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Studies on quality of Shrikhand by blending papaya and banana pulp

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Abstract
Shrikand is a traditional Indian sweet dish prepared from curd. An effort was done to produce novel fermented milk. Further, effects were made to standardize to optimum level of papaya and banana pulp in the preparation of Shrikhand by sensory evaluation and to study its economics. Shrikhand was prepared from whole milk chakka with content level of sugar (30 percent by weight of chakka) blended with varying levels of papaya and banana pulp at the rate of quantity of chakka *i.e.* 50% (T1), 40% (T2), 30% (T3). Treatment T0 (8.48) showed highest overall acceptability than other treatments. For fat percent in shrikand, treatment T0 (9.11) showed highest fat percent among all the treatment. For Total solid percent in shrikand was highest in T3 (61.80) and lowest T0 (58.80). For Protein percent treatment T0 (10.94) was significantly higher than rest of the treatments. Titratable acidity percent was highest in T0 (1.26) and lowest in T1 (1.04). Cost of product of 1kg shrikand was T0 (Rs117), T1 (Rs95), T2 (Rs84) and T3 (Rs73).

Keywords: Studies, quality, blending papaya, banana pulp, Indian sweet dish prepared from curd

Introduction
Shrikhand prepared from buffalo milk due to higher fat and total solids percent of milk. India has a very rich variety of fermented foods prepared from milk, cereals, pulses vegetables, fruits and fish. Milk and milk products like curd, buttermilk lassi and Shrikhand is inseparable dish in a regular diet of Indians. As per Aneja (2002) [1], Shrikhand is a very popular and delicious product liked by many Indian and is consumed regularly during various occasions due to its pleasant taste and aroma. Because of this, Shrikhand has a good Market value and manufactured with different brands. (Barnet, Pelkman, 2008) [3]. Shrikand with its distinct taste, richness, delicacy, diversity and fairly longer Shelf-life is very popular in India, particularly in the states like Maharashtra and Gujarat. Shrikand is a semi-soft, sweetish sour, fermented product prepared from chakka. David, (2015) [4]. Shrikhand is one the most popular fermented milk products for taste and therapeutic value. Shrikhand contains appreciable milk protein and phospholipids and is obtained by lactic acid fermentation through the action of Lactobacillus bulgaricus, Streptococcus lactic, Streptococcus diactylactis, Lactobacillus citrovoroum and Streptococcus thermopiles. (De, 1982) [5]. the large variations have been reported in the organoleptic, microbiological and chemical qualities of Shrikhand. (Sarkar and Mishra, 1997) [10] Due to its variation in preparation and production techniques. By addition ofsugar and other materials the taste and the appearance of the product can be improved. It may be considered the western equivalent to quarg yogurt (Sarkar, 2008) [9] 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 (Sonawane *et al.*, 2007) [12] 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 (Singh, 2007) [11]. To improve the nutritive and sensory quality of Shrikhand various attempts has been made to by adding ashwagandha Powder (Landge *et al.,* 2011) [7] and apple pulp with celosia powder (Kumar *et al.*, 2011) [6], papaya pulp (Nigam *et al.*, 2009) [8], cocoa powder and papaya pulp (Vagdalkar *et al.*, 2002) [13], strawberry pulp (Sonawane *et al.*, 2007) [12], mango pulp (Bardale *et al.*, 1986) [2] etc.

FSSAI Standard of Shrikand composition

Total solid, minimum,%, (m/m)	NLT 58.0.
Milk fat, minimum,%, (m/m) on dry basis	NLT 8.5
Milk protein minimum(m/m) on dry basis	NLT 9.0
Titratble acidity minimum(m/m) on dry basis	NMT 1.4
Sugar (sucrose) minimum(m/m) on dry basis	NMT 72.5
Total ash minimum(m/m) on dry basis	NMT 0.9

Banana composition

Protein	1.09
Fat	0.33
Ash	0.82
Carbohydrate	22.84

Papaya composition

	Ripe fruit	Raw fruit
Protein	0.5	2.1
Fat	-	0.1
Carbohydrate	12.2	4.9

Method and Materials

The experiment "Studies on quality of Shrikhand by blending papaya and banana pulp" was carried out in the research lab of "Warner college of Dairy Technology" Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad. The materials and method adopted during this investigation are given below.

Milk: Whole milk was purchased from local market of Allahabad.

Sugar: Sugar was purchased from local market of Allahabad.

Banana and Papaya: Banana and papaya were purchased from local market of Allahabad.

Material required for preparation of control and experimental Shrikand.

Procurement and collection of ingredients.

Preparation of treatments.

Analysis of developed product.

Chemical analysis

Microbial analysis

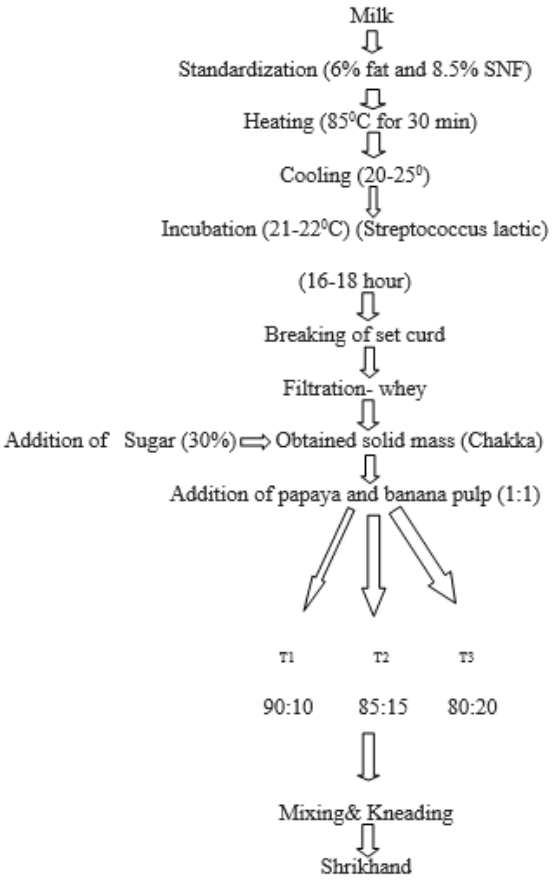
Sensory analysis

Cost analysis

Treatment combination (Ratio)

Treatment	Chakka	Papaya pulp (%)	Banana pulp (%)	Sugar
T0	70	-	-	30
T1	50	10	10	30
T2	40	15	15	30
T3	30	20	20	30

Flow chart for making shrikand

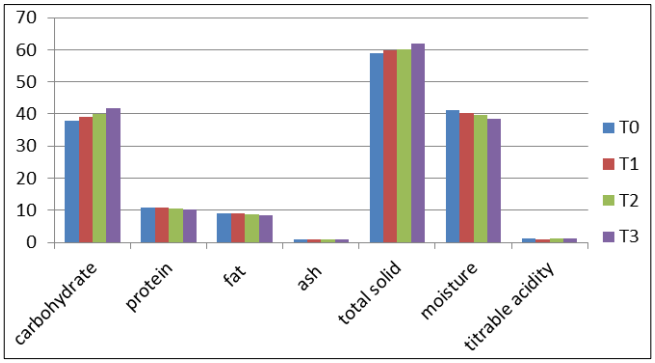


Result and discussion

The investigation was based to prepare ''Studies on quality of shrikand by blending papaya and banana pulp'' The data collected on the different aspects were tabulated and analyzed statistically using the method of analysis of variance and critical difference technique. The significant and non-significant differences observed have been analyzed critically within and between the treatment combinations.

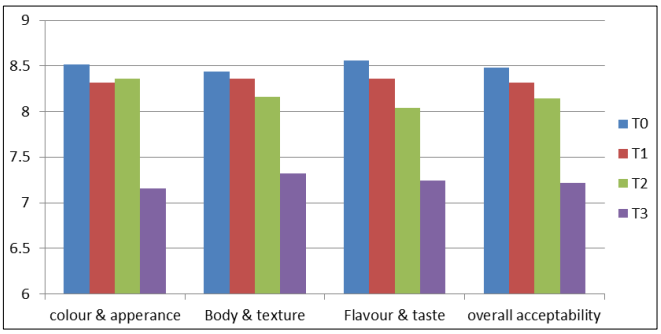
Average data for different parameters of control and experiments (in percent)

Parameter	T0	T1	T2	T3
Physio-chemical analysis				
Carbohydrates %	37.86	39.21	39.97	41.76
Protein%	10.94	10.76	10.55	10.35
Fat %	9.11	8.94	8.77	8.57
Ash %	0.88	0.89	0.91	0.92
T.S %	58.80	59.80	60.20	61.80
Moisture%	41.20	40.20	39.80	38.40
Acidity	1.26	1.04	1.12	1.16



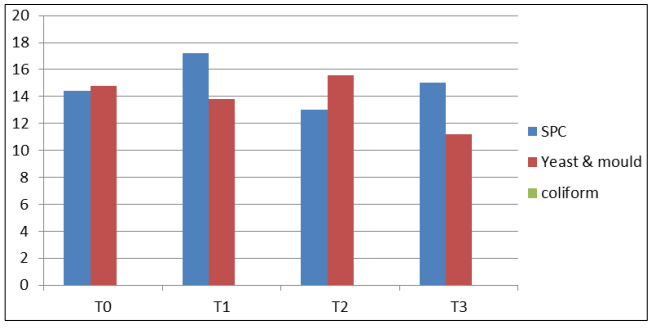
2. Organoleptic scores (9 point hedonic scale)

Colour & Apparence	8.52	8.32	8.36	7.16
Body &Texture	8.44	8.36	8.16	7.32
Flavour & taste	8.56	8.36	8.04	7.24
Overall acceptability	8.48	8.32	8.14	7.22



3. Microbial Analysis

SPC ($\times 10^3$)(cfu/g)	14.40	17.20	13.00	15.00
Yeas & Mould (per g)	14.80	13.80	15.60	11.20
Coli Form (per g)	Nil	Nil	Nil	Nil
Cost of ingredients				
Chakka (in rupees/kg)	117	95	84	73



It is evident from the tables that fat percent was highest (9.11) in control T_0 sample where as the protein percent was highest (10.94) in the same. The increasing trend in fat and from T_0 to T_3. Carbohydrate percent was highest (41.76) in control sample. Ash percent was lowest (0.88). In control T_0 and highest (0.92) in T_3 containing 20% papaya and banana pulp. Treatment combination T_3 recorded highest for its mineral content. Moisture percent was mainly dependent upon percent papaya and banana pulp present in treatment samples. As it was present in highest amount in treatment T_3 hence its moisture percent was highest (41.20). Treatment T_3 recorded highest percent acidity as compared to all other sample which showed a decreasing trend form T_3 to T_0. Treatment T_2 (15% papaya and banana pulp) received highest scores (8.8) for colour and appearance, (9.0) flavour and taste, and overall acceptability (8.8) on 9 point Hedonic scale. But T_1 (8.8) in highest in body and texture (8.2). Yeast and mould count in 10^3cfu dilution was highest in treatment samples T_2. Lesser count of yeast and mould count observed in T_0. Coliform counts observed were nil which demonstrate no post packaging contamination. Cost of production (Rs.) per kilogram of finished product) for experimental samples were T_1 (95), T_2 (84), T_3 (73) and that for control was T_0 (117).

Conclusion

It may be concluded that the blended Shrikhand can be successfully prepared by using Whole milk with addition of papaya and banana.

It was found that the experimental Shrikhand in treatment T_1 was best in organoleptic characteristics and received highest score in organoleptic (colour & appearance, body & texture, flavour & taste, overall acceptability).

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