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Analyzing the effect of fennel powder on Shrikhand: A study of sensory and physicochemical properties

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Abstract
Shrikhand is a sweeten and original milk product of semi-solid consistency with a typical sweet and sour taste. It is made from fermented milk curd. In this study, various herbal products are produced in the dairy industry. Herbs such as fennel seed have been used since ancient times for cleaning the mouth and using home medicine. Fennel shrikhand can be considered as an herbal shrikhand which tries to diversify the benefits and medicinal properties of shrikhand. It was prepared with the addition of fennel powder. In this study, the final powder is used as 1% fennel powder for T_1, 2% fennel powder for T_2, 3% fennel powder for T_3, 4% fennel powder for T_4. After production of shrikhand, physio-chemical changes were analyzed and sensory evaluation was done from day 1 to day 21 of all treatments. The study showed that there is no change in the T_2 sample and it increases the sensory quality and overall acceptability of the product.

Keywords: Shrikhand, curd, herbal, sugar, chakka, fennel

1. Introduction
Fermented products are widely consumed worldwide and are considered to be alternatives to alleviate conditions associated to gut problems.it is also have been various nutritional and therapeutic properties. During the fermentation process, micro-organism such as lactic acid bacteria (LAB) transform organic substrates into simple organic end products. Lactic acid bacteria (LAB) play a major role in determining the positive health effect of fermented milk and related products.

Shrikhand is sweetened, indigenous dairy product having semi solid consistency with typical sweetish sour test. It is prepared from lactic acid fermented curd; the curd is partially stained through a muslin cloth to remove the whey and thus produce a solid mass called chakka. Shrikhand is fermented milk product which derive its name from the Sanskrit word "shrikharani" meaning a curd prepared with added sugar and flavoring agents. It is popular in the state of Gujarat, Maharashtra and part of Karnataka.

Shrikhand is also high nutritive, characteristic flavor, taste, palatable nature and possible therapeutic value. It can be recommended as health food for specific patients suffering from obesity and cardiovascular disease due to its low fat and sugar content. Dairy industry is using new concepts like production of sweets with herbal ingredients.

A similar study was undertaken with different levels (10%, 15%, 20% and 25%) of mango pulp. Experimental mango Shrikhand mix was standardized to 6.0 fats, 9.0 solid non fats, 35% sugar and @ 1% culture. Shrikhand samples of different treatments were analysed for fat per cent, lactic acid per cent, protein per cent, moisture, total solids per cent, organoleptic characteristics (flavour and taste, colour and appearance, consistency, overall acceptability) and microbiological characteristics (yeast and mould and coli form count).

9Herbal powders are widely used in the dairy products such as source of antioxidants. Fennel (Foenicnicum vulgare) is a plant belonging to the Apiaceae family, and thanks to its edible and very fragrant leaves and seeds has a long history of use.

Fortification of dairy products with herbs and spices to utilize functional and medicinal properties has also gained momentum (Paswan, 2021) [3] Fennel seeds contain polyphenols and flavonoids and are used for medicinal purposes and as a flavour component. Fennel is used for diabetes, bronchitis, chronic cough, and kidney stone treatment. Fennel flavoured shrikhand can be considered as herbal shrikhand looking to diversified benefits and medicinal value of fennel.

2. Materials and Methods

2.1 Production of fennel Shrikhand

Shrikhand was manufactured by the standard procedure given by Su Kumar De (1980), Present investigation was undertaken to prepare shrikhand with fennel powder (Foenicnicum vulgare). The material used and methods were adopted were as under.

Fresh standardized milk used for products preparation good quality fennel was purchased from the local market. It was ground into a powder form, then this powder was passed through a fine sieve. Dahi culture was prepared in the departmental laboratory.

The milk was heated to 71 °C for 15 seconds, then cooled to 38-40 °C. After cooling the milk, a 2% curd culture was inoculated into the milk, then mixed well and incubated at 40^0 C until the curd solidified. When the curd has settled into a good structure, cut it and hang it on a muslin cloth for 8-10 hours. In this process the whey is drained off and the solid mess thus obtained is called Chakka. It is used as the basis of shrikhand.

Chakka is mixed with 25% sugar and kneaded to mix evenly. The product thus obtained is a control sample of stingray, which does not contain any fennel powder. To prepare fennel shrikhand, Chakka is mixed with sugar and different percentages of fennel powder like 1% fennel powder for T_1, 2% fennel powder for T_2, 3% fennel powder for T_3, and 4% fennel powder for T_4. The final product was filled into paper cups and stored at 6-8 °C.

Buffalo skim milk (10% total solids) is heat-treated at 85 °C for 30 minutes, and then inoculated to 42 °C active YH culture solution at 1.5-2.0% to obtain curd (lactic acid 0.9). The 'chukka', when mixed with the required amount of cream and sugar, turned into a satisfying shrikhand (Patel *et al*., 1985). A study was conducted with kiwifruit (Actinidia deliciosa) pulp for chemical composition of kiwifruit pulp added shrikhand. Three levels of kiwi pulp *viz*. 5% (T_2), 10% (T_3) and 15% (T_4) on weight basis of shrikhand were prepared as 40% sugar by weight of chakka and compare T_2, T_3 and T_4 along with T_1 (as control) (Bandage *et al*., 2020)

3. Results and Discussion

3.1 Sensory evaluation of finished products

The acceptability of the final products was measured in terms of sensory attributes such as color and appearance, body texture, flavor and taste, and overall taste acceptability using a 9-point hedonic scale with different individuals. The sample of shrikhand were subjected to the organoleptic evaluation by a panel of five of five semi trained judges. Evaluation was done on a 9-points hedonic scale (IS:6273-2, 1971). Sensory evaluation of control and functional shlihands formulated with pomegranate peel extract was performed using a 9-point hedonic scale (Amerine *et al*., 1965) [8].

Table 1: Sensory evaluation of shrikhand using with different percentage of Fennel

Sample	Colour & Appearance	Body & Texture	Flavour & Taste	Overall Acceptability
T_0	7.26	7.25	6.87	7.00
T_1	7.75	7.87	7.12	7.62
T_2	7.75	7.90	8.25	7.75
T_3	7.12	7.00	6.62	6.35
T_4	6.50	7.00	6.25	5.75

3.2 Physiochemical parameter of control shrikhand and fennel shrikhand

The study showed physiochemical properties of fennel shrikhand. Total solids in fennel shrikhand can be affected by adding an additional amount. It increased from T_0 38.8 to treatment T_2 40.6 and moisture content was decreased as compared to T_0 (61.2) to treatment T_2 (59.4). The fat percentage of fennel shrikhand cannot be changed significantly, ranging between T_0 (8.5) and T_2 (8.4). Adding a large amount of fennel powder showed results on titratable acidity being changed from T_0 (0.135) to T_2 (0.189) and protein can be affected through the adding of fennel powder from treatment T_0 (7.0) to treatment T_2 (10.5). Similar observations were also reported in papaya pulp incorporated Shrikhand (Nigam *et al*. 2009) [9]. The sensory properties of shrikhand blended with banana pulp at 10, 20 and 30% were analysed and the sample with the 20% incorporation of banana pulp showed no significant difference in sensory attributes up to 14 days in comparison with other two samples (Narayanan and Lingam, 2013). The preparation of herbal shrikhand was done by incorporating aqueous extract of basil 1%, 2%, 3% and 4%, designated as T_1, T_2, T_3 and T_4, respectively, where T_0 was the control sample without basil extract and was evaluated for different physical-chemical, organoleptic and microbiological parameters (David, 2015) [1].

The shrikhand samples were analyzed for the colour quality and proximate properties which included moisture, ash, protein, fat, carbohydrate and energy content (Srinivas, 2017) [6]. The score of colour & appearance, consistency, flavour & tastes as well as the overall acceptability of different types of Shrikhand were compared (Ojha *et al*., 2018) [13].

Table 2: Physiochemical parameter of control shrikhand and fennel shrikhand

Sample	Titratable acidity (%)	Moisture	Total solid	Fat	Protein (%)
T_0	0.135	61.2	38.8	8.5	7.00
T_1	0.180	60.4	39.6	8.4	9.50
T_2	0.189	59.6	40.4	8.2	10.5
T_3	0.171	59.4	40.6	8.1	8.75
T_4	0.162	58.8	41.1	7.9	8.75

Treatment T_2 achieved the highest titratable acid percentage recorded for fennel shrikhand, 0.189, followed by T_0 0.135, T_1 0.180, T_3 0.171 and T_4 0.162. These values demonstrate the significant effect of treatment on percent titratable acid. With increasing apple pulp content, pH values decreased and titratable acidity increased significantly ($P< 0.05$), but there was no significant difference between GH and A1 (Sahu, 2021) [7].

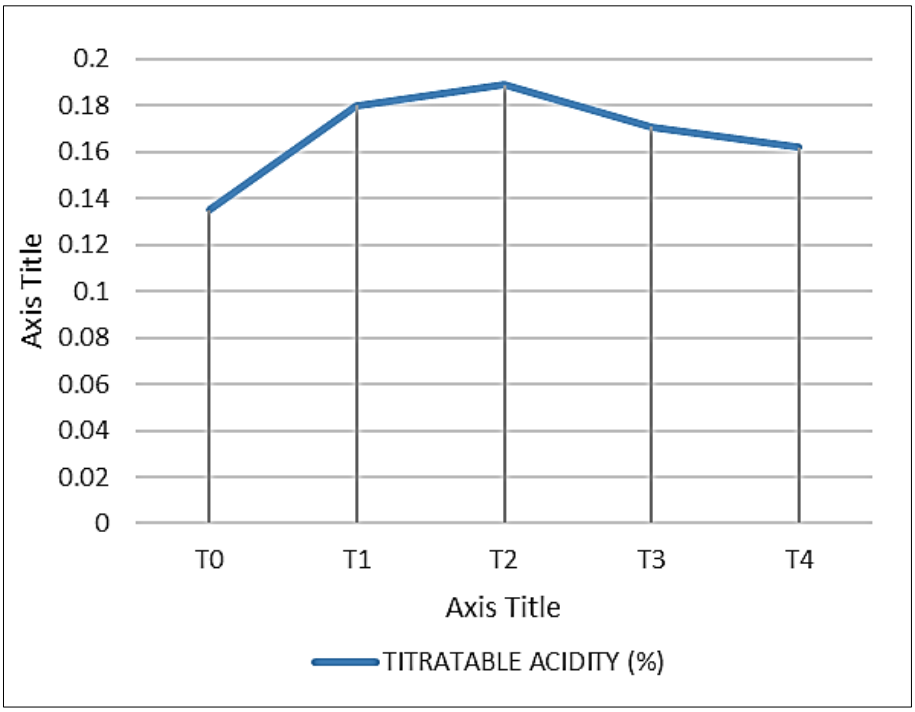

Fig 1: Titratable Acidity of fennel shrikhand with different treatments

Study showed that the highest amount of fennel powder mixed in treatment T_4 resulted in the lowest moisture content. Treatment T_0 achieved the highest moisture score with fennel shrikkand, recording 61.2, followed by T_1 60.4, T_2 59.6 T_3 59.4 and T4 58.8. Treatment T_2 and T_3 obtained the highest value for total solid percentage in the fennel shrikhand recorded of 40.6, followed by T_0 38.81, T_1 39.6 and T_4 37.8. These values indicate a significant effect of treatment on the total solid percentage. Determination of total solid by Sodium Hydroxide Method, IS 12333: 1997.

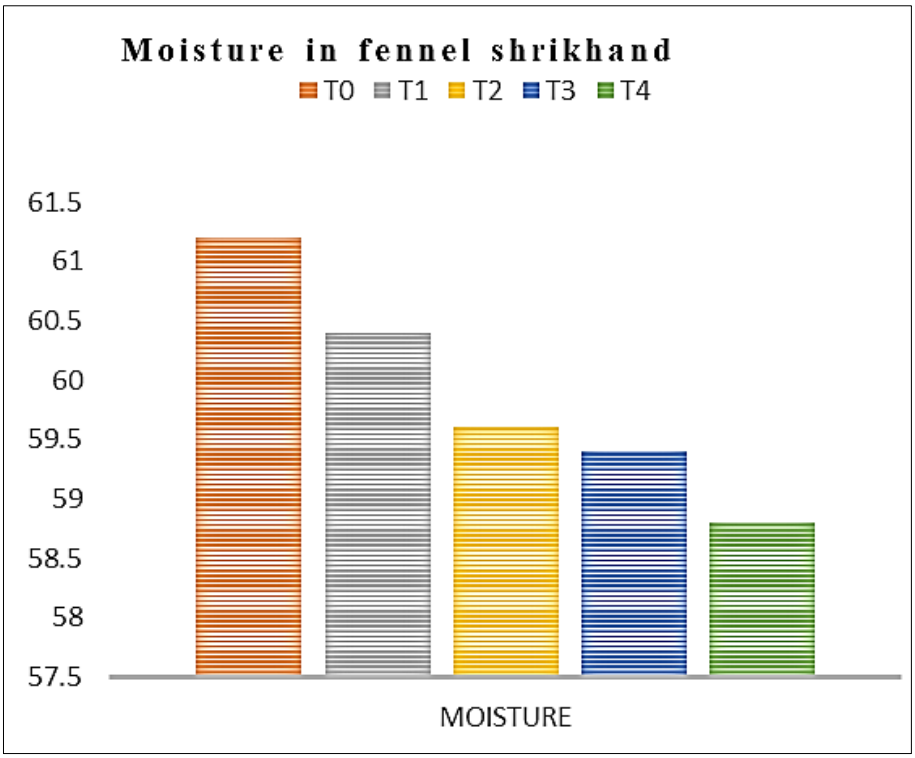

Fig 2: Moisture in fennel shrikhand with different treatments

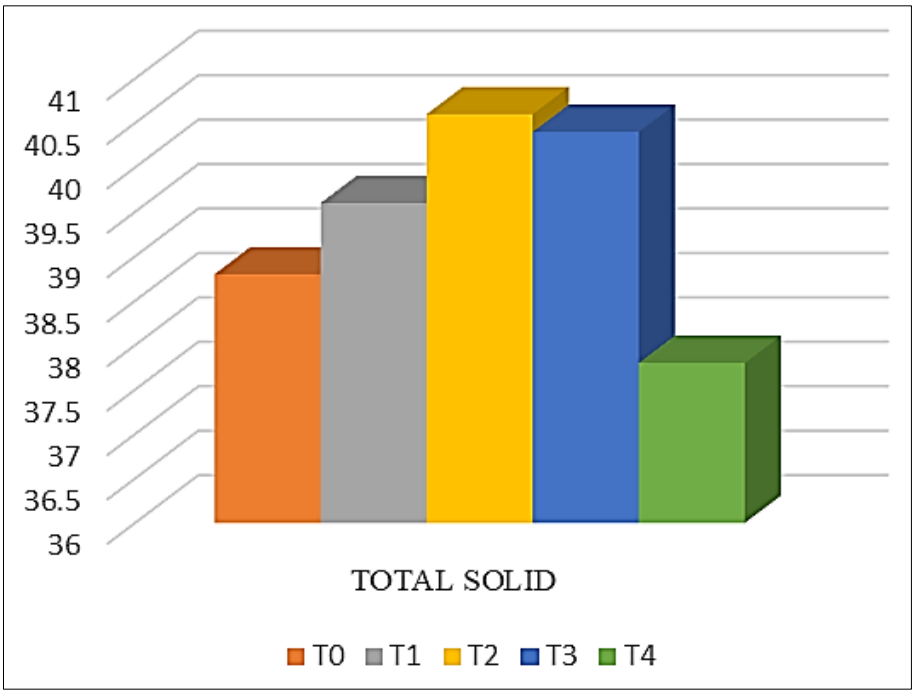

Fig 3: Total Solids in fennel shrikhand with different treatments

The highest volume for fat percentage in fennel shrikhand 8.5 was obtained from the treatment T0 followed by T_1 8.4 T_2 8.2 T_3 8.1 and T_4 7.9. These are values indicating significant effects of treatment. Determination of Fat (by Acid Digestion Method) (IS 2785 -1979). the protein percentage in the fennel Shrikhand 10.5 was obtained from the treatment T_1 followed by T_2 7.0, T_3 8.75, T_4 8.75. Different treatments are indicating the different value of protein percentage.

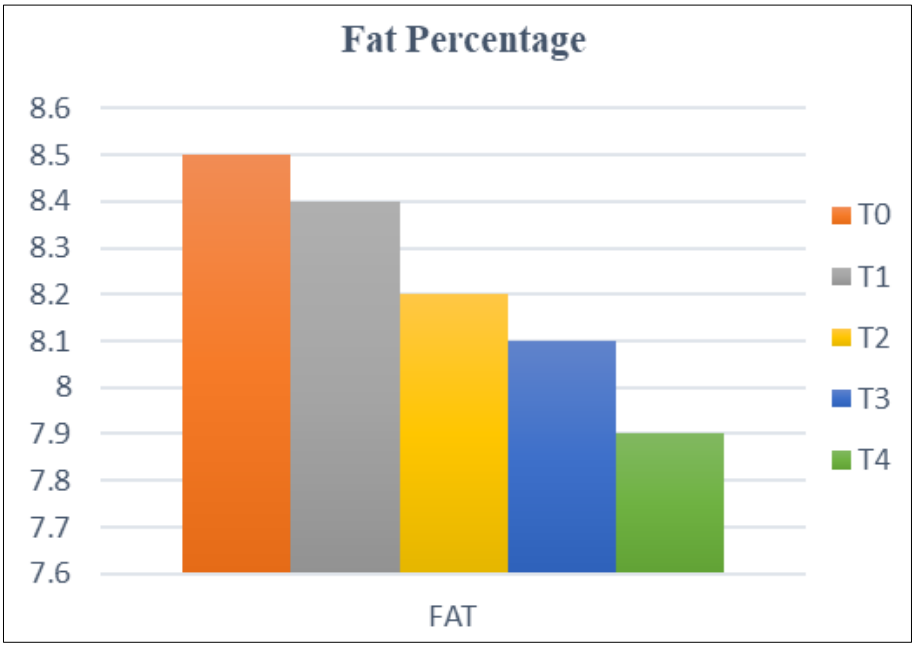

Fig 4: Fat in fennel shrikhand with different treatments

4. Conclusion

The study investigating the effect of fennel powder on the sensory and physicochemical properties of Shrikhand provides valuable insights into the potential diversification and enhancement of this traditional dairy product. The incorporation of fennel powder, particularly at a 2% level (T_2), has shown significant improvements in sensory quality and overall acceptability without compromising physicochemical parameters.

The sensory evaluation revealed favorable responses to color, appearance, body texture, flavor, and taste of Shrikhand with fennel powder, especially in the T_2 treatment. This indicates the potential of fennel to enhance the sensory attributes of Shrikhand, making it more appealing to consumers. Physicochemical analysis demonstrated notable changes in parameters such as total solids, moisture, fat, titratable acidity, and protein content with the addition of fennel powder. Treatment T_2 exhibited particularly promising results, indicating its potential for maintaining or even enhancing certain physicochemical properties of Shrikhand. These

findings suggest that fennel powder can be considered a viable additive for improving the sensory attributes and potentially enhancing the nutritional profile of Shrikhand.

5. References

1. David J. Preparation of herbal shrikhand prepared with basil (*Ocimum basilicum*) extract. The Pharma Innovation. 2015;4(8):81.
2. Yadav AK, Rai DC. Comparative study of the physico-chemical and functional properties of Ashwagandha root extract enriched Shrikhand and control Shrikhand during storage. Journal of Pharmacognosy and Phytochemistry. 2018;7(2):1172-1179.
3. Paswan VK. Herbs and spices fortified functional dairy products. Herbs and Spices-New Processing Technologies; c2021.
4. Meena M. Proximate analysis of branded Shrikhand. Journal of Food and Dairy Technology. 2013;1(2):2347-2359.
5. Srinivas J, Suneetha WJ, Maheswari KU, Krishnaiah N. Sensory analysis and consumer acceptance of value added Shrikhand. Advances in Life Sciences. 2016;5(18):7982-7985.
6. Srinivas J, *et al*. Nutritional analysis of value added Shrikhand. Journal of Pharmacognosy and Phytochemistry. 2017;6(5):1438-1441.
7. Sahu V, Pathak V. Development and comparison of goat milk Shrikhand with apple fruit pulp Shrikhand prepared with goat milk; c2021.
8. Amerine MA, Pangborn RB, Roessler EB. Principles of sensory evaluation of food; c1965.
9. Nigam N, Singh R, Upadhayay PK. Incorporation of chakka by papaya pulp in the manufacture of Shrikhand. Journal of Dairying, Foods & Home Sciences. 2009;28(2):115-118.
10. De S. Outline of Dairy Technology. 2nd ed; c1982.
11. BIS Indian Standard. 1479 (Part I) Methods of Test for Dairy Industry. Rapid Examination of Milk; c1960.
12. Chopade S, Gavhane A, Gunjal M. Shrikhand: Nutritional composition, types and associated health benefits; c2022.
13. Ojha N, *et al*. Process optimization of herbal Shrikhand by incorporating tulsi and turmeric powder. The Pharma Innovation Journal. 2018;7(6):100-102.
14. Patel RS, Chakraborty BK. Reduction of curd-forming period in Shrikhand manufacturing process. Le Lait. 1985;65:55-64.