



ISSN: 2395-7476
IJHS 2015; 1(2): 53-56
© 2015 IJHS
www.homesciencejournal.com
Received: 25-04-2015
Accepted: 28-05-2015

Disha Bindra
Department of Foods &
Nutrition, Govind Ballabh Pant
University of Agriculture and
Technology, Pantnagar
Uttarakhand, India

Development and evaluation of 'Snacks' from new varieties of Mung bean pulse

Disha Bindra

Abstract

The present study was conducted with the objective to prepare 'Barfi', 'Soup' and 'Sprouted Mungbean Cutlet' from three varieties namely: Pant Mung 5 (PM 5), Pant Mung 6 (PM 6) and a local variety of mungbean grain. The foods prepared thereby viz. PM 5, PM 6 and Local variety 'Barfi', PM 5, PM 6 and Local variety 'Soup' and PM 5, PM 6 and Local variety 'Sprouted Mungbean Cutlet' was subjected to sensory evaluation using Nine Point Hedonic Scale and the Score Card methods as given by Amerine *et al.*, 1965 and also for evaluation of their nutritional composition. The results depicted that PM 6 'Barfi' was liked extremely by 56.67% and Local variety Barfi was liked slightly by 23.43% of panelists. Moreover the PM 5, PM 6 and Local variety 'Soup' was liked very much by 68%, 74% and 70% respectively. The Sprouted Mungbean Cutlet prepared from PM 5, PM 6 and Local variety was liked extremely by 56.67%, 53.33% and 23.33% respectively. For one serving of Barfi (33 g), one bowl of Soup (90 g) and 75 g of Sprouted Mungbean (40 g) cutlet the crude protein content ranged from 6.54 to 12g and the calcium content was gauged to be in the range of 80.51 to 90.75 mg for PM 5, PM 6 and Local variety of mungbean grains respectively.

Keywords: Snacks, Mung bean pulse, Hedonic Scale

Introduction

The Mungbean grain is a leguminous species, valued for its protein rich edible seeds, easy digestibility and low flatulence production. Pant Mung 5 is an early maturing (60-65 days) variety with long pods, large and shining seeds. Pant Mung 5 was released in the year 2002 for entire of Uttar Pradesh and plains of Uttarakhand for cultivation both in Kharif and Zaid seasons. It is resistant to mungbean yellow mosaic virus disease and yields 12 to 15q/ha as reported by Singh and Khulbe, 2009.

Pant Mung 6 has been released in 2007 for North East Hill Zone of the country. Pant Mung-6 has small shining seeds as explained by Singh and Khulbe, 2009.

In a study whole fried namkeen, dehusked fried namkeen, roasted namkeen and salad were formulated that were found to be good on the scale of 0-10 (Score Card Method) by the panel of consumers. On an average, among the products developed the fresh product salad was the best acceptable with the average overall acceptability of 8.31 followed by values of dehusked fried namkeen of 7.80, whole fried namkeen of 7.61 and roasted namkeen of 7.02. Whole fried namkeen and dehusked fried namkeen were found to have considerable amount of good fat, protein, carbohydrate, energy content and *in-vitro* protein digestibility. Roasted namkeen was found to have low fat content (Raghuvanshi, 2009)^[4]. Oligosaccharide content in mungbean as reported by Sampath *et al.* (2008)^[5] was 1.25 mg per g (dm) whereas raffinose and maltotriose were not present. Ghavidel and Prakash (2007)^[2] reported 46.7 g per cent total starch, 9.8 g per cent glucose released and 18.9 per cent *in-vitro* starch digestibility. Alongwith macronutrients, leguminous seeds contain appreciable amounts of some vitamins and minerals as well as dietary fiber (Guillon and Champ, 2002)^[3]. Thus the present study was carried out to formulate products from whole and germinated mungbean varieties and evaluate the products for sensory characteristics. The emulsion capacity for mungbean grains and its protein isolates was 19.80 g/g and 31.40 g/g respectively. The oil absorption capacity of the mungbean grains showed negative correlation with nitrogen solubility index (Wenho *et al.*, 2010).

Correspondence

Disha Bindra
Department of Foods &
Nutrition, Govind Ballabh Pant
University of Agriculture and
Technology, Pantnagar
Uttarakhand, India

Materials and Methods

The study was conducted in Food Product Development

Laboratory, Department of Foods and Nutrition, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Uttarakhand.

Procurement of Raw Materials:

The ingredients of ghee, sugar powder, whole Mung, oil, cumin seeds, salt, asafetida, turmeric powder onion and tomatoes were adequately purchased from local market Pantnagar.

Formulation of Products

The mentioned ingredients were utilized to formulate 'Barfi', 'Soup' and 'Sprouted Pulse Cutlet' represented in (Table 1, 2 and 3) respectively. For preparation of Barfi ghee was heated in a yoke and flour was added to it. The flour was shallow fried till it became light brown in colour. Thereafter the powdered sugar was added and the mixture was removed from the fire finally. After cooling it was hand molded into small

balls called as Barfi. Similarly for preparation of Soup whole Mungbean grains were pressure cooked with salt and turmeric added to it until it became soft in consistency. Oil was heated in a pan and asafetida and cumin seeds were added to it. Finally the pressure cooked Soup was added to it and cooked for about 3 minutes till it acquired the consistency of a thick soup. The Sprouted pulse cutlet was prepared by utilizing sprouted mungbean grains, onion, tomato and salt. The aforesaid ingredients were mixed together and lemon juice was added to it.

Table 1: Ingredients and Amounts of Ingredients to prepare 'Barfi'

Ingredients	Amount (in g)
Flour	100
Ghee	50
Sugar powder	70

Table 2: Ingredients and Amounts of Ingredients to prepare 'Soup'

Ingredients	Amount
Whole Mungbean grains	15 g
Oil	1 tsp.
Cumin seeds	¼ tsp.
Salt	¼ tsp.
Asafetida	1 pinch
Turmeric powder	1 pinch
Water	150 ml

Table 3: Ingredients and Amounts of Ingredients to prepare 'Sprouted pulse cutlet'

Ingredients	Amount
Sprouted mungbean	80 g
Onion	20 g
Salt	¼ tsp.

Sensory Evaluation

The formulated products namely Barfi, Soup and Sprouted pulse cutlet were evaluated for sensory quality characteristics by Nine Point Hedonic Scale and Score Card method by fifteen semi-trained panelists (Amerine *et al.*, 1965).

Nutrient Composition of Formulated Products

Nutrient composition of prepared products was computed by calculation method.

Results and Discussion

In the present study Barfi, Soup and Sprouted pulse cutlet

prepared from the three varieties namely Pant Mung 5, Pant Mung 6 and a local variety were gauged for parameters of colour, flavour, texture, taste, appearance, and overall acceptability (Table 4). Consistency was solely evaluated for Soup prepared from the aforesaid varieties.

Sensory Evaluation for 'Barfi'

The mean sensory score of colour of the three varieties were 7.06 for Pant Mung 5, 7.67 for Pant Mung 6 and 7.93 for local variety. A significant difference was recorded for colour between Pant Mung 5 and the local variety. Pant Mung 5 differed significantly from Pant Mung 6 and the local variety in terms of taste, overall acceptability and texture. The results obtained from Nine Point Hedonic scale revealed that 6.67 per cent panelists liked the product very much, 33.33 per cent panelists liked it moderately, 46.67 per cent panelists liked it slightly and 13.33 per cent panelists neither liked nor disliked the Barfi prepared from Pant Mung 5 (Table 5).

Table 4: Sensory Evaluation of 'Barfi' prepared from three varieties using Score Card

Sensory Characteristics	PM 5	PM 6	LV	F value	Difference	Comparison at 5%
Colour	7.06	7.67	7.93	4.25	S	1 2ns 3* 2 3ns
Flavour	6.93	7.73	8.06	5.50	S	1 2* 3* 2 3ns
Taste	6.73	7.80	8.13	8.20	S	1 2* 3* 2 3ns
Texture	6.47	7.87	7.87	9.10	S	1 2* 3* 2 3ns
Appearance	6.8	7.70	8.06	7.92	S	1 2* 3* 2 3ns
Overall acceptability	6.67	7.73	8.00	9.15	S	1 2* 3* 2 3ns

Note: PM 5= Pant Mung 5, PM 6= Pant Mung 6, LV= Local variety

Sensory Evaluation of 'Soup'

Results obtained from Nine Point Hedonic scale revealed that 13.33 per cent panelists liked extremely, 6.67 per cent panelists liked very much, 56.67 per cent panelists liked moderately and 43.33 per cent panelists liked slightly the Soup prepared from Pant Mung 5.

Table 5: Sensory Evaluation of 'Barfi', 'Soup' and 'Sprouted pulse cutlet' prepared from three varieties using Hedonic Scale method

The results also depicted that there was no significant difference between the three varieties with reference to colour of the prepared Soup. Pant Mung 5 differed significantly from Pant Mung 6 with respect to flavour. Pant Mung 5 differed significantly from Pant Mung 6 and the local variety in terms of taste and texture.

Hedonic Scale	Barfi			Soup			Sprouted pulse cutlet		
	PM 5 (%)	PM 6 (%)	LV (%)	PM 5 (%)	PM 6 (%)	LV (%)	PM 5 (%)	PM 6 (%)	LV (%)
Like extremely	0	6.67	13.33	13.33	23.43	20.00	56.67	53.33	26.67
Like very much	6.67	23.43	20.33	62%	72%	79%	40.00	40.00	53.33
Like moderately	25.33	46.67	40.00	46.67	20	46.67	13.33	6.67	20.00
Like slightly	46.67	6.67	6.67	23.43	0	13.33	0	0	0
Neither like nor dislike	13.33	6.67	6.67	0	0	0	0	0	0

Note: PM 5= Pant Mung 5, PM 6= Pant Mung 6, LV= Local variety

Table 6: Sensory Evaluation of 'Soup' prepared from the three varieties using Score Card Method

Sensory Characteristics	PM 5	PM 6	LV	F value	Difference	Comparison at 5%
Colour	8.40	7.70	7.80	1.77	NS	-
Flavour	8.40	7.27	8.00	4.11	S	1 2* 3ns 2 3ns
Taste	8.60	7.67	7.80	3.88	S	1 2* 3* 2 3ns
Texture	8.60	7.53	7.80	4.65	S	1 2* 3* 2 3ns
Appearance	8.53	7.60	8.00	3.18	S	1 2* 3ns 2 3ns
Consistency	8.33	7.20	7.73	4.98	S	1 2* 3ns 2 3ns
Overall acceptability	8.53	7.33	7.87	4.86	S	1 2* 3ns 2 3ns

Note: PM 5= Pant Mung 5, PM 6= Pant Mung 6, LV= Local variety

Sensory Evaluation of 'Sprouted pulse cutlet'

The Nine Point Hedonic Scale depicted that 56.67% per cent panelists liked extremely, 40 per cent panelists liked very much and 13.33 per cent panelists liked moderately the salad prepared from Pant Mung 5.

The mean sensory of colour of the three varieties were 7.73 for Pant Mung 5, 6.93 for Pant Mung 6 and 7.67 for the local

variety taken. There was no significant difference amongst the three varieties with reference to colour, texture, appearance and overall acceptability. As a matter of fact Pant Mung 5 differed significantly from local variety in terms of flavour and taste. Pant Mung 5 scored the highest and Pant Mung 6 and the local variety scored the same for their respective appearance (Table 6).

Table 7: Sensory Evaluation of 'Sprouted pulse cutlet' prepared from three varieties using Score Card method

Sensory Characteristics	PM 5	PM 6	LV	F value	Difference	Comparison at 5%
Colour	7.67	6.93	7.64	2.64	NS	-
Flavour	8.06	8.06	7.20	4.17	S	1 2ns 3* 2 3*
Taste	8.01	7.73	7.20	4.16	S	1 2ns 3* 2 3ns
Texture	7.73	7.53	7.80	0.20	NS	-
Appearance	8.13	7.53	7.53	2.24	NS	-
Overall acceptability	8.13	7.80	7.73	1.43	NS	-

Note: PM 5= Pant Mung 5, PM 6= Pant Mung 6, LV= Local variety

Nutritive Value of Formulated products

Nutritive value of 'Barfi'

The results revealed that one serving (i.e. 33 g) of Barfi prepared from Pant Mung 5 contained 8.78 g of protein, 17.18 g of fat, 2.17g of fiber, 46.04 g of carbohydrate and 370.70 kcal of energy. The mineral content of the Barfi was reported to be 80.51 mg of calcium and 1.77 mg of iron per serving. The protein content was found to be highest in case of Barfi prepared from Pant Mung 5. The Barfi prepared from Pant Mung 6 for one serving of 40 g contained 8.14 g of protein,

17.16 g of fat, 2.04 g fiber, 46.47 g of carbohydrate and 373 kcal of energy (Table 7).

Nutritive Value of 'Soup':

The results revealed that Soup prepared from Pant Mung 5 for one serving (i.e. 90 g) contained 7.89 g of protein, 5.46 g of fat, 1.96 g of fiber, 17.43 g of carbohydrate and 125.60 kcal of energy. The calcium content was recorded to be 72.45 mg and that of 1.6 mg of iron respectively.

Table 8: Nutritive Value of the products prepared from the three varieties

Per serving	Barfi (40g)			Soup			Sprouted pulse cutlet		
	PM 5	PM 6	LV	PM 5	PM 6	LV	PM 5	PM 6	LV
Crude protein (g)	8.78	8.14	7.30	7.89	7.32	6.54	12.60	12.00	10.60
Crude fat (g)	17.18	17.16	17.20	5.46	5.44	5.48	0.70	0.70	0.60
Crude fiber (g)	2.17	2.04	1.75	1.96	1.83	1.58	2.91	2.73	2.73
Carbohydrate (g)	46.04	46.47	47.13	17.43	17.82	18.42	27.90	28.74	28.74
Physiological Energy (kcal)	370.70	373.00	372.33	125.60	124.70	124.10	165.45	166.00	218.20
Calcium (mg)	80.51	83.78	78.89	72.45	75.39	71.01	85.50	90.75	83.40
Iron (mg)	1.77	1.96	1.76	1.60	1.80	1.60	2.16	2.14	2.14

Note: PM 5= Pant Mung 5, PM 6= Pant Mung 6, LV= Local variety

Nutritive Value of 'Sprouted pulse cutlet'

The results showed that 75 g of Sprouted pulse cutlet prepared from Pant Mung 5 contained 12.60 g of protein, 0.7 g of fat, 2.91g of fiber, 27.90g of carbohydrate, 165.45 kcal of energy, 85.50 mg of calcium and 2.16 mg of iron content. The protein

content was highest in Sprouted pulse cutlet prepared from Pant Mung 5. The calcium content was highest in Sprouted pulse cutlet prepared from prepared from Pant Mung 6. On the other hand the calcium and protein content were lowest for Sprouted pulse cutlet prepared from the local variety.

Conclusion

Thus the new varieties are nutritious and can be consumed in daily diet both in snacks and in main course meals.

References

1. Amerine NA, Pangborn RM, Roessler EB. Principles of sensory evaluation of food. Academic Press. New York, 1965.
2. Ghavidel RA, Prakash J. The impact of germination and dehulling on nutrients, antinutrients, *in vitro* iron and calcium bioavailability and *in vitro* protein digestibility of some legume seeds. Science direct. 2007; 40:1292-1299.
3. Guillon F, Champ MJ. Carbohydrate fractions of legumes: Uses in human nutrition and potential for health. British Journal of Nutrition. 2002; 88(3):S293-S306.
4. Raghuvanshi RS. Pulses in human nutrition. In: Singh D.P. ed. Pulse Research at Pantnagar (2000-2009). Directorate of experiment station, G.B.P.U.A. &T., Pantnagar. 2009, 83-90.
5. Sampath S, Madhava RT, Reddy KK. Effect of germination on oligosaccharides in cereals and pulses. Journal of Food Science and Technology. 2008; 45(2):196-198.