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Effect of addition of strawberry pulp on physicochemical attributes of Kulfi

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Abstract

The study was conducted on the topic "Effect of Addition of Strawberry Pulp on physicochemical Attributes of Kulfi". The different levels of Strawberry Pulp 10, 15, 20 and 25 percent were tried in buffalo milk Kulfi. The product obtained was subjected for organoleptic evaluation by panel of judges. It was observed that the flavour score for treatment T0, T1, T2, T3 and T4 was 8.16, 8.25, 8.48, 8.18 and 7.90 respectively. Colour and Appearance was 8.51, 8.44, 8.57, 8.23 and 7.69, respectively. Body and texture was 8.24, 8.42, 8.58, 8.22 and 7.90, respectively. Overall acceptability score was 8.30, 8.37, 8.53 and 8.18 and 7.82 respectively for T0, T1, T2, T3 and T4. It was clear that the level of 15 Strawberry Pulp have highest overall acceptability.

Keywords: Sensory analysis, Kulfi, strawberry pulp and completely randomized block design

Introduction

Kulfi is traditional frozen dessert in South Asia, sometimes referred to as "Indian ice cream". It is popular in India, Myanmar, Pakistan and Bangladesh, as well as the Middle East. It can be found in Indian restaurants around the world. *Kulfi* is an indigenous frozen dairy product popular in India and which resembles ice-cream. *Kulfi* is originating in the Indian subcontinent during the Mughal era in the 16th Century. It is often described as traditional Indian ice-cream. It is famous in Bangladesh, Myanmar, Nepal, Sri Lanka. The present investigation on "Utilization of strawberry pulp in preparation of *kulfi*" was undertaken during 2021-2022 at the Department of Animal Husbandry and Dairy Science, College of Agriculture, Vasantrya Naik Marathwada Krushi Vidyapeeth, Parbhani, Maharashtra. Sensory evaluation of the product was carried out by the panel of experts for the parameters, color and appearance, body and texture, flavor, and overall acceptability by using 9 points hedonic scale. Result revealed that the blended with 15 percent strawberry pulp scored highest score for all sensory attributed as *Kulfi* compared to control as well as *kulfi* blended with 10 percent, 20 percent and 25 percent strawberry pulp. Hence considering the benefits of supplementation of strawberry pulp in the diet; concerning its nutritional, medicinal value, and technological properties. It is decided to study the effect of the addition of strawberry pulp on the sensory attributes of *Kulfi*.

Materials and Methods

Treatment combinations

For preparation of *kulfi*, strawberry pulp is tried in different levels and compare with control /the treatment combinations used were as detailed below.

To: 100 parts concentrated buffalo milk (control)

T1: 90 parts of concentrated buffalo milk + 10 parts of strawberry pulp

T2: 85 parts of concentrated buffalo milk + 15 parts of strawberry pulp

T3: 80 parts of concentrated buffalo milk + 20 parts of strawberry pulp

T4: 75 parts of concentrated buffalo milk + 25 parts of strawberry pulp

Experimental Methodology

Prior to preparation of strawberry pulp first removal of leaves then strawberry fruit will be washed with clean water. The slices will be cut with the help of knife and finally it was converted in homogenous mass by putting into mixer.

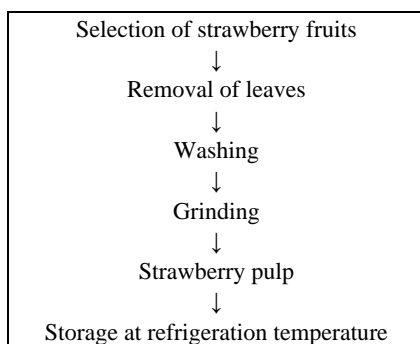


Fig 1: Preparation of strawberry pulp

Kulfi was prepared by using the method described by Kale A.B, (2011) with slight modifications [3].

Flow chart showing preparation of *kulfi*

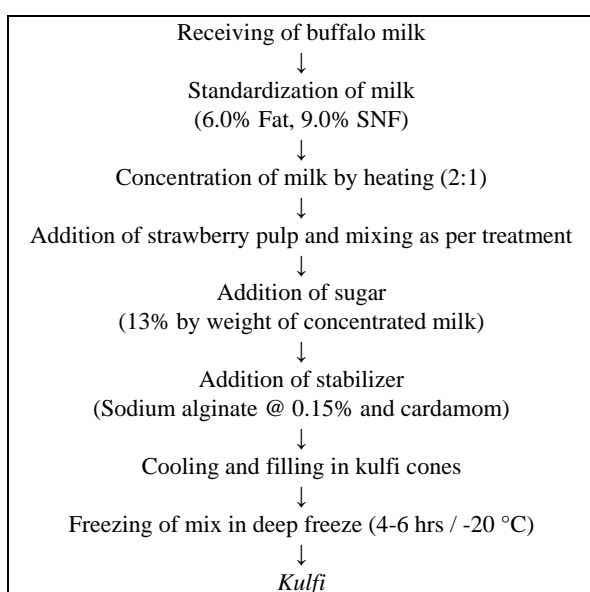


Fig 2: Preparation of *kulfi*

Chemical Analysis

The Strawberry pulp *kulfi* were chemically analyzed for moisture as per the procedure described by ISI: 2785 (1964) [8], fat by ISI: 1224 (part II) (1977) [6], ash by ISI: 1547 (1985) [4], total solids estimated as per the procedure described in ISI: (1981) [11].

Results and Discussion

Proximate chemical analysis of strawberry pulp *kulfi*

Strawberry pulp *kulfi* sample prepared under each treatment were analysed for moisture, fat, protein, total solid, ash, acidity and pH. The results are depicted in following tables.

Table 1: Effect of various levels of Strawberry pulp on organoleptic evaluation of *Kulfi*

Constituents	Treatments				
	T1	T2	T3	T4	T5
Moisture	59.05	60.00	60.53	61.20	61.65
Fat	11.12	9.95	9.55	9.26	9.05
Protein	4.00	3.86	3.79	3.73	3.67
Total solid	38.75	37.93	37.50	37.00	36.43
Ash	1.05	0.91	0.85	0.80	0.73
Acidity	0.24	0.35	0.39	0.42	0.46
pH	6.63	6.50	6.35	6.18	5.74

1. Moisture content of strawberry pulp *kulfi*

Moisture content in strawberry pulp *kulfi* under different treatment combinations was determined. Moisture affects various biochemical and microbiological activities which directly influences the shelf life of the *kulfi*. The results obtained to moisture content of control *kulfi* (T0) and *kulfi* prepared from different level of strawberry pulp viz. 10, 15, 20 and 25 percent (T1, T2, T3 and T4) are presented in Table 1. It is seen from table 1 that the moisture content of *kulfi* are lowest for treatment T0 and it increased gradually to T4. The moisture content for treatment T0, T1, T2, T3 and T4 were 59.05, 60.00, 60.53, 61.20 and 61.65 percent respectively. As level of strawberry pulp increased in *kulfi*, the moisture content in *kulfi* also decreased. This might be due to high moisture content in strawberry pulp. The maximum moisture content in *kulfi* was observed for treatment T5 (61.65) and minimum moisture content observed for control sample (without strawberry pulp) was 59.05%.

These results are in agreement with previous research work of Shelke (2007) who reported the added levels of mango pulp in *kalakand* and *burfi* increased the level of moisture in final product respectively [12].

2. Fat content of strawberry pulp *kulfi*

It was observed from table 1 that the fat content of *kulfi* was significantly affected due to addition of strawberry pulp. The average fat content was significantly highest for treatment T0 (11.12 percent) and it decreased gradually to T4 (9.05 percent). The fat content for treatment T0, T1, T2, T3 and T4 were 11.12, 9.95, 9.55, 9.26 and 9.05 percent respectively. From the table 4.6, it also seen as the level of the strawberry pulp increases the fat content in the *kulfi* decrease. The results obtained are in analogous with Thikare (2020) *kalakand* blended with strawberry pulp. The fat content of *kalakand* blended with 5, 10, 15 and 20% strawberry pulp were 20.11, 19.22, 18.04 and 17.14% respectively [14].

3. Protein content of strawberry pulp *kulfi*

It may be apparent from table 1 that the protein content of *kulfi* was significantly affected due to addition of strawberry pulp. The average protein content was significantly highest for treatment T0 (4.00 percent) and it decreased gradually to treatment T4 (3.67 percent). The protein content for treatment T0, T1, T2, T3 and T4 were 4.00, 3.86, 3.79, 3.73 and 3.67 percent respectively. As strawberry pulp level increased, protein content in *kulfi* decreased and vice-versa.

This might be due to the less protein content of strawberry pulp. The results obtained are in analogous with Patel (2020) examined that the development of *kulfi* included with *amaranthus* (Rajgara). The results indicated that the treatment, T1, T2, T3, T4 and T5 contain protein content found in range from 3.60 to 4.02 percent [12].

4. Total solid content of strawberry pulp *kulfi*

It may be apparent from table 1 that the total solid content of *kulfi* was significantly affected due to addition of strawberry pulp. The maximum total solid content in treatment T0 (38.75 percent), whereas minimum in treatment T4 (36.43 percent). The total solid content for treatment T0, T1, T2, T3 and T4 were 38.75, 37.93, 37.50, 37.00 and 36.43 percent respectively. It is indicated that as the strawberry pulp level increased, total solid content in *kulfi* decreased. This might be due to high moisture content in strawberry pulp.

Kale (2011) also reported the similar trend of decrease in total solid content of *kulfi* with addition of mango pulp. The total solid content of *kulfi* with 5, 10, 15% mango pulp were 34.80, 33.92 and 33.01 respectively^[3].

5. Ash content of strawberry pulp *kulfi*

It is apparent from table 1 that the ash content of *kulfi* was significantly affected due to addition of strawberry pulp. The maximum ash content in treatment T0 (1.05 percent), whereas minimum in treatment T4 (0.73 percent). The ash content for treatment T0, T1, T2, T3 and T4 were 1.05, 0.91, 0.85, 0.80 and 0.73 percent respectively. It is indicated that as the strawberry pulp level increased, ash content in *kulfi* decreased. This might be due to low total solid content in *kulfi*.

Kale (2011) reported the ash content of *kulfi* incorporated with 5, 10, 15% mango pulp were 0.68, 0.66 and 0.65 respectively^[3].

6. Titrable Acidity content of strawberry pulp *kulfi*

It is apparent from table 1 that the acidity content of *kulfi* are significantly affected due to addition of strawberry pulp. The maximum acidity content was founded in treatment T4 (0.46 percent), while minimum in treatment T0 (0.24 percent). The acidity content of treatment T0, T1, T2, T3 and T4 were 0.24, 0.35, 0.39, 0.42 and 0.46 percent respectively. There was significantly increase in the acidity content of *kulfi* due to increase in the level of strawberry pulp.

Kale (2011) also reported the titrable acidity of *kulfi* blended with 5, 10, 15% mango pulp were 0.26, 0.27 and 0.27% respectively^[3].

7. pH content of strawberry pulp *kulfi*

It may be apparent from table 1 that the pH content of *kulfi* was significantly affected due to addition of strawberry pulp. The maximum pH content for treatment T0 (6.63) while minimum pH content in treatment T4 (6.74). The pH content for treatment T0, T1, T2, T3 and T4 were 6.63, 6.50, 6.35, 6.18 and 5.74, respectively. It is indicated that as the strawberry pulp level increased, pH content in *kulfi* decreased. This might be due to higher pH content in strawberry pulp as compare to control *kulfi*.

Kale (2011) also reported the pH content of *kulfi* blended with mango pulp @ 5, 10, 15% were 6.37, 6.30 and 6.24 respectively^[3].

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