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Research Article

DEVELOPMENT, ORGANOLEPTIC AND NUTRITIONAL EVALUATION OF PEARL MILLET BASED MATHRI

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ABSTRACT

Mathris was prepared by substituting semolina with *bajra* flour. The different samples prepared were Type A, Type B, Type C, Type D and Type E in the ratios of (semolina:*bajra* flour) 100, 75:25, 50:50, 25:75, 100 respectively. *Mathris* was sensory evaluated using nine point hedonic scale. Results showed that *mathri* (Type B) was highly acceptable as scored (7.9±0.07) whereas *mathri* (Type E) was least acceptable as scored (7.1±0.09) on the other hand all types of *mathri* found under the category of 'liked moderately' . Most acceptable *mathri* (Type B) was further analysed for proximate and mineral content along with standard *mathri* (Type A). Result showed that *mathri* (Type B) has more protein (11.5±0.6 g), fat (18.9±0.1 g), fibre (1.4±0.3 g), moisture (5.9±0.5 %), ash (1.9±0.2 %), calcium (24.2±0.1 mg) and iron (3.3±0.4 mg) than standard (Type A). Thus replacement of traditional food like semolina with *bajra* flour for preparing *mathri* is feasible and beneficial too and also were very well accepted.

INTRODUCTION

In the recent years there has been an increasing recognition of the importance of millets as the substitution for major cereal crops. Almost whole of the pearl millet produced in India is consumed in the form of various foods depending on the region and their food habits[1]. The percentage of crude protein, fat, crude fibre and ash content of pearl millet as reported in various analytical studies ranges from 7.02 to 13.67, 4.02 to 7.80, 0.54 to 3.00 and 0.25 to 2.54 per cent, respectively. Besides, the total quantity of protein, their amino acid composition is important for better nutritional quantity. The amino acids profile of pearl millet is better than that of sorghum and maize and is comparable to wheat, barley and rice [2]. The consumption of pearl millet is very poor inspite of being nutritional superior to other crops. The majority of people in India are economically poor and thus, food choices for a balanced diet are further restricted by poverty and insufficient supply of nutritious foods. Therefore, it becomes important to focus on promoting maximal use of locally available inexpensive foods rich in protein, calcium, iron, fibre etc [3].

These days refined cereals such as semolina, refined flour are being preferred by most of the people in urban and rural areas. Usually the food products made of refined cereal is poor in nutritional quality especially in terms of minerals, vitamins and fibre content[4].

Substitution with *bajra* flour is a cost-effective way to increase protein, fibre, iron and other nutrient [5]. Traditional preparation when modified like *mathri* with *bajra* flour could serve a means of enhancing nutritive value. Therefore, the present study was undertaken to know the effect of addition of *bajra* flour on sensory and nutritive value of *mathri*.

MATERIALS AND METHODS

Procurement of pearl millet

Pearl millet was procured from Sector-15 Market, Chandigarh.

Processing of pearl millet

The clean and healthy grain of pearl millet was used for preparation of flour. They were roasted in a pan and then ground with the help of electric grinder. Then the ground content was sieved through a mesh sieve to obtain flour. The powdered sample was stored in air tight container until further use for experiments (Fig.1).

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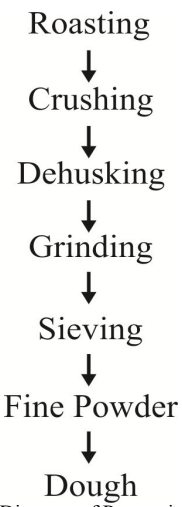


Fig1 Flow Diagram of Processing of *Bajra*

Biochemical analysis of pearl millet

Moisture, crude protein, fat, ash, crude fibre, iron and calcium were determined by the method of AOAC[6]. Phytic acid was determined by the method of Haug and Lantzch[7]. Polyphenols was determined by the method of Singh and Jambunathan[8].

Standardization and development of mathri

A standard recipe is one in which the amount and proportion of the ingredients and method will consistently produce a high quality product. The ingredients are carefully balanced for the number of servings a recipe has to yield. Formulation was prepared by blending semolina and *bajra* flour in different proportions. Table I depicted different combinations of flour of semolina and *bajra* flour.

Table I Proportion of *Mathri*

Sr.No	Ingredients	Type A	Type B	Type C	Type D	Type E
1.	Semolina	100	75	50	25	-
2.	*Bajra* flour	-	25	50	75	100

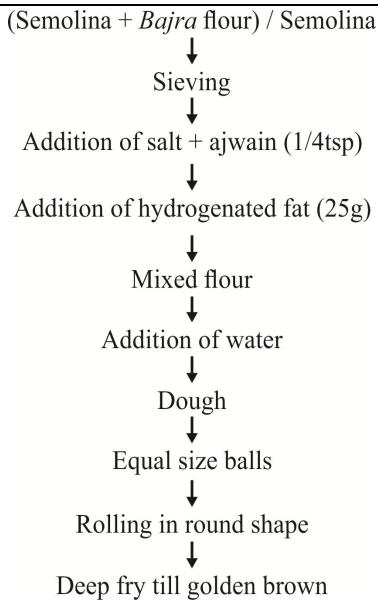


Fig 2 Flow Diagram for Preparation of *Mathri*

Sensory evaluation of mathri

The developed value added *mathri* was standardized using sensory evaluation technique with the help of 5 panel members using 9-point hedonic scale. The developed value added *mathri* along with standard sample was served to the panel members for sensory evaluation. Most acceptable level of *bajra* flour in *mathri* was further analysed for its nutrient content.

Estimation of proximate composition and mineral content of standard and most acceptable bajra mathri

The standard and most acceptable *bajra mathri* out of the ratios were evaluated to assess proximate and mineral composition as per the parameters mentioned earlier.

Statistical analysis

All the obtained data of chemical analysis and sensory evaluation were statistically analyzed using Mean, Standard error, Friedman-Test according to the standard method.

RESULTS AND DISCUSSION

Estimation of proximate composition, mineral content and anti-nutritional factors of pearl millet

The analysis showed the composition of *bajra* (Table II) as moisture 12.6±0.2 %, protein 9.9±2.8 g, fibre 2±2.6 g, fat 4.2±0.5 g, carbohydrate 69 g, ash 2.39±0.2 %**,** calcium 39.3±1.3 mg, iron 6.7±0.4 mg, phytic acid 647.8±0.1 mg and polyphenols 606±0.2 mg per 100 gram.

Table II Proximate Composition, Mineral Content and Anti-nutritional Factors of Pearl Millet

Proximate Composition	Mean (per 100 gram)
Moisture (%)	12.6±0.2
Protein (g)	9.9±2.8
Crude fibre (g)	2.0±2.6
Fat (g)	4.2±0.5
Ash (%)	2.3±0.2
Carbohydrate (g)	69
Mineral Content	
Calcium (mg)	39.3±1.3
Iron (mg)	6.7±0.4
Anti-nutritional Factors	
Phytic acid (mg)	647.8±0.1
Polyphenols (mg)	606±0.2

Development of mathri

Five types of *mathri* were developed from flour of the pearl millet in different proportions.

Sensory evaluation of mathri

Results of sensory evaluation of *mathri* prepared with *bajra* flour presented in (Fig. 3) revealed that the overall acceptability of *mathri* ranged from 7.1-7.4. This indicated that the recipes were found under the category of 'liked moderately. *Bajra mathri* (Type B) exhibit highest scores for all sensory attributes i.e. 7.8±0.58 (appearance), 8.0±0.31 (color), 8.0±0.31 (texture),

7.8±0.58 (flavour), 8.2±0.2 (taste) and 7.9±0.07 (overall acceptability). However incorporation of *bajra* flour in *mathri* upto 100 per cent level maintains like moderately on the basis of 9 point hedonic scale. No significant differences were observed among mean rank of all types of *mathri* in terms of all the sensory parameters.

It was observed that Type B has more protein (11.5±0.6 g), fat (18.9±0.1 g), fibre (1.4±0.3 g), moisture (5.9±0.5 %), ash (1.9±0.2 %), calcium (24.2±0.1 mg) and iron (3.3±0.4 mg) than Type A (9.4±0.2g), (16.2 ±0.3g), (0.9±0.4 g), (5.2±0.1 %), (1.7±0.7%), (14.3±0.4 mg) and (1.2±0.1 mg) respectively. However Type A has more carbohydrate (66.6 g) than Type B (60.4 g).

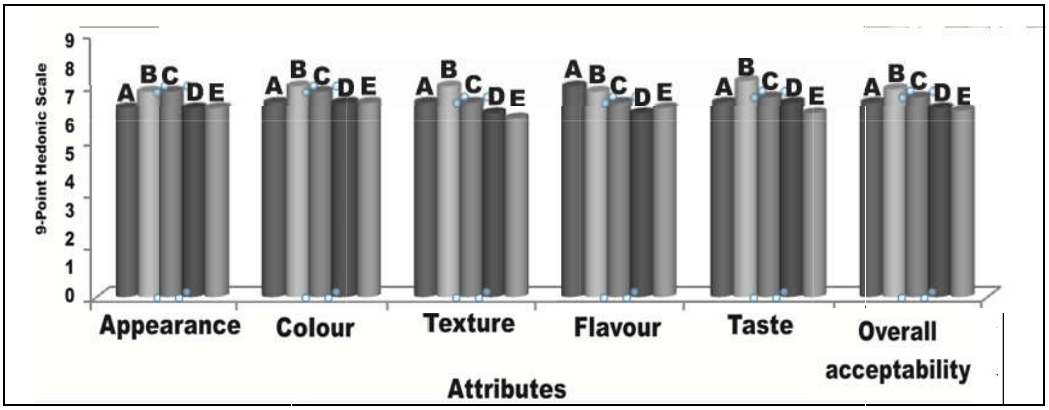
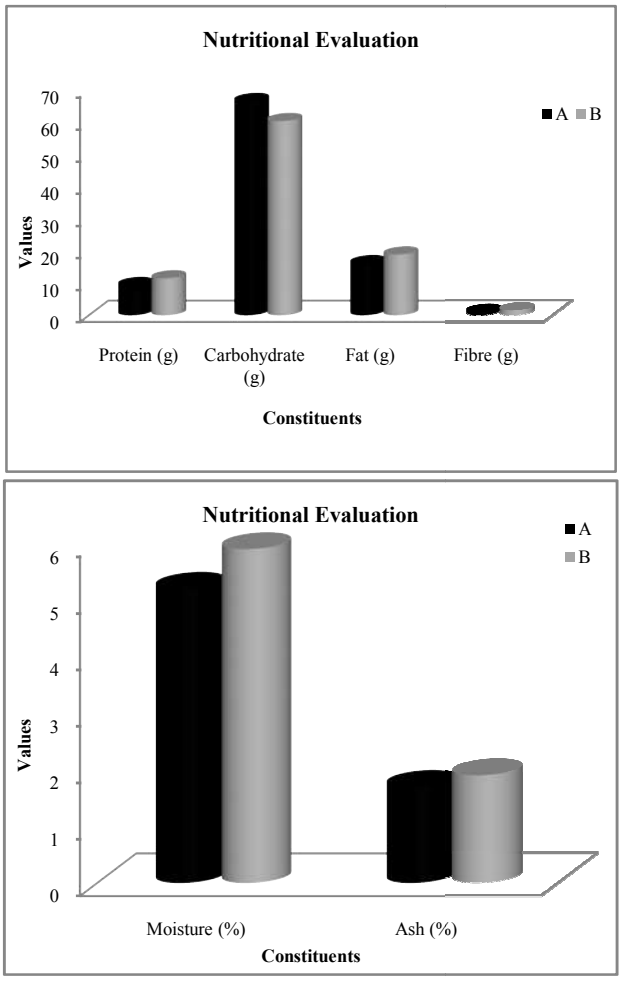


Fig 3 Mean Scores of Sensory Evaluation of *Mathri*

Estimation of proximate composition and mineral content of standard and most acceptable bajra mathri

The data in respect to proximate analysis and mineral content of standard (Type A) and most acceptable *bajra mathri* (Type B) depicted in Fig.4.



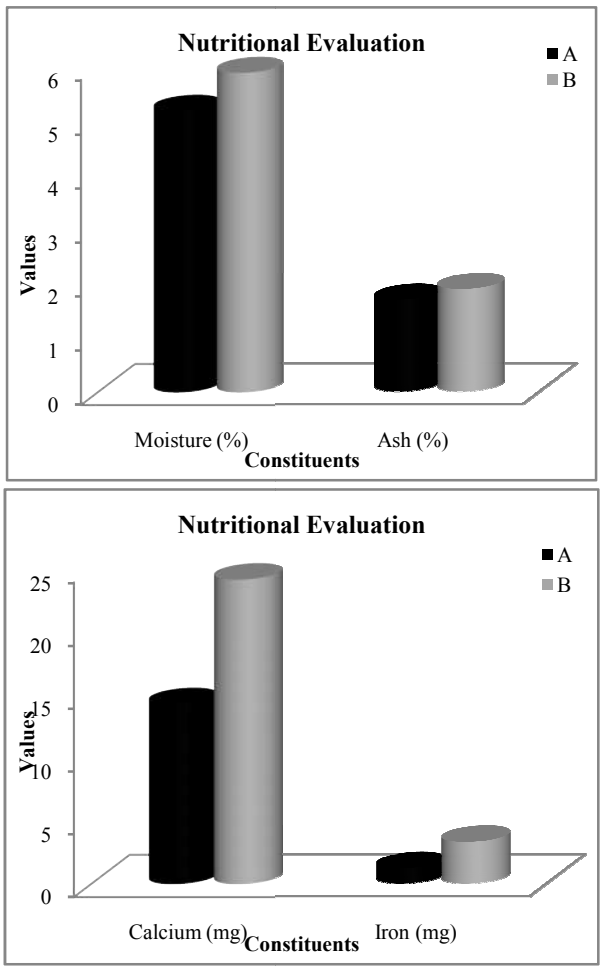


Fig 4 Proximate Composition and Mineral Content of *Mathri*

SUMMARY AND CONCLUSION

This study has demonstrated that addition of increasing levels (100 %) of *bajra* flour in the *mathri* affected the quality of sensory attributes. *Mathri* with 100% *bajra*

flour contains the highest amount of energy, protein, fibre, calcium and iron. The findings of the present study may help in developing commercial processing technology for effective utilization of *bajra* flour especially for preparation of *mathri*. So it can be inferred from the present study that the *mathri* developed by using *bajra* flour were nutritious and acceptable. Therefore, results suggest that there is a great scope for use and marketing of value added *mathri* using *bajra* and it can be concluded that *bajra* can be utilized for achieving food and nutritional security for nation.

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