

DEVELOPMENT AND SENSORY EVALUATION OF READY-TO-COOK IDLI MIX FROM BROWNTOP MILLET (*Panicum ramosa*)

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Abstract: Browntop millet (*Panicum ramosa*) is an annual warm season grass that used to prepare some foods in some parts of Karnataka. The present study was focused on development of ready-to-cook idli mix using browntop millet, by varying the levels of browntop millet and wheat semolina in the ratio of 100:0, 75:25, 50:50 and 0:100 respectively. The product was subjected to sensory evaluation, idli mix with 75 per cent millet was found to be best accepted with scores of 7.3, 7.3, 7.4, 7.4, 7.5 and 7.4 for appearance, texture, colour, aroma, taste and overall acceptability. The proximate composition of the idli mix was found to contain 9.71, 7.43, 1.52, 3.42 and 51.12 per cent of protein, fat, minerals, crude fibre and carbohydrates respectively. The product was stored for shelf life study for a period of 3 months at both refrigeration and ambient temperature. The stored product was subjected for sensory evaluation, which revealed that the mixes can be kept for three months both in ambient and refrigerated temperature without affecting quality.

Keywords: Browntop millet, Ready-to-cook mixes, sensory evaluation, shelf life study.

INTRODUCTION

Millets are small seeded annual grasses that are cultivated as grain crops in dry temperate, subtropical and tropical areas (Baker, 1996).

Browntop millet is a warm season grass that is produced annually and used in forage management systems. Browntop millet originated in Southeast Asia and grown in some parts of Africa, Arabia, Western Asia, China, and Australia (Clayton, 2006). Browntop grows up to 2 - 5 ft tall. The nutritional composition of browntop millet is on par with the other millets. Colour of the millet is also appealing and well accepted when compared to finger millet and kodo millet. It is good source of zinc, iron and also contains good amount of fiber. Browntop millet is also used in the traditional food preparations in few parts of Karnataka locally it is

known as Korale in Tumkur region and Karlakki in Mandya region. But this millet is not popular for food use.

In the present scenario, convenience foods play an important role. Convenience foods are foods that require little preparation or no preparation. Ready-to-cook food such as idli mix, upma mix *etc.*, are examples of convenience foods and these foods requires little preparation before consumption like boiling, frying *etc.* Some of the convenience foods includes canned foods, breakfast cereals, idli mixes, dosa mixes, cake mixes, soup mixes *etc.* The demand for convenience products is increasing because of changing life style, socio and economic pattern, increasing number of working women and modified food habits. Hence, development of convenience foods from locally available and low cost food materials is needed and this can solve the countries food insecurity problem. The main objective of the study is to prepare Ready-to-eat idli mix with browntop millet and to study the acceptability and shelf life of the developed product.

MATERIAL AND METHOD

Procurement of raw materials: Decorticated and whole browntop millet was procured by Mr. Raghu a progressive farmer from Tumkur, Karnataka and also from an organic shop Sahaja Samruddi, Bangalore. Other ingredients were obtained from local market, Bangalore.

Milling of millet: Milling of browntop millet was done by tempering millet for 10 min, followed by pulverising in mini mill and sieving using a mesh of 0.5mm to obtain fine flour.

Drying of vegetables: Chilly and carrot were cut into 1cm length. Carrot, chilly and curry leaves were kept for drying at 60°C. Carrots were dried after blanching. Blanching was done by dipping vegetables in boiling water for 3 minutes followed by immediate cooling.

Preparation of mix: Three variations of idli mixes were prepared by incorporating browntop millet and semolina at different levels. Millet semolina and wheat semolina in the ratios 0:100 (Control – BMI-1), 100:0 (BMI-2), 50:50(BMI-3) and 75:25(BMI-4). Table 1 gives composition of different ingredients used for idli mix preparation.

Nutrient composition of mix: Nutrient compositions of developed mix was calculated by computational method using the analysed nutritive value of browntop millet and “Nutritive value of Indian foods” (Gopalan *et al.*, 1991)

Preparation of idli from idli mix: Idli was prepared by soaking 100 g of idli mix in 30 ml of curd for 20 min and steamed for 12 min.

Sensory evaluation of the product: Developed products were evaluated by 20 semi-trained panel members from the division of Food Science and Nutrition, GKVK, UAS, Bangalore-

560065. The products were evaluated for appearance, texture, flavour, taste and overall acceptability using 9 point hedonic scale. (Deshpande., 2011).

Shelf life study of developed mixes: The best accepted products from sensory evaluation i.e idli prepared using 75 per cent of browntop millet and 25 per cent wheat were packed in polythene covers (LDPE of 200 guage) and kept for shelf life study under ambient temperature (28 ± 2 °C) and refrigeration temperature (4 ± 2 °C). The sensory evaluation of theses stored products was done for 30th, 60th and 90th days of storage. Every month products were prepared from the respective set of ready-to-cook mixes stored in the polythene pouches and evaluated for sensory characteristics.

RESULT AND DISCUSSION

Sensory evaluation

The results pertaining to the sensory evaluation of idli prepared from different idli mixes is presented in the table 1. The control idli scored higher values for all the sensory attributes. The scores for control were 8.1, 8.2, 7.8, 7.8, 8.2 and 7.9 for appearance, texture, colour, aroma, taste and overall acceptability respectively. Among millet idli, 75 per cent millet idli was found to be best accepted with scores of 7.3, 7.3, 7.4, 7.4, 7.5 and 7.4 for appearance, texture, colour, aroma, taste and overall acceptability. Least scores were observed for idli prepared by incorporating 25 per cent millet. There is significance different between all variations for all attributes except for overall acceptability, but all the variations were in the acceptable level.

Nutritive value

Nutritive value of best accepted products prepared from browntop millet was calculated using nutritional composition table (Gopalan *et al.*, 2012). The results obtained are depicted in the table 3. As browntop millet contain good amount of crude fibre the crude fibre content in the prepared idli was also higher. The idli prepared with 75:25 millet and wheat flours with other ingredients was found to contain 9.71, 7.43, 1.52, 3.42 and 51.12 percent of protein, fat, minerals, crude fibre and carbohydrates respectively. The energy value of the product was 301 kcal. It was found to contain 29.73 mg calcium, 175.03mg phosphorus and 3.68 mg of iron.

Shelf life study

The effect of storage on the sensory evaluation of the product stored at ambient and refrigeration temperature is presented in the table 4 and 5 respectively. As the storage time increased the scores for all sensory characteristics decreased for the product stored at ambient

temperature. Whereas, for the product stored under refrigerated condition the sensory scores decreased up to 60 days and the scores remained same for 90th day of storage. There was no significant difference observed for texture and overall acceptability of products stored at ambient condition but significance difference was observed for appearance, texture and aroma. Significant difference was observed for the acceptability of the product on different storage days and storage conditions.

CONCLUSION

Browntop millet can be incorporated with wheat semolina for the preparation of idli mix and can be stored for 3 months both refrigeration and ambient condition without affecting its quality.

REFERENCES

- [1] BAKER, R. D., 1996, Millet production guide A-414. At: <http://www.google.com>. pp 6.
- [2] CLAYTON, W.D., VORONTSOVA, M, S., HARMAN, K, T. AND WILLIAMSON, H., 2006, Grass Base—the online world grass flora. <http://www.kew.org/data/grasses-db.html>. (accessed 19 Aug. 2014).
- [3] DESHPANDE, H. W. AND POSHADRI, A., 2011., Physical and sensory characteristics of extruded snacks prepared from Foxtail millet based composite flours. *Int Food Research J.*, **18**: 751-756.
- [4] GOPALAN, C., RAMA, S. B. V. AND BALASUBRAMANIAN, S. C., 2012, Nutritive value of Indian foods. *National Institute of Nutrition*, Indian Council of Medical Research, Hyderabad. 47-95.

Table 1: Compositions of idli mix variations

Idli Ingredients	Quantity (g/ml)			
	BMI-1	BMI-2	BMI-3	BMI-4
Millet semolina	0	100	50	75
Wheat semolina	100	0	50	25
Soda	0.8	0.8	0.8	0.8
Oil	5	5	5	5
Dal	2	2	2	2
Mustard	0.5	0.5	0.5	0.5
Curry leaves	3	3	3	3
Carrot	5	5	5	5

Table 2: Mean sensory scores of Idli prepared from idli mix

Variations	Mean sensory scores (n=20)					
	Appearance	Texture	Colour	Aroma	Taste	Overall Acceptability
BMI-1	8.1	8.2	7.85	7.85	8.25	7.9
BMI-2	7.2	7.35	6.9	6.95	7.2	7.2
BMI-3	7.4	7.65	7.05	7.15	7.3	7.3
BMI-4	7.3	7.3	7.45	7.4	7.55	7.45

Table 3: Nutritive value of best accepted product (BMI-4)

Nutrient	Quantity
Protein (gm)	9.71
Fat (gm)	7.43
Minerals (gm)	1.52
Crude fibre(gm)	3.42
Carbohydrate (gm)	51.12
Energy (kcal)	301
Calcium (mg)	29.73
Phosphorus (mg)	175.03
Iron (mg)	3.68

Table 4: Variation in mean acceptability scores of idli on storage at ambient condition

Duration (days)	Sensory attribute					
	Appearance	Texture	Colour	Aroma	Taste	Overall acceptability
Initial	7.3	7.3	7.45	7.3	7.55	7.45
30 days	7.05	7.1	7.2	7.25	7.55	7.1
60 days	6.75	6.65	7.05	6.75	7.1	6.9
90 days	6.7	6.35	6.85	6.7	6.4	6.5

Table 5: Variation in mean acceptability scores of idli on storage at refrigeration condition

Duration (days)	Sensory attribute					
	Appearance	Texture	Colour	Aroma	Taste	Overall acceptability
Initial	7.3	7.3	7.45	7.4	7.55	7.45
30 days	7.05	7.1	7.35	7.25	7.55	7.1
60 days	6.75	7	7.35	6.95	7.4	7.1
90 days	6.75	6.35	7.2	6.65	6.9	7.1