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## Studies on physico-chemical properties of diabetic shrikhand by using Jamun (*Syzygium Cumini* L.) Pulp

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**Abstract**

The research work was conducted in the laboratory of Department of Animal Husbandry and Dairy Science, College of Agriculture, Latur, VNMKV, Parbhani during the year 2018-19. Shrikhand prepared by using of buffalo milk chakka with jamun pulp was prepared from different proportion of jamun pulp. It is well known that inclusion of jamun in your diet and it may naturally reduce the amount of sugar in blood. The developed samples of shrikhand prepared by using jamun pulp were subjected for the analysis of physico-chemical properties i.e. acidity, pH, fat, protein, moisture, total solids and ash along with its control treatment. The range of acidity for jamun pulp added shrikhand was 1.03, 1.11, 1.22 to 1.31% for treatments T0 to T3, respectively and the pH range for jamun pulp added shrikhand was 4.55, 4.45, 4.37 and 4.28 for treatments T0 to T3, respectively. The fat content of jamun pulp added shrikhand was 9.13, 8.03, 7.45 and 6.00% and the of protein content for jamun pulp added shrikhand was 7.79, 7.21, 6.73 and 6.14% for treatments T0, T1, T2 and T3, respectively. The moisture content of jamun pulp added shrikhand was 40.18, 47.20, 47.79 and 48.64% and total solids content of jamun pulp added shrikhand was found to be 59.82, 52.80, 52.21 and 51.37% for treatments T0, T1, T2 and T3, respectively. The mean ash content in the jamun pulp added shrikhand was found to be 0.89, 0.87, 0.83 and 0.80% for treatments T0 to T3, respectively.

**Keywords:** Shrikhand, Jamun pulp, Physico-chemical properties

**Introduction**

Shrikhand is one of the fermented indigenous milk product obtained by fermented action of lactic acid bacteria. The name shrikhand is derived name from the Sanskrit word 'Shrikharani' meaning a curd prepared with added sugar, flavouring agent like saffron fruits and nuts (Srinivas *et al.* 2017)<sup>[12]</sup>.

Shrikhand is an Indian quarg belonging to the family of fermented dairy product and mostly popular in Maharashtra, Gujrat, Karnataka and some parts of South India. As fermented products have better keeping quality and are easily digestible, highly nutritious because of increased vitamin contents (Sonawane *et al.* 2007)<sup>[11]</sup>.

Fermented milk products constitute a vital component of the human diet in many regions of the world. Indian fermented milk products utilize 7% of total milk produced and mainly include three sweetened products i.e. dahi, shrikhand and lassi. These products have enjoyed reputation for their nutritional and therapeutic value from time immemorial and play an important role in synthesis of vitamin B complex in human body. These products also prevent the stomachic diseases, because several lactic organisms produce natural antibiotics. Shrikhand is popular dessert and forms part of a delicious supplement on religious functions (Devi *et al.* 2018)<sup>[4]</sup>.

Jamun is considered as a traditional medicine that helps in controlling diabetes. Specifically, jamun has an action on the pancreas, the main organ responsible for causing diabetes. The jamun seeds contain a type of glucose called Jamboline, which checks the conversion of Jamun (*Syzygium Cumini* L.).

The jamun fruits have various medicinal properties such as stomachic, astringent, anti-scorbutic, diuretic, anti-diabetic, anti-oxidant, anti-proliferative and efficacy in reducing the risk of enlargement of spleen. The fruit concentrate has a very long history of being used for treatment of chronic diarrhoea and other enteric disorders. The fruit extract has also showed anti proliferative and pro-apoptotic effects against breast cancer cells.

These species are reported to be very rich in tannins, essential oils, anthocyanin, flavonoids and other phenolic compounds (Sadawarte *et al.* 2015)<sup>[7]</sup>.

Jamun is considered as a traditional medicine that helps in controlling diabetes. Specifically, jamun has an action on the pancreas, the main organ responsible for causing diabetes. The jamun seeds contain a type of glucose called Jamboline, which checks the conversion of starch into sugar in cases of increased production of glucose, the main reason behind your high sugar levels (Bhowmik *et al.* 2013) [1]. Dagadkhair *et al.* (2017) [3], studied the chemical composition of jamun (*Syzygium Cumini*) seeds: a traditional therapeutic tree and its processed food products. Fruit pulp contains anthocyanins, diglucosides of delphinidin, petunidin, malvidin, peonidin, and cyanidin. Volatile oils such as  $\alpha$ -pinene,  $\beta$ -pinene,  $\beta$ -myrcene, cis-ocimene, trans-ocimene, terpinolene, linalool, 4-terpineol,  $\alpha$ -terpineol, cis-dihydrocarvone, caryophyllene,  $\alpha$ -humelene, cis- $\beta$ -farnesene, cis- $\alpha$ -farnesene, trans- $\alpha$ -farnesene, cis-nerolidol, geranyl butyrate, globulol, widdrol, torreyol, neocedranol,  $\beta$ -bisabolol. In that observed composition of jamun pulp moisture (75.9%), protein (3.88%), fat (0.17%), ash (2.67%), (fibre 1.82%), carbohydrates (15.53%), ascorbic acid (204 mg), carotenoids (2.02 mg) and TSS0 Brix (24).

**Materials**

Following technical programme were developed to meet the objectives of present study.

**Collection of buffalo milk**

The whole fresh and clean standardized fresh buffalo milk was procured from local market of Latur city, of Natural Milk Pvt., Ltd., Latur having 6.0% fat and 9% SNF.

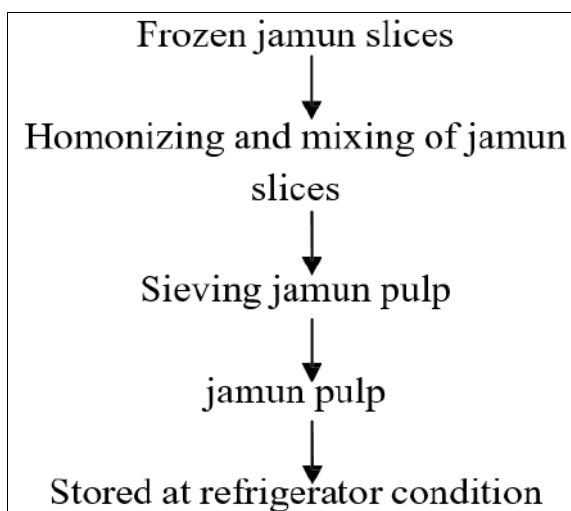
**Collection of Jamun pulp**

Frozen jamun slices were purchased from local market of Latur (MS).

**Methodology**

**Preparation of Jamun pulp**

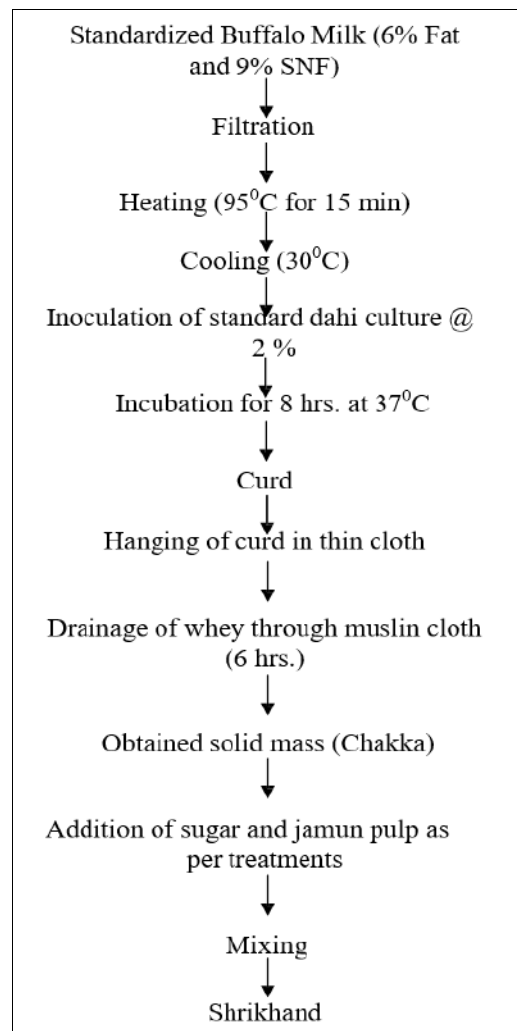
The frozen jamun slices purchased from local market of Latur. That frozen slices were softened and prepared a pulp in mixer. After that jamun pulp was sieved with the help of normal sieve to remove the outer peel of jamun. After the sieving the pulp was stored at refrigerator condition for further used.



**Flow dig 1:** Preparation of jamun pulp

**Preparation of shrikhand by adding jamun pulp**

Shrikhand was prepared by using jamun pulp with buffalo milk’s chakka as per in flow dig. (2)



**Flow dig 2:** Preparation of jamun pulp shrikhand (Singh and Paswan, 2015) [10]

**Treatment combinations**

For preparation of jamun shrikhand by using jamun pulp (*Syzygium Cumini* L.), the treatment combinations were finalized on weight basis as per Table no. (1).

The 40% sugar was used for all treatments and different levels of jamun pulp were tried and compared with control (T0).

**Table 1:** Treatment combinations used for research work.

| T0 | 100 Parts of chakka                        |      |
|----|--|------|
| T1 | 90.0 Parts of chakka + Parts of Jamun pulp | 10.0 |
| T2 | 80.0 Parts of chakka + Parts of Jamun pulp | 20.0 |
| T3 | 70.0 Parts of chakka + Parts of Jamun pulp | 30.0 |

**Results and Discussion**

The study was undertaken to prepare jamun-shrikhand by using jamun pulp. The requisite samples of shrikhand prepared by using jamun pulp were subjected for analysis of physico- chemical properties viz. acidity, pH, fat, protein, moisture, total solids and ash along with its control. The results obtained on account of this parameter are presented in Table no. (2).

**Table 2:** Physico-chemical evaluation of jamun pulp added shrikhand

| Sr. No. | Parameters   | Treatments |       |       |       | S.E.± | C.D.at 5% |
|---------|--------------|------------|-------|-------|-------|-------|-----------|
|         |              | T          | T     | T     | T     |       |           |
| 1       | Acidity      | 1.03       | 1.11  | 1.22  | 1.31  | 0.007 | 0.024     |
| 2       | pH           | 4.55       | 4.45  | 4.37  | 4.28  | 0.044 | 0.137     |
| 3       | Fat          | 9.13       | 8.03  | 7.45  | 6.00  | 0.074 | 0.228     |
| 4       | Protein      | 7.79       | 7.21  | 6.73  | 6.4   | 0.114 | 0.352     |
| 5       | Moisture     | 40.18      | 47.20 | 47.79 | 48.64 | 0.315 | 0.963     |
| 6       | Total Solids | 59.82      | 52.80 | 52.21 | 51.37 | 0.317 | 0.973     |
| 7       | Ash          | 0.89       | 0.87  | 0.83  | 0.80  | 0.015 | 0.047     |

### 1. Acidity of jamun pulp added shrikhand

Titration acidity of a food system is indicative of the total acid concentration within a food and it is a better predictor of an acid's impact on flavour than pH. From the table no. (2), it indicated that the average acidity percent of finished product found to be 1.03, 1.11, 1.22 and 1.31 percent for treatment T0, T1, T2 and T3, respectively. The acidity of finished product was increased in concentration of jamun pulp. It may be due to higher acidity of jamun pulp. (Sehwag and Das 2014) [8].

The above results were comparable with the findings of Para *et al.* (2014) [6], who studied the effect of orange pulp and chiku pulp in combination on the quality characteristics of shrikhand and acidity increased significantly with increasing level of orange and chiku pulp combination.

### 2. pH of jamun pulp added shrikhand

The pH of the finished product was measured by using digital pH meter at room temperature after standardized the instrument. From the table average pH of finished product was recorded 4.55, 4.45, 4.37 and 4.28 percent for treatment T0, T1, T2 and T3, respectively.

The values recorded in pH content in the present investigation were comparable with Chaudhari *et al.* (2017) [2], who prepared shrikhand by using banana pulp. It was found that banana shrikhand has acidic pH 4.0. Standard shrikhand has pH of 6.0. The banana pulp added shrikhand is low as compare the standard.

### 3. Fat of jamun pulp added Shrikhand

The fat of developed product was measured by Gerber's fat determination instrument. From that table indicates that the average fat percent of finished product found to be 9.13, 8.03, 7.45 and 6.0% for treatment T0, T1, T2 and T3, respectively. The fat content of finished product was decreased due to the lowest fat percentage level of jamun pulp (Sehwag and Das 2014) [8].

The above results are comparable with the findings of Thakur *et al.* (2014) [13], who prepared shrikhand by using mango pulp. The fat percentage observed in between the range of 3.99 to 4.92. However differences in this value were significant and dropping in nature.

### 4. Protein content of jamun pulp added shrikhand

The values recorded in respect of protein content of the finished product are shown in table no. (2). The average protein content of the shrikhand samples was found to be 7.79, 7.21, 6.73 and 6.14% for treatment T0, T1, T2, and T3, respectively.

The values recorded in protein content in the present investigation were comparable with Kumar *et al.* (2011) [5], who studied the effect of apple pulp and *Celosia argentea* on the quality characteristics of shrikhand. The mean protein values of shrikhand ranged from 3.17 to 6.25%. A significantly decreasing trend was observed with increasing level of the apple pulp.

### 5. Moisture content of jamun pulp added shrikhand

The values recorded in respect of moisture content of the finished product are shown in table no. (2). It was observed from the table that average moisture content of finished product was found as 40.18, 47.20, 47.79 and 48.64 for treatments T0, T1, T2 and T3, respectively. The control shrikhand was significantly having lower moisture as compared to jamun added shrikhand. It might be due to the addition of jamun pulp after drainage of whey from curd, which had more moisture than chakka.

The values recorded in moisture content in the present investigation were comparable with Sharma *et al.* (2017) [9], who observed the physicochemical characteristics of sapota incorporated shrikhand. The moisture content in shrikhand for treatment T0, T1, T2 and T3 was 38.04, 38.62, 39.60 and 40.32, respectively. The moisture content increased with increasing level of sapota pulp.

### 6. Total solid content of jamun pulp added shrikhand

The values recorded in respect of total solids content of the finished product are shown in table no. (2). It is clearly indicated from table that the treatment T0, T1, T2 and T3 were 59.82, 52.80, 52.21 and 51.37, respectively. From the no. (2), it is evident that average total solid content was decreased from T0 to T3.

The above results were comparable with the findings of Sonawane *et al.* (2007) [11], who studied the effect of levels of strawberry pulp and sugar on chemical composition during storage of shrikhand. The total solid content in shrikhand samples ranged from 36.53 to 46.87% with an average value of 41.05%.

### 7. Ash content of jamun pulp added shrikhand

From table no. (2), it indicated that the average ash content of finished product was 0.89, 0.87, 0.83 and 0.80% for treatment T0, T1, T2 and T3, respectively.

The above results are comparable with the findings of Kumar *et al.* (2011) [5], who observed that the effect of apple pulp and *Celosia argentea* on the quality characteristics of shrikhand. The mean ash percentage value of shrikhand ranged from 0.25 to 0.59%. A significantly decreasing trend was also observed with increasing level of apple pulp.

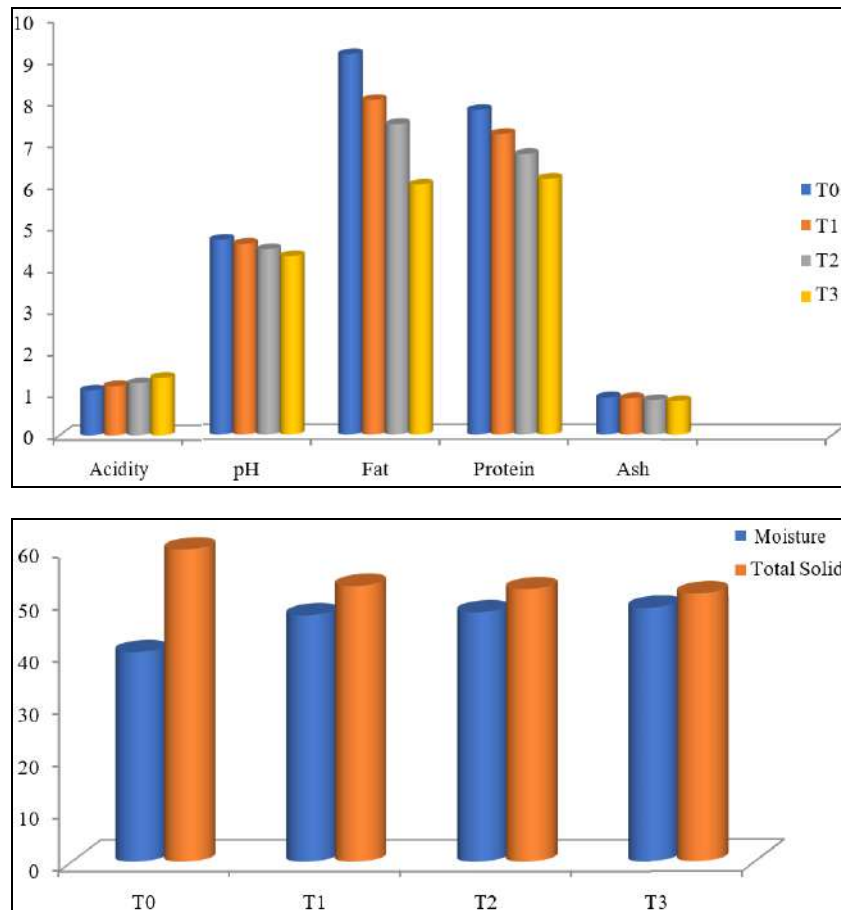


Fig 1: Physico-chemical Properties of Jamun Pulp added Shrikhand

### Conclusion

From present investigation it was concluded that the jamun pulp could be very well utilized for preparation of palatable and nutritional shrikhand. It was observed that as the blending of jamun pulp increased and chakka decreased, there was increase in acidity and moisture content whereas, decrease in pH, protein, total solids, ash and, fat, content of shrikhand. The blend of treatment T3 was more acceptable than T0, T1, and T2.

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