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Sensory properties of buffalo milk Shrikhand by using of date (*Phoenix dactylifera*) Pulp

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Abstract

In present studies of preparation of shrikhand by using buffalo milk and date pulp at different date pulp levels i.e. 0%, 10%, 20% and 30% for treatments T₁, T₂, T₃ and T₄, respectively. It was observed that the Overall acceptability mainly describe by average mean of sensory parameters, respectively. The present investigation indicates that the mean average of overall acceptability of shrikhand for treatments T₁, T₂, T₃ and T₄ were scores 7.89, 8.01, 8.25 and 8.18, respectively in ascending order and then decreased. The lowest score of overall acceptability listed for control T₁ (7.89) and uppermost score found in T₃. From the above scores it specified that addition of date pulp in shrikhand initially increased at particular point and then declined. It may therefore, be concluded that the using of 20 per cent date pulp in 80 per cent *chakka* for preparation of shrikhand is acceptable, comparatively cheaper and adaptable as far as processing technology is concerned.

Keywords: buffalo milk, date pulp, Chakka, sensory parameters

Introduction

The fermented milk products have enjoyed reputation for their nutritional and therapeutic value from, time immemorial. Shrikhand is a semi solid, sweetish-sour fermented milk product prepared from dahi, whey is drained off from dahi to yield *chakka*. Sugar, flavor, colour are mixed into *chakka* to form a soft homogenous mass that resembles sweetened quarg of Germany (Landge *et al.* 2011) [5]. The name shrikhand is derived from the Sanskrit word 'Shikharini'. Shrikhand is semi solid; sweetish-sour fermented milk product is prepared by fermentation of milk with lactic acid bacteria expulsion of whey from the curd of yield *chakka* and by adding it with sugar, flavoring agent, fruits and nuts. It is known for high nutritive, characteristic flavor taste, palatable nature and possible therapeutic value. (More *et al.* 2017). Date has much nutritive value and can play an effective role in providing the nutritional needs of humans. Each kilogram of fresh date contains approximately 1570 calories of energy, whereas dry date contains more than 3000 calories per kg. (Mete *et al.* 2017) [7]. a. Date fruit is also a good source of important phyto-chemicals, including carotenoids, phenolics, and flavonoids. Date fruit can not only provide antioxidant, anti-mutagenic, and immune-modulatory benefits to health but also has diverse medicinal values, including anti-hyperlipidemic, anticancer, gastro-protective, hepato-protective, and nephro-protective properties. (Raina *et al.* 2014) [10].

Materials and Methods

Methods Buffalo milk and Date pulp

Standardized fresh buffalo milk was collected from local market of Latur city, of Natural Milk Pvt., Ltd., Latur having 6.0 per cent fat and 9 per cent SNF. The Date fruit (Kimia Variety) was purchased from local market of Latur city. Date pulp was prepared in laboratory.

Packaging Material

The prepared product was packed in plastic container (Glass) and kept at refrigerator temp 5±1 °C for storage.

Equipment and Accessories

Equipment's and accessories include stainless steel vessels of requisite capacity, knives, incubator, fruit extractor/mixture, muslin cloth, standard weight balance, thermometer, gas shedgi etc for preparation of date pulp added shrikhand. Before using this material, it was properly cleaned and washed with detergent solution and all the precautionary measures was considered during the conduct of trials to avoid contamination.

Preparation of Date Pulp

For preparation date pulp fresh dates was used. Firstly removed the seeds of dates. The dates were grinded in a mixer for few minutes to obtain pulp. The pulp was stored in refrigerator for further use. The date pulp obtained from 1 kg date pulp was 750 gm.

Preparation of Shrikhand by using Date Pulp

For preparation of shrikhand by using buffalo milk and date pulp. The buffalo milk was heated at 80 – 85 °C for 15 minute and cooled to room temperature (37 °C). After cooling 2 per cent standard dahi culture NCDC – 167 was added in the milk and incubated at 37 °C for 8 hours. The curd was obtained after incubation was tied in muslin cloth. Then it was hanged in double folded muslin cloths to drain out of whey for 6-8 hours. The chakka was used as base material for preparation of shrikhand. Then chakka was weighted and divided into four portions. In each parts of chhaka were considered as treatments and powdered sugar were added T₁ 35 per cent, T₂ 30 per cent, T₃ 25 per cent and T₄ 20 per cent and date pulp also added in three treatments as per treatment combinations to maintain the desire sweetness of final product. The proportion of sugar was reduced as the proportion of date pulp increased. Finally proper mixing was done and packed the shrikhand was kept at refrigerator condition for further study.

Result and Discussion

Sensory Evaluation of Date Pulp Added Shrikhand

Sensory evaluation has been defined as a scientific method used to analyze and interpret those responses of products as perceived through the smell, touch, taste and senses of sight/look, appeal to consumers for its perception. The samples of date pulp added shrikhand were subjected for the sensory attributes such as colour and appearance, flavour, consistency, taste and overall acceptability by semi trained panel judges of using of a 9 point Hedonic scale. The scores given by judges for different parameters were recorded and subsequently discussed in the tables and paragraphs.

Colour and Appearance Score of Date Pulp Added Shrikhand

The score for colour and appearance is denoted in table. 1.

Table 1: Colour and appearance score of date pulp added shrikhand

Replication/Treatment	R ₁	R ₂	R ₃	R ₄	Mean
T ₁	8.00	8.00	8.00	8.00	8.00 ^a
T ₂	8.10	8.10	8.20	8.15	8.14 ^b
T ₃	8.45	8.55	8.40	8.50	8.48 ^c
T ₄	8.30	8.50	8.30	8.20	8.33 ^d
S.E.± 0.0527 C.D. at 5% 0.1150					

The values with different superscript row wise differ significantly at 5 and level of significance.

From the above table the values of the date pulp added shrikhand in respect of colour and appearance for treatments T₁, T₂, T₃ and T₄ were 8.00, 8.14, 8.48 and 8.33, respectively record from 8.00 to 8.48. The mean of all treatments were secured score greater than 8 denoting product on “9 point hedonic scale as like very much for colour and appearance parameters. The score of colour was initially high and then subsequently declined. This may be due to the faint brown colour appeared in T₄ treatment. All treatments T₁, T₂, T₃ and T₄ were significantly different from each other. The trend and value recorded in above table of date pulp added shrikhand for colour and appearance was increased first two treatments

and then starts to decline from third treatments. Then effect was noted same by other research work.

Landge *et al.* (2011) [5], prepared shrikhand using ashwagandha powder as additive. The trend of colour and appearance firstly increased and gradually decreased. The average mean score for colour and appearance were 7.25, 7.37, 7.56 and 7.42 for treatments T₀, T₁, T₂ and T₃, respectively. Ghode *et al.* (2016) [3], studied the utilization of rose petal powder in the preparation of shrikhand. The score of colour and appearance of rose petal powder added shrikhand were 12.38, 14.48, 16.20 & 15.06 out of 20 for treatments T₁, T₂, T₃ & T₄, respectively which indicate that the scores for colour and appearance were firstly increased and then decline. Hole *et al.* (2017) [4], studied on keeping quality of shrikhand prepared from cow milk blended with unripe banana. The sensory score for colour and appearance were went increasing and at the last treatment the score was declined gradually. The sore for all treatment combinations T₁, T₂, T₃, T₄ & T₅ were 17.80, 18.00, 18.25, 18.80 and 17.65, respectively.

Flavour Score of Date Pulp Added Shrikhand

Flavour has a important attribute of consumer for liking or disliking of concerned food items. The flavour has sense which comes together from smell and taste of shrikhand. Flavour has an important character for consumer acceptance proposes. It has an indication of the essential character of date pulp added shrikhand. The result for flavour score was presented by “9 point hedonic scale. The flavour score tabulated in table. 2.

Table 2: Flavor score of date pulp added shrikhand

Replication/Treatment	R ₁	R ₂	R ₃	R ₄	Mean
T ₁	8.05	8.00	8.01	8.00	8.02 ^a
T ₂	8.11	8.15	8.10	8.05	8.10 ^a
T ₃	8.45	8.40	8.30	8.30	8.36 ^b
T ₄	8.46	8.41	8.31	8.31	8.37 ^b
S.E.± 0.0290 C.D. at 5% 0.0895					

The values with different superscript row wise differ significantly at 5% and level of significance.

The above observation score for flavour of date pulp added shrikhand reveled that, the average mean score for flavour were 8.02, 8.10, 8.36 and 8.37 for treatments T₁, T₂, T₃ and T₄, respectively. In above observations the pattern of flavour score was increasing but T₃ and T₄ have nearly similar score and statistically at par with each other. The highest score T₄ i.e. 8.37 due 30 per cent pulp used in the shrikhand. In present work T₁ and T₂ found at par with each other and significantly different from treatments T₃ and T₄. The mean of all treatments were allowable and secured score greater than 8 denoting product liked more on “9 point hedonic scale for flavour. The values recorded for flavour of date pulp added shrikhand comparable with some other studies given below.

Para *et al.* (2014) [9], reported the sensory score for flavour for shrikhand prepared by orange and chiku pulp in (1:1) combination. The average mean score for treatments 7.00 ± 0.06, 7.02 ± 0.07, 7.18 ± 0.04 and 7.37 ± 0.06, respectively. And More *et al.* (2017) [8], reported the similar sensory score for flavour of shrikhand prepared by soymilk blended with cow milk. The score went increasing 6.25, 6.75, 7.00 and 7.38 scores for treatments T₁, T₂, T₃ and T₄, respectively. Kolape *et al.* (2010), studied the chemical, microbial and organoleptic quality of papaya shrikhand. The sensory parameter score for flavour of shrikhand were 7.10, 7.30, 7.53 and 8.05, respectively.

Taste Score of Date Pulp Added Shrikhand

Taste is one of the important parameters which fascinate the people for consumption of shrikhand or any product. The average score for taste were recorded in table. 3.

Table 3: Taste score of date pulp added shrikhand

Replication/Treatment	R ₁	R ₂	R ₃	R ₄	Mean
T ₁	7.95	8.00	8.00	7.90	7.96 ^a
T ₂	8.02	8.10	8.20	8.05	8.09 ^{ac}
T ₃	8.15	8.25	8.45	8.20	8.26 ^b
T ₄	8.10	8.15	8.28	8.15	8.17 ^{bc}
S.E.± 0.0527 C.D. at 5% 0.1372					

The values with different superscript row wise differ significantly at 5% and level of significance.

From given table. 3, it is reported that, the taste score for date pulp added shrikhand were listed for treatments T₁, T₂, T₃ and T₄ were 7.96, 8.09, 8.26 and 8.17, respectively. The lowest score obtained in T₁ (control) and highest in T₃ (20 per cent pulp) and then again declined gradually in further treatment. As per result treatment T₁ and T₂ was at par with each other and treatment T₃ and T₄ also at par with each other. The mean of all treatments were allowable and secured score nearly 8 denoting product liked more on “9 point hedonic scale for taste.

The comparable results for taste of date pulp added shrikhand are stated as in following some research works.

David (2015) [2], revealed that the taste score of basil extract shrikhand has got highest score in treatment T₃ (8.21) and after that T₀ (7.63), T₂ (7.98), T₁ (7.58) and T₄ (7.16), respectively. There was significant difference found in between them. Mehrotra *et al.* (2014) [6], they observed that, score of taste increased with increased in the level of stevia leaf powder shrikhand and then decreased. The average score were 7.73, 7.73, 7.74, 7.77 and 7.70 for 0 per cent (control), 10 per cent, 20 per cent, 30 per cent and 40 per cent levels of stevia leaf powder, respectively.

Consistency Score of Date pulp Added Shrikhand

The actual meaning of consistency has consistent behavior of any product. The consistency has texture parameter which attracts the people for buying the product. The consistency

score tabulated in table. 4.

Table 4: Consistency score of date pulp added shrikhand

Replication/Treatment	R ₁	R ₂	R ₃	R ₄	Mean
T ₁	7.50	8.00	7.50	7.60	7.54 ^a
T ₂	7.80	8.10	7.60	7.80	7.71 ^b
T ₃	8.00	8.55	7.85	8.00	7.91 ^c
T ₄	7.95	7.77	7.74	7.92	7.85 ^{bc}
S.E.± 0.0468 C.D. at 5% 0.1442					

The values with different superscript row wise differ significantly at 5 and level of significance.

The average consistency score denoted in table. 4 and revealed that, the range of scores for consistency 7.54, 7.71, 7.91 and 7.85 for treatments T₁, T₂, T₃ and T₄, respectively. The mean of all treatments were allowable and secured score nearly 8 denoting product liked more on “9 point hedonic scale for consistency. The average firstly increased and then decreased due to the more amount of date pulp disturbed the overall consistency of shrikhand. From the present result treatment T₂ and T₄ were at par with each other and treatment T₁ and T₃ were different from each other whereas T₂ and T₄ also par with each other at 5 per cent level of significance. Similar values that about consistency denoted by Yadav *et al.* (2018) [12] and some others.

Yadav *et al.* (2018) [12], concluded that the increased in the level of sapota pulp and betel leaf extract help to improve the consistency of shrikhand significantly up to certain level and then decreased. Thakur *et al.* (2014) [11], noted highest score of consistency in mango blended shrikhand for treatment T₃ (7.64) 20 per cent pulp followed by T₁ (7.44) 10 per cent pulp, T₂ (7.40) 15 per cent pulp and T₄ (7.32) 25 per cent pulp, respectively. The difference may be due to that the mango pulp was added by Thakur *et al.* (2014) [11].

Overall Acceptability Score for Date Pulp Added Shrikhand

Overall acceptability is average mean of all sensory parameters which means acceptability to consumer. In the overall acceptability quality is judge by objective and subjective tests. The score for overall acceptability for treatments T₁, T₂, T₃ and T₄ is denoted in table. 5.

Table 5: Overall acceptability score of date pulp added shrikhand

Replication/Treatment	Colour and appearance	Flavor	Taste	Consistency	Mean
T ₁	8.05	8.02	7.96	7.54	7.89 ^a
T ₂	8.14	8.10	8.09	7.71	8.01 ^{ab}
T ₃	8.48	8.36	8.26	7.91	8.25 ^b
T ₄	8.33	8.37	8.17	7.85	8.18 ^{ba}
S.E.± 0.1154 C.D. at 5% 0.3556					

The values with different superscript row wise differ significantly at 5 and level of significance.

From given table. 5 scores expressed accordingly all sensory parameters. Overall acceptability mainly describe by average mean of sensory parameters, respectively. The above table displays that the mean average of overall acceptability of shrikhand for treatments T₁, T₂, T₃ and T₄ were scores 7.89, 8.01, 8.25 and 8.18, respectively in ascending order and then decreased. The lowest score of overall acceptability listed for control T₁ (7.89) and uppermost score found in T₃. From the above scores it specified that addition of date pulp in shrikhand initially increased at particular point and then declined. Treatment T₁, T₂ and T₄ were at par with each other and treatments T₂, T₃ and T₄ at par with each other. It indicate that the overall sensory score of shrikhand's treatments were

not clear cut different from each other between developed treatments, it increased initially and the decreased after T₃. The results of overall acceptability of developed shrikhand were match to the trends of following workers.

David (2015) [2], was observed that, the overall acceptability of basil extract added shrikhand for different treatments varied between 7.66, 7.73, 7.90, 8.06 and 7.42 for treatments T₀, T₁, T₂, T₃ and T₄, respectively. Dandile *et al.* (2014) [1], was revealed that the overall acceptability of shrikhand by using cardamom and saffron. The score for overall acceptability were 7.39, 7.68, 8.01, 7.65, and 8.13 for treatments T₀, T₁, T₂, T₃ and T₄, respectively.

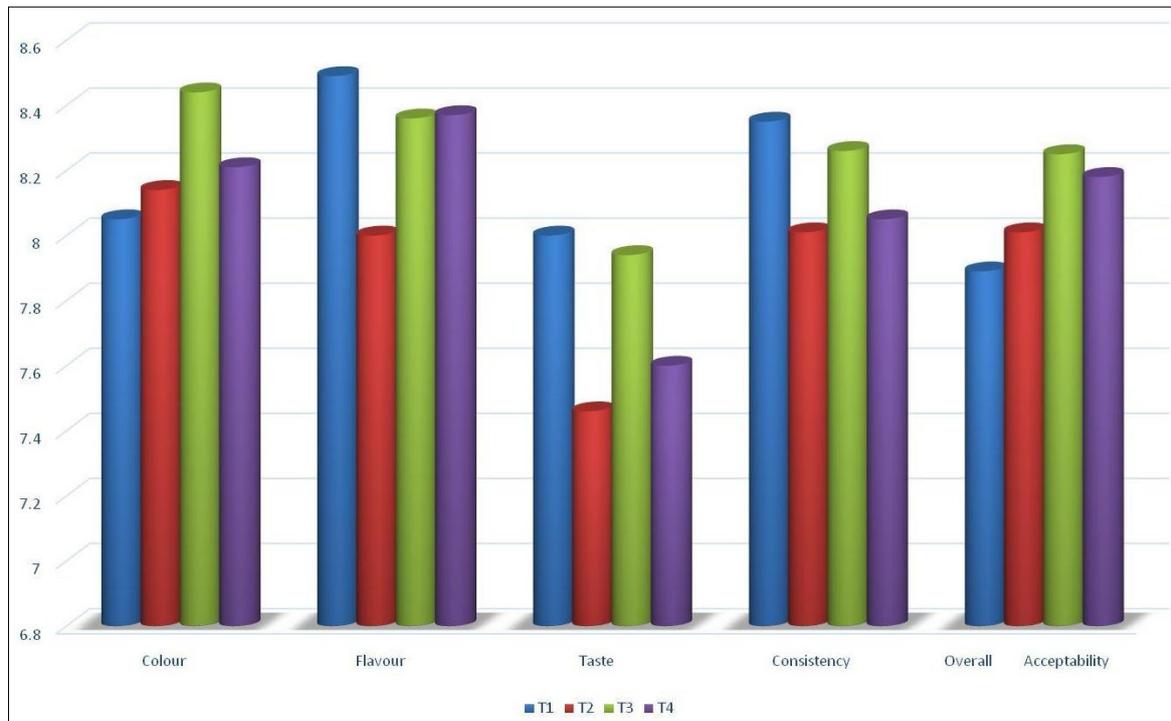


Fig 1: Graphical presentation of sensory evaluation of date pulp added shrikhand

Conclusion

From the above observation showed that by the addition of date pulp in shrikhand firstly increase the mean score of colour, taste, consistency and overall acceptability and then decreased gradually. Except flavor in above observations the pattern of flavour score was increasing but T3 and T4 have nearly similar score.

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