

# Nutritive Value Evaluation of Fortified Bajra Recipes

## Abstract

Bajra grain is nutritious. It has no husk, no tannin, contains five-seven percent oil. It is rich in B vitamins, potassium, magnesium, iron, zinc, copper and manganese. It is a gluten-free grain. It is very high in calories. Bajra is an underutilized grain crop commonly used as whole flour for traditional food preparation. Moreover, flour was analyzed for its various physicochemical attributes i.e. moisture, fat, protein, carbohydrate, crude fibre and total ash. These products were prepared by incorporation of ground nut flour, and wheat flour, dry fruits to bajra flour. All incorporated products (laddus, and biscuits) had better quality in terms of nutrition. Therefore, these incorporated products should be introduced to all age groups and pregnant and lactating women, malnourished children for proper physical and mental development.

**Keywords:** Bajra, Ground Nut Flour, Wheat Flour, Nutritive Value and Health Products

## Introduction

Bajra (*Pennisetum Glaucom* (L.) also known as Bulrush or Cattail millet) is the most important of a number of unrelated millet species grown for food worldwide on a total of 40 million ha (FAO 1986). Bajra is recommended by many health professionals, dieticians and nutritionists because of its various health benefits. It is also not very expensive millet, which can reduce its consumption. People are becoming more and more conscious about the fact of bajra having various good effects on the body. It is a gluten-free grain. So it is one of the grains which can be easily included in the diet of a person who is suffering from gluten-induced enteropathy or has an allergy towards gluten. It is noted for high iron content also. Bajra (millet) flour, which is nutritious as it contains iron, magnesium, zinc, vitamin B. It is very good for breath and longevity. Bajra flour is used in various cultures in many different ways. It tends to require a binding agent while used in cooking and is much more superior and healthy alternative to wheat flour, as thirty-five grams of bajra contains approximately 4gms of protein. Bajra flour is sweet in taste. Millet soup made from millet flour is commonly used by nursing mothers to aid in milk production and healthy child birth. This gluten-free flour gives baked goods a soft and dry base.

## Aim of the Study

To study in detail about the products of Bajra.

## Research Methodology

### Preparation of Laddu

Laddu in which ground nut flour was replaced by bajra flour at 20, 40, 60, 80% respectively, were prepared.

### Method

1. Bajra flour (level of incorporation 20%, 40%, 60% and 80%) and ground nut flour was taken.
2. Flour roasted on low medium flame in melted ghee until brown color and pleasant aroma appear.
3. Sugar and dry fruits were mixed in it.
4. Then small sizes of balls were made.

### Preparation of Biscuit

Biscuit in which wheat flour was replaced by bajra flour at 20, 40, 60, and 80% respectively, were prepared.

### Method

1. Bajra flour (level of incorporation 20%, 40%, 60% and 80%) and wheat flour was taken.
2. Baking powder (one pinch) was added in flour.
3. Then hydrogenated fat was beaten like cream.
4. Sugar, coconut powder and flour were added in hydrogenated fat.



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- All ingredients were kneaded into soft dough using required water then made equal sizes pieces and cut by biscuit cutter.
- Then equal sizes of pieces were baked at 120°C for 10 min in oven.

**Nutritive Value of Prepared Product**

The prepared samples were analyzed for nutritive value as protein, fat, carbohydrate, fibre and total ash using AOAC procedure.

**Statistical Analysis**

The data obtained in present investigation were tabulated statistically by using CRD (Completely Randomized Design).

**Research finding and Discussion****Mean score of nutritive value of bajra laddu (incorporated with ground nut flour)**

The data of mean score were tabulated and analyzed statistically; result and discussion has been presented in table 1.

**Protein Profile**

Table 1 shows that mean score of protein content of 20%, 40%, 60% and 80% incorporated products were 18.94, 16.36, 13.65 and 13.45 respectively. Table indicate that 20% incorporated products were found highly significant in respect to protein content than other incorporated products. The protein content of 20% incorporated products was better than other incorporated products. It is concluded that prepared laddus are rich source of protein. These products may be prescribed to anaemic patients, school going children, pregnant women. These products may be prescribed to celiac patient because these are gluten free products.

**Fat Profile**

It is evident from the table 1 that the mean score of fat content of 20%, 40%, 60% and 80%

incorporated products were 41.46, 34.05, 27.05 and 16.45 respectively.

A perusal of data presented in table indicates that the fat content differed significantly in the incorporated products. The fat content of 20% incorporated sample was better than other incorporated products.

**Carbohydrate Profile**

Table 1 indicates that the mean value of Carbohydrate content of 20%, 40%, 60% and 80% incorporated products were 30.51, 38.64, 46.84 and 57.25 respectively.

The table shows that incorporated products were highly significant at the level of 5% critical difference. Table shows that as the level of incorporation of ground nut flour to bajra flour increases the carbohydrate content of products decreases. Bajra flour is rich source of carbohydrate.

**Crude fibre Profile**

It is evident from the table 1 that the mean score of fat content of 20%, 40%, 60% and 80% incorporated products were 2.53, 2.14, 1.74 and 1.64 respectively.

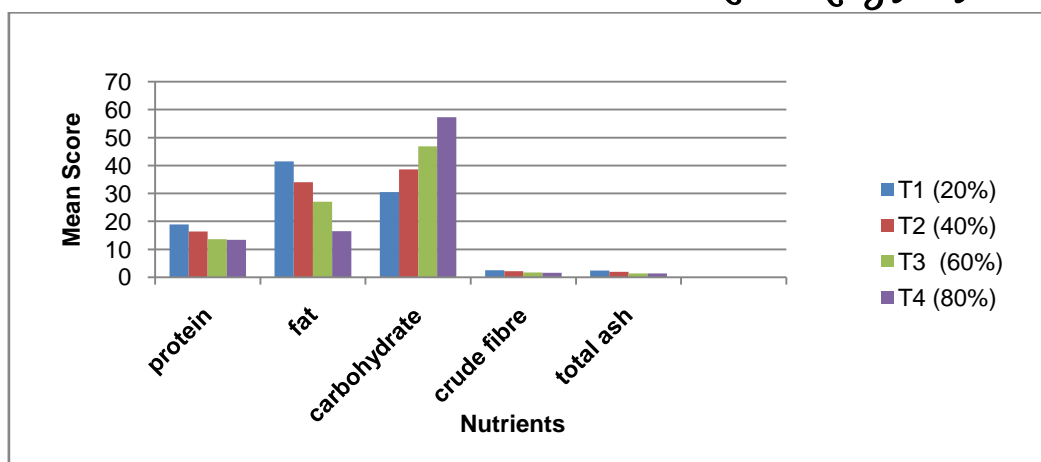
The table shows that fibre content incorporated products were highly significant. It means fibre content was differed from each other. Table shows that fibre content of 20% was higher than other incorporated products.

**Total ash Profile**

Table 1 shows that mean score of total ash content of 20%, 40%, 60% and 80% incorporated products were 2.38, 1.93, 1.43 and 1.33 respectively. Table indicates that 20% incorporated products was found significant with respect to total ash content in comparison to other incorporated product. It is concluded that 20% incorporated product had highest ash content which shows its mineral constituents.

**Table 1 Mean Score of Nutritive Value of Laddus (In Per 100g)**

Parameters	Nutrients					Mean
	Protein (%)	Fat (%)	Carbohydrate (%)	fibre (%)	Totalash (%)	
T <sub>1</sub> (20%)	18.94	41.46	30.51	2.53	2.38	19.16
T <sub>2</sub> (40%)	16.36	34.05	38.64	2.14	1.93	18.62
T <sub>3</sub> (60%)	13.65	27.05	46.84	1.74	1.43	18.14
T <sub>4</sub> (80%)	13.45	16.45	57.25	1.64	1.33	18.02
Mean	15.6	29.75	43.31	2.01	1.76	
SE (d)	0.2771	0.2561	0.2262	0.0400	0.0721	
C D	0.5870	0.5438	0.4802	0.0822	0.1547	



**Mean score of Nutritive Value of Bajra Biscuit (Incorporated with Wheat Flour)**

The data of mean score were tabulated and analyzed statistically; result and discussion has been presented in table 2.

**Protein Profile**

Table 2 shows that mean score of protein content of 20%, 40%, 60% and 80% incorporated products were 10.35, 10.34, 10.27 and 11.05 respectively.

Table indicate that 80% incorporated products were found highly significant in respect to protein content than other incorporated products .The protein content of 80% incorporated product was better than other incorporated products.

**Fat Profile**

It is evident from the table 2 that the mean score of fat content of 20%, 40%, 60% and 80% incorporated products were 18.24, 18.89, 19.54 and 13.05 respectively.

A perusal of data presented in table indicates that the fat content differed significant in the incorporated products. The fat content of 60% incorporated sample was better than other incorporated products.

**Carbohydrate Profile**

Table 2 indicates that the mean value of Carbohydrate content of 20%, 40%, 60% and 80%

incorporated products were 56.84, 56.44, 55.92 and 61.03 respectively.

The table shows that incorporated products were highly significant at the level of 5% critical difference. Table shows that as the level of incorporation of wheat flour to bajra flour increases the carbohydrate content of products increases. The mean value of 80% incorporated product was higher than other incorporated products.

**Crude Fibre Profile**

It is evident from the table 2 that the mean score of fat content of 20%, 40%, 60% and 80% incorporated products were 2.04, 1.5, 1.75 and 1.34 respectively.

The table shows that fibre content incorporated products were highly significant. It means fibre content was differed from each other. Table shows that fibre content of 20% was higher than other incorporated product. So this product may be prescribed to constipation patients.

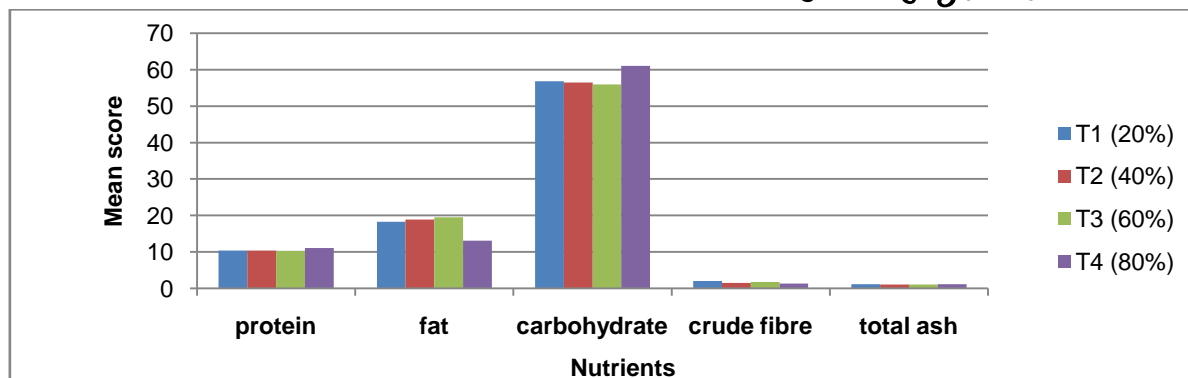
**Total ash Profile**

Table 2 shows that mean score of total ash content of 20%, 40%, 60% and 80% incorporated products were 1.14, 1.05, 1.04 and 1.13 respectively

The total ash content of 80% incorporated product was better than other incorporated product

**Table 2 Mean Score of Nutritive Value of Biscuit (In Per 100g)**

Parameters	Nutrients					Mean
	Protein (%)	Fat (%)	Carbohydrate (%)	Fibre (%)	Total ash (%)	
T <sub>1</sub> (20%)	10.35	18.24	56.84	2.04	1.14	17.72
T <sub>2</sub> (40%)	10.34	18.89	56.44	1.5	1.05	17.64
T <sub>3</sub> (60%)	10.27	19.54	55.92	1.75	1.04	17.70
T <sub>4</sub> (80%)	11.05	13.05	61.03	1.34	1.13	17.52
Mean	10.50	17.43	57.55	1.65	1.09	
SE (d)	0.0200	0.0872	0.1019	0.0200	0.0200	
C D	0.0399	0.0436	0.1860	0.2150	0.0422	



**Conclusion**

The nutrient analysis of incorporated products concluded that the nutritive value of incorporated products can be increased with addition of ground nut flour and wheat flour. In all prepared products the protein and carbohydrate content increased and fat and fibre content decreased with increase in bajra flour incorporation level. The study substitution of bajra flour showed significant contribution of amino acids and increase biological value and digestibility coefficient. Hence the developed supplementary foods are recommended in the diet of vulnerable group to overcome protein and iron deficiency. The study suggests that bajra flour can be used for Indian traditional recipes because of its exotic flavor and nutritive value similar to products which is prepared by bajra flour.

**References**

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