plasma cholesterol levels. Absorbed soluble fiber decreases cholesterol synthesis by liver and cleansing blood vessels. Insoluble fiber provides bulkiness in the intestines, thereby decreasing appetite. It promotes intestinal movements relieving constipation, cleansing colonic harmful bacteria and reduced incidence of colonic cancer. It is a good source of niacin, reducing LDL (low density lipoprotein) and increasing HDL (high density lipoprotein) levels. Minerals such as selenium and vitamin E provide beneficial antioxidant effects. Magnesium, a co-factor for many carbohydrate metabolism enzymes and high fiber content contributes for its blood glucose reducing effect in Type 2 diabetes. It has good diuretic activity and is useful in urinary tract infections.

Amaranthus cruentus, a member of the *Amaranthaceae* family, is an unconventional plant that has gained popularity, both among consumers and farmers. The use of its seeds has also increased; it is now used as a source of lipids and a material for the production of fl our, fl akes, popped seeds, several sorts of bread and confectionery (Sindhuja *et al.*, 2005) [7]. The amaranth-based products are a valuable source of nutrients and minerals. In addition, the amino acid profile of amaranth makes it an attractive source of protein. Nowadays, consumers seek and demand foods with important attributes, such as high nutritive value, rich in good quality proteins, and nutraceutical compounds. Amaranth is considered a multipurpose grain with high nutritional quality (Venskutonis & Kraujalis, 2013) [11]. The amaranth grain contains highly digestible proteins (approximately 90%) with good levels of essential amino acids; its balance being close to the optimum required in the human diet. Depending on the species, the total protein content ranges from 13.2% to18.4%. 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). The essential amino acids from different amaranth grains. Regarding fiber content, amaranth seeds have high fiber values (2.2-5.8%) which may vary depending of the species.

Carrot pomace containing about 50% of â-carotene could profitably be utilized for the supplementation of products like cake, bread, biscuits and preparation of several types of functional products.Carrot is the excellent source of a carotene and other vitamins. The carrot is utilized as raw, cooked vegetable, sweet meats or as juice and beverages. It 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) [2].

Sweet potato flour can serve as a source of energy and carbohydrates, beta carotene (pro-vitamin A), minerals (Ca, P, Fe and K) and dietary fibre which can add natural sweetness, colours and flavour to processed food products. Traditionally cookies are made from wheat flour but small quantities of other cereal flours or starches can also be added to give special flavour or structural properties. In recent years the interest in high fibre content in foods has greatly increased. High dietary fibre supplemented cookies have been prepared by replacing wheat flour with cereal by-products like corn bran, rice bran or barley husk. Most of the research has been focused on the development of new products using sweet potato flour rather than on efficient methods to produce and store the flour (Hagenimana *et al.*, 1992) [3].

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) [2].

Materials and Methods

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.

A. Prepration of Amaranth Flour

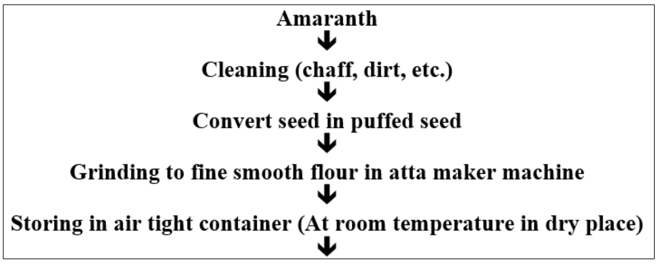
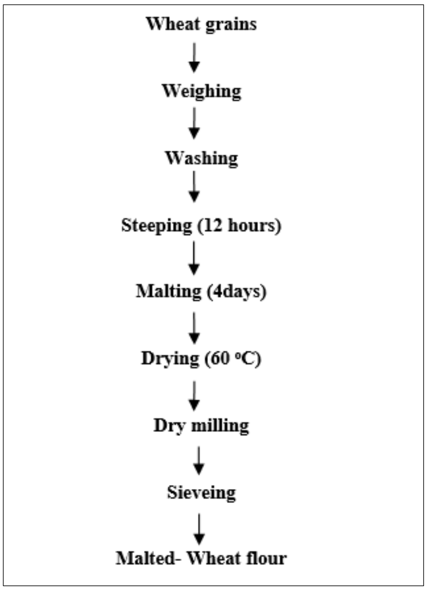


Fig 1: Flow Diagram for preparation of Amaranth Flour

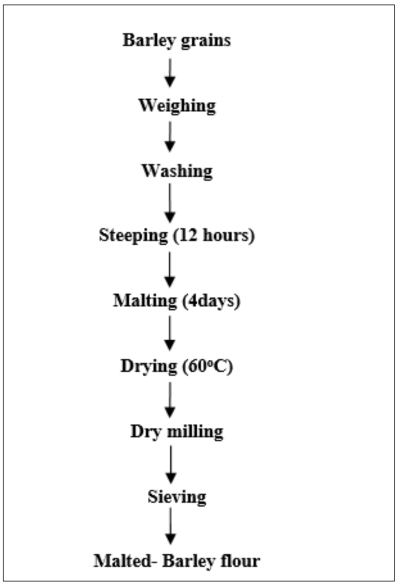
B. Preparation of malted wheat flour



Source: (Bolarinwa, 2015) [1].

Fig 2: Flow diagram of preparation of malted wheat flour

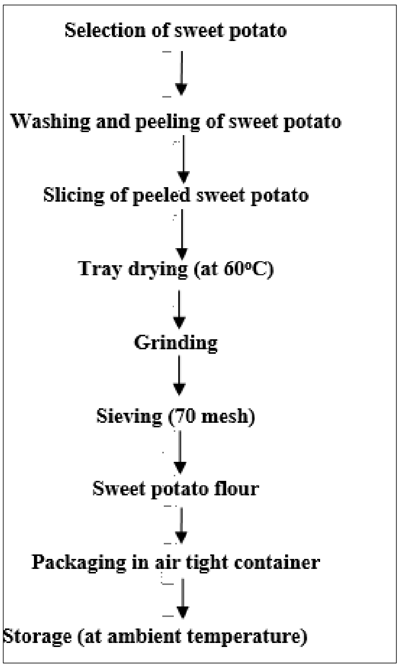
C. Preparation of malted barley flour:



Source: Srivastava *et al*., 2012) [9].

Fig 3: Flow diagram of preparation of carrot

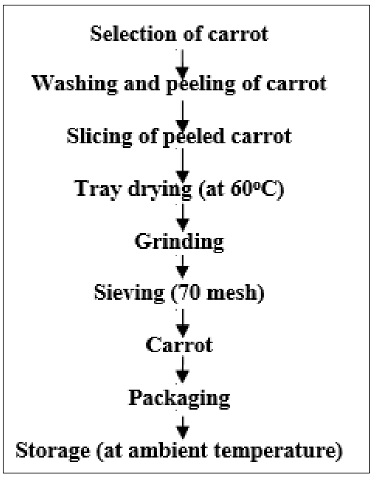
D. Preparation of Sweet Potato Flour



(***Source***: Srivastava *et al*., 2012) [9].

Fig 4: Flow diagram of preparation of sweet potato flour

E. Preparation of carrot flour



(*Source*: Srivastava *et al*., 2012) [9].

Fig 5: Flow diagram of preparation of carrot

Treatments and Replications of Products

The basic recipes was serving as control (T_0)

Detail of treatment of products

The basic recipes was serving as control (T_0)

Table 2: Detail of treatment of products (Halwa)

Food Products	Treatments				Replication
	T_0	T_1	T_2	T_3	
1.*Halwa*					**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 *Halwa* by incorporating (sweet potato, carrot, puffed amaranth seed, malted wheat, malted barley) flour

- **T_0 (control):** the product was prepared using only 100g wheat flour without incorporating flours.
- **T_1:** the product was prepared using 30g malted wheat flour,20g malted barley flour, 20g sweet potato flour, 20gm carrot flour,10g puffed amaranth seed flour.
- **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.
- **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.

Replications – Control and each of the treatments for each product were replicated three times.

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) [8].

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) [2] 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

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

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.

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 products- *Panjeeri, Pancake and Halwa* using different flours combination.

The results obtained from the analysis are presented and discussed in the following sequence.

Halwa

Table 3: Average sensory scores of control and treated samples of *Halwa.*

Control and Treatments	Colour and Appearance	Consistency	Taste and Flavour	Overall Acceptability
T_0	7.06±0.14	7.13±0.108	7.33±0.054	6.933±0.196
T_1	6.933±0.217	7.33±0.054	7.06±0.196	7.133±0.196
T_2	8.666±0.144	8.46±0.108	8.6±0	8.33±0.144
T_3	5.4±0.094	6±0	6.2±0.188	6.533±0.054
F-test	S	S	S	S
C.D	0.13	0.02	0.06	0.07

Colour and Appearance

F=37.58 (4.76), Significant, $P \leq 0.05$ CD=0.13

Body and Texture

F= 11(4.76), Significant, $P \leq 0.05$ CD=0.02

Taste and Flavour

F= 40.9(4.76), Significant, $P \leq 0.05$ CD=0.06

Overall acceptability

F= 26.08(4.76), Significant, $P \leq 0.05$ CD=0.07

The formulated *Halwa* were evaluated for sensory attributes and results are presented in Table 3. The mean scores obtained from sensory evaluation showed that all treatments were accepted. There were significant ($P < 0.05$) differences between overall acceptability of all the formulations. The data illustrated in the table 3 shows the average sensory scores of different parameters in weaning food clearly indicates that treatments T_2 (8.66) had the highest score for colour and appearance followed by T_0 (7.06), T_1 (6.93) and T_3 (5.4). In case of texture, T_2 (8.46) had the highest score followed by T_0 (7.13), T_1 (7.33) and T_3 (6). T_2 (8.6) had the highest mean score for taste and flavour followed by T_0 (7.33), T_1 (7.06) and T_3 (6.2). The average sensory scores of overall acceptability of *Halwa* shows that treatments T_2 (8.6) had the highest score followed by T_0 (7.33), T_1 (7.06) and T_3 (6.2). Among the treatments, T_2 had highest average mean scores for all the sensory attributes which indicates that an increase in the amount of malted wheat flour, malted barley flour with sweet potato, carrot and puffed amaranth seed flour attributes of the *Halwa* gradually decreases.

There was a significant difference between the treatments at 5% probability level. The calculated value of F is greater than the tabulated value of F at 5% probability level. Therefore, it can be concluded that there was significant difference between treatments of weaning food regarding the various sensory attributes (colour and appearance, taste and flavour, consistency and over all acceptability). Nazni and Suresh Kumar (2011) [5] reported the same findings in their work.

Table 4: Comparison between the colour and appearance of the treatment of *Halwa* against C.D.

Treatment Mean value	T_0(7)	T_1(6.9)	T_2 (8.6)	T_3 (5.4)
T_0(7)		0.1	1.6*	1.6*
T_1 (6.9)			1.7*	1.5*
T_2 (8.6)				3.2*
T_3 (5.4)				

CD= 0.13; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for colour and appearance of *Halwa* against critical difference in the above table the variation in scores for colour and appearance of *Halwa* can be seen as follows. The difference in the mean value of T_0,T_2 (1.6); T_0,T_3 (1.6); T_1,T_2 (1.7); T_1,T_3 (1.5); T_2,T_3 (3.2) were greater than C.D, (0.13) therefore the difference is significant while the difference in the mean value of T_0,T_1 (0.1) were less than C.D., therefore the difference is non-significant.

Table 5: Comparison between the consistencies of the treatment of *Halwa* against C.D.

Treatment Mean value	T_0(7.1)	T_1(7.33)	T_2 (8.46)	T_3 (6)
T_0(7.1)		0.23*	1.36*	1.1*
T_1 (7.33)			1.13*	1.33*
T_2 (8.46)				2.46*
T_3 (6)				

CD= 0.02; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for consistency of *Halwa* against critical difference in the above table the variation in scores for consistency of *Halwa* can be seen as follows. The difference in the mean value of T_0,T_1 (0.23); T_0,T_2 (1.36); T_0,T_3 (1.1); T_1,T_2 (1.13); T_1,T_3 (1.33) and T_2, T_3 2.46) were greater than C.D, (0.02) therefore the difference is significant.

Table 6: Comparison between the taste and flavour of the treatment of *Halwa* against C.D.

Treatment Mean value	T_0(7.3)	T_1(7)	T_2 (8.6)	T_3 (6.2)
T_0(7.3)		0.3*	1.3*	1.1*
T_1 (7)			1.6*	0.8*
T_2 (8.6)				2.4*
T_3 (6.2)				

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

On comparing the average scores for taste and flavour of *Halwa* against critical difference in the above table the variation in scores for taste and flavour of *Halwa* can be seen as follows. The difference in the mean value of T_0,T_1 (0.3); T_0,T_2 (1.3); T_0,T_3 (1.1); T_1,T_2(1.6); T_1,T_3 (0.8) and T_2,T_3 (2.4) were greater than C.D, (0.06) therefore the difference is significant.

Table 7: Comparison between the overall acceptability of the treatment of *Halwa* against C.D.

Treatment Mean value	T_0(6.9)	T_1(7.1)	T_2 (8.3)	T_3 (6.5)
T_0(6.9)		0.2*	1.4*	0.4*
T_1 (7.1)			1.2*	0.6*
T_2 (8.3)				1.8*
T_3 (6.5)				

CD= 0.07; *S = Significant ($p \leq 0.05$), NS = Non Significant

On comparing the average scores for overall acceptability of *Halwa* against critical difference in the above table the variation in scores for overall acceptability of *Halwa* can be seen as follows. The difference in the mean value of T_0,T_1 (0.2); T_0,T_2 (1.4); T_0,T_3 (0.4); T_1,T_2(1.2); T_1,T_3 (0.6) and T_2,T_3 (1.8) were greater than C.D, (0.07) therefore the difference is significant.

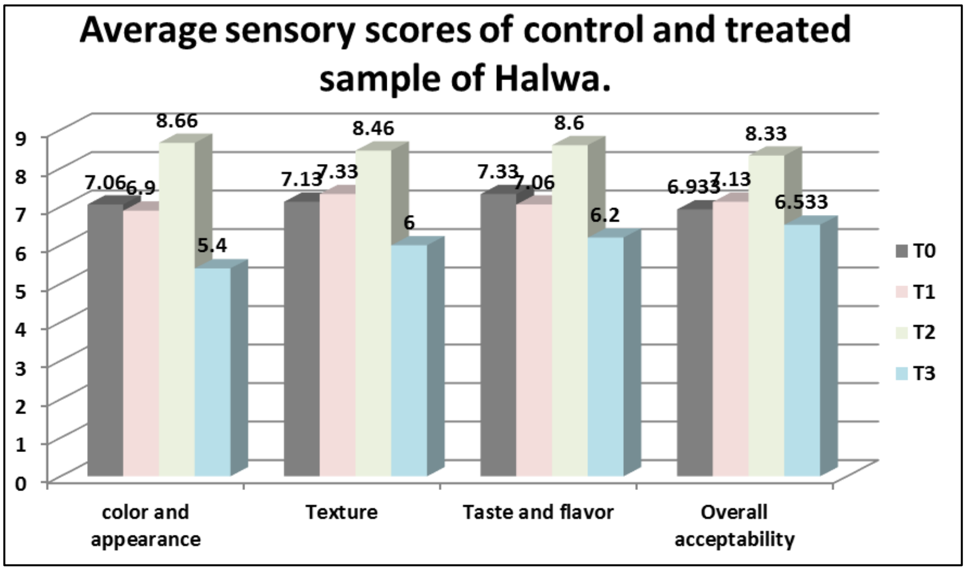


Fig 1: The effect of incorporation of malted wheat flour, malted barley flour, sweet potato flour, carrot flour, puffed amaranth seed flour at different levels on the sensory attributes of *Halwa.*

Table 8: Comparison between nutrient content of control and best treatment of *Halwa* by using t-test.

Nutrients	T_0	T_2	$T_2 - T_0$	t.cal.	t.tab. (5%)	Results
Energy	485.5	497.05	11.55	7.578	4.303	S
Protein	12.1	15.8	3.7	16.228	4.303	S
Fat	5	6.802	1.802	7.903	4.303	S
Carbohydrate	94.25	101.87	7.62	5	4.303	S
Calcium	51	57.95	6.95	4.560	4.303	S
Iron	4.9	6.2	1.3	5.701	4.303	S

On comparing the nutrient content of control and best treatment of *Halwa by* using t-test in the table the variation in nutrient content of *Halwa* can be seen as follows. The difference in the t- calculated value of energy, carbohydrate and calcium (T_2, T_0), were 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 calcium, fat, carbohydrate, iron and fiber more than control. The difference in the t-calculated value of carbohydrate, protein and fat. (T_2, T_0), was less than t- tabulated (4.303) at 5% probability level therefore the difference was non-significant.

The contribution of energy (day 1) per serving (1 unit) was T_o (543.76) and T_2 (556.69) Kcal, respectively. These values correspond to 40.27 and 41.23% of the daily intake recommendations of energy for children aged 4 to 6 years. The contribution of protein per serving was T_o (13.55) and T_2 (17.69) g. These values correspond to 67.41 and 88% of the daily intake recommendations of protein. The contribution of fat per serving was T_o (5.6) and T_2 (7.6) g. These values correspond to 22.4 and 30.4% of the daily intake recommendations of fat. The contribution of calcium per serving was T_o (57.12) and T_2 (64.90) mg. These values correspond to 9.52 and 10.81% of the daily intake recommendations of calcium. The contribution of iron (day 1) per serving (1 unit) was T_o (4.9) and T_2 (6.2) mg, respectively. These values correspond to 37.69 and 47.69% of the daily intake recommendations of iron for children aged 4 to 6 years. These results indicate that the replacement of wheat flour by formulated flour in food products may help to increase nutritional intake for children. The amount of nutritional value given in it compared with the RDA which is recommended by ICMR (2011) [4].

Table 9: Cost of the prepared products namely *Halwa.*

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			8.6		11.26		11.37		11.45

Table shows that the total cost of *Halwa* 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.

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, *Panjeeri*, *Pancake*, *Halwa* 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 *Panjeeri*, *Pancake* and *Halwa* 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 Rs. 11.26-11.45/100g for *Panjeeri*, for *Pancake* Rs. 11.26-11.45 /100g, for *Halwa* Rs. 11.26-11.45 /100g. The cost was found to be acceptable as compared to the control.

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.

References

1. Bolarinwa IF1, Olaniyan SA1, Adebayo LO2, Ademola AA1. Malted Sorghum-Soy Composite Flour: Preparation, Chemical and Physico-Chemical Properties. Food Processing & Technology. 2015; 6(8):1-7
2. Gopaln C, Sastri Rama BV, Balasubramanian S.C. Food and their Nutrient Content. Nutritive values of Indian's food, revised edition, National Institute of Nutrition, Indian Council of Medical Research (ICMR) Hyderabad, 2015, 47-59.
3. Hagenimana V, E Carey, ST Gichuki, MA Oyunga, JK, Imungi. Changes in carotenoid content after drying and processing sweetpotato products. Ecological Food Nutrition. 1992; 37(3):450-473.
4. Indian Council for Medical Research. Dietary Guidelines for Indians—A Manual. 2nd Edition, National Institute of Nutrition, Hyderabad, India, 2011, 89.
5. Nazni P, Sureshkumar C. Formulation and Demonstration of High Nutrient Density Foods to Adhidravidar Mothers, Journal of Studies on Home and Community Science. 2011; 5(1):45-50.
6. Sahai KM, Singh KK. Milled jowar: availability, constraints and prospects, Productivity. 1991; 32(2):258-261.
7. Sindhuja A, Sudha ML, Rahim A. Effect of incorporation of amaranth flour on the quality of cookies. Eur. Food Res. Technol. 2005; 221(5):597-601.
8. Srilakhmi B. Food Sciences 5th Edition, printed by New Age International Publishers, 2010, 294-302.
9. Srivastava S, Genitha RT, Yadav V. Preparation and Quality Evaluation of Flour and Biscuit from Sweet Potato. Journal of Food Processing & Technology. 2012; 3(12):1-5.
10. Varadharajan SK, Thomas T, Kurpad VA. Poverty and the state of nutrition in India. Asia Pac J Clin Nutri. 2013; 22(3):326-339.
11. Venskutonis PR, Kraujalis P. Nutritional components of amaranth seeds and vegetables: Are view on composition, properties, and uses. Comprehensive Reviews in Food Science and Food Safety. 2013; 12(4):381-412.