Full Length Research Paper

Standardization and production of traditional Indian milk product 'Ujani basundi' from Buffalo milk

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A study on the standardization of "Ujani basundi" was carried out by using Buffalo milk. Milk was standardized to 6% fat and 9% SNF. The attempts have been made to study the effect of different levels of sugar (6, 8 and 10% w/w of original milk) and rate of concentration (2.5, 3.0 and 3.5X including sugar) on sensorial and chemical quality of Ujani basundi. The results have indicated that the product prepared with 8% sugar level and 3.0X concentrated had optimum consistency, brown colour, pleasant flavour, with small flakes hence scored highest among all the treatments.

Key words: Ujani basundi, traditional milk product, caramel flavour.

INTRODUCTION

Ujani basundi is the heat desiccated indigenous dairy product of Ujani village located in Latur district of Maharashtra state. The survey was conducted in this region to gather the information about the manufacturing and marketing of this product. According to the two families, that is, Bardapure and Dhawan they are preparing this product since the beginning of 20th century (Gaikwad and Hembade, 2010). Special thing regarding these families and other manufacturing agents in this village is they do not prepare any other dairy product except Ujani basundi. The production of Ujani basundi is confined to hotel owners, which results in variation in its quality attributes. But because of its characteristic taste, appearance, characteristic thickness and attractive brown colour this product becomes an only important and popular dairy product throughout the region.

PRODUCTION STATISTICS

Total Ujani basundi production statistically is presented in Table 5. The production level of Ujani basundi varies with increasing demand during festive seasons throughout the year, that is, the production level increases in Navaratra

due Bhawani goddess in Tuljapur town. This is because Ujani village is located near this religious place, and all pilgrimages round the district and outside the district pay visits to such place by walking only. As Ujani village is located on same route, it resulted in consumption of this famous delicious indigenous product. In festivals such as Deewali, Dashhara and other holidays the production of this product increases in double (Gaikwad et al., 2009).

Increasing popularity of this product resulted in high demand. Having special flavor, body and texture, and appearance, this product has a potential to up grading and standardization. But due to lack of manufacturing technology this product is not produced by the manufacturers in uniform quality; those who are expert in preparing this product, want to keep it as trade secrete. Investigators (Patel and Upadhyay, 2003a, b, c and d) studied the standardization of basundi and not Ujani basundi. This is region specific product, that is, Ujani basundi which is different in its body and texture, color and appearance and flavor from basundi. Therefore, present investigation was undertaken to standardize the product by using the Buffalo milk.

MATERIALS AND METHODS

The standardized buffalo milk Ujani basundi was prepared by the flow diagram given. For the preparation of Ujani basundi, Buffalo milk was procured from local milk producers and standardized

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Table 1. Effect of level of sugar on compositional attributes of Buffalo milk Ujani basundi (3.0X).

Attributes (%)	Level of sugar (%)			CD	SE
	6	8	10		
Moisture	40.98	37.70	33.46	4.620302	2.179388
Fat	17.66	17.97	18.62	0.600856	0.283423
Protein	11.25	10.75	10.25	0.61476	0.289981
Sucrose	28.24	31.62	35.63	4.533575	2.138479
Ash	1.86	1.95	2.03	0.10644	0.050207

3.0X concentration. CD at P<0.05. Mean values are averages of three replications.

according to Pearson's square method described by De (1980) to 6% fat and 9% SNF using Buffalo skim milk. The standardized milk was taken in stainless steel "karahi" and heated over a direct fire. For heating, medium LPG was used. The milk was stirred vigorously and constantly with a circular motion (clockwise) by a "khunti" so as to avoid scorching the milk. As soon as the milk started boiling, constant evaporation of moisture took place. The speed of churning cum scrapping was maintained constantly to evaporate the maximum moisture as soon as possible. When the concentration of milk reached 2:1, the three levels (6, 8 and 10% w/w of milk) of sugar were added. After the addition of sugar the milk was continuously heated, stirred vigorously till the three levels of concentration (2.5, 3.0 and 3.5X the total solids, including sugar) were obtained. After the final concentration the product was transferred to aluminum tray and allowed to cool at room temperature to attain desired body and texture. The samples of Ujani basundi were subjected for chemical analysis. The samples were analyzed for chemical composition, namely Fat, using method as per Indian standards (Sp:18, part XI,1981), Protein by AOAC (2005), Sucrose volumetrically by Lane Eynon Indian standards (Sp:18, Part XI, 1981), Ash Indian standards (Sp:18, Part XI, 1981), and moisture Indian standards (Sp:18, Part XI, 1981).

The product was evaluated by conducting sensory evaluation of panel of 6 semi-trained judges. The flavour (45), body and texture (35), color and appearance (15) and package (5) were assod on 100- point scale using the scorecard of basundi as suggested by Patel and Upadhyay (2003a). The packaging material was not used at the time of sensory evaluation hence maximum points. The manufacturing, chemical analysis and sensorial analysis were repeated three times. Results were analyzed using Factorial Randomized Block Design as per Snedecor and Cochran (1994). Figure 1.

RESULTS AND DISCUSSION

The effect of level of sugar on compositional attributes of Buffalo milk Ujani basundi (3.0X concentration)

Table 1 represents the effect of the level of sugar on chemical composition of various samples. The sample prepared with 10% sugar level showed very low (33.46%) moisture contents than the 6% (40.98%) and 8% (37.70%) sugar level respectively with a critical difference of 4.62. The fat content increased with an increase in sugar level. The sample prepared with 10% sugar level showed highest (18.62%) fat content than 6 and 8% sugar level and these values are significantly different

at 0.5% level. The 6% sugar level showed (17.66%) of fat whereas 8% sugar level showed 17.97% of fat. Fat and sucrose also significantly (P<0.05) increased with increase in sugar level the same results were also reported by Patel and Upadhyay (2003b) and Prajapati et al. (1991).
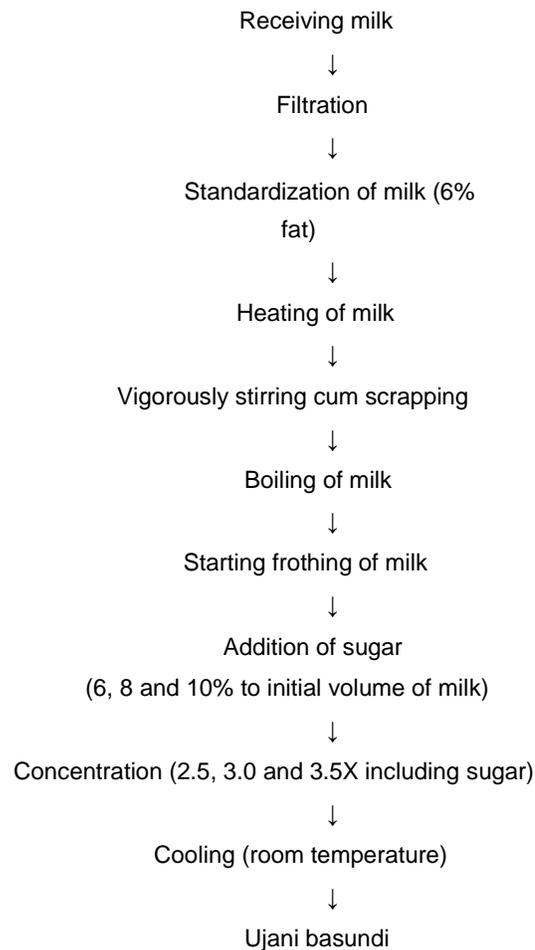
Protein content decreased in all treatments as sugar content increased. The sample prepared with 10% sugar level showed lowest (10.25%) percentage of protein as compared to 6% (11.25%) and 8% (10.75%) of sugar level with a critical difference of 0.61 and these values are not significant at 0.5% level. Sucrose and ash also showed similar trend, that is, as sugar level increases the sucrose and ash contents also increased, trend showed a critical difference of 4.53 and 0.10 respectively, which are not significant at 0.5 levels.

The effect of level of concentration on compositional attributes of Buffalo milk Ujani basundi (8% sugar level)

The Ujani basundi product prepared by three different levels of concentrations, that is, 2.5, 3.0 and 3.5X (original total milk solids, including sugar) for ideal level of concentration of milk to identify the quality product on the basis of physico-chemical properties of Ujani basundi. Table 2 represents the effect of the level of concentration on chemical composition of various samples. All the mean values of attributes (fat, sucrose and ash) significantly (P<0.05) increased with the increase in level of sugar concentration. Moisture contents more significantly (P<0.05) decreased as concentration of sugar increased. The protein, moisture, fat and sucrose contents significantly (P<0.05) increased with increase in concentration. However ash contents did not show any significant increased level in all treatments. The result obtained corroborates with that of Patel and Upadhyay (2003a, b).

The effect of level of sugar on sensory quality of Buffalo milk Ujani basundi (3.0 X concentrations)

The results of sensory evaluation of 2.5X concentrated

Receiving milk

↓

Filtration

↓

Standardization of milk (6%
fat)

↓

Heating of milk

↓

Vigorously stirring cum scrapping

↓

Boiling of milk

↓

Starting frothing of milk

↓

Addition of sugar
(6, 8 and 10% to initial volume of milk)

↓

Concentration (2.5, 3.0 and 3.5X including sugar)

↓

Cooling (room temperature)

↓

Ujani basundi

Figure 1. Flow diagram of product manufacture.

Table 2. Effect of level of concentration on compositional attributes of Buffalo milk Ujani basundi (8% sugar level).

Attributes (%)	Level of concentration (%)			CD	SE
	2.5X	3X	3.5X		
Moisture	44.62	37.70	31.74	7.896904	3.724955
Fat	15.80	17.96	19.28	2.151001	1.014623
Protein	9.50	10.75	12.24	1.679132	0.792043
Sucrose	28.28	31.62	34.65	3.902472	1.840788
Ash	1.78	1.95	2.08	0.182631	0.086147

8% sugar. CD at $P<0.05$. Mean values are averages of three replications.

Buffalo milk Ujani basundi samples made from the three different levels of sugar are shown in Table 3. From the table, it could be seen that flavor score was significantly ($P<0.05$) affected with increase in level of sugar. As the level of sugar increased the score also increased. Higher sugar might be accepted by judges due to developed taste of this popular product. The product prepared with 6% sugar level got lowest score due low sweetness and the product prepared with 8% sugar level got higher score. Patel and Upadhyay (2003a), Sen and Rajorhia (1991) also reported the same findings regarding cow milk basundi. The body and texture score decreased with increase in sugar level and it might be due to increased sugar level which affect the original body and texture hence the panelists gave low score as the sugar level increased above 8%. The highest scores in all the sensory attributes were awarded to the Ujani basundi sample prepared with 8% sugar. Levels of sugar addition

Table 3. Effect of level of sugar on sensory quality of Buffalo milk Ujani basundi (3.0X concentration).

Attributes (%)	Level of sugar (%)			CD	SE
	6	8	10		
Flavor (45)	31.33	36	39.33	4.924375	2.322818
Body and texture (35)	25.67	30	31.67	3.795402	1.790284
Color and appearance (15)	11	12.33	13.33	1.434527	0.676664

3.0X concentration. CD at P<0.05. Mean values are averages of three replications. The figures in the parenthesis indicate maximum score.

Table 4. Effect of level of concentration on sensory quality of Buffalo milk Ujani basundi (8% sugar level).

Attributes	Level of concentration (%)			CD	SE
	2.5X	3X	3.5X		
Flavor (45)	30.667	40.667	28.667	7.878435	3.716243
Body and texture (35)	29.333	31	28	1.841929	0.868834
Color and appearance (15)	12	13	12	0.707504	0.333728

8% sugar level. CD at <0.05.Mean values are averages of three replications. Figures in parenthesis indicate maximum score.

Table 5. Production statistics of Ujani basundi.

Unit	Values
No. of production units	20
Daily output in production units	275 kg
Monthly output In production units	8250 kg
Total annual output (approximately)	99000 kg
Value of output (annually)	Rs.99, 000,00

did not affect the color and appearance therefore panelists have given nearly equal score to all Ujani basundi samples. The product prepared with 6% of sugar had less viscous than the 8 and 10% of sugar level of samples. However the score awarded to the body and texture, and color and appearance was not statistically significant at P<0.05 level.

The effect of level of concentration on sensory quality of Buffalo milk Ujani basundi (8% sugar level)

The effect of level of concentration on organoleptic quality of Ujani basundi is depicted in Table 4. The milk was concentrated to 2.5, 3.0 and 3.5X (original milk solids including sugar) with 8% sugar level. It can be seen that color and appearance of all treatments were not significantly (P<0.05) affected with increase in concentration hence panelists have given nearly similar score to all these treatments. The product made with 3.0X concentration got highest score and it might be due to optimum browning whereas 2.5X got low score due to dull color of final product. The product made with 3.5X concentrations had more brownish color therefore got lowest score than the 2.5 and 3.0X concentrations. The

flavor score significantly (P<0.05) increased till the 3.0X then decreased. It might be due to the fact that the product was concentrated to 3.5X had more viscous and pronounced flavor which is not matched with traditional product hence scored low. The product made with 3.5X was more viscous and did not have optimum consistency with small soft flakes hence scored lowest for body and texture. Out of the three levels of concentrations studied, 3.0X total solids (including sugar) gave a product of highest flavor score with optimum viscous and brown color development. The lower the concentration (2.5X) of milk, the lower will be the brown color.

Conclusion

The best Ujani basundi product with optimum consistency and optimum sweet with characteristic brown colour can be prepared by using the standardized Buffalo milk with 6% fat and 9% SNF by adding the 8% sugar and concentrating to 3.0X to its original total solids including sugar.

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