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Physico-chemical evaluation of *Shrikhand* by using kiwi (*Actinidia deliciosa*) fruit pulp

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Abstract

Effect of addition of different levels of kiwi fruit (*Actinidia deliciosa*) pulp on chemical composition of kiwi fruit pulp added *shrikhand*. The three levels of kiwi fruit pulp viz. 5% (T₂), 10% (T₃) and 15% (T₄) on weight basis of *shrikhand* were prepared as 40% sugar as per the weight of *chakka* and compare T₂, T₃ and T₄ along with T₁ (as a control). With increase in the level of kiwi fruit pulp acidity, moisture goes on increase and pH, fat, protein, total solid and ash goes on decrease. The range of acidity for kiwi fruit pulp added *shrikhand* was 1.03, 1.29, 1.35 to 1.47 for treatments T₁ to T₄, respectively and the pH range for kiwi fruit pulp added *shrikhand* was 4.68 to 4.30 per cent, respectively. The fat content of kiwi fruit pulp added *shrikhand* was 8.75, 8.49, 8.34 to 8.21 and the of protein content for kiwi fruit pulp added *shrikhand* was 7.82, 7.70, 7.58 and 7.48 for treatment T₁, T₂, T₃ and T₄. The moisture content of kiwi fruit pulp added *shrikhand* was 40.13, 43.52, 45.49 and 48.05 per cent and total solids content of kiwi fruit pulp added *shrikhand* was found to be 59.87, 56.48, 54.52 and 51.96 per cent for treatment T₁, T₂, T₃ and T₄. The mean ash content in the kiwi fruit pulp added *shrikhand* was found to be 0.96 to 0.80 per cent.

Keywords: Kiwi fruit pulp *shrikhand*, physico-chemical analysis.

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, flavoring agents (Saffron), fruits and nuts. It is prepared by the fermentation of milk by using known strain of lactic acid bacteria, which are widespread in nature and are also found in our digestive system. These lactic acid bacteria are best known for their role in the preparation of fermented dairy products and are excellent ambassadors for an often maligned microbial world. They are not only of major economic significance, but are also of value in maintaining and promoting human health. Lactic acid bacteria decrease serum cholesterol levels, increase vitamin B content in the product (Devi *et al.*, 2018) [4].

The kiwi fruit (*Actinidia deliciosa*) is unique because of its high nutritional content, different flavors, vitamins, minerals, antioxidants, phytochemicals and fiber content. In terms of nutrient content, the kiwi fruit is amongst the richest fruits. It is also very valuable in terms of health. It is usually consumed fresh but in recent years along with increased production, industrial use is increasing. It is used in the canned food industry, for marmalades, fruit sauces and candies and for fruit juice concentrates, either separately or mixed with strawberries or apples.

2. Materials and Methods**2.1 Materials**

Following material were collected to meet the objectives of the present study.

1. Collection of Buffalo milk

Already standardized fresh Buffalo milk was procured from local market of Latur city, of Natural Milk Pvt., Ltd., Latur having 6.0 per cent fat and 9 per cent SNF.

2. Collection of kiwi fruit pulp

Fresh kiwi fruit purchased from local market of Latur and kiwi fruit pulp was prepared in laboratory.

3. Dahi culture

The standard *dahi* culture was used during the *shrikhand* preparation @ 3 per cent.

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Preparation of Kiwi fruit Pulp

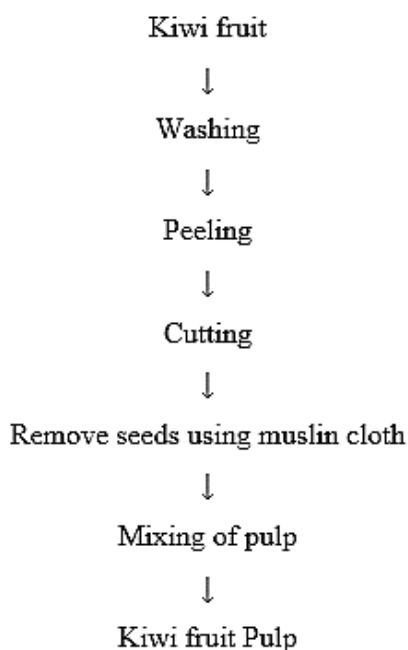
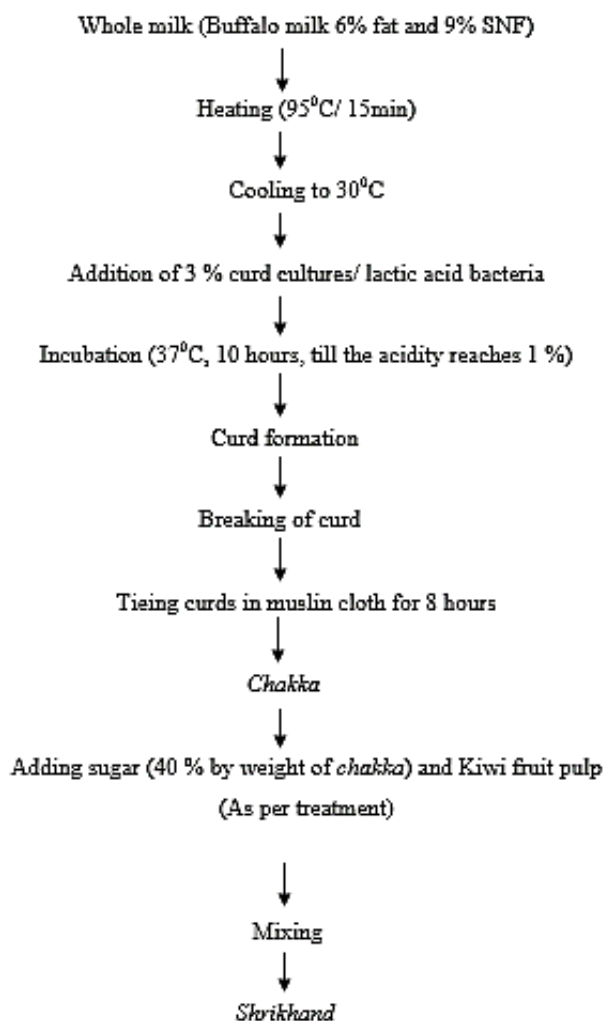


Fig 1: Preparation of kiwi fruit Pulp

Preparation of Kiwi fruit Pulp added *Shrikhand*



(Source: De S, 2011) [3].

Fig 2: Preparation of kiwi fruit Pulp added *Shrikhand*. (De Sukumar 2011)

Treatment Combinations

For the preparation of *shrikhand* by using kiwi fruit (*Actinidia deliciosa*) pulp, the treatments were follows:

T₁ - 100 Parts of *Chakka*

T₂ - 95 Parts of *Chakka* + 5 Parts of Kiwi fruit pulp

T₃ - 90 Parts of *Chakka* + 10 Parts of Kiwi fruit pulp

T₄ - 85 Parts of *Chakka* + 15 Parts of Kiwi fruit pulp

These levels were tried and compared with control (T₁)

Results and Discussion

The present study was based to evolve "Preparation of *Shrikhand* using Kiwi fruit pulp". The data were collected and analyzed statistically by using Completely Randomized Design (CRBD) as per Panse and Sukhatme (1985) [6]. The significance of the result was evaluated on the basis of critical difference. In all four replication, it was carried out.

Table 1: Effect of kiwi fruit pulp on composition of *shrikhand*

Treatment	Acidity	pH	Fat	Protein	Moisture	Total solid	Ash
T ₁	1.03	4.68	8.75	7.82	40.13	59.87	0.96
T ₂	1.29	4.50	8.49	7.70	43.52	56.48	0.92
T ₃	1.35	4.40	8.34	7.58	45.49	54.52	0.87
T ₄	1.47	4.30	8.21	7.48	48.05	51.96	0.80
S.E.	0.036	0.074	0.028	0.022	0.311	0.311	0.011
C.D.at 5%	0.011	0.230	0.088	0.069	0.960	0.960	0.035

Acidity: The average acidity per cent of finished product found to be 1.03, 1.29, 1.35 and 1.47 per cent for treatment T₁, T₂, T₃ and T₄, respectively. The acidity content of finished product was increased as increased in concentration of kiwi fruit pulp. It may be due to higher acidity content of kiwi fruit pulp. David (2012), studied preparation of herbal *shrikhand* prepared with basil (*Ocimum basilicum*) extract and observed increase in acidity with increase in basil extract [2].

pH: The pH content in the developed product as found to be 4.68, 4.50, 4.40 and 4.30 per cent for treatment T₁, T₂, T₃ and T₄, respectively. The treatment T₁ and T₄ was significantly different from each other at 5% level of significance. Kolape *et al.* (2010), observed that the pH of *shrikhand* was changed due to addition of papaya pulp. The pH of *shrikhand* of treatments T₁, T₂, T₃ and T₄, was 4.38, 4.47, 4.55 and 4.63, respectively. He indicated that pH increased with increased level of papaya pulp added in the *shrikhand* [5].

Fat: The fat content ranged between 8.21 to 8.75 per cent. The highest value of fat content was recorded for treatment T₁ (8.75 per cent) and lowest value was for treatment T₄ (8.21 per cent) and found that the kiwi fruit was reduced the fat content of *shrikhand*. It may be due to low fat content in kiwi fruit pulp. Chorage *et al.* (2015), prepared probiotic *shrikhand* by using *yoghurt* culture and incorporation of ginger (*Zingiber officinale*) juice at different levels *viz.* 5 per cent (T₁), 10 per cent (T₂) 15 per cent (T₃) and 20 per cent (T₄) of the *chakka* and reported average fat content as 7.23, 6.93, 6.59, 6.27 and 6.08 per cent for treatment T₀, T₁, T₂, T₃ and T₄, respectively. It means the effect of ginger juice blending in *chakka* was statistically significant for fat content of *shrikhand*. Fat content decreased with the increasing levels of ginger juice in *shrikhand*. This may be due to less fat content of ginger juice as compare to Buffalo milk [1].

Protein: The average protein content of the *shrikhand* samples was found to be 7.82, 7.70, 7.58 and 7.48 per cent for

treatment T₁, T₂, T₃ and T₄, respectively. The highest protein content was recorded for control treatment T₁ (7.82) per cent and the lowest protein content was recorded for treatment T₄ (7.48) per cent. There was significantly difference between the protein content of all treatment. Sameem *et al.* (2018)^[7], studied physico-chemical qualities of dragon fruit pulp *shrikhand* and observed that the protein content of product ranged from 9.1- 8.41 per cent, which was decreasing in order, which might be due to the variation of in dragon fruit pulp used for preparation of *shrikhand*^[7]. Singh and Kumar (2017), observed that there was decrease in protein with increase in wood apple pulp concentration of *shrikhand* i.e. from 7.48 to 6.6 per cent for treatment T₀ to T₃ respectively^[9].

Moisture: It was observed that the average moisture content of finished product were to be found as 40.13, 43.52, 45.49 and 48.05 per cent in treatments T₁, T₂, T₃ and T₄, respectively. It was also observed that the lowest moisture content was in T₁ (40.13) and the highest was found in T₄ (48.05). All treatments significantly difference from each other. This might be due to due to higher water holding capacity of interactive mixture of kiwi fruit and milk solids. Sameem *et al.* (2018)^[7], reported that the level of dragon fruit pulp increased, the moisture content in *shrikhand* also increased. It shows that average mean scores of moisture ranges from 42.7, 43.98, 45.25 and 46.52 for the treatments T₀, T₁, T₂ and T₃, respectively^[7]. Sharma *et al.* (2017), studied the effect of percentage incorporation of sapota pulp on physico-chemical characteristic of cocoa *shrikhand* and shows that the increase in proportion of sapota pulp in *shrikhand*, moisture content in *shrikhand* also increased. Moisture content increases from 38.04 to 40.32 for treatment T₀ to T₃. Moisture content in *shrikhand* increased may be due to increase in the proportion of sapota pulp^[8].

Total solid: It was observed that the average total solid content of treatment T₁, T₂, T₃ and T₄ were 59.87, 56.48, 54.52 and 51.96, per cent, respectively. The values of total solid content in all the treatment significantly differed from each other. It was also observed that the total solid content was in decreasing order from treatment T₁ to T₄. Sameem *et al.* (2018)^[7], found similar results in dragon fruit pulp added *shrikhand*. They reported that blending of dragon fruit pulp in *shrikhand* resulted in decreased in total solid content with increasing concentration of dragon fruit pulp proportion in the blend. The mean value for total solid of *shrikhand* samples were observed as 57.33, 56.03, 54.75 and 53.48 for T₀ T₁, T₂ and T₃, respectively^[7]. Sharma *et al.* (2017), also observed similar trends in their study and mentioned the same reason that as total solid content decreased with increase in the proportion of sapota pulp and cocoa powder in the blend of *shrikhand*^[8].

Ash: The average ash content of finished product was 0.96, 0.92, 0.87 and 0.80 percent in treatment T₁, T₂, T₃ and T₄, respectively. It was also observed that the lowest ash content was in T₄ and highest was found in T₁. All the treatments were significantly different from each other and decreased the ash content as the kiwi fruit pulp was increased. Singh and Kumar (2017), studied the wood apple blended *shrikhand*. The ash content of wood apple pulp added *shrikhand* was increased with increase in the proportion wood apple pulp. It also reported that ash content of wood apple pulp *shrikhand* for treatment T₀, T₁, T₂ and T₃ were 0.88, 0.82, 0.77 and 0.74

per cent, respectively^[9]. Chorage *et al.* (2018)^[1], also reported that ash content of *shrikhand* for treatment T₀, T₁, T₂, T₃ and T₄ were 0.53, 0.51, 0.47 and 0.45 per cent, respectively. The ash content of *shrikhand* was decreased with increase in the proportion of *yoghurt* culture and ginger juice in *shrikhand*. It was also showed that increasing *yoghurt* culture and ginger juice proportion in the blend there was decrease in ash content of *shrikhand*. It may be due to decrease in the total solid content^[1].

Conclusion: It was observed that as the level of kiwi fruit pulp increased, there was increased acidity, moisture and decreased in ash, fat, total solid, protein and pH content of kiwi fruit pulp added *shrikhand*.

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