



Standardization of process line for preparation of unripe banana shrikhand

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ABSTRACT : The present investigation entitled “Standardization of process line for preparation of unripe banana shrikhand” was undertaken in the Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during the year 2013-2014. The efforts were made to incorporate the nutritional value of banana in shrikhand and prepared the value added fermented dairy product. The investigation was planned with main objectives to standardize the process line for preparation of shrikhand, to standardize the optimum level of unripe banana pulp in shrikhand, sensory evaluation and determination of cost of production of shrikhand. Before blending unripe banana was cooked at 90°C for 5 min. and prepare paste which improves sensory quality of shrikhand. It was found that blending of 20 per cent unripe banana in shrikhand produce a good and more acceptable quality shrikhand. Cost of production was reduced due to increase in the level of unripe banana pulp in shrikhand.

KEY WORDS : Shrikhand, Unripe banana pulp, Sensory evaluation, Cost of production

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INTRODUCTION

Cultured dairy products are the vital component of the human diet in India. Apart from imparting nutrition and novelty, these products help to preserve the precious nutrients in milk which is tend to quick deterioration. Due to high nutritive characteristics flavour, taste, palatable nature and possible therapeutic value of shrikhand is one amongst the most preferred dairy product in western India. Shrikhand is a traditional indigenous fermented semi soft, sweetened whole milk product prepared using chakka (strained dahi). Further taste and the appearance of the product can be improved by adding sugar and other ingredients like nuts, colours etc. This low fat fermented product play an important role in synthesis of vitamin B complex in human body and in the prevention of stomachic diseases and is recommended as health food for specific patients suffering from obesity and cardiovascular

disease. Because of the change in the economic status and food habit of consumers the other varieties of shrikhand such as fruit shrikhand are also in great demand. Recently attempt has been made to improve the nutritive and sensory characters of shrikhand by adding ashwagandha powder (Lande *et al.*, 2011), apple pulp with celosia powder (Kumar *et al.*, 2011) and papaya pulp (Nigam *et al.*, 2009) etc. In addition with this shrikhand is often prepared by adding unripe banana to enhance its colour and appearance and flavour.

Banana fruit pulp is a rich source of carbohydrate and it contents moisture 38.5 per cent, protein 2.8 per cent, ash 3.8 per cent, fat 0.2 per cent, crude fibre 0.7 per cent, sugar 5.53 per cent, carbohydrate 54 per cent, and total solid 6.5 g/100 g also banana fruit pulp helps in controlling the wastage of vitamins and minerals from the shrikhand (Egbebi and Bademosi, 2012). Looking to above diversified benefits of Banana pulp and nutritive value of fermented milk, Banana shrikhand was prepared from cow milk chakka with various combinations of banana pulp. Recently there has been an increasing trend to fortify the product with fruit pulp or juice. Fruits are considered good source of mineral and vitamins and hence which improves the nutritional quality as well as flavour of shrikhand.

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MATERIAL AND METHODS

Shrikhand was prepared by adopting the method reported by Sunil *et al.* (2011). Fresh, clean, whole cow milk was procured from Livestock Instructional Farm of Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Cow milk was standardized at 4 per cent fat and then it was heated at 71°C for 15 sec. After heating it was cooled up to 30°C and inoculated with 1 per cent starter culture. Then it was allowed for incubation for 12-14 hours. After preparation of curd, coagulum was break down and hanged in muslin cloth for drainage of whey. After expulsion of whey, sugar was added @ 45 per cent by weight of shrikhand and unripe banana was blended as 0 per cent, 10 per cent, 15 per cent, 20 per cent and 25 per cent in treatment T₁, T₂, T₃, T₄ and T₅, respectively. Before blending unripe banana was cooked at 90°C for 5 min. and the pest of unripe banana was prepared to blend as per treatments. The shrikhand was packaged in plastic coated cups and stored at refrigerated temperature for further sensory evaluation.

The sensory evaluation of the product was carried out for various sensory attributes *viz.*, flavour, body and texture, colour and appearance and the overall acceptability by 100-point numeric score card as prescribed by Pal and Gupta (1985). The data thus obtained was analyzed as per one way ANOVA described by Snedecor and Cochran (1994).

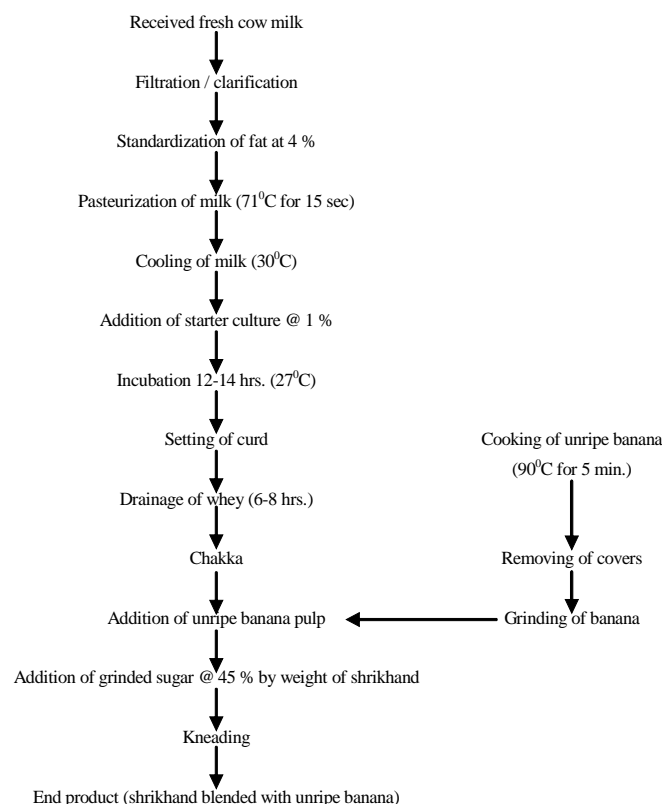


Fig. A : Flow chart for preparation of cow milk shrikhand blended with unripe banana

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

Sensory evaluation :

The average score obtained for different parameter of sensory evaluation was analyzed, tabulated and presented in Table 1.

Flavour :

It was revealed from Table 1, that the variation in the score of flavour was observed statistically significant due to effect of various treatments. The mean score of flavour of shrikhand blended with unripe banana for treatment T₁, T₂, T₃, T₄ and T₅ were 41.68, 40.57, 42.66, 43.76 and 39.44, respectively. The treatment T₄ was significantly superior over T₁, T₂, and T₅ treatments, the treatment T₃ was at par with treatment T₄. Due to addition of unripe banana pulp in chakka improves the typical and acceptable flavour to the shrikhand. These result were supported by the result reported by Narayanan and Lingam (2013) who observed highest score 8.66 (9 point hedonic scale) for 20 per cent ripe banana shrikhand improves the flavour over control.

Body and texture :

The variation in the score of body and texture was observed statistically significant due to effect of various treatments. It was observed that mean score of body and texture of unripe banana blended shrikhand for treatment T₁, T₂, T₃, T₄ and T₅ were 31.93, 31.03, 32.81, 33.55 and 30.34, respectively. The treatment T₄ was significantly superior over T₁, T₂, T₃ and T₅ treatments. Gavane *et al.* (2010) reported that, blending of a maximum of 2 per cent of custard apple pulp had a positive appeal on the body and texture of shrikhand.

Colour and appearance :

The variation in colour and appearance score was observed to be statistically significant due to effect of various treatments. It was observed that mean score of colour and appearance of unripe banana blended shrikhand for treatment T₁, T₂, T₃, T₄ and T₅ were 16.96, 16.38, 17.57, 18.69 and 15.80, respectively. The treatment T₄ was significantly superior over T₁, T₂, T₃ and T₅ treatments. Chavan *et al.* (2009) reported that the shrikhand samples prepared with addition of 15 per cent strawberry pulp and 30 or 40 per cent sugar were showed the better colour and appearance score than the other samples. Kumar *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.

Overall acceptability :

The data of overall acceptability score was observed to be statistically significant due to effect of various treatments.

It was observed that mean score of overall acceptability of unripe banana blended shrikhand for treatment T₁, T₂, T₃, T₄ and T₅ were 90.57, 87.99, 93.03, 95.99 and 85.58, respectively. The treatment T₄ was significantly superior over T₁, T₂, T₃ and T₅ treatments. Mali *et al.* (2010) reported that the significantly highest score for overall acceptability was obtained in shrikhand prepared with 20 per cent papaya pulp, while the lowest score was obtained in shrikhand prepared without papaya pulp. Narayanan and Lingam (2013) reported that highest score 8.66 for 20 per cent ripe banana shrikhand improves the overall acceptability over control.

Cost of production :

The data obtained in respect to production cost of shrikhand blended with unripe banana was analyzed, tabulated and presented in Table 2.

While estimating the cost of finished product, the cost of the ingredient used in the preparation of unripe banana blended shrikhand rated as per prevailing market price. From Table 2 showed that, cost of production of unripe banana shrikhand (per kg) for treatment T₁, T₂, T₃, T₄ and T₅ were Rs. 107.78, 105.56, 102.22, 98.89 and 96.67, respectively. Unripe banana pulp blending with cow milk chakka proportionally reduces

the cost of production. The cost of production of blended shrikhand could be lowered further if the same was manufactured on large scale. The cost of production of plain shrikhand T₁ (control) was considered to be more than the shrikhand prepared with unripe banana blend. Increased level of unripe banana showed slight decreased in cost of production of shrikhand. This difference was occurs due to the addition of unripe banana, which was available at lower cost. Lower cost of production was observed in case of treatment T₅. However, the best treatment selected by judges was T₄ (where addition of 20 per cent unripe banana to shrikhand was done) and the cost of production of shrikhand in this treatment was founded to be Rs. 98.89 per kg.

Conclusion :

- Paste of unripe banana was prepared by cooking (at 90°C for 5 minute) and grinding with mixture. Paste of unripe banana was thoroughly mixed with chakka as per treatments for preparation of shrikhand.
- The acceptable shrikhand was prepared by using cow milk chakka and unripe banana in the proportion of 80:20.
- The cost of production was reduced due to addition

Table 1 : Sensory evaluation of unripe banana shrikhand

Treatment	Flavour	Body and texture	Colour and appearance	Overall acceptability
T ₁	41.68	31.93	16.96	90.57
T ₂	40.57	31.03	16.38	87.99
T ₃	42.66	32.81	17.57	93.03
T ₄	43.76	33.55	18.69	95.99
T ₅	39.44	30.34	15.80	85.58
F test	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.38	0.21	0.16	0.49
C.D. (P=0.05)	1.14	0.64	0.49	1.48

Table 2: Cost of production of unripe banana shrikhand

Sr. No.	Particulars	Treatments				
		T ₁	T ₂	T ₃	T ₄	T ₅
1.	Quantity of milk used in lit. Cow milk(1 lit = 250 g chakka)	1.000	0.900	0.850	0.800	0.750
2.	Cost of milk required as per treatment cost of milk Rs. 34/lit.	34.00	31.00	29.00	27.00	25.50
3.	Cost of starter culture (Rs.40/lit.)	0.50	0.50	0.50	0.50	0.50
4.	Weight of chakka obtained (g)	250	225	213	200	187
5.	Unripe banana pulp required as per treatment (g)	0	25	37	50	63
6.	Cost of unripe banana pulp (cost of unripe banana Rs. 40/ kg)	0.00	2.00	2.50	3.00	3.50
7.	Sugar required as per treatment	200	200	200	200	200
8.	Cost of sugar Rs. 35/ kg	7.00	7.00	7.00	7.00	7.00
9.	Miscellaneous cost (Rs.).	7.00	7.00	7.00	7.00	7.00
10.	Total weight of shrikhand (g)	450	450	450	450	450
11.	Total cost of production of final product (Rs.).	48.50	47.50	46	44.5	43.50
12.	Total cost of production / kg (Rs.).	107.78	105.56	102.22	98.89	96.67

of the level of unripe banana. The cost for acceptable unripe banana shrikhand (20 % pulp) was calculated as Rs.98.89 per kg, which was about 8 per cent less than the plain shrikhand (Rs. 107.78 per kg).

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