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SENSORY QUALITY AND COST STRUCTURE OF BOTTLE GOURD PULP (*Lagenaria siceraria*) UJANI BASUNDI

S.B. Gawande[1],V.G. Atkare[2] and R. M. Zinjarde[3]

ABSTRACT

The research work entitled "Utilization of bottle gourd pulp (*Lagenaria siceraria*) for the preparation of Ujani basundi" was carried out during the year 2018-19. Milk was standardized to 4 per cent fat and the Ujani basundi prepared with addition of bottle gourd pulp at 0% (T_1), 5% (T_2), 10% (T_3) and 15% (T_4) per cent by weight of milk. The data analyzed statistically by using completely randomized design (CRD) with four treatments and five replications. The data obtained by evaluation of sensory characteristics like colour and appearance, body and texture, flavour and overall acceptability were subjected to statistical analysis. The sensory evaluation for overall acceptability carried out by the judges showed that Ujani basundi prepared by adding with 15 part bottle gourd pulp (T_4) had secured the highest score (8.80) and ranked as acceptable treatment. The cost of production of Ujani basundi was decrease with the increase in the level of bottle gourd pulp. The cost of production was higher of treatment T_1 with addition of 0 part bottle gourd pulp (Rs.155.46 kg^{-1}) while, the Ujani basundi prepared by adding 15 parts of bottle gourd pulp (T_4 treatment) costing Rs.152.85 kg^{-1}which was superiorly accepted by the panel of judges. Hence, it could be concluded that superior quality Ujani basundi can be prepared by addition of 15 per cent of bottle gourd pulp.

(Key words:Ujani basundi,bottle gourd,sensory attributes, cost structure)

INTRODUCTION

Milk is paramount importance to survival, proper development and vigorous growth of the neonate (newborn). Milk is the only supply of the water, organic nutrient and minerals to which the neonate has access. Milk supplies everything to the neonate except air. It has a high calorific value and generally is balanced for the nutrient needs of the rapidly developing young of that species. Colostrum (The first milk obtained from mammary gland after parturition) and milk also contain non nutrient substances (such as antibodies and bioactive factors) that may be important for growth, development and survival of the neonate.

Basundi is a traditional heat desiccated whole milk product prepared by partial dehydration of the milk with sugar. Basundi is popular milk delicacy having sweetish caramel and pleasant aroma. Light to medium brown color, thick body and creamy consistency with or without soft textured flakes that are uniformly suspended throughout the product. It contains all the solids of milk in an appropriate concentration plus additional sugar and dry fruits (Pagote, 2003).

Ujani basundi is the heat desiccated indigenous dairy product prepared by the addition of 10% sugar level and it is more concentrated than Basundi, It was observed to be sweet with pronounced caramelized flavor. The product has a more thick body than the normally present in basundi. Which is main characteristics of the products. Ujani village is situated on the Solapur Latur highway just near the famous religious place, Tuljapur. This product is very much popular in Ujani and around villages as well as all over the Latur district (Maharashtra State) and border areas of Maharashtra and Karnataka (Gaikwad *et al.*, 2009).

Bottle gourd is rich source of vitamins and minerals. It contains higher concentration of dietary fibers, A,C,E,K,B_1,B_2,B_6, potassium manganese, pantothenic acid, calcium, magnesium and phosphorus. Bottle gourd use for diabetics, heart problems, blood pressure and so many other ailments. Those who do not have any problem can also use this juice as a health tonic (Bhutkar *et al.*, 2015). Now a day's a local producer use only traditional Basundi nothing use the vegetables. Therefore, present study planned to use vegetable like Bottle gourd for the preparation of Basundi.

1. P.G. Student, Animal Husbandry and Dairy Science, College of Agriculture,Nagpur
2. Professor (CAS), Animal Husbandry and Dairy Science, College of Agriculture, Nagpur
3. Assoc. Professor (CAS), Animal Husbandry and Dairy Science, College of Agriculture, Nagpur

Keeping these in mind, the present paper focused to study on sensory evaluation and cost structure of bottle gourd pulp (*Lagenaria siceraria*) Ujani Basundi".

MATERIALS AND METHODS

During the entire study fresh, clean, whole cow milk was obtained from Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur. The milk was strained through clean muslin cloth and transfer into well cleaned and sterilized flat bottom stainless steel vessel.

Cow milk was used for conducting the trial throughout the experiment. The milk was standardized at 4 per cent fat by using Pearson's square formula by the addition of skim milk as followed for adjustment of 4 per cent fat.

Good quality, fresh bottle gourd fruit was purchased from local market of Nagpur. The fruit was washed with clean fresh potable water. The skin was removed and fruit was cut into pieces with the help of knife and seed were removed. The pulp of fruit was made by using mixer cum grinder under hygienic condition was used in Ujani basundi.

Treatment details

T_1= 100 Parts of cow milk + 0 parts of bottle gourd pulp

T_2= 95.0 Parts of cow milk + 5.0 parts of bottle gourd pulp

T_3= 90.0 Parts of cow milk + 10 parts of bottle gourd pulp

T_4= 85.0 Parts of cow milk + 15.0 parts of bottle gourd pulp

(5 per cent sugar added in all treatments)

Sensory evaluation of basundi

The product for sensory characteristics viz., color, appearance, flavor, body and texture were evaluated by using score card method by offering a sample to panel of 5 judges as prescribed by Pal and Gupta (1985).

Characters	Prefect score
Colour and appearance	30
Flavour	50
Body and texture	20
Total	100

Overall acceptability was determined by a trained sensory panel (minimum of 6 members) on a 9-point hedonic scale as prescribed by Nelson and Trout (1964).

Hedonic rating

Sr. No.	Remarks	Score
1	Like extremely	9
2	Like very much	8
3	Like moderately	7
4	Like slightly	6
5	Neither like nor dislike	5
6	Dislike slightly	4
7	Dislike moderately	3
8	Dislike very much	2
9	Dislike extremely	1

(Score of 5.5 and above indicates acceptability within the score of 1 to 9)

Statistical analysis

The experiment was laid out in CRD with four treatments and five replications. The data obtained were analyzed statistically according to method described by Snedecor and Cochran (1994)

RESULTS AND DISCUSSION

Sensory evaluation of bottle gourd Ujani basundi

The sample of fresh product were subjected to evaluation by panel of trained 5 judges. The same judges evaluated sample of each trial throughout the experiment to avoid the possibility to variation. The evaluation was done for the flavour, body and texture and colour and appearance as per the method suggested by Pal and Gupta (1985).

The data with respect to sensory evaluation of bottle gourd Ujani basundi are presented in table 1.

Flavour

The flavour score of Ujani basundi was significantly affected due to addition of different levels of bottle gourd pulp at 0 per cent (T_1), 5 per cent (T_2), 10 per cent (T_3) and 15 per cent (T_4) were recorded as 44.60, 45.20, 47.20 and 49.00 per cent, respectively. Significantly highest score (49.00 out of 50) was obtained by Ujani basundi prepared with 15 per cent bottle gourd pulp (T_4) as compared to other treatments. The bottle gourd pulp Ujani basundi in treatmentT_4 (85.0 Parts of cow milk + 15.0 parts of bottle gourd pulp) was appreciated, followed by T_1(100 Parts of cow milk + 0 parts of bottle gourd pulp), T_2(95.0 Parts of cow milk + 5.0 parts of bottle gourd pulp) and T_3(90.0 Parts of cow milk + 10 parts of bottle gourd pulp). The bottle gourd pulp Ujani basundi prepared with 15 parts (49.00) of bottle gourd pulp was superior over 0, 5 and 10 parts levels.

The results are in agreement with past research workers. Yadav (2015) reported that flavor score of basundi with carrot (3, 4, 5 and 6 per cent) was improved at 4 per cent carrot in basundi under the treatment T_2 (4 per cent of carrot). The results are also in collaborative with Gite *et al.* (2017), who reported that flavor score for basundi with addition of custard apple pulp improved at 30 per cent custard apple pulp under the treatment T_2 (in proportion of rabri and custard apple pulp 70:30) in basundi.

Body and texture

The body and texture score of Ujani basundi was significantly affected due to addition of different levels of bottle gourd pulp. The body and texture score of Ujani basundi prepared with addition of bottle gourd pulp at 0 per cent (T_1), 5 per cent (T_2), 10 per cent (T_3) and 15 per cent (T_4) were recorded as 16.60, 17.30, 18.30 and 19.60 per cent, respectively. Significantly highest score (19.60 out of 20) was obtained by Ujani basundi prepared with 15 per cent bottle gourd pulp (T_4) as compared to other treatments. The bottle gourd pulp Ujani basundi in treatment T_4(85.0 Parts

of cow milk + 15.0 parts of bottle gourd pulp) was appreciated, followed by T_1(100 Parts of cow milk + 0 parts of bottle gourd pulp), T_2(95.0 Parts of cow milk + 5.0 parts of bottle gourd pulp) and T_3(90.0 Parts of cow milk + 10 parts of bottle gourd pulp). The Ujani basundi prepared with 15 parts (19.60 out of 20) of bottle gourd pulp was superior over 0, 5 and 10 parts levels.

Gaikwad *et al*. (2016), prepared basundi by using different levels of date fruit crush. The date fruit basundi prepared with 6 Per cent of date fruit crush under the treatment T_3 (scored 8.38 out of 10) of date fruit crush superior over T_0 (0%), T_1 (2%), T_2 (4%), T_4 (8%), T_5(10%) and T_6 (12%) per cent levels.

These findings are comparable with the findings of present study.

Colour and appearance

The color and appearance score of Ujani basundi was significantly (P<0.05) affected due to addition of different levels of bottle gourd pulp. The colour and appearance score of Ujani basundi prepared with addition of bottle gourd pulp at 0 per cent (T_1), 5 per cent (T_2), 10 per cent (T_3) and 15 per cent (T_4) were recorded as 24.80, 26.20, 27.80 and 29.20 per cent, respectively. Significantly highest score (29.40 out of 30) was obtained by Ujani basundi prepared with 15 per cent bottle gourd pulp (T_4) as compared to other treatments. The bottle gourd Ujani basundi T_4 (85.0 Parts of cow milk + 15.0 parts of bottle gourd pulp) was appreciated, followed by T_3(90.0 Parts of cow milk + 10 parts of bottle gourd pulp), T_2 (95.0 Parts of cow milk + 5.0 parts of bottle gourd pulp) and T_1(100 Parts of cow milk + 0 parts of bottle gourd pulp). The Ujani basundi prepared with 15 parts of bottle gourd pulp was superior over 0, 5 and 10 parts levels. Hence, it is indicated that increase in the levels of bottle gourd pulp resulted in better colour and appearance of Ujani basundi.

More or less similar results were reported by Deshmukh *et al*. (2017). They prepared kheer from cow milk with addition of poppy seeds. The kheer prepared with 2 parts (19 out of 20) of poppy seeds was superior over 2.5 parts rice (T_1), 4 (T_3) and 6(T_4) parts of poppy seeds. Naik *et al*. (2017) also found that addition of jackfruit pulp significantly improved the color and appearance of basundi. The highest score was obtained (7.99) at the level of 10 per cent jackfruit pulp under the treatment (T_2). However, all the levels of jackfruit pulp were statistically at par with each other. These findings are in line with the findings of present study.

Overall acceptability

Organoleptic evaluation for overall acceptability of product was determined by 9 point Hedonic scale as suggested by Nelson and Trout (1964).

The mean scores for overall acceptability of Ujani basundi prepared in the proportion of 100:00 (T_1), 95:05 (T_2), 90:10 (T_3) and 85:15 (T_4) cow milk to bottle gourd pulp were recorded as 6.60, 7.10, 7.80 and 8.80 per cent, respectively. Hence, it is inferred that increase in the levels of bottle gourd pulp resulted in better overall acceptability score of Ujani basundi.

More or less similar results were reported by Chavan *et al*. (2019). They reported that increase in level of khamang rice resulted in better in overall acceptability score of kheer.The maximum score 8.08 was obtain for the treatment T_4 (3%) and the minimum score 7.70 was obtain for the treatment T_1 (1.5%). Bawale (2018) also reported the score for overall acceptability of basundi with different levels of custard apple pulp for treatments T_0(0%), T_1(5%), T_2 (10%) and T_3(15%) were 7.93, 8.05, 8.08 and 7.70 per cent, respectively. The maximum score 8.08 was obtain for the treatment T_2 (10%) and the minimum score 7.70 was obtain for the treatment T_3(15%). These results are in conformity with the results of present study.

Cost of production

The cost of production of 1 kg^{-1} bottle gourd Ujani basundi ranged from Rs.152.85 to 155.46 (Table 2).The cost of production of different treatment combinations was Rs. 155.46, Rs. 154.77, Rs. 153.18 and Rs.152.85 for treatments T_1(100 Parts of cow milk + 0 parts of bottle gourd pulp), T_2(95.0 Parts of cow milk + 5.0 parts of bottle gourd pulp), T_3 (90.0 Parts of cow milk + 10 parts of bottle gourd pulp) and T_4(85.0 Parts of cow milk + 15.0 parts of bottle gourd pulp), respectively. The cost of production decreased with increase in levels of bottle gourd pulp.The lowest cost of production (Rs. 152.85) was recorded in case of Ujani basundi prepared with addition of 15 per cent bottle gourd pulp (T_4),which was found as the best treatment selected by panel of judges for sensory evaluation.

On contrary,Naik *et al*.(2017) reported that in the highest cost of INR 98.00 kg^{-1} was recorded for basundi prepared with 20 per cent jack fruit pulp under the treatment T_4(20 parts of jackfruit pulp + 80 parts of plain basundi) while lowest cost (INR 84.00 g^{-1}) was recorded for basundi without jackfruit pulp under the treatment T_0(0 parts of jackfruit pulp + 100 parts of plain basundi). The increase in cost of basundi was mainly due to addition of jack fruit pulp at different levels. They further reported that addition of 20 per cent jackfruit pulp improved the acceptability and nutritional value of jackfruit pulp basundi.

Table 1. Combined table for sensory attributes of Ujani basundi as affected by different levels of bottle gourd pulp

Treatment	Parameters		
	Flavour (50)	Body & Texture (20)	Colour & Appearance (30)
T_1	44.60^d	16.60^d	25.20^d
T_2	45.20^c	17.30^c	26.40^c
T_3	47.20^b	18.30^b	28.20^b
T_4	49.00^a	19.60^a	29.40^a
SE (m) +	0.50	0.32	0.38
CD at 5%	1.50	0.96	1.14

Table 2. Cost of production of 1 kg Ujani basundi prepared from different levels of bottle gourd pulp (Rs.)

Treatments	Quantity of milk taken	Cost of milk (Rs.)	Sugar (g)		Bottle gourd pulp (g)		Fuel charge @ Rs. 750 14.2 kg^{-1} gas		Electricity charge @ Rs. 5 unit^{-1}		Labour charge @ Rs. 230 8Hrs^{-1}		Total cost (Rs.)	Cost of basundi kg^{-1}(Rs.)
	Basundi Obtained		Qty (g)	Cost (Rs.)	Qty (g)	Cost (Rs.)	Qty (g)	Cost (Rs.)	Unit (g)	Cost (Rs.)	Qty (g)	Cost (Rs.)		
T1	1000 (485)*	40	50	1.8	-	-	54	2.85	0.40	2	1 hrs	28.75	75.40	155.46
T2	1000 (492)	40	50	1.8	25	0.75	54	2.85	0.40	2	1 hrs	28.75	76.15	154.77
T3	1000 (502)	40	50	1.8	50	1.50	54	2.85	0.40	2	1 hrs	28.75	76.90	153.18
T4	1000 (508)	40	50	1.8	75	2.25	54	2.85	0.40	2	1 hrs	28.75	77.65	152.85

*Quantity of basundi prepared.

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