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Formulation and Proximate Analysis of Milk Based Sweet Incorporated with Dragon Fruit Pulp

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Abstract

A experiment was conducted in Department of Food Process Engineering, Vaugh Institute of Agricultural Engineering & Technology, SHUATS, Prayagraj during 2020-21 with an investigation on burfi was prepared from different combinations of khoa prepared with buffalo milk and dragon fruit (Selenicereusundatus) pulp as 100:00,90:10, 80:20, 70:30 and 96:40 and the samples were subjected to sensory evaluation, chemical analysis and physical analysis. The ingredient of burfi i.e., khoa was prepared from milk, the dragon fruit pulp and khoa was mixed with different level and heated upto appearing dough stage. Then 30 per cent sugar was added and mixed properly. Then heating the mix till solidification and burfi was prepared. For sensory evaluation the results revealed that overall acceptability scores of developed burfi obtained 8.6. The burfi prepared from various combinations up to 70 per cent buffalo milk khoa and 30 per cent dragon fruit pulp was found overall acceptable. In reference to treatment 70 per cent of khoa and 30 per cent of dragon fruit pulp chemical analysis was found that, moisture, fat, protein, total sugar, ash, total solids, SNF (solid not fat), Titratable acidity, pH was 29.88, 17.11, 17.58, 44.75, 2.28, 76.62, 62.91, 0.71, 5.81.

Keywords: *Dragon fruit (Selenicereusundatus), Burfi, Physico-chemical analysis*

Introduction

The dragon fruit's scientific name is derived from the Greek word hyle (woody), the Latin word cereus (waxen) and the Latin word undatus, which refers to the wavy edges of its stems. The origin of the dragon fruit is unknown, but it is probably native to Central America. It is also known as pitahaya in Mexico, and pitaya roja in Central America and northern South America. The dragon fruit (*Selenicereusundatus*) is a tropical fruit that belongs to the climbing cacti (Cactaceae) family. Widely cultivated in Vietnam, the fruit is popular in Southeast Asia. Apart from being refreshing and tasty, it has been noted that the dragon fruit is a rich source of vitamin C, calcium and phosphorus.

Dragon fruit have been utilized in the preparation of candy, jam, jelly and variety of milk based products. These indicate that there is tremendous scope for milk product prepared from dragon fruit which increase nutritive value of product.Health benefits of Dragon fruit are also rich in flavonoids that act against cardio related problems, also dragon fruit aids to treat bleeding problems of vaginal discharge. Dragon fruit is also helpful in reducing blood sugar levels in people suffering from type 2 diabetes, studies suggest that the glucose found in Dragon fruit helps in controlling the blood sugar level for diabetes patients. It contains high level of phosphorus and calcium. It helps to reinforce bones and play an important role in tissue formation and forms healthy

teeth[6].

Burfi is one of the most popular khoa based sweet, prepared from cow or buffalo milk. Burfi is prepared by heating the mixture of khoa and sugar to a near homogenous consistency followed by cooling and cutting it into small cuboids. At first buffalo milk was purchased and strained to check the presence of foreign material.Khoa was prepared[1]. Several varieties of burfi are available in the market such as plain or mawa / khoa burfi, fruit and nut cashew burfi, chocolate, saffron and rava burfi. Burfi sold commercially varies widely in colour, body texture, Sweetness and flavour characteristics[7]. Although the Bureau of Indian Standards has laid down a standard for chemical and microbiological quality of milk burfi, there is a need for generating data on optimizing processing and quality of milk burfi[3, 8].

India is the world's largest and fastest-growing country for milk and milk products. The value addition and variety in the availability of milk products are on everybody's agenda There is an increasing demand for new products and processes The total milk production of India is 1555 million tons, out of which 44% is consumed as liquid milk and about 50 to 56 % of the total milk produced in India is converted into traditional milk products such as paneer, dahi, khoa, etc, while share of the khoa is about 7% out of total milk production. Per capita availability of milk is about 337 gm per day.

Material and Methods

The detail of the materials and methods used for an investigation of "Formulation and Proximate Analysis Milk Based Indian Sweet Incorporated with Dragon Fruit Pulp"are given below:

Buffalo milk

Fresh, clean, composite samples of buffalo milk from the local market. The milk was strained through a clean muslin cloth before using further for the preparation of burfi.

Dragon fruits

Fully ripened dragon fruits were procured from the mundera mandi Prayagraj and used in the present investigation of preparation of burfi.

Sugar

Sugar purchased from local market of Prayagraj.

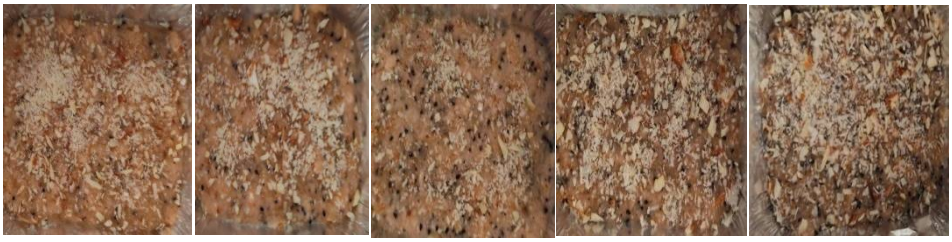
Cardamom powder, Almonds, Pistachios

Cardamom powder, Almonds, Pistachios purchased from local market of Prayagraj.

Different standardization trials were conducted to develop burfi from dragon fruit pulp. Five sample treatments were conducted as mentioned in Table 1 and in figure 1 showed the picture of different treatment of developed burfi.

Table 1 Experimental plan for dragon fruit pulp incorporated burfi

Sr. no	Sample no	Dragon fruit pulp %	Khoa %
1	$\mathbf{T_1}$	00	100
2	$\mathbf{T_2}$	10	90
3	$\mathbf{T_3}$	20	80
4	$\mathbf{T_4}$	30	70
5	$\mathbf{T_5}$	40	60



T_1 T_2 T_3 T_4 T_5

Fig 1: Different treatments of Developed burfi

The burfi was prepared by using standard method. The burfi obtained were subjected to physico- chemical and sensory analysis for selecting the optimized level of dragon fruit pulp.

Fig.2 showed the process flow chart of dragon fruit pulp incorporated burfi.

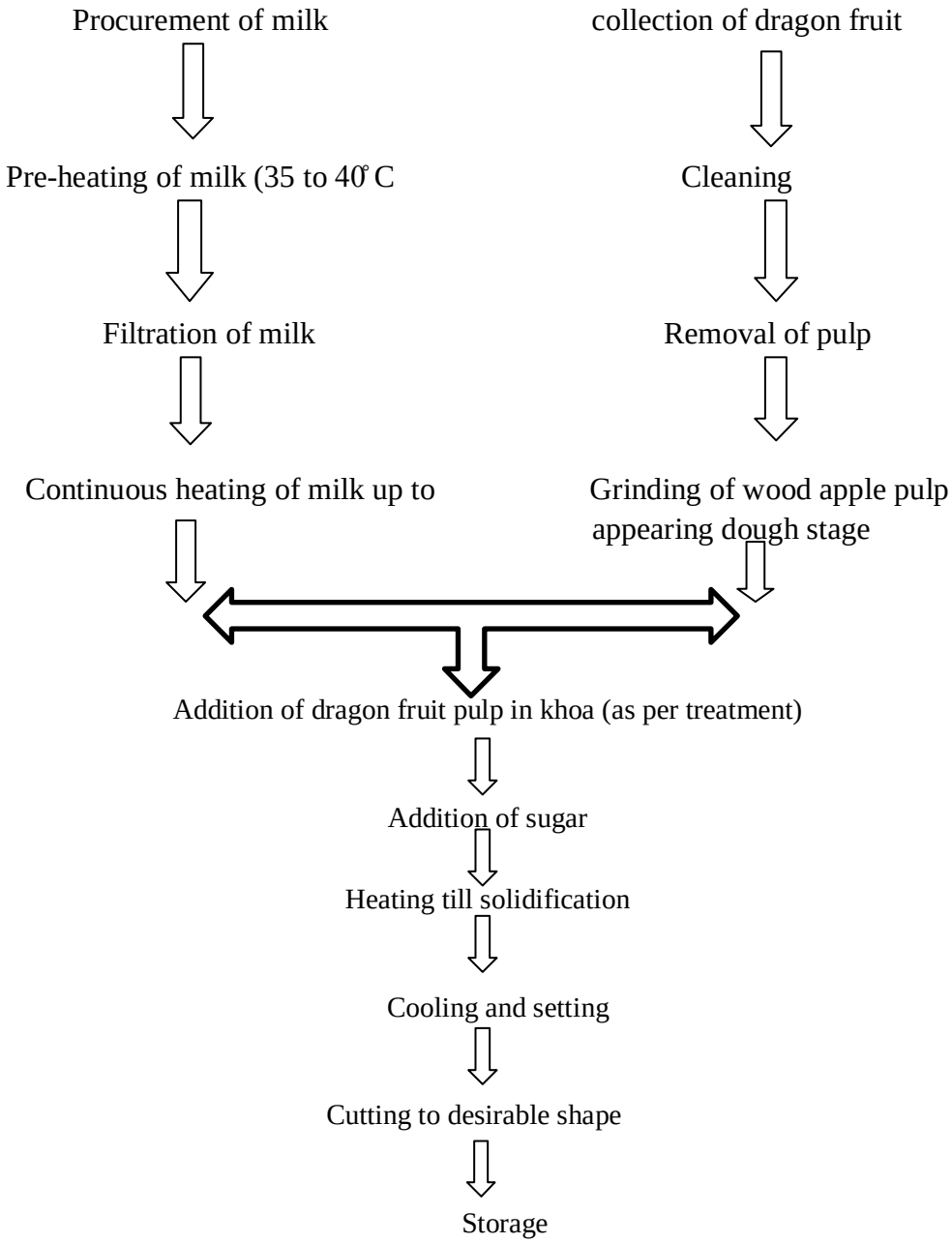


Fig 2 Process flow chart of dragon fruit pulp incorporated burfi

Results and Discussion

The investigation was subjected to identified the physico-chemical and sensory analysis composition such as length, width, thickness, weight, moisture, fat, protein, total sugar, ash, total solids, solid not fat, acidity, and pH was determined. Sensory evaluation viz., flavor, consistency, colour and appearance and overall acceptability and cost of developed burfi with different treatment combination.

Physical Analysis

Physical analysis of burfi is important as an objective judgment of quality. Physical analysis of burfi is important as an objective judgment of quality. The data regarding means for effect of various treatments on length of burfi shown in Table 2 depicted that khoa 100 percent and dragon fruit pulp 00 per cent exhibits minimum Length 4.51 cm, while maximum Length 4.56 cm was observed in treatment 60 per cent khoa and 40 per cent dragon fruit.

The data regarding means for effect of various treatments on width of burfi shown in Table 2 depicted that khoa 100 percent and dragon fruit pulp 00 per cent exhibits maximum width 3.50cm, followed by khoa 90 percent and dragon fruit pulp 10 per cent (3.53 cm) while minimum width (3.47 cm) was observed in khoa 90 percent and dragon fruit pulp 10 per cent.

The data regarding means for effect of various treatments on thickness of burfi shown in Table 2. The thickness of biscuit prepared from different treatment ranged from 1.30 to 1.19 cm. The result elucidated that T_1 has maximum thickness1.30 cm while minimum thickness was observed in treatment T_5 (1.19 cm).

The data regarding means for effect of various treatments on thickness of burfi shown in Table 2. The weight of burfi prepared from different treatment ranged from 35.43 to 35.29 gm. The result elucidated that T_1 has maximum gram 35.43 gm while minimum weight was observed in treatment T_5 (35.29).

Table 2 Mean score for Physical analysis

Treatment	Length (cm)	Width (cm)	Thickness (cm)	Weight (gm)
T_1	4.51	3.50	1.30	35.43
T_2	4.52	3.52	1.29	35.41
T_3	4.53	3.55	1.27	35.45
T_4	4.55	3.58	1.24	35.42
T_5	4.56	3.61	1.19	35.40

Chemical analysis

It was revealed from table 3 that, the average moisture content of burfi was 19.00, 21.98, 25.41, 29.88, and 34.40 in treatment T_1, T_2, T_3, T_4, and T_5 respectively. The moisture content in burfi significantly increased with increase in the level of dragon fruit pulp for the preparation of dragon fruit pulp burfi[4]. The increase in different levels of pineapple pulp increases the moisture percentage in burfi.

The mean ash content in burfi was significantly affected due to the addition of dragon fruit pulp at different level. The ash

per cent was significantly highest (3.11 per cent) in burfi prepared without addition dragon fruit pulp (T_1) while, ash content was lowest (2.07 per cent) in burfi prepared with addition of 40 per cent dragon fruit pulp (T_5). It was concluded that the average ash content in burfi was significantly decreased with addition of pineapple pulp[2].

The average fat content in the burfi was significantly affected due to addition of dragon fruit pulp. The fat content in burfi without addition of dragon fruit pulp T_1 (20.77%) was the highest over all the treatments, and lowest fat content observed 16.79 per cent in T_5. Fat content in burfi was decreased with increase the proportion of dragon fruit pulp in the burfi preparation. This is might be due to low fat content in dragon fruit pulp. **Tawade (2015)** reported fat content in stevia liquid burfi.

The protein content in dragon fruit burfi ranges from 15.29 to 18.43. The burfi (T_1) without addition of dragon fruit pulp was significantly highest protein content (15.29 %), while burfi with 40 per cent dragon fruit pulp was highest (18.43%) protein content in treatment T_5. The significant difference was observed between the treatments. This effect is might be due to more protein in dragon fruit pulp[4].

The highest per cent of total sugar was noticed in burfi T_5 prepared with 40% Dragon fruit pulp and 60% buffalo milk khoa and the lowest level of total sugar was noticed in control burfi T_1. Treatment T_5 is significantly superior to the other treatments. This is might be due to total sugar present in dragon fruit pulp. **Patil (2015)** reported that increased in the dried date powder in burfi results increases in the total sugar content in the burfi.

The total solids content of burfi affected by addition of different levels of dragon fruit pulp in the proportion i.e. decrease in the total solids per cent in burfi. It was observed that, the treatment differences were significant at 10 per cent level of significance. Indicating that, there was decrease in total solids content in burfi as increases in level of dragon fruit pulp in burfi preparation[2].

The average Titrable acidity per cent in the burfi was significantly affected due to addition of dragon fruit pulp. The acidity content significantly highest was noticed in treatment T_5 (0.78%) with addition of 40 per cent dragon fruit pulp and lowest acidity percent was observed in control T_1, treatment (0.29%). The acidity of pineapple burfi was significantly increased with the increasing the level of pineapple pulp in the burfi[2].

The highest level of solid not fat was noticed in burfi T_4 (30%) and the lowest level of solids not fat was noticed in control burfi T_1. The present result was contrast with the result of **Dhande (2014)** reported that the SNF content of fresh ash gourd burfi increased with level of ash gourd pulp in the burfi.

From Table 4, it was revealed that the average pH percent in the burfi was significantly affected due to addition of dragon fruit pulp in burfi preparation. It is observed the pH of control sample to be 5.37 and the treated sample having pH .it is observed that the pH of burfi significantly decreased with the increase in doda concentration in the burfi[2].

Table 3 Chemical composition of developed dragon fruit pulp burfi

Treatment	Moisture (%)	Ash (%)	Fat (%)	Protein (%)	Total sugar (%)	Total solid (%)	Titrable Acidity	SNF	pH
T_1	19.00	3.11	20.77	15.29	30.03	82.44	0.29	61.67	5.05
T_2	21.98	2.73	19.73	15.43	36.64	80.26	0.54	62.54	5.28
T_3	25.41	2.46	18.59	16.54	40.50	78.43	0.64	62.89	5.51
T_4	29.88	2.28	17.11	17.58	44.75	76.62	0.71	62.91	5.81
T_5	34.99	2.07	16.79	18.43	48.84	73.81	0.78	62.83	6.00

Sensory analysis of Burfi

Sensory analysis is carried out by using experienced panelists to measure sensory characteristics like senses of sight, smell, taste, touch and acceptability of food product. Mean score for sensory evaluation of biscuit presented in Table 5.

Color is very important parameter not only in judging that burfi was properly prepared but also provides information about the formulation and quality of the product. The mean score of color had been decline from 8.1 to 7.Taste is the primary factor which determines the acceptability of any product, which has the highest impact on market success of product. The mean score of color had been decline from 8.3 to 7.5.

The mean score of flavor was mentioned in table 5 which indicated that the lowest score value was observed in the burfi prepared from buffalo milk khoa, also the highest score was recorded in treatment T4, which was prepared from buffalo milk khoa and dragon fruit pulp in proportion of 70:30. **Patil et al., (2015)** reported the sensory scores, burfi prepared with 15% dried date scored highest score for flavour whereas lowest score was 10% dried date blended burfi.

Appearance score of burfi in treatment T_4 (8.40) was highest over rest of the treatments, Burfi prepared with 30% dragon fruit pulp and 70% buffalo milk khoa had medium brownish colour compared with the T_1, T_2, T_3 and T_5[4]. The overall acceptability was like extremely 8.6 in T_4 than the other treatmentT_1, T_2, T_3, and T_5. This is might be due to addition of dragon fruit pulp proportionately in burfi preparation.

Table 5 Mean score for sensory evaluation of burfi

Treatment	Colour	Taste	Flavour	Texture	Appearance	Overall acceptability
T_1	7.2	7.5	6.6	8.6	7.6	6.8
T_2	7.5	7.9	6.8	8.5	7.9	7.6
T_3	7.8	8.0	7.4	8.2	8.2	8.0
T_4	8.1	8.3	9.0	7.9	8.4	8.6
T_5	7.9	7.8	7.4	7.6	6.2	7.4

Conclusion

From the result obtained during present investigation, following conclusions were drawn; Good quality burfi can be prepared on the basis of sensory evaluation by using 30 per cent dragon fruit pulp and 70 per cent khoa with pleasant flavour, light brownish colour and also the overall acceptability.

Burfi prepared with the addition of 30 per cent dragon fruit pulp was found superior over the rest of the treatments. The Physico-chemical composition of burfi i.e. fat, protein, total solids, solid not fat, pH and ash per cent was decreased whereas, moisture, total sugar and acidity increased with increase in the level of dragon fruit pulp. The cost of burfi decreased with the increase in the level of dragon fruit pulp.

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