International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(6): 2522-2524
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Received: 11-09-2020
Accepted: 16-10-2020

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Study on Physico-chemical properties of Kulfi prepared by using betel vine leaves extract

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DOI: https://doi.org/10.22271/chemi.2020.v8.i6aj.11150

Abstract

Kulfi is 500 years old popular frozen dessert of Indian origin and it occupies a privilege position among the traditional Indian dairy products. Due to its palatability and comparatively low cost, *kulfi* is popular in many parts of country. The present study was carried out with incorporation of betel vine leaves extract at 10, 15, 20 per cent levels represented as T_1, T_2, T_3 respectively and T_0 is control without incorporation of betel vine leaves extract. The prepared betel vine *kulfi* was subjected to physicochemical analysis such as total soilds, fat, protein, total sugar, ash, titratable acidity. *Kulfi* prepared with 15 per cent betel vine leaves extract was found superior over rest of the treatments.

Keywords: Betel vine leaves extract, milk, *kulfi*

Introduction

Milk is an ideal food for both infant and adults. It has been regarded as best alternative to build nourishing diet. It is a rich source of fat, protein, carbohydrates, vitamins, etc. It has been regarded as best alternative to build nourishing diet. Among indigenous frozen milk products, *kulfi* is widely accepted and has demand next to ice-cream. It is produced by concentrating whole milk to about two folds followed by addition of sugar and freezing it in aluminium or plastic moulds, usually of conical shape. It has distinctive taste due to caramelization of lactose and sugar during the lengthy heating process.

Betel *(Piper betle* L) is a leaf of a vine belonging to the *piperaceae* family and is a perennial climber cultivated for its leaf. It is valued as mild simulant and for its medicinal properties. It also has immense social, religious and export value. In fact, no Hindu religious ceremony is complete without pan. Betel leaves are mostly consumed in Asia and other parts of world by some Asian emigrants. Betel leaves are beneficial to the throat and remove viscidity in human beings. The juice of betel leaves is used as an adjunct to pills administered in the Ayurvedic medicines. The fresh crushed leaves are used as antiseptic for cuts and wounds. It is also useful for treatment of mastitis, leucorrhoea, ringworm, swelling of gums. It is used as folk medicine for cut, injuries, headache, constipation, itches. It neutralizes the acidity and acts as blood purifier. Main constituents of betel leaves are vitamin B and C, carotene, and other elements.

Material and Methods

For preparation of *kulfi* incorporated with betel vine leaves extract, buffalo milk was received from Dairy farm, College of Agriculture, Dapoli, whereas as betel vine leaves were purchased from Horticulture farm, College of Agriculture, Dapoli. Amul fresh cream and sugar were purchased from the local market. The betel vine *kulfi* was prepared as per the procedure given by Sukumar De with minor modification.

The fresh good quality buffalo milk was pre-heated to 35-40 ^{0}C for 5 minutes and filtered through two fold muslin cloth. The milk was concentrated to 50% of original volume with continous stirring. Sugar was added @ 12% of volume of unsweetened condensed milk and cream added @ 14 % of volume of unsweetened condensed milk. Betel vine extract was added as per treatment i.e, @ 0, 10, 15 and 20% of kulfi mix. Ageing of mix was done at 6-7 °C for 2-3 hours. The mix was transfer to *kulfi* cones and hardened at -18 to -20 °C for overnight.

Receiving of milk
↓
Pre-heating
(35 to 40 °C/5 minutes)
↓
Filtration
(Two fold muslin cloth)
↓
Consentration
(50% of Oringinal volume)
↓
Adition of sugar
(12% of volume of unsweetened condensed milk)
↓
Addition of cream
(14% of volume of unsweetened condensed milk)
↓
Addition of betel vine leaves extract as per treatment
↓
Ageing of mix (6-7 °C for 2-3 hours)
↓
Transfering of mix to *kulfi* cones and freezing (0-5 °C)
↓
Hardening
(-18 to -20°C overnight)
↓
Betel vine *kulfi*

Fig 1: Flow chart for betel vine *kulfi* preparation

The total solids and protein content of milk and betel vine *kulfi* were determined as per IS: 1479 (part-II), 1961 [6]. The fat content of milk and betel vine *kulfi* was determined by using standard Gerber method as per IS: 1224 (part-I), 1977 [7]. The acidity of milk and betel vine *kulfi* was estimated according to IS: 1479, (part–I), 1960 [5]. The ash content of milk and betel vine *kulfi* was determined as per the procedure given in A.O.A.C. (1975) [1]. The lactose content of milk and betel vine *kulfi* was estimated by Lane Eyon method prescribed in ISI Handbook (1981). The data were statistically analyzed according to Snedecor and Cochran (1994) [12] using randomized block design.

Results and Discussion

The chemical analysis indicated that the buffalo milk used for betel vine *kulfi* preparation had average 15.72 per cent total solids, 6.33 per cent fat, 15, 3.65 per cent protein, total sugar 4.9 per cent, 0.13 per cent acidity, and 0.78 per cent ash. All these values lie within the range of legal standards for buffalo milk as described by PFA rules, 1976 cited by De (1983). The results are furnished in Table 2 and graphically presented in fig. No.1.

Chemical analysis of betel vine *kulfi*

Total solid content

The total solids content of betel vine *kulfi* shows significant decrease with increase in level of betel vine leaves extract with values of 37.14, 35.81, 35.22 and 34.67 per cent at 0, 10, 15 and 20 per cent level of betel vine leaves extract, respectively. This was obviously due to addition of 12 per cent sugar and 14 per cent cream. With addition of cream and sugar the total solid content of *kulfi* mix was increased to 37.14 per cent, however with the addition of betel vine leaves extract in *kulfi* mix there was addition of total solid content ranging from 9.55g (T_1) to 19.11g (T_3) in *kulfi* mix with increase in the weight of kulfi mix ranging from 50g. (T_1) to 100 g. (T_3). Hence, with addition of betel vine leaves extract there was reduction in per cent total solids of *kulfi*.

Fat content

The average values of fat for 0, 10, 15 and 20 per cent level of betel vine leaves extract were 12.30, 11.43, 11.06 and 10.67 per cent respectively. As the level of betel vine leaves extract increased, the fat content of *kulfi* decreased significantly. The highest fat content was observed at T_0 (12.30 per cent) i.e. betel vine *kulfi* without addition of betel vine leaves extract and lowest fat content was observed at T_3 (10.67 per cent).

Protein content

Protein content of betel vine *kulfi* decreased significantly with the increase of betel vine extract. The average values for 0, 10, 15 and 20 per cent level of betel vine leaves *kulfi* were 5.84, 5.54, 5.46 and 5.38 per cent respectively. However protein content lie within the legal permissible limits. The *kulfi* without addition of betel vine extract contained highest 5.84 per cent protein and lowest protein content was observed at T_3 (5.38 per cent).

The protein content of base material i.e. unsweetened condensed milk was 6.95, whereas protein content of cream is very negligible as it contains 2 per cent protein. When betel vine leaves extract was added in *kulfi* mix there was addition of protein content ranging from about 1.5g (T_1) to 3.1g (T_3) in *kulfi* mix. Simultaneously, there was increase in the weight (mass) of *kulfi* mix ranging from 50g. (T_1) to 100g. (T_3). Hence, with addition of betel vine leaves extract there was reduction in per cent protein of *kulfi*.

Total sugars

The total sugar content of betel vine *kulfi* decreased significantly with increase in the level of betel vine leaves extract. The average values for 0, 10, 15 and 20 per cent level of betel vine leaves extract were 17.02, 5.80, 15.26 and 14.75 per cent respectively. The *kulfi* without addition of betel vine extract contained highest 17.02 per cent protein and lowest protein content was observed at T_3 (14.75 per cent).

Ash content

The perusal of data revealed that the ash content of betel vine *kulfi* decreased non-significantly with increase in the level of betel vine leaves extract. The average ash content of betel vine *kulfi* for 0, 10, 15 and 20 per cent level of betel vine leaves extract were 1.36, 1.16, 1.12 and 1.08 per cent respectively.

Titratable acidity

The titratable acidity content of betel vine *kulfi* increased significantly with increase in the level of betel vine leaves extract. The average values for 0, 10, 15 and 20 per cent level of betel vine leaves extract were 0.207, 0.208, 0.209, 0.210 per cent respectively.

Conclusion

The results of present investigation concluded that betel vine leaves extract can be successfully utilized for manufacturing of *kulfi*. All the compositional values decreased and such decrease was significant for total solids, fat, total sugar and titratable acidity. As *Piper betle* has many medicinal importance it can used in preparation of *kulfi* and other dairy products.

Table 1: Average chemical quality of buffalo milk (%)

Sr. No.	Constituents	Buffalo Milk
1	Total solid	15.72
2	Fat	6.33
3	Protein	3.65
4	Total sugars	4.9
5	Ash	0.78
6	Titratable acidity	0.13

Table 2: Average chemical quality of betel vine *kulfi* (%)

Levels of Betel vine leaves extract (%)	Constituents					
	Total solid	Fat	Protein	Total sugars	Ash	Titratable acidity
0	37.14	12.30	5.84	17.02	1.36	0.207
10	35.81	11.43	5.54	15.80	1.16	0.208
15	35.22	11.06	5.46	15.26	1.12	0.209
20	34.67	10.67	5.38	14.75	1.08	0.210
SE±	0.134595	0.088832	0.097802	0.119206	0.068363	0.000096
CD	0.405716	0.267768	0.294806	0.359325	0.206068	0.000290

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