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Studies on preparation of Shrikhand by using dragon fruit pulp

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Abstract

The upward trend in nutritional and health awareness has increased the consumer demand for fermented foods. The investigation was made with an attempt to develop dragon fruit pulp Shrikhand. Milk for control and treatment was standardized to 4.5% fat, 8.5% SNF, 25% sugar in treatments dragon fruit pulp was added at the rate of 3%, 6% and 9% respectively. Significant difference was found within control and treatment on chemical analysis fat, protein, carbohydrate, moisture, total solids, acidity percentage due to addition of dragon fruit pulp. Organoleptic analysis for attributes like colour and appearance, Consistency, Flavour and taste, over all acceptability were judged using 9 point hedonic scale by trained panelist revealed that treatment with 6% dragon fruit pulp scored the maximum in most of the attributes. The micro biological analysis revealed that strict hygienic condition was maintained as the coliform count was found nil. All these attributes satisfied with the (FSSAI) standards. Thus treatment can be rated as $T_2 > T_0 > T_1 > T_3$.

Keywords: Standard milk, Shrikhand, dragon fruit pulp, sugar

Introduction

Shrikhand is one of the important fermented milk products which derive its name from the Sanskrit word "Shikharani" meaning a curd prepared with added sugar, flavouring agents (cardamom and Saffron), fruits and nuts. It is popular in western part, especially in Maharashtra, Gujarat and Karnataka. Shrikhand is known for its high nutritive, characteristic flavour, taste, palatable nature and possible therapeutic value. It is very refreshing particularly during summer months. It can be recommended as health food for specific patients suffering from obesity and cardiovascular disease due to its low fat and sugar contents. (Ramprasad More *et al.* 2017) [6].

Dragon fruit (*Hylocereus spp.*) is a promising tropical fruit which can be cultivated in different tropical and subtropical parts of the world such as Southeast Asia, and Central and South America. The demand for dragon fruit extensively increases and the fruit today can be found on almost all exotic fruit markets around the world. This success can be partly explained by the fruit qualities, e.g. appearance, nutritional values and health benefits. Besides being consumed fresh, dragon fruit can also be processed into, juice and puree. Dragon fruit and its products may be used as ingredients for innovative food products that respond to consumers' interest (Le Bellec *et al.*, 2006; Sabbe *et al.*, 2009) [5]. The palatability Shrikhand and goodness of dragon fruit pulp can be combined to form dragon fruit pulp Shrikhand keeping the above in mind and effort was made by in addition of dragon fruit pulp in different ratio and evaluate its effect on Organoleptic, microbiological and physico-chemical quality to arrive at the best combination by using suitable statistical tools.

Materials and methods

Standardized milk (4.5% fat/ 8.5% MSNF) was heated to 63 °C for 30 min. and cooled to 35 °C curd was prepared using (ZAH1-1) culture which was added in milk. The inoculated at 35-40 °C till desire acidity in the dahi (0.6-0.9% LA) was obtained. Dragon fruit and sugar was obtained from the local market in Allahabad, the research work was carried out in student training dairy of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad, U.P. (India). Four treatment were studied each replicated five time were studied.

Preparation of Shrikhand

Fresh sweet good quality standardized milk (4.5% and 8.5% MSNF) and was converted to Shrikhand as follows. The standardized milk was heated to 63 °C for 30 minutes; it was cooled to 35 °C. And then inoculated by lactic starter culture @ of 2% and incubated, at 35-40 °C for 5 to 6 hours until a firm coagulum (Dahi) was formed. The Dahi, so formed was broken and transferred to muslin cloth and hanged for 16 hours, for drainage of whey the coagulum so obtained is called chakka, was mixed with 25% sugar and dragon fruit pulp was mixed in chakka, as per the treatment 3%, 6% & 9% to obtain the final product dragon fruit pulp Shrikhand.

Physico- chemical analysis

Moisture was determined by procedure described in IS: 1010 (1968). Fat was determined as per the procedure described in IS: 2311 (1963). In this method, the sample is treated with ammonia to dissolve the proteins and ethyl alcohol to help precipitate the proteins. Thereafter, the fat is extracted with diethyl ether and petroleum ether. The mixed ethers are then evaporated and the residue weighed. Total nitrogen/protein of Shrikhand was determined by Semi Micro Kjeldahl method (IS:1479 Part II,1961). Ash content of all the samples was determined by procedure described in IS:1547 (1985). The acidity of Shrikhand was obtained by method described in BIS (IS: 1166 1968) for condensed milk. Carbohydrate content was calculated by differential method (AOAC, 1980).

Microbiological analysis

The yeast and mold count (YMC) was determined as per the procedure described in IS: 5403 (1969) using Potato Dextrose Agar (PDA) and coliform count by the methods as described in IS: 5550 (2005) and (FSSAI 2017) respectively.

Sensory evaluation

Sensory evaluation of Shrikhand samples were carried out by a trained panel of six judges of the institute by using 9- point hedonic scale described by Lim (2011). Colour and

appearance, body and texture, flavor, consistency and overall acceptability sensory parameter were include for study.

Statistical analysis

The data obtained during different phases of this study was analyzed using Randomized Block Design. The experiment was designed and responses were analyzed using software Design Expert Version 8.0.10.

Result and discussion

Different label of dragon fruit pulp was studied for feasibility and suitability for use in Shrikhand.

Sensory evaluation of Control and dragon fruit pulp Shrikhand

Colour and Appearance

The highest mean score for colour and appearance in dragon fruit pulp Shrikhand (8.4) was obtained from T₂ followed the treatment by T₀ (7.8), T₁ (7.2). The minimum score (7.00) was obtained in T₃. There were significant differences found among the treatments. F Value was 4.80, indicating significant effect of treatment on colour and appearance.

Flavour and Taste

The highest mean score for flavour and taste in dragon fruit pulp Shrikhand (8.164) was obtained from the treatment T₂ followed by T₀ (7.562), T₁ (7.294). The minimum score (6.896) was obtained in T₃. There were significant differences found among the treatments. F Value was 6.14, indicating significant effect of treatment on flavour and taste.

Body and Texture

The highest mean score for body and texture in dragon fruit pulp Shrikhand (7.9) was obtained from the treatment T₂ followed by T₀ (7.6), T₁ (7.3). The minimum score (6.6) was obtained in T₃. There were significant differences found among the treatments. F Value was 3.84, indicating significant effect of treatment on body and texture.

Table 1: Sensory evaluation of dragon fruit pulp Shrikhand

Parameters	Scores/ values based on mean value of different parameters of treatments				F Value	CD
	T ₀	T ₁	T ₂	T ₃		
Color & appearance	7.8	7.2	8.4	7	4.80*	0.89
Flavor	7.562	7.294	8.164	6.896	6.14*	0.66
Body and texture	7.6	7.3	7.9	6.6	3.84*	0.88
Overall acceptability	7.562	7.294	8.164	6.896	6.14*	0.31

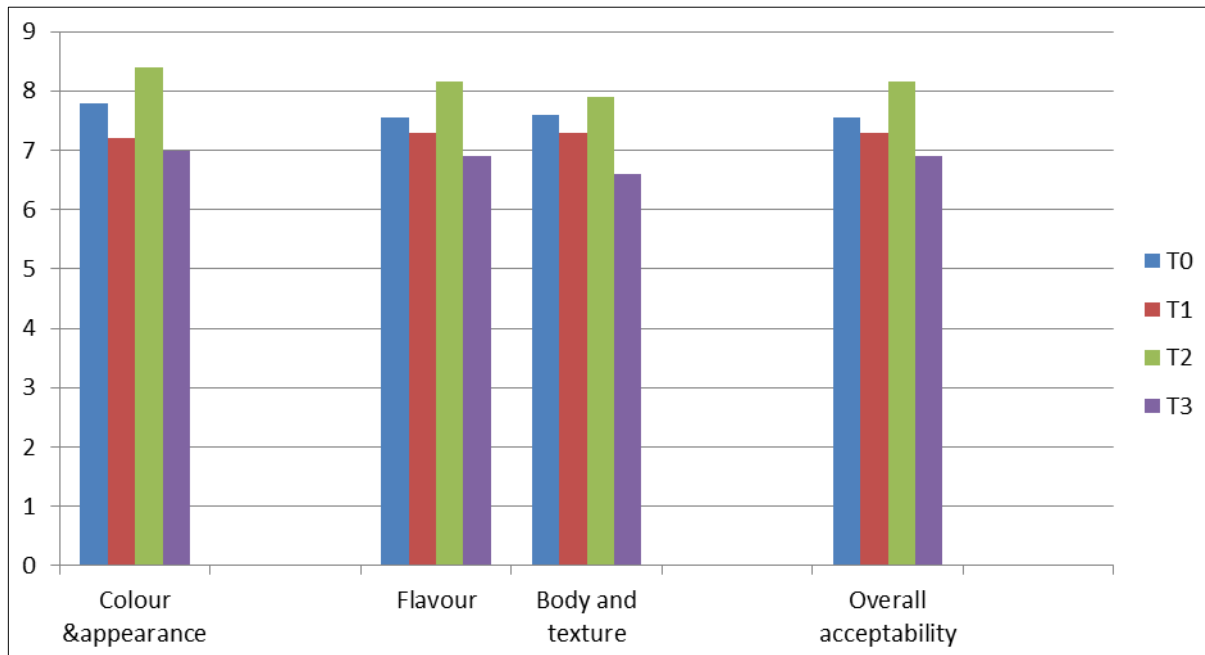
* Significant at 5% level

** Non- Significant at 5% level

Overall Acceptability

The highest mean score for overall acceptability in dragon fruit pulp Shrikhand (8.164) was obtained for the treatment T₂ followed by T₀ (7.562), T₁ (7.294). The minimum score

(6.896) was obtained in T₃. There were significant differences found among the treatments. F Value was 6.14, indicating significant effect of treatment on overall acceptability.



Physico-chemical quality of Control and dragon fruit pulp Shrikhand

Fat percentage

The highest mean value for fat percentage in dragon fruit pulp Shrikhand (11.2) was obtained from the treatment T₀ (control) followed by T₁ (10.86), T₂ (10.52). The minimum score (10.19) was obtained in T₃. There were significant differences found among the treatments. F Value was 447.15, indicating significant effect of treatment on fat percentage.

Protein percentage

The highest mean value for protein percentage in dragon fruit pulp Shrikhand (9.1) was obtained from the treatment T₀ (control) followed by T₁ (8.87), T₂ (8.64). The minimum score (8.41) was obtained in T₃. There were significant differences found among the treatments. F Value was 187.26, indicating significant effect of treatment on protein percentage.

Moisture percentage

The highest mean value for moisture percentage in dragon fruit pulp Shrikhand (46.52) was obtained from the treatment T₃ followed by T₂ (45.25), T₁ (43.98). The minimum score (42.7) was obtained in T₀ (control). There were significant

differences found among the treatments. F Value was 1462.58, indicating significant effect of treatment on moisture percentage.

Carbohydrates

The highest mean value for carbohydrates percentage in dragon fruit pulp Shrikhand (35.33) was obtained from the treatment T₀ (control) followed by T₁ (34.62), T₂ (33.96). The minimum score (33.29) was obtained in T₃. There were significant differences found among the treatments. F Value was 1610.51, indicating significant effect of treatment on Carbohydrate percentage.

Ash percentage

The highest mean value for ash percentage in dragon fruit Shrikhand (1.7) was obtained from the treatment T₀ (control) followed by T₁ (1.66), T₂ (1.63). The minimum score (1.59) was obtained in T₃. There were significant differences found among the treatments. F Value was 27.37, indicating significant effect of treatment on ash percentage.

Table 2: Physico-chemical qualities of dragon fruit pulp Shrikhand control and experiments.

Parameters%	Scores/ values based on mean value of different parameters of treatments				F Value	CD Values
	T ₀	T ₁	T ₂	T ₃		
Fat	11.2	10.86	10.52	10.19	447.15*	0.06
Protein	9.1	8.87	8.64	8.41	187.26*	0.07
Moisture	42.7	43.98	45.25	46.52	1462.58*	0.13
Carbohydrate	35.33	34.62	33.96	33.29	1610.51*	0.07
Ash	1.7	1.66	1.63	1.59	27.37*	0.03
Total solids	57.33	56.02	54.75	53.48	1242.34*	0.14
T. Acidity#	0.93	1.08	1.19	1.26	93.77*	0.05

* Significant at 5% level

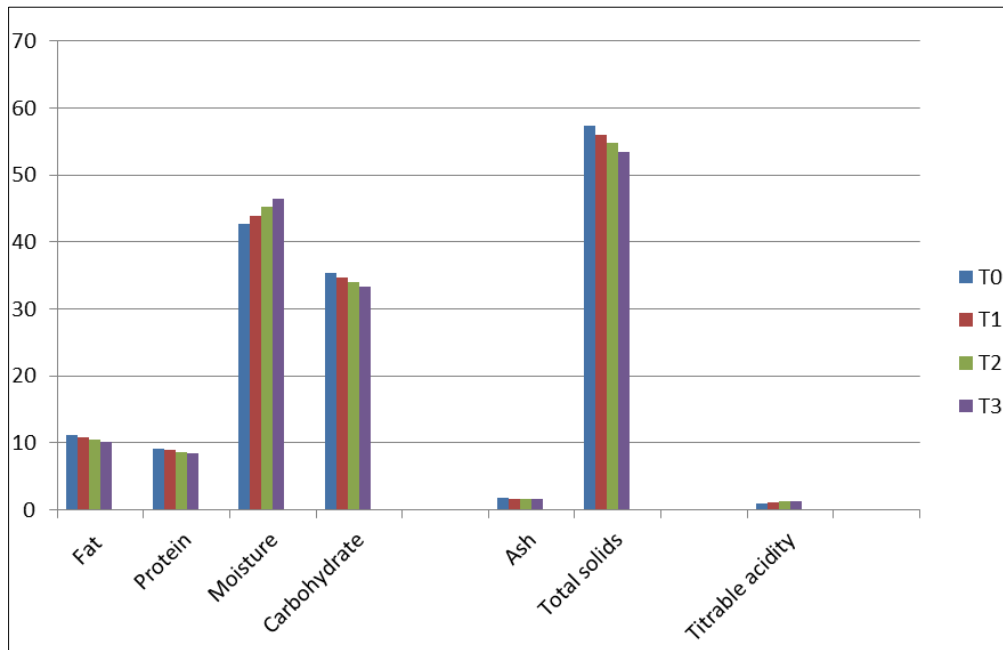
** Non- Significant at 5% level

As per lactic acid.

Total Solids percentage

The highest mean value for total solids percentage in dragon fruit Shrikhand (57.33) was obtained from the treatment T₀ (control) followed by T₁ (56.02), T₂ (54.75). The minimum

score (53.48) was obtained in T₃. There were significant differences found among the treatments. F Value was 1242.34, indicating significant effect of treatment on total solids percentage.



Titrate acidity percentage

The highest mean value for titrate acidity percentage in dragon fruit Shrikhand (1.26) was obtained from the treatment T₃ followed by T₂ (1.19), T₁ (1.08). The minimum score (0.93) was obtained in T₀ (control). There were significant differences found among the treatments. F Value was 93.77, indicating significant effect of treatment on titrate acidity percentage.

Average of microbial analysis of Control and dragon fruit pulp Shrikhand

Table shows Average of microbial analysis of control and

dragon fruit pulp Shrikhand. The highest mean score for yeast and moulds in dragon fruit Shrikhand (8.20) was obtained from the treatment T₃ followed by T₂ (7.8), T₁ (7.2) the minimum score (6.2) was obtained in T₀ (control). There were significant differences found among the treatments. F Value was 5.10, indicating significant effect of treatment on yeast and mould count.

None of the samples of dragon fruit pulp Shrikhand showed presence of the coliforms at 0 day. Which indicates, proper hygienic conditions were maintained during the preparation and storage of the product.

Table 3: Microbiological analysis

Parameters	Scores/ values based on mean value of different parameters of treatments				F Value	CD
	T ₀	T ₁	T ₂	T ₃		
Yeast & mould (cfu/gm)	6.2	7.2	7.8	8.2	5.10*	1.19
Coliform count (10 ¹ /ml)	Nil	Nil	Nil	Nil	-	Nil

* Significant at 5% level

** Non- Significant at 5% level

Conclusion

It may be concluded that good quality, value added Shrikhand with more acceptability can be prepared by addition of dragon fruit pulp. The treatment containing 6% dragon fruit pulp was most acceptable in terms of sensory score however the treatment containing 3% & 9% dragon fruit pulp also obtained satisfactory results as they were within the acceptable limit.

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