Studies on Sensory Evaluation of Diabetic Shrikhand by using Jamun (Syzygium Cumini L.) Pulp

P.B. Chavan, P.V. Padghan and P.S. Andharepatil

ABSTRACT
Shrikhand was prepared by using jamun pulp at 10 per cent, 20 per cent and 30 per cent on the weight basis of chakka with 40 per cent sugar. The main aim of using jamun pulp was to harvest and conserve the medicinal properties of jamun specially anti-diabetic and used of a major and cheap source of manganese, calcium, iron, potassium and sodium. It is well known that inclusion of jamun in your diet and it may naturally reduce the amount of sugar in blood. The product obtained was subjected for sensory evaluation by panel of judges. It was observed that the colour and appearance score for treatment T1, T2, T3 and T4 was 7.63, 7.50, 8.00 and 8.50, respectively. Flavour score was 8.13, 8.00, 8.25 and 8.38, respectively. Taste score was 8.13, 7.75, 8.00 and 8.25, respectively. Consistency score was 8.25, 7.75, 7.75 and 7.75, respectively. Overall acceptability scores for sensory was 8.03, 7.75, 8.00 and 8.22, respectively. Sensory parameters of shrikhand i.e. Colour and appearance, flavour, taste and overall acceptability was increased progressively in all treatments but consistency goes on decreased and remain constant for jamun pulp added shrikhand.

Key words: Jamun pulp, Sensory quality, Shrikhand.

INTRODUCTION
Fermented milk products constitute a vital component of the human diet in many regions of the world. Indian fermented milk products utilize 7 per cent 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, particularly in the state of Maharashtra, Gujarat, Karnataka and some parts of South India Devi et al. (2018). Shrikhand is a sweetened lactic acid fermented milk product which popular delicacy in Indian states. Shrikhand is a semi soft, sweetish, sour, whole milk product prepared from lactic fermented curd. The curd (dahi) is partially strained through a cloth to remove the whey and thus produce a solid mass called chakka (the basic ingredient for shrikhand). This chakka is mixed with the required amount of sugar etc. to yield shrikhand. Mehrotra et al. (2014).

Jamun (Syzygium cumini L.) is commonly known as Indian Blackberry, Jambul, Black Plum and Java Plum and it belongs to the family Myrtaceae. Large trees cultivated throughout India for the edible fruits that are reported to contain huge amount of vitamin C, gallic acid, tannins and anthocyanins includes cyanidin, petunidin and malvidinglucoside. The fruit has a combination of sweet, mildly sour and astrangent flavour and tend to colour the tongue purple due to presence of high amount of anthocyanins. Jamun fruits have higher level of antioxidant activity compared to other popular fruits like sapota, papaya, banana and guava. The higher antioxidant activity attributed due to presence of vitamins, tannin and anthocyanins. Jamun fruits is widely used by traditional practitioners over many centuries for the treatment of a number of diseases due to presence of following pharmacological actions viz., free radical scavenging, antioxidant, hepatoprotective, anti-diarrhoeal, hypoglycaemic, anti-diabetic effects, antibacterial, antifungal, antiviral, antigenotoxic, anti-inflammatory, anti-ulcerogenic, cardioprotective, anti-allergic, anticancer, chemopreventive and radioprotective. The pulp of jamun is highly nutritious and contains important minerals like sodium, potassium, calcium, phosphorous, iron and zinc, water soluble vitamins like ascorbic acid, thiamine and niacin, carbohydrates like glucose, mannose, sucrose, maltose, fructose, galactose and mannose, free amino acids like alanine, asparagine, tyrosine, glutamine and cysteine.

There is a great scope for the development of value added dairy products with this fruit not only because of their exotic flavour but also due to their nutraceutical importance and therapeutic values. Thus, processing of jamun fruit into value-added products result in a wide variety of exotically flavoured product with better nutritional and sensory qualities may unveil new market for export. Singh and Paswan (2015).
MATERIALS AND METHODS

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

1. 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 per cent fat and 9 per cent SNF.

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

Preparation of jamun pulp
Frozen jamun slices
↓
Homogenizing and mixing of jamun slices
↓
Sieving jamun pulp
↓
jamun pulp
↓
Stored at refrigerator condition

Flow dig. Preparation of jamun pulp

Preparation of Jamun Pulp added Shrikhand
Standardized Buffalo Milk (6 % Fat and 9 % SNF)
↓
Filtration
↓
Heating
(95°C for 15 min)
↓
Cooling (30°C)
↓
Inoculation of standard dahi culture @ 2 %
↓
Incubation for 8 hrs at 37°C
↓
Curd
↓
Hanging of curd in thin cloth
↓
Drainage of whey through muslin cloth (6 hrs.)
↓
Obtained solid mass (Chakka)
↓
Addition of sugar and jamun pulp (as per treatments)
↓
Mixing
↓
Shrikhand

RESULTS AND DISCUSSION

Flavour
The flavour of any food product is an important attributes as far as consumer liking is concerned and shrikhand is not exception to it. The flavour is much more important than other properties due to its instant feeling and first indication about quality of food. The average mean score for flavour jamun shrikhand was 8.13, 8.00, 8.25 and 8.38 for treatments T₀, T₁, T₂ and T₃ respectively. It is observed from the table average mean score of flavour were ranges between 8.0 to 8.38 for all treatment combination. The flavour score highest in T₃ treatment may be due to the excessive use of jamun pulp in shrikhand.

Similar result noticed by David J. (2015) that increased average mean score for flavour preparation of herbal shrikhand prepared with basil (Ocimum basilicum) extract. More et al. (2017) also studied the increased average mean score for flavour organoanleptic evaluation of shrikhand prepared from soya milk blended with cow milk.

Taste
The score for taste of shrikhand prepared by using jamun prepared by using jamun (Syzygium cumini L.), the treatment combinations were finalized on weight basis as follows:

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

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

A sensory score card suggested by Amerine et al. (1965) with little modification was adapted to analyze the sensory characteristics of the jamun pulp added shrikhand. The acceptability of jamun pulp added shrikhand was evaluated on the basis of sensory attributes such as colour and appearance, flavour, taste, Consistency and overall acceptability using 9 Point hedonic scale by a panel of five semi expert judges. The data so obtained were analyzed using completely randomized design (CRD) and shown in forth coming Table 1.

Colour and appearance
In developed shrikhand as compared to control shrikhand had range between 7.50 to 8.50. That means of all treatments were acceptable and secured score more than seven indicates like moderately on 9 point hedonic scale for colour and appearance. The average score of colour and appearance of jamun pulp added shrikhand were 7.63, 7.50, 8.00 and 8.50 for the treatments T₀, T₁, T₂ and T₃ respectively.

Similar result found by Thakur et al. (2014) observed increased average scores for colour and appearance preparation of shrikhand by using mango pulp. Yadav et al. (2018) also indicated that increased the proportion of sapota pulp and betel leaf extract increased the score for colour and appearance of goat milk shrikhand.

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pulp with buffalo milk was recorded as combine response of sweetness and pleasant smell. The mean taste score for shrikhand prepared by using jamun pulp were 8.13, 7.75, 8.00 and 8.25 for the treatment $T_0$, $T_1$, $T_2$, and $T_3$ respectively. The taste score observed between 8.13 to 8.25 i.e. like moderately to like very much, it means as per the taste is concerned all the treatments were acceptable.

But the score was increased due to the use of jamun, it may be due to the bitter taste of jamun and changed taste of developed shrikhand as compared to control shrikhand. Similar result to be initiated by Nadaf et al. (2012) the mean scores of taste showed a significantly increasing trend with increasing level of gulkand in gulkand and rose petal powder shrikhand. Thakur et al. (2014) also observed increased average mean score for taste preparation of the shrikhand by using mango pulp.

Consistency
The average mean score of consistency of jamun shrikhand for different treatment varied from 7.75 to 8.25. The mean consistency score for treatments $T_0$, $T_1$, $T_2$ and $T_3$ was 8.25, 7.75, 7.75 and 7.75, respectively.

Similar result found by Para et al. 2014 the mean consistency score decreased significantly with increasing level of orange pulp and chiku pulp in combination (1:1). Sonawane et al. 2013 also observed decreased average mean score for consistency of jambhul/powder enriched milk kulfi.

Overall acceptability
Overall acceptability can be considered as a complex characteristic of food that determines its value or acceptability to consumer. Quality is judged by both subjective and objective tests. The subjective tests are the sensory tests and whereas the objective tests are the chemical and nutritive tests. It is clearly noticed from the overall acceptability table that the treatment $T_3$ shrikhand have higher score than the developed ones. The mean score for overall acceptability for treatment $T_3$, $T_0$, $T_2$ and $T_3$ were 8.03, 7.75, 8.00 and 8.22, respectively.

Similar result observed by David J. (2015) that studied the preparation of herbal shrikhand prepared with basil (Ocimum basilicum) extract. Yadav et al. (2018) also indicate that, increased in proportion of sapota pulp and betel leaf extract in the blend increased the score for consistency of goat milk shrikhand.

**CONCLUSION**
Since from current investigation it can be concluded that treatment $T_3$ with 30 per cent jamun pulp and 70 per cent buffalo milk chakka was significantly superior over treatment $T_0$, $T_1$, and $T_2$ which had the highest sensory score with respect to colour and appearance, flavour, taste and consistency. It was observed that the overall acceptability score increased as proportion of jamun pulp.

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