"FORMULATION OF VALUE ADDED SNACKS BY AN ADMIXTURE OF FLOURS"

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Abstract: The present study was carried out with the objectives to prepare doughnut, panjiri, biscuit and Chila by incorporating Bajra and flour in whole wheat flour, to assess the acceptability of the developed products and to calculate the nutrient value of the developed products. In control no addition of Bajra and maize flour was done while an experimental treatments T_1°, T_2, T_3 and T_4 Bajra flour and maize flour were added at 15 percent, 20 percent 25 percent and 30 percent levels respectively in all the treatments sesame seed we kept constant and were added to enhance the taste and nutritive value of the product. Sensory evaluation of all the four products was carried out using the 9 point Hedonic Scale. The data obtained during the study was analysed statistically using analysis of variance and critical difference techniques. On the basis of findings it was concluded that in case of Doughnuts and Chila T_2 (20 percent) was found to be the best and colour and appearance, body and texture and flavor and over all acceptability. In case of panjiri T_1 (15 Percent) was best in colour and appearance and T_3 (25 percent) was best in body and texture, taste and flavor and overall acceptability and for biscuits T_1(15 percent) was found to be the best in colour in appearance, body and taste and flavor and over all acceptability. Nutritive value of the products was calculated using the food composition table (**Gopalan 2004**) in treatment T_4 (30 percent of Bajra and 30 percent of maize flour and 40 percent of whole wheat flour) nutritive values scored the best and all the prepared products . Therefore it can be concluded that up to 20 percent Bajra and Maize flour can be successfully incorporated in the prepared products.

Keywords: Bajra flour Maize flour, developed products, overall acceptibility, organoleptic quality, 9 point hedonic scale.

A large population of our community today consumes over half their diet as highly processed, empty calorie foods. They can also be defined as the food purchase self-services or carry out eating places without waiter services. **Schlosser and Guthrie (2001)** According to **Khare (2005)** there is a shift in taste preferences of consumers from conservative and traditional cooking commodities. The reasons are as follows:

- Shift from joint families to nuclear household.
- Increase in the number of working women to carve a career along with the family.
- A growing tendency to spend on fashion, health, fitness, education and more importantly "self".

This indulgence may be attributed to increase the income levels and also the independence from parental pressures.

The best snacks are the ones that include healthy nutrient dense foods. Unprocessed whole foods make incredible snacks to fuel the body throughout the day and provide the energy one needs to perform an optimal level. Ultimately healthy foods are simply ones that are close as possible to what God intended, foods with their nutrient intact, and a minimum of toxins. The best foods have no ingredients list. An apple is just that, an apple! More of these foods in our diet, the better the food. Healthy snacks can be made attractive and palatable so that they are enjoyed by the teens and others and also be able to derive the required nutrition for proper growth. Healthy snacks are an opportunity to get nutrients into hungry adolescents- based on them minimal processed foods like whole grain breads and vegetables, cheese, yoghurt, or nut butters.

Millets have received for less research and develop attention than other crops with regard to crop improvement and utilization. Development of value added products from millets have been in process of development and standardization at various places some of these are biscuits, vermicelli, etc. it is assumed like other millets Bajra and Mize flour have certain beneficial qualities which may play a major role in achieving nutritional security. In view of these present study was undertaken with the following objectives:
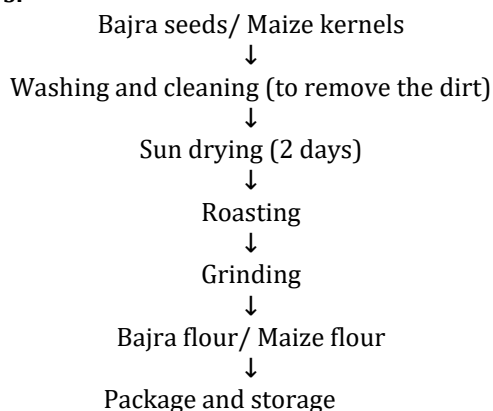
- To prepare value added snacks & to assess their Organoleptic attributes.
- To calculate the nutritive value of the prepared products.
- To calculate the cost benefit ratio of the preparation of the value added products.

MATERIALS AND METHODS

Preparation of Bajra flour/ maize flour:

Bajra seeds/ Maize kernels were subjected to make flour, Bajra, Maize were sun dried for two days, and then it was ground in atta maker to make the flour.

The flow diagram of standard procedure is as follows:

Bajra seeds/ Maize kernels
↓
Washing and cleaning (to remove the dirt)
↓
Sun drying (2 days)
↓
Roasting
↓
Grinding
↓
Bajra flour/ Maize flour
↓
Package and storage

Flow diagram showing preparation of Bajra flour/ Maize flour Source: (Anjana 2007)

Four recipes using different methods of cooking namely Doughnut (Deep-frying), Panjeeri (Roasting), Biscuit (Baking) and Chila (Shallow-frying) were developed by incorporating Bajra flour and Maize flour in Whole Wheat flour at different levels of incorporation. The products were prepared by using standard recipes.

Experimental Design:

Four treatments i.e. incorporation of Bajra flour and Maize flour at different levels with whole Wheat flour was referred as T_1, T_2, T_3 and T_4 respectively for the product development. The treatment details are shown in the table below:

Treatments	Wheat flour	Maize flour	Bajra flour
T_0 (Control)	100%	-	-
T_1	70%	15%	15%
T_2	60%	20%	20%
T_3	50%	25%	25%
T_4	40%	30%	30%

Calculation of nutritive value of the value added snacks:

Nutrient composition of product was computed with the help of Food composition table published by **Gopalan et.al. (2004)**. This includes values per 100 gm of each products, with respect to *"doughnut"*, *"panjeeri"*, *"biscuit"* and *"chila"*.

Effect of incorporation of *flours* on different characteristics of *doughnut*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF DOUGHNUT				
	T_0	T_1	T_2	T_3	T_4
R_1	7.4	7.8	7.4	7.4	7
R_2	8	7.8	7	6.2	6
R_3	7.8	7.4	7.8	6.6	6.2
R_4	7.8	8.4	8.4	7.6	8.4
R_5	8.2	8.8	8.8	7.4	6.6
MEAN	7.84	8.04	7.88	7.04	6.84

Statistical analysis   S.E ±0.31   F= 5.88
Significant,   P ≤ 0.05   CD=0.639

From the above table of Critical Difference it is evident that significant difference was observed between the treatments (T_1 , T_4); (T_1 , T_3); (T_2, T_4) & (T_0, T_4) whereas there was no significant difference between (T_1, T_0); (T_1, T_2); (T_2, T_3); (T_2, T_0); (T_0, T_3); (T_3, T_4). since the average score of treatment T_1 as regards to ' Colour & Appearance' was highest so it can be regarded as the best treatment.

Effect of incorporation of *flours* on colour & appearance of *Doughnut*

Treatments →	AVERAGE SENSORY SCORE OF DOUGHNUT				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	7.4	8	7.2	7.8	7.4
R_2	7.8	7.2	7.2	7.2	6
R_3	7.2	7.4	8	7.2	6.4
R_4	8	7.8	8.2	7.6	8
R_5	7.2	7.8	9	8.4	7.6
MEAN	7.52	7.64	7.92	7.64	7.08
Statistical analysis S.E ± F= 3.01 Non Significant P≤0.05					

The mean scores above pertaining to the effect of addition of flours on body and texture of *Doughnut* shows that treatment T_2 scored the maximum marks 7.92 followed by T_3, T_1, T_0 and T_4 respectively. Therefore it can be concluded that T_2 was liked slightly while the four treatments including control were moderately liked by the panel of judges indicating the enrichment of *Doughnut* with combination of flours improved the texture.

Effect of incorporation of *flours* on taste & flavor of *Doughnut*

Treatments →	AVERAGE SENSORY SCORE OF DOUGHNUT				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	7.4	7.6	8	8	7.6
R_2	6.6	7.2	8.4	8.2	6.8
R_3	7.4	7.2	8.2	7.2	7.2
R_4	7.6	8	7.8	8.2	7.8
R_5	6.2	6.4	8.2	9	7.6
MEAN	7.04	7.28	8.12	8.12	7.4
Statistical analysis S.E ±0.32 F=3.01 Significant, P≤0.05 CD= 0.66					

The table illustrates the average score of taste and flavour for *Doughnut* with four different level of incorporation. The average score of *Doughnut* was obtained maximum for two treatments T_2 and T_3 enriched with 20% of Bajra flour and 20% Maize flour and T_3 with 20% of Bajra flour, 20% of Maize flour followed by treatments T_4, T_1 and T_0 with 30%, 15% and 0% Bajra and Maize flour respectively. The result obtained showed that the incorporation of Bajra and Maize flour up to 25%was acceptable and improved the taste and flavour of *Doughnuts*, but at 30% of incorporation level, its pungent flavour and bitterness became more prominent which made the product less acceptable.

Effect of incorporation of *flours* on overall acceptability of *Doughnut*

Treatments →	AVERAGE SENSORY SCORE OF DOUGHNUT				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	7.4	7.8	7.5	7.7	7.3
R_2	7.4	7.5	7.5	7.2	6.2
R_3	7.5	7.1	7.2	6.9	6.3
R_4	7.8	8.1	8.1	7.8	8.1
R_5	7.2	7.5	8.5	8.1	7.1
MEAN	7.46	7.6	7.76	7.54	7
Statistical analysis S.E± F= 3.01 Non Significant, P≤0.05					

The above table shows that the mean score of *Doughnuts* in relation to overall acceptability which indicated that the treatment T_2 scored maximum followed by T_1, T_3, T_0 and T_4. The overall quality was found to be similar to each other as per the grading scale. But data shows that the addition of Bajra and Maize flour improved the overall acceptability of the product.

Effect of incorporation of *flours* on different characteristics of *Panjeeri*

Treatments →	AVERAGE SENSORY SCORE OF PANJEERI				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	8.8	8.2	8.4	8	8.2
R_2	8.8	8.6	8.2	7.6	7
R_3	8.2	8.2	8.2	8.8	8.2
R_4	8.6	8.6	8.2	7.8	7.8
R_5	7.8	8.6	7.4	8.6	7.8
MEAN	8.44	8.44	8.08	8.16	7.8
Statistical analysis S.E ± F= 3.01 Non Significant, P≤0.05					

The table shows the mean score of Panjeeri in relation to colour which indicates that T_0 and T_1 at 15% incorporation level of Bajra and Maize flour had the highest and same scores (8.44) followed by T_3 (8.16), T_2 (8.08) and T_4 (7.8) respectively. Therefore it can be concluded that the control and T_1 was liked by the panel of judges as regard to colour and appearance and regarded as the best treatment as the average score of T_0 and T_1 are highest and same so both treatments are best and equally good.

Effect of incorporation of *flours* on body and texture of *Panjeeri*

Treatments →	AVERAGE SENSORY SCORE OF PANJEERI				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	7.6	7.8	7.6	8.4	7.8
R_2	8.2	8.4	8.2	8	7.6
R_3	8	8.2	8.4	8.8	8
R_4	8.6	8.4	8.4	7.6	7.6
R_5	7.6	8.2	8.4	9	9
MEAN	8	8.2	8.2	8.36	8
Statistical analysis S.E ± F= 3.01 Non Significant, P≤0.05					

The mean scores above pertaining to the effect of Bajra and Maize flour on body and texture of Panjeeri shows that treatment T_3 scored the maximum marks (8.36) followed by T_2 (8.2), T_1 (8.2) and T_4 (8.00) respectively. Therefore it can be concluded that the control and T_3 was liked by the panel of judges indicating the enrichment of Panjeeri with Combination of flours (Bajra and Maize) improved the texture.

Effect of incorporation of *flours* on taste and flavour of *Panjeeri*

Treatments →	AVERAGE SENSORY SCORE OF PANJEERI				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	8.8	8.8	8	8.4	7.8
R_2	8.6	8.4	8.4	8.6	7.8
R_3	8	8.4	8.8	9	7.8
R_4	8	7.8	8	7.6	7.2
R_5	6.8	7.4	9	8.7	7.4
MEAN	8.04	8.16	8.44	8.46	7.6
Statistical analysis S.E ± F= 3.0 Non Significant, P≤0.05					

The table shows the mean score of *Panjeeri* in relation to texture which indicates that T_3 at 25% incorporation level of Bajra and Maize flour had the highest score (8.46) followed by T_2 (8.44), T_1 (8.16), T_0 (8.04) and T_4 (7.6) respectively. Therefore it can be concluded that the control and T_3 was liked by the panel of judges as regard to taste and flavour and regarded as the best treatment.

Effect of incorporation of *flours* on overall acceptability of *Panjeeri*

Treatments →	AVERAGE SENSORY SCORE OF PANJEERI				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	8.4	8.2	7.9	8.3	7.9
R_2	8.5	8.5	8.3	8.1	7.4
R_3	8.1	8.3	8.4	8.8	8.02
R_4	8.4	8.2	8.2	7.7	7.5
R_5	6.9	8.08	8.3	8.6	8.08
MEAN	8.06	8.25	8.22	8.3	7.78
Statistical analysis S.E ± F= 3.01 Non Significant, P≤0.05					

The above table shows that the mean score of *Panjeeri* in relation to overall acceptability which indicated that the treatment T_3 scored maximum followed by T_1, T_2, T_3 and T_0. The overall quality was found to be similar to each other as per the grading scale. But data shows that the addition of Bajra and Maize flour improved the overall acceptability of the product.

Effect of incorporation of *flours* on different characteristics of *Biscuits*

Treatments →	AVERAGE SENSORY SCORE OF BISCUITS				
Replications ↓	T_0	T_1	T_2	T_3	T_4
R_1	9	8.8	8.6	8.2	7.6
R_2	8	7.4	7.6	7.6	7
/R_3	9	8.6	8.6	8.6	8.6
R_4	8.2	8	8	8	7.2
R_5	8.6	8.8	8.8	8	8.2
MEAN	8.56	8.32	8.32	8.08	7.72
Statistical analysis S.E ± 0.10 F= 3.01 Significant, P≤0.05 CD=0.20					

From the above table, it is found that the treatment T_0 had the highest score (8.56) followed by T_1 (8.32), T_2 (8.32), T_3 (8.08) and T_4 (7.72) respectively. It can be therefore concluded that T_0 held the highest score regarding the colour and appearance of Biscuits that the rest indicating that 100% of whole wheat flour improved the colour and appearance of Biscuits.

From the ANOVA table), it is clear that there was significant difference (P ≤0.05) between the treatments of Biscuits for which CD test was applied. 'Significant' result in ANOVA table means that there is a positive effect of different treatments on the given attributes (i.e. colour, texture, flavour etc.) 'Non-significant result means that there is no effect of different treatments on the given attributes.

On comparing the average scores for colour and appearance of Biscuits from different treatments against the CD values, the variation in mean scores differ significantly between (T_0, T_4); (T_0, T_1); (T_0, T_2); (T_0, T_3) and (T_3, T_4) whereas non-significantly between the remaining pairs of treatments (T_1, T_4) and (T_1, T_2).

Effect of incorporation of *flours* on body and texture of *Biscuits*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF BISCUITS				
	T_0	T_1	T_2	T_3	T_4
R_1	8.8	8.2	8	7.4	7
R_2	7.6	8	8	7.6	6.8
R_3	8.6	8.2	8.4	8.4	8.2
R_4	8.4	8.6	7.8	7.6	7.4
R_5	8.4	8.8	8.8	8	8.4
MEAN	8.36	8.36	8.2	7.8	7.56
Statistical analysis S.E ±0.23 F= 3.01 Significant , P≤0.05 CD=0.47					

Table illustrates the average score of body and texture for *Biscuits* with four different level of incorporation. The average score of *Biscuits* was obtained maximum for two treatments T_0 control treatment and T_1 enriched with 15% of Bajra flour and 15% Maize flour followed by treatments T_2, T_3 and T_4 with 20%, 25% and 30% Bajra and Maize flour respectively. The result obtained showed that the incorporation of Bajra and Maize flour up to 15%was acceptable and improved the taste and flavour of *Biscuits*, but at 20% of incorporation level Bajra flour at high level made the product crunchy, it may be due to low gluten and high fiber content. Similar findings were observed in case of Bajra flour incorporated soy fortified biscuits by **Mridula and Gupta (2008)**

Effect of incorporation of *flours* on taste and flavour of *Biscuits*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF BISCUITS				
	T_0	T_1	T_2	T_3	T_4
R_1	8.8	8.2	7.8	8	7.6
R_2	7.6	8	7.6	7.2	6.4
R_3	7.4	7.6	8.4	8	6.2
R_4	7.8	8.2	8.4	8.2	7.6
R_5	8.2	8.8	8.2	8.2	8.2
MEAN	7.96	8.16	8.08	7.92	7.2
Statistical analysis S.E ± 0.20 F= 3.01 Significant, P≤ 0.05 CD=0.41					

The table illustrates the average score of taste and flavour for *Biscuits* with four different level of incorporation. The average score of *Biscuits* was obtained maximum for T_1 enriched with 15% of Bajra flour and 15% Maize flour followed by treatments T_2, T_3 and T_4 with 20%, 25% and 30% Bajra and Maize flour respectively. The result obtained showed that the incorporation of Bajra and Maize flour up to 15%was acceptable and improved the taste and flavour of *Biscuits*, but at 20% of incorporation level, its pungent flavour and bitterness became more prominent which made the product less acceptable.

Effect of incorporation of *flours* on overall acceptability of *Biscuits*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF BISCUITS				
	T_0	T_1	T_2	T_3	T_4
R_1	8.9	8.5	8.1	7.9	7.4
R_2	7.7	7.7	7.7	7.3	6.7
R_3	8.3	7.9	8.5	8.13	7.7
R_4	8.1	8.7	8.1	7.9	7.4
R_5	8.4	8.8	8.7	8.3	8.3
MEAN	8.28	8.32	8.22	7.9	7.5
Statistical analysis S.E ±0.17 F=3.01 Significant, P≤0.05 CD= 0.35					

The scores shown in the table signify the mean scores of Biscuits regarding its overall acceptability. Results revealed that the treatment T_1 (8.32) enriched with of Bajra flour and Maize flour at 15% scored maximum followed by T_0, T_1, T_3 and T_4 respectively. It is quite clear from the result that the addition at 15% incorporation level of Bajra flour improved the overall acceptability.

Effect of incorporation of *flours* on different characteristics of *Chila*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF CHILA				
	T_0	T_1	T_2	T_3	T_4
R_1	6.4	7.6	7.8	8.8	7.2
R_2	7.8	7.8	8.4	7.6	7.4
R_3	8.2	8	8	7.6	8
R_4	7.6	8.2	8.6	8.4	8.2
R_5	8.2	8.2	8.6	8.2	7.6
MEAN	7.64	7.96	8.28	8.12	7.68
Statistical analysis S.E ± F= 3.01 Non Significant, P≤0.05					

The mean scores above pertaining to the effect of addition of *Bajra* flour and *Maize* flour on the colour of *Chila* clearly indicates that treatment T_2 gave the highest score 8.28for colour of *Chila* than T_3, T_1, T_4 and T_0 respectively.

Effect of incorporation of *flours* on body and texture of *Chila*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF CHILA				
	T_0	T_1	T_2	T_3	T_4
R_1	6.8	7	7.2	8	6
R_2	8	8.2	7.8	7.2	7.2
R_3	8	7.2	8.2	7.6	7.4
R_4	8	7.6	8.6	8.4	7.8
R_5	8.8	8.2	8.6	8.2	8
MEAN	7.92	7.64	8.08	7.88	7.28
Statistical analysis S.E ±0.23 F=3.01 Significant, P≤0.05 CD=0.47					

Table shows the average score foe texture of Chila for all the treatments. Result revealed that the treatment T_2 scored the maximum followed by T_0,T_3, T_1 and T_4 respectively.

It is clear that control was softer than the treatment T_2 prepared from the flour blends containing Bajra and Maize flour at 20% thereafter toughness increased. Higher fiber and lower gluten content in Bajra and Maize than wheat flour may be attributed to increase toughness. Although T_2 with higher proportion of Bajra and Maize flour was found tougher as compared to control on but found acceptable on sensory evaluation. Similar findings were reported by **Mridula et.al. (2008).**

On comparing the average scores for body and texture of Chila from different treatments against the CD value, the variation in mean scores were observed significantly between (T_2, T_4) and (T_0, T_4) while non-significant difference was found between (T_2, T_1); (T_2, T_3); (T_2,T_0); (T_0, T_1); (T_0,T_3);(T_3, T_4); (T_3,T_1) and (T_1, T_4).

Effect of incorporation of *flours* on taste and flavour of *Chila*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF CHILA				
	T_0	T_1	T_2	T_3	T_4
R_1	6.6	6.6	6.4	7	5.6
R_2	7.2	7.8	8.2	8.2	7.6
R_3	7	7.6	8.2	7.2	6.6
R_4	8.2	8	8.6	8.4	7.8
R_5	8.2	8.8	8.8	8	7.6
MEAN	7.4	7.76	8.04	7.76	7.04
Statistical analysis S.E ± 0.2 F=3.01 Non Significant, P≤0.05 CD=0.41					

The date shows the mean scores of Chila regarding its taste and flavour which clearly indicates that the treatment T_2 held the highest score 8.04as compared to T_1, T_3 which held the same scores 7.76, T_0 7.4 and T_4 7.04. It is clear from the mean scores that all the treatments in comparison to T_4 were liked moderately by the panel of judges. However T_2 was preferably better regarding the flavour of Chila than the rest indicating that 20% incorporation level of Bajra and Maize flour in Chila improved its taste and flavour. The date above illustrates that as the incorporation level of Bajra and Maize flour increased; its bitter taste became more prominent which made the product less acceptable. **Surekha *et.al* (2008)** also found that the taste decreased as the proportion of Bajra flour increased in soy incorporated cereal based papads. On comparing the average scores for taste and flavour of Chila from different treatments against the CD value, the variation in mean scores were observed significantly between (T_2, T_4) and (T_2, T_0); (T_3,T_4) and (T_1, T_4) while non-significant difference was found between (T_2, T_1); (T_2, T_3); (T_3,T_0); (T_1, T_0) and (T_0,T_4).

Effect of incorporation of *flours* on overall acceptability of *Chila*

Treatments → Replications ↓	AVERAGE SENSORY SCORE OF CHILA				
	T_0	T_1	T_2	T_3	T_4
R_1	6.6	7.1	7.1	7.9	6.3
R_2	7.9	8.3	8.3	7.9	7.6
R_3	7.9	7.7	8.1	7.5	7.1
R_4	7.9	7.9	8.5	8.1	7.9
R_5	8.4	8.4	8.6	8.4	7.6
MEAN	7.74	7.88	8.12	7.96	7.3
Statistical analysis S.E ± F=3.01 Non Significant, P≤0.05					

The above table shows that the mean score of *Chila* in relation to overall acceptability which indicated that the treatment T_2 scored maximum followed by T_3, T_1, T_0 and T_4. The overall quality was found to be similar to each other as per the grading scale. But data shows that the addition of Bajra and Maize flour improved the overall acceptability of the product.

NUTRITIVE VALUE OF VALUE ADDED DOUGHNUTS

NUTRIENTS	TREATMENTS				
	T_0	T_1	T_2	T_3	T_4
ENERGY (kcal)	1571.9	1575.05	1576.15	1577	1580.1
PROTEIN (gm)	21.03	20.8	20.71	20.68	20.46
FAT (gm)	111.7	112.48	112.78	113	113.26
FIBER (gm)	2.04	2.05	2.06	2.06	2.15
CALCIUM (mg)	162	155.4	152.6	150.6	148.4
CARBOHYDRATE (gm)	120.3	119.56	119.2	118.	118.7
VITAMIN C (mg)	-	-	-	-	-
IRON (mg)	13.76	11.36	10.56	9.71	8.96
MOISTURE (gm)	56.9	57.3	57.36	57.56	57.65
SODIUM (mg)	20	18.01	17.36	16.6	15.97
POTASSIUM (mg)	315	309.45	307.6	305.	303.9

Above table shows the nutritive value of prepared *Doughnuts* with incorporation of Bajra flour, Maize flour and sesame seeds in whole wheat flour. Result revealed that highest energy was found in T_4 (1580.1), followed by T_3, T_2, T_1 and T_0. Protein content was highest in T_0 (21.03), followed by T_1, T_2, T_3 and T_4. Fat content was lowest in T_0 (111.7), followed by T_1, T_2, T_3 and T_4. Fiber content increased as the incorporation level of *Bajra and Maize flour* increased. Calcium content was highest in T_0 (162), followed by T_1, T_2, T_3 and T_4, and carbohydrate content decreased as the amount of *Bajra and Maize flour* increased .iron content was found highest in T_0 (13.76), followed by T_1, T_2, T_3 and T_4. Moisture content was high in T_4 (57.65), followed by T_3, T_2, T_1 and T_0. Sodium and Potassium was found highest in T_0 (162).

NUTRITIVE VALUE OF VALUE ADDED PANJEERI

NUTRIENTS	TREATMENTS				
	T_0	T_1	T_2	T_3	T_4
ENERGY (kcal)	675	706.3	706.4	708.4	711.25
PROTEIN (gm)	12.15	12.8	12.7	12.7	12.48
FAT (gm)	16.7	19.58	19.82	20.1	20.36
FIBER (gm)	1.9	2.05	2.06	2.06	2.15
CALCIUM (mg)	72.15	119.05	116.6	114.65	118.45
CARBOHYDRATE (gm)	119.1	119.46	119.2	118.9	118.76
VITAMIN C (mg)	-	-	-	-	-
IRON (mg)	12	10.1	9.3	8.45	7.7
MOISTURE (gm)	12.4	13.1	13.16	13.36	13.45
SODIUM (mg)	20	18.01	17.36	16.6	15.9
POTASSIUM (mg)	315	309.9	307.6	305.7	303.9

Above table shows the nutritive value of prepared *Panjeeri* with incorporation of Bajra flour, Maize flour and sesame seeds in whole wheat flour. Result revealed that highest energy was found in T_4 (711.25), followed by T_3, T_2, T_1 and T_0. Protein content increased as the incorporation level of *Bajra and Maize flour* increased. Fat content was lowest in T_0 (16.7), followed by T_1, T_2, T_3 and T_4. Fiber content increased as the incorporation level of *Bajra and Maize flour* increased. Calcium content was highest in T_4 (118.76), followed by T_3, T_2, T_1 and T_0., and carbohydrate content decreased as the amount of *Bajra and Maize flour* increased .iron content was found highest in T_0 (12), followed by T_1, T_2, T_3 and T_4. Moisture content was high in T_4 (13.45), followed by T_3, T_2, T_1 and T_0. Sodium and Potassium was found highest in T_0.

NUTRITIVE VALUE OF VALUE ADDED BISCUITS

NUTRIENTS	TREATMENTS				
	T_0	T_1	T_2	T_3	T_4
ENERGY (kcal)	990	1021.3	1022.4	1023.4	1026.3
PROTEIN (gm)	12.15	12.82	12.73	12.7	12.48
FAT (gm)	51.7	54.58	54.82	55.1	55.36
FIBER (gm)	1.9	2.05	2.06	2.06	2.15
CALCIUM (mg)	82.45	119.05	116.65	114.65	112.45
CARBOHYDRATE (gm)	119.1	119.56	119.2	118.9	118.7
VITAMIN C (mg)	-	-	-	-	-
IRON (mg)	12	10.1	9.3	8.45	7.7
MOISTURE (gm)	12.4	13.1	13.16	13.36	13.45
SODIUM (mg)	20	18.01	17.36	16.6	15.9
POTASSIUM (mg)	315	309.45	307.6	305.7	303.9

Above table shows the nutritive value of prepared *Biscuits* with incorporation of Bajra flour, Maize flour and sesame seeds in whole wheat flour. Result revealed that highest energy was found in T_4 (1026.3), followed by T_3, T_2, T_1 and T_0. Protein content increased as the incorporation level of *Bajra and Maize flour* increased. Fat content was lowest in T_0 (51.07), followed by T_1, T_2, T_3 and T_4. Fiber content increased as the incorporation level of *Bajra and Maize flour* increased. Calcium content was highest in T_4 (112.45), followed by T_3, T_2, T_1 and T_0., and carbohydrate content decreased as the amount of *Bajra and Maize flour* increased .iron content was found highest in T_0 (12), followed by T_1, T_2, T_3 and T_4. Moisture content was high in T_4 (13.45), followed by T_3, T_2, T_1 and T_0. Sodium and Potassium was found highest in T_0.

NUTRITIVE VALUE OF VALUE ADDED CHILA

NUTRIENTS	TREATMENTS				
	T_0	T_1	T_2	T_3	T_4
ENERGY (kcal)	531.21	562.51	563.56	564.61	567.46
PROTEIN (gm)	12.68	13.35	13.26	13.23	13.01
FAT (gm)	21.7	24.6	24.8	25.14	25.4
FIBER (gm)	2.16	2.31	2.32	2.32	2.41
CALCIUM (mg)	90.33	126.03	124.53	122.53	106.95
CARBOHYDRATE (gm)	72.34	72.8	72.44	72.14	72
VITAMIN C (mg)	8.4	8.4	8.4	8.4	8.4
IRON (mg)	11.94	10.04	9.24	8.39	7.64
MOISTURE (gm)	48.1	48.8	48.86	49.06	49.15
SODIUM (mg)	22.66	20.67	20.02	19.26	18.63
POTASSIUM (mg)	369.6	364.05	362.2	360.3	358.5

Above table shows the nutritive value of prepared *Chila* with incorporation of Bajra flour, Maize flour and sesame seeds in whole wheat flour. Result revealed that highest energy was found in T_4 (567.46), followed by T_3, T_2, T_1 and T_0. Protein content increased as the incorporation level of *Bajra and Maize flour* increased. Fat content was lowest in T_0 (21.7), followed by T_1, T_2, T_3 and T_4. Fiber content increased as the incorporation level of *Bajra and Maize flour* increased. Calcium content was highest in T_4 (106.95), followed by T_3, T_2, T_1 and T_0., and carbohydrate content decreased as the amount of *Bajra and Maize flour* increased .Vitamin C content is equally present in T_0, T_1, T_2, T_3 and T_4 iron content was found highest in T_0 (11.94), followed by T_1, T_2, T_3 and T_4. Moisture content was high in T_4 (49.15), followed by T_3, T_2, T_1 and T_0. Sodium and Potassium was found highest in T_0.

Conclusion: it is concluded that Bajra and Maize flours can be successfully incorporated in Whole Wheat Flour to enhance the Nutritive Value of the value added snacks. Among the experimental treatments T_2 (20%) was most acceptable for two products viz. Doghnut and Chila, and T_3 (25%) for Panjeeri and Biscuits were acceptable at T_1 (15%). The nutritive value for three products namely viz. Doughnut, Panjeeri and Chila T_2 (20%) and T_1 (15%) for Biscuits scored highest than the control and other treatments regarding energy, Protein, vitamin, mineral and fats and fiber content. Bajra flour and maize flour being highly nutritious and a good source of complex carbohydrates, calcium, iron and high in dietary fiber. thus the development of value added snacks was incorporated with Bajra flour and maize flour increases their nutritional value and functional properties. This is good for therapeutic purposes and can be included in the diets of people with various degenerative diseases like diabetes, constipation, osteoporosis and heart diseases it can also be recommended to be included in the daily diet of all age groups because of their healthy benefits.

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