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Effect of Different Level of Ash Gourd Pulp for Manufacturing Dietetic *Kulfi*

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ABSTRACT

In the new millennium we are witnessing the upward trend in nutritional and health awareness which has increased the consumers demand for functional foods. An investigation was made with an attempt to develop a quality *Kulfi* by addition of different levels (5%, 10%, 15%) of ash gourd pulp. For control, *Kulfi* mix was standardized to 10% milk fat, 15% sugar, 0.2% stabilizer to obtain 37% total solids and treatment (T_1) was standardized to 10% fat, 15% sugar, 0.2% stabilizer, 5% ash gourd pulp. (T_2) was standardized to 10% fat, 15% sugar, 0.2% stabilizer, 10% ash gourd pulp. (T_3) was standardized to 10% fat, 15% sugar, 0.2% stabilizer, 15% ash gourd pulp. Samples were treated for chemical analysis (fat, total solids, acidity, protein, moisture, ash) and organoleptic characteristics (flavour and taste, body and texture, colour and appearance)was evaluated by trained panelist using 9 point hedonic scale. The highest value was observed in treatment (T_3) containing 15% level of ash gourd pulp. In microbiological analysis the best treatment was (T_2) for shelf life through the results of SPC and coliform tests.Thus, for overall acceptability the treatment can be rated as $T_0 > T_1 > T_2 > T_3$.

Key words *Buffalo milk, ash gourd, Kulfi.*

Kulfi is a frozen dairy product made by suitable blending and processing of SMP and other milk products, together with sugar and flavour, with or without stabilizer or colour. It is a popular frozen dessert from the Indian subcontinent. It has a distinctive taste due to caramelizationof sugar during the lengthy cooking process. A typical composition range for the components used in the *kulfi* mix is milk fat 10-16%, milk solids not fat 9-12%, Sucrose 9-12%, Corn syrup solids 4-6%, Stabilizers/ emulsifiers 0-0.5%, total solids 36-45% and water 55-64%(Sharma, 2010). Ash gourd is a nutritive vegetable with many medicinal values used in many drinks and dishes. It is a natural healer. It is used to heal summer fevers, obesity because it is low in calorie and it prevents sugar into fats. It also helps in boasting memory and other ailments. Being low in calorie it is good for weight control. It is usually sweetened with caramelized sugar which enhances the taste.

MATERIALS AND METHODS

The *kulfi* was prepared following the standard procedure of Salooja, *et al.*, 1982 and Pinto, 2010. 1kg of whole milk with 6% fat and 9%MSNF was placed in a steel pan with a wood plunger and heated by placing pan in the container containing water (double jacketed vat arrangement) over direct fire. The milk was condensed to (2:1) ratio. Calculated amount of liquid ingredients and dry ingredients like sugar, stabilizer was added as per the requirements in the treatments T_1, T_2 and T_3. Then the mix was held at 68°C for 30 minutes to fulfill the P.F.A requirement of pasteurization and cooled to 42°C and ash gourd pulp was added at different ratios (5%, 10% and 15%). Then the mix was cooled to 5°C and other ingredients such as cashew nuts were added. The mix was subsequently frozen in a batch freezer and transferred into *Kulfi* moulds and hardened at -20°C overnight. The samples were analyzed for physicochemical, microbial and organoleptic qualities as per procedure laid down by ICAR manual in Dairy chemistry and microbiology, 1972.

RESULTS AND DISCUSSION

The data collected on different aspects as per plan were tabulated and statistically analyzed as per Chandel, 1991. Table 1 showed average data on different parameters.

Physicochemical properties:

The highest mean for protein percentage in ash gourd *kulfi* was T_3=3.87, T_2(3.86), T_1(3.82) and T_0(3.51). The differences between the treatments were significant. The highest mean for fat percentage was found in T_3=10.06,T_2(10.04), T_1(10.02) and T_0(10.00).The differences were non-significant. The highest mean for ash percentage was found in T_3=0.96,T_2(0.94), T_1(0.92) and T_0(0.75). There were significant differences found between the treatments. The highest mean for acidity percentage was found in T_3=0.35,T_2(0.27), T_1(0.27) and T_0(0.26). There were no significant differences found between the treatments. The highest mean percentage for total solids was found in T_3=38.58,T_2(38.12), T_1(37.95) and T_0(37.51). The treatments differed significantly. The highest mean for moisture percentage was found in T_0=62.58, T_1(62.05), T_2(61.87) and T_3(61.41). There were significant differences between the treatments.

Table 1. Average of different physicochemical parameters.

Parameters(%)	Treatments			
	T_0	T_1	T_2	T_3
Protein	3.51	3.82	3.86	3.87
Fat	10.00	10.02	10.04	10.06
Ash	0.75	0.92	0.94	0.96
Acidity	0.26	0.27	0.27	0.35
Total Solids	37.51	37.95	38.12	38.58
Moisture	62.48	62.05	61.87	61.41

Table 2 showed the highest mean value for standard plate count was in T_3(26.60), T_1(23.80), T_0(21.80) and T_2(17.00). There were no significant differences found between the treatments. There were no coliform found in all the treatments, thus indicated proper hygiene was followed during manufacture.

Table 2. Microbial Parameters

Parameters	Treatments			
	T_0	T_1	T_2	T_3
SPC (10^3)cfu/g	21.80	23.80	17.00	26.80
Coliform	Nil	Nil	Nil	Nil

Table 3 showed that the highest mean value for colour and appearance was found in T_0=8.05, T_1(7.85), T_3(7.55) and T_2(7.50). There were no significant differences found among the treatments. The highest mean value for body and texture was found in T_0=7.95, T_2(7.75), T_1(7.60) and T_3(7.25). There were significant differences found between the treatments. The highest mean value for flavour and taste was found in T_0=8.00, T_1(7.80), T_2(7.55) and T_3(7.20). The treatments differed significantly. The highest mean value for melting resistance was found in T_3(25.20), T_2(22.80), T_1(20.20) and T_0(17.80). There were significant differences found between the treatments.

Table 3. Organoleptic Parameters

Parameters	Treatments			
	T_0	T_1	T_2	T_3
Colour and Appearance	8.05	7.85	7.50	7.55
Body and Texture	7.95	7..60	7.75	7.25
Flavour and Taste	8.00	7.80	7.55	7.20
Melting resistance	17.80	20.20	22.80	25.20

Overall acceptability of the product:

Table 4 and Fig.1 showed the highest mean value for overall acceptability of the product was found in T_0=7.99, T_1(7.74), T_2(7.64) and T_3(7.31). The treatments differed significantly, thus showed the popularity of the product.

The results from the statistical analysis revealed that the ash gourd kulfi made from whole milk + 15% sugar + 5% ash gourd pulp wasfound to be best among all the treatments. Product quality further enhanced by extra protein content and the product was economic.

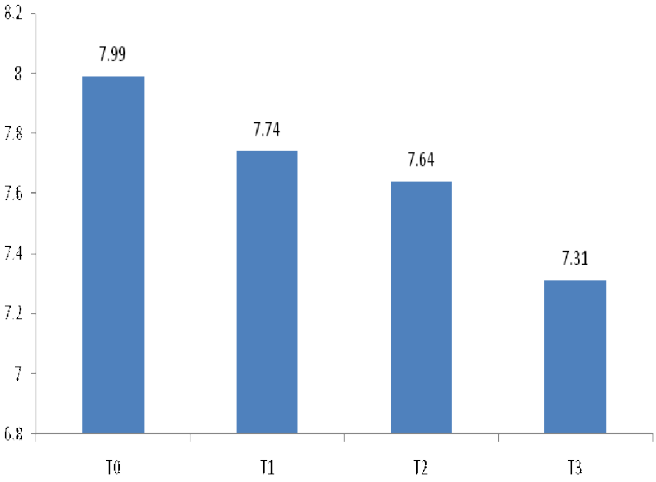

Fig. 1. The average score of overall acceptability for control & experimental ash gourd *kulfi*

Table 4. Overall acceptability of the product

Replication	Treatments			
	T_0	T_1	T_2	T_3
R_1	8.33	7.91	8.06	7.74
R_2	8.08	7.83	7.91	7.73
R_3	7.83	8.08	7.66	7.16
R_4	7.66	7.24	7.08	7.24
R_5	8.07	7.66	7.49	7.08
Mean	7.99	7.74	7.64	7.31

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