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Full Length Research Paper

Sensory analysis of banana blended shrikhand

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Shrikhand is a popular Indian dessert prepared by fermentation of milk. It has a semi-soft consistency and is sweetish sour in taste. Fresh Curd (dahi) prepared was partially strained through a cloth to remove the whey and produce a solid mass called chakka. Chakka was finely mixed with sugar and flavouring agents, to give a sweetish-sour taste. Shrikhand was prepared from dahi with a constant level of sugar (40%) and supplementing with banana pulp at 10% (T_1), 20% (T_2) and 30% (T_3). T_0 served as control with no supplementation, sensory analysis showed a significant difference in different sensory attributes of T_2 sample with the rest of the treatments. T_2 (20%) supplementation of banana pulp to shrikhand was much preferred. Total solids of T_2 were 59.96 ± 0.35. Storage of 20% supplemented shrikhand showed no significant difference in sensory attributes up to 14 days.

Key word: Fruit shrikhand, banana shrikhand, value based shrikhand.

INTRODUCTION

The increasing demand from consumers for dairy products with 'functional' properties is a key factor driving value sales growth in developed markets. This has led to the promotion of added-value products such as probiotic and other functional yoghurts, reduced-fat and enriched milk products, fermented dairy drinks, and organic cheese (Rudrello, 2004). Present day consumers prefer foods that promote good health and prevent diseases. Furthermore, these foods must fit into current lifestyles providing convenience of use, good flavour and an acceptable price value ratio. Such foods constitute current and future waves in the evolution of the food development cycle (Chandan, 1999).

Since time immemorial, a significant proportion of milk has been used in India for preparing a wide variety of dairy delicacies, an unending array of sweets and other specialties from different regions of the country. In the process, the basic limitation of milk and its perishable nature has been tastefully overcome. It's processing aims is to extend the shelf-life of milk, while converting it into mouth-watering tit-bits. Thus, diverse methods to prepare as well as preserve milk products have been developed. An estimated 50 to 55% of the milk produced in India is converted into a variety of traditional milk products, using processes such as coagulation (heat and/or acid), desiccation and fermentation.

In Indian households, the life of milk is extended from 12 to 24 h by repeated boiling. It is preserved by souring with the aid of lactic cultures, which imparts an acid taste, particularly refreshing in hot climate. Dairy products are likely to remain as important dietary components because of their nutritional value, flavor, and texture. There will be a continuous demand for traditional, high quality dairy products, despite increasing competition from non-dairy based products (Rathore et al., 2007).

Shrikhand is a popular Indian dessert prepared by the fermentation of milk. It has a semi-soft consistency and a sweet and sour taste. Shrikhand originated in Persia

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Table 1. Sensory evaluation of shrikhand blended with different levels of banana pulp[@].

Treatment	Sensory parameter				
	Colour and appearance	Body and texture	Sweetness	Flavour	Overall acceptability
T_0	7.50 ± 0.22^{a}	7.00 ± 0.01^{a}	8.00 ± 0.03^{NS}	7.83 ± 0.16^{a}	8.00 ± 0.01^{a}
T_1	7.16 ± 0.16^{a}	7.50 ± 0.22^{a}	8.00 ± 0.01^{NS}	7.66 ± 0.21^{a}	8.00 ± 0.02^{a}
T_2	8.66 ± 0.21^{b}	8.50 ± 0.22^{b}	8.00 ± 0.01^{NS}	8.66 ± 0.21^{b}	8.66 ± 0.21^{b}
T_3	7.50 ± 0.22^{a}	7.33 ± 0.21^{a}	8.00 ± 0.02^{NS}	7.50 ± 0.22^{a}	8.16 ± 0.16^{a}

Values with different superscript differ significantly ($P < 0.01$); [@] values are averages of 6 trials; [NS]Non significant.

using Frasi-shir (milk) and khand (sugar), and was later brought to the shores of Gujarat by the Parsi Zohrastrian settlers.

Fresh curd (dahi) is partially strained through a cloth to remove the whey and produce a solid mass called chakka. Chakka is finely mixed with sugar and flavouring agents, giving a sweetish-sour taste. Typically shrikhand constitutes 39.0% moisture and 61.0% of total solids of which 10.0% is fat, 11.5% is proteins, 78.0% is carbohydrates and 0.5% is ash, on a dry matter basis with a pH of about 4.2 to 4.4 (Boghra and Mathur, 2000; Kulkarni et al., 2006).

Some workers have attempted to improve the sensory and nutritive characteristics of Shrikhand by adding fruit pulp. Nigam et al. (2009) have studied the effect of papaya pulp on the quality characteristics of Shrikhand.

The present investigation was undertaken to explore the possibility of the use of banana pulp in shrikhand to produce a novel fermented milk product and assess its sensory attributes during its storage.

MATERIALS AND METHODS

Shrikhand was prepared by adopting the method of Sunil et al. (2011).

Preparation of shrikhand

Fresh milk was procured from the dairy plant at the Madras Veterinary College, Chennai, Tamil Nadu, India with 3.5% fat and 8.5% Solid not fat (SNF). Dahi was procured from local market and used as culture. Milk was boiled and then cooled down at 28 to 30°C and inoculated with dahi at the rate of 1.5% and incubated at 30 to 32°C for 10 to 12 h until a firm coagulum was formed. Coagulum was then crushed and transferred to a double muslin cloth and hung for expulsion of whey for 8 to 10 h in refrigerated conditions (4 ± 1°C). The semi solid chakka obtained after drainage of whey was used as the base for shrikhand. The level of sugar was adjusted at 40%. The sugar was powdered and kneaded uniformly with the chakka. Shrikhand was prepared by supplementing different levels of banana pulp viz. 10, 20, and 30% to chakka. Shrikhand prepared without banana pulp served as control and was compared with the treatments.

The sensory evaluation of the product was carried for attributes, namely colour and appearance, flavour, body and texture, sweetness and the overall acceptability of fresh shrikhand and samples stored up to 14 days by a panel of trained members based on a 9-point hedonic scale, wherein 9 denoted "extremely desirable" and 1 denoted extremely undesirable. The product was cooled to 4 ± 1°C coded and served cold to the panelists.

The scores for qualitative data such as colour and appearance, flavour, body and texture, sweetness, and the overall acceptability given by different judges were tabulated. The total solid content of the different treatment samples was determined by the method described in IS 2802 (Part II), 1964 by ISI and compared. The data thus obtained was analyzed as per one way ANOVA by Snedecor and Cochran (1994).

Storage studies

On the basis of various sensory parameters, shrikhand containing 20% banana pulp was selected as optimum. The optimum product was further packed in polystyrene cups and stored under refrigerated conditions at 4 ± 1°C for a period of two weeks.

RESULTS AND DISCUSSION

Sensory attributes

The mean values of various sensory parameters of shrikhand containing 0, 10, 20 and 30% of banana pulp are presented in Table 1.

Sensory evaluation of shrikhand

Colour and appearance

It is revealed from Table 1 that, the colour and appearance of shrikhand was significantly ($P < 0.01$) affected due to blending of banana pulp. The average score for colour and appearance attributes of shrikhand in different treatments and control viz. T_0, T_1, T_2, and T_3 were 7.50, 7.16, 8.66, and 7.50 respectively. The average score for colour and appearance attributes of shrikhand was highest in 20% T_2 (8.66) and lowest in control T_0 (7.50). Sunil et al. (2011) observed that, there was a decline in the trend in appearance score with increase in apple pulp, though the decline was not significant. Gavane et al. (2010) reported that, the scores for colour and appearance were highest with 2% supplementation of custard apple pulp to shrikhand.

Table 2. Total Solids content of the shrikhand blended with Banana pulp at different levels[@].

Treatment	Total solids (%)
T_0	57.98 ± 0.23^{a}
T_1	58.40 ± 0.18^{a}
T_2	59.96 ± 0.35^{b}
T_3	60.41 ± 0.71^{b}

Values with different superscript differ significantly ($P < 0.01$); [@] values is average of 6 trials.

Table 3. Sensory evaluation of shrikhand blended with 20% of banana pulp@ at different storage period in days.

Tr	Sensory parameters											
	Body and texture			Sweetness			Flavour			Overall acceptability		
	0	7th	14th	0	7th	14th	0	7th	14th	0	7th	14th
T_2	8.50± 0.22^{NS}	8.50± 0.22^{NS}	8.50± 0.22^{NS}	8.00± 0.00^{NS}	8.01± 0.00^{NS}	8.02 ±0.0^{NS}	8.66± 0.21^{NS}	8.66± 0.21^{NS}	8.66± 0.21^{NS}	8.66± 0.00^{NS}	8.66± 0.00^{NS}	8.66± 0.00^{NS}

[@]Values are average of 6 trials; [NS]Non significant.

Body and texture

It was observed that the body and texture of shrikhand was significantly ($P<0.01$) affected due to blending of banana pulp at 20 percent level. (T_2). The score for body and texture of shrikhand prepared under each treatment ranged from 7.00 (T_0) to 8.50 (T_2). The highest score for body and texture of shrikhand was recorded for T_2 (8.50). Gavane et al. (2010) reported that, blending of a maximum of 2% of custard apple pulp had a positive appeal on the body and texture of shrikhand.

Sweetness

It was noticed that, there was no significant difference in sweetness in all the treatment samples indicating that the sugar blended was equal in all treatments.

Flavour

It was found that, the mean score for flavour of shrikhand were 7.83, 7.66, 8.66, and 7.50 in different treatments viz. T_0, T_1, T_2 and T_3, respectively. The flavour of shrikhand was significantly ($P<0.01$) affected due to blending of banana pulp at 20% level. The highest score (8.66) was recorded for shrikhand blended with 20% banana pulp (T_2), the lowest being recorded for T_0 (7.83). Sunil et al. (2011) reported that, the scores for flavour showed a significantly increasing trend with increasing level of apple pulp supplementation.

Overall acceptability

The scores for overall acceptability was highest in T_2 (8.66) and lowest in T_0 (8.00) and it was significantly ($P < 0.01$) affected due to blending of banana pulp at 20% level. Sunil et al. (2011) reported that, 20% supplementation of apple pulp had a higher overall acceptability score than the control, 10 and 30% supplementation levels.

It was noticed that, the total solids content of shrikhand was significantly ($P < 0.01$) affected due to blending of banana pulp at different levels. The mean total solids content of shrikhand in different treatments viz. T_0, T_1, T_2 and T_3, were 57.98, 58.40, 59.96 and 60.41% respectively (Table 2). The mean total solids content of shrikhand in T_3 was highest (60%.) and lowest in T_0 (57.98%). This is in corroboration with Patel and Abd-El-Salem (1986) who reported the total solids content in plain shrikhand as 57.6%. Gavane et al. (2010) reported that, the mean total solids content of shrikhand bended with custard apple at various levels of custard apple pulp were higher than plain shrikhand. Shinde (1994) reported the average total solids content of plain shrikhand as 59.4%.

Table 3 showed that, there was no significant effect on all the sensory parameters with 20% banana pulp blended Shrikhand during storage period of 14 days after which the samples deteriorated.

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