DEVELOPMENT AND SENSORY EVALUATION OF PEARL MILLET PRODUCTS

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ABSTRACT

Supplementary products were developed utilizing Pearl millet flour. Biscuit and Namkeen Sev was made by using non sprouted and sprouted pearl millet flour. Sensory evaluation of the products was made in terms of colour, appearance, flavor, taste, texture and overall acceptability using nine point hedonic scales. It was found that Biscuits prepared by using (15%) sprouted pearl millet flour there was increasing in sensory score of overall like colour, appearance texture, aroma taste and overall acceptability. Namkeen Sev which was prepared by incorporating 10% NSPMF were "moderately desirable" in colour and it was "desirable in other arrtributes. Incorporation of 15 % NSPMF brought down the scores for all attributes.

INTRODUCTION

Pearl millet (Pennisetum glaucum (L) R. Br.) is an important coarse grain cereal and forage crop of the arid and semi-arid tropics of the Indian subcontinent and several African regions. Pearl millet is known to have originated in western tropical Africa before 1100 A.D. Pearl millet has many common names in different parts of the world. In India, it is known as bajra, bajri, bajje or cumbu, whereas, in USA it is called Pearl millet, cat tail millet or pencillaria. In Africa, it is known as sanio, dukkin, bulrush millet and in Europe it is commonly called candle millet or dark millet.

Pearl millet accounts for only 3.5 percent of the total 697 million hectare area under cereals and it amounts to about one percent of the total world cereal production. The annual world pearl

millet grain production is around 16.3 metric tons. In Asia, the largest producer is India with 6.8 metric tons of grain, which comes out to be 42 percent of total world pearl millet production. In Haryana, pearl millet production in the year 2001-2002 was 832 thousand tones in an area of 585.5 thousand hectare giving an yield of 1422 k g/ha **.**

Pearl millet crop, by virtue of its remarkable sturdiness and adaptability to the conditions of moisture stress and its short growing period, is the main crop in some of the driest and poorest regions of the country. It is also known as poor man's grain, which happens to have high nutritional quality. Pearl millet, for its low cost and high nutritional value is a good source of supplying food energy to sustain the population engaged in hard physical labour (Gill, 1991). Indian Council of Medical Research (ICMR) and National Institute of Nutrition (NIN) has recommended the inclusion of pearl millet in the diet of lower income group (Gopalan et al., 1981). Thus it has a good scope for its utilization through development of wide variety of food products. These include traditional products (roti, dalia, khichri, bakli, suhali, shakkerpara, ladoo sev, matar baked products (cake, biscuits, nan-khatai); extruded products (Pasta, macaroni, noodles) etc. The utilization of pearl millet for product development will help in diversifying its use for achieving food nutrition security (Sain, K., 2003). In India convenience food have attained a considerable popularity and each day its demand is growing with a high pace. But in case of pearl millet, demand is very low because convenience products from pearl millet are still not developed and require great attention and efforts to make it acceptable by the consumers.

Although pearl millet is good as for as nutritive value and product development is concerned, but there are some constraints that obstacle its diversified utilization.

MATERIAL AND METHOD

LOCALE OF STUDY: The investigation was conducted in the Department of foods and Nutrition, B.P.S.M. Girls College of Home Science, Bhagat Phool Singh Mahila Vishvidhalaya, Sonepat.

PROCUREMENT OF MATERIALS

Seeds of one grey variety i.e 86N33 of pearl millet were procured in a single lot from the Bajra section of Department of plant Breeding, The state Agriculture fultilizer and seeds center place Haldaur (Bijnor). The seeds were free from extraneous matter and stored in air tight plastic containers for further use.

STANDARDIZATION AND DEVELOPMENT OF PRODUCTS

The following products using pearl millet flour, refined flour, wheat flour and gram flour were standardized and developed.

Table 1. Method of preparation of Biscuits

Ingredients	Control	I	II	III	IV	Method
Refined flour	100	90	85	90	85	**(i)** Creamed ghee and sugar with milk.
NSPMF (g)	-	10	15	-	-	**(ii)** Added refined flour, ajwain, salt and baking powder.
SPMF (g)	-	-	-	10	15	**(iii)** Folded the refined flour, dried leaf powder in abale mixture.
Hydrogenated fat (g)		60	60	60	60	**(iv)** The dough was rolled and cut into biscuit shape with help of cutter or with the help of hand.
Sugar (g)	30	30	30	30	30	
Ajwain (g)	2.3	2.3	2.3	2.3	2.3	
Salt (g)	1.5	1.5	1.5	1.5	1.5	**(v)** Baked at 150 ^{0}C for 15-20 minutes.
Baking powder (g)	2.5	2.5	2.5	2.5	2.5	
Milk (ml)	30	30	30	30	30	

NSPMF (Non sprouted pearl millet flour)

SPMF (Sprouted pearl millet flour)

Table 2. Method of preparation of Namkeen Sev

Ingredients	Control	I	II	III	IV	Method
Gram flour	100	90	85	90	85	1. Sieved the gram flour and mix with pearl millet flour. 2. Added salt, and redchilli in mixture and make the paste using water. 3. Put the paste in machine and fall the namkeen sev into the hot oil. 4. Deep fried the namkeen sev till golden brown in colour.
NSPMF (g)	-	10	15	-	-	
SPMF (g)	-	-	-	10	15	
Salt (g)	4	4	4	4	4	
Red chilli	4	4	4	4	4	
Oil	For frying	-	-	-	-	

NSPMF (Non sprouted pearl millet flour)
SPMF (Sprouted pearl millet flour)

ORGANOLEPTIC EVALUATION OF PRODUCTS

Organoleptic evaluation of the products developed was done by the method illustrated by Rangana (1977). Products developed from pearl millet flour, wheat flour, refined flour and gram flour i.e. Biscuit and Namkeen sev, were subjected to sensory evalution by a panel of six judges. The judges scored the quality characters (colour, aroma, taste, texture, appearance and overall acceptability) of each product on a nine point hedonic rating scale .The mean score of five or above was considered acceptable for each quality character. The mean scores were obtained from the values given by all the judges.

STATISTICAL ANALYSIS

The data were subjected to statistical analysis for analysis of variance in a completely randomized design according to the standard method (Panse and Sukhatme 1961).

RESULT AND DISCUSSION

ORGANOLEPTIC EVALUATION OF THE PRODUCT:

BISCUIT

The Biscuit prepared by incorpating pearl millet evaluated was subjected to sensory analysis. The panel member evaluated the product for the colour, appearance, flavour, texture, taste and overall acceptability. The result sensory analysis presented in table 3. The control sample got score ranging from 5.50 to 7.50 for different attributes and fell in the category of "slightly desirable". Addition of non sprouted pearl millet powder (10%) brought down the score of sample with respect to colour. Biscuit prepared by using (15%) NSPMF was increase in sensory score of colour and taste. Addition of SPMF (10%) increase the score of sample with respect to colour, appearance, texture, aroma and taste. Biscuits prepared by using (15%) sprouted pearl millet flour there was increasing in sensory score of overall like colour, appearance texture, aroma taste and overall acceptability. It was also reported that biscuit prepared after incorporation of 20 percent soya flour was liked slightly by the panelist (Singh et al. 1996).

Biscuits developed by using processed pearl millet were acceptable organoleptically (Archana 2001).It was also observed that biscuit developed from pearl millet was liked slightly by the judges (Srivastava et al. 2003).

Namkeen *Sev*

The namkeen sev prepared without incorporation of pearl millet flour were desirable in all attributes like colour, appearance and overall acceptability. Sev which was prepared by incorporating 10% NSPMF were "moderately desirable" in colour and it was "desirable in other arrtributes. Incorporation of 15 % NSPMF brought down the scores for all attributes. From an average score of 8.63 for control biscuit, the score came down to 7.66 for the 15% incorporated NSPMF. However the Sev prepared by incorporating 10% SPMF were desirable in terms of appearance, texture and taste and " moderately desirable" in other terms. For an average score of 8.63 for control biscuit, score came down to 8.30 in 15 % incorporated SPMF products. The result sensory analysis presented in table 4. It was also reported that sevian prepared from potato flour, soya flour, and corn flour were organoleptically acceptable Khara sev prepared form different varieties of cowpea was liked moderately by the judge. It was also found that sev prepared from 50 percent cowpea flour was liked moderately where as the sev, prepared from 100 percent cowpea flour was liked slightly by the judges (Sinha 1999).

Table 3. Organoleptic acceptability of Biscuit prepared from processed and non processed pearl millet flour

Type of Biscuit	Colour	Appearance	Aroma	Texture	Taste	Overall acceptability
Control	5.83±0.54	7.50±0.42	5.83±0.47	5.50±0.34	6.00±0.68	6.13±0.39
NS I	4.16±0.30	7.83±0.40	6.16±0.30	6.33±0.33	7.00±0.44	6.90±0.22
NS II	6.50±0.22	7.33±0.33	5.83±0.40	6.66±0.21	7.33±0.21	6.73±0.12
S I	7.16±0.30	7.50±0.34	6.50±0.34	6.83±0.47	7.33±0.33	7.06±0.22
S II	7.16±0.30	7.83±0.16	7.50±0.22	7.16±0.16	7.66±0.21	7.46±0.11
CD (P≤ 0.05)	NS	NS	NS	NS	NS	NS

NS- Non Sprouted, S- Sprouted

Control = 100% refined flour
I = 90% refined flour + 10% non sprouted pearl millet flour.
II = 85% refined flour + 15% non sprouted pearl millet flour.
III = 90% refined flour + 10% sprouted pearl millet flour.
IV = 85% refined flour + 15% sprouted pearl millet flour.

Table 4. Organoleptic acceptability of Namkeen sev prepared from processed and non-processed pearl millet flour.

Type of Sev.	Colour	Appearance	Aroma	Texture	Taste	Overall acceptability
Control	8.83±0.16	8.66±0.21	8.16±0.30	8.83±0.16	8.66±0.21	8.63±0.18
NS I	7.83±0.44	8.00±0.36	8.33±0.21	8.66±0.42	8.66±0.21	8.23±0.27
NS II	7.83±0.30	7.33±0.49	7.66±0.33	7.83±0.65	7.66±0.33	7.66±0.26
S I	7.50±0.61	8.00±0.44	7.83±0.65	8.16±0.65	8.33±0.49	7.96±0.54
S II	8.500±0.22	8.33±0.33	8.00±0.63	8.16±0.47	6.50±0.50	8.30±0.39
CD (P≤ 0.05)	0.66	0.61	0.62	0.72	0.54	0.58

NS- Non Sprouted, S- Sprouted

Control = 100% Gram flour Gram
I = 90% Gram flour + 10% non sprouted pearl millet flour.
II = 85% Gram flour + 15% non sprouted pearl millet flour.
III = 90% Gram flour + 10% sprouted pearl millet flour.
IV = 85% GRAM FLOUR + 15% SPROUTED PEARL MILLET FLOUR

CONCLUSION:

Present investigation reveals that sprouted pearl millet flour products have higher acceptability in terms of sensory attributes. Shelf life of the products also increased by this method. Biscuits prepared by using (15%) sprouted pearl millet flour there was increasing in sensory score of overall like colour, appearance texture, aroma taste and overall acceptability. . However the Sev prepared by incorporating 10% SPMF were desirable in terms of appearance, texture and taste and " moderately desirable" in other terms.

There is a need to develop and explore the potentiality of pearl millet for the development of convenience baked products. These products could have greater nutritional value and health benefits as compared to similar products developed from major cereals.

REFERENCES

- Archana (2001). Development and nutritional evaluation of pearl millet based diabetic food. Ph.D. Thesis, CCSHAU, Hisar, India.
- Aggarwal, A.J. (1992). Processing of pearl millet for its more effective utilization. Ph. D. Thesis CCSHAU, Hisar, India.
- Andrews, D.J. and Kumar, K.A. (1992). Pearl millet : Food, feed, forage, Advances in Agronomy, 48:90-139.
- Dulby, A; an C.Y Tasi. 1976. "Lysine and Tryptophan Increase during Germination of Cereal Grains" Cereal Chemistry, 53:222-224.
- Gill, K.S. 1991. Pearl millet and its improvement. Publications and Information Divistion, ICA, New Delhi. PP 1-7.
- Gopalan, C., Ramashastri, B.V. and balasubramanian, S.C. 1981. The nutritive values of Indian foods-National Institute of Nutrition Indian Council of Medical Research New Delhi, pp 83.
- Panse, Y.G. and Sukhatme, P.V. 1961. Statistical methods for agricultural workers 2nd Edn. Indian Council of Agricultural Research, New Delhi, pp. 12-87.

- Sain, K. 2003. Acceptability of pearl millet based products among rural women. M.Sc. thesis CCSHAU, Hisar, Indian.
- Srivastaa, S. and Singh, G. (2003). Processing of millets for value addition and development of health foods,. Final report (NATP) Submitted by G.B Pant university of Agriculture and Technology Pantnagar, Uttaranchal.