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Studies on sensory evaluation of flavoured milk prepared by using Gulkand

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Abstract
Beverages based on fruit and milk products are currently receiving considerable attention as their market potential is growing. Soft drink industry had made significant progress during recent years in terms of production, but there is only a limited range of flavours available in India. The present study was carried out to develop gulkand flavoured milk. The ratio for Milk and gulkand was for treatment T_1 96:4, T_2 94:6, T_3 92:8 and T_0 rose flavoured milk (0.2 per cent) rose flavour and sodium alginate as stabilizer (0.2%), in the formulation. Addition of gulkand improved sensory quality and acceptability of the product. The most acceptable quality flavoured milk could be prepared by using 8 per cent of the gulkand.

Keywords: Flavoured milk, Gulkand

Introduction
Flavoured milk is a beverage in which sugar, flavouring and colouring agents are added and it contains all the constituents of milk. It is a good source of protein, carbohydrate and minerals. regulate body temperature and prevent dehydration. Over the years, the importation of extremely large quantities of milk to satisfy the consumer demands for milk and other dairy products has been the source of genuine concern for the governments, processors and consumers alike because the imported milk is expensive and it drains large sums of foreign exchange reserves. New value-added milk products are entering the market. Some examples are milks fortified with calcium, cultured milk fortified with multivitamins and minerals, *flavoured milks* with banana, chocolate and strawberry flavours, new ready-to-drink blends of evaporated milk and black, green and chamomile teas with spices of cinnamon, ginger and clove. (Khalid and Singh 2017) [5].
*Flavoured milk*s are also prepared by adding various types of herbs to provide therapeutic value to the *flavoured milk*. Several vitamins and minerals are also added in *flavoured milk* to enrich with health providing components. Fruit based *flavoured milk* are prepared by adding fruit pulps or fruit juices to add the variety to the *flavoured milk*s (Tiwari and Asgar, 2017) [29].
Gulkand is an Arabic word Gul means Rose and Kand means Sugar. Gulkand is undoubtedly the most delicious ayurvedic preparation known to mankind. Traditionally it has been used as a cooling tonic to combat fatigue, lathery, muscular aches, biliousness itching, and heat-related conditions. It is naturally rich in calcium and also known as antioxidant and good blood purifier (Sundaram, 2010) [8]. Gulkand or rose petal jam is one of the most delicious ayurvedic preparations which have been used from ancient times for good health.

Material and Methods
Following technical programme has been developed to meet the objectives of the present study.

1. Collection of cow milk:
Already standardized fresh cow milk was procured from local market of Latur city, of Natural Milk Pvt., Ltd., Latur having 3.0 per cent fat.

2. Gulkand:
Fresh gulkand was purchased from local market of Latur city.

3. Sugar
Sugar was purchased from local market of Latur city.

4. Sodium alginate:
Sodium alginate was purchased from local market of Latur city.

5. Rose flavour:
Rose flavour purchased from local market of Latur city.

Treatment combinations
Fat level of cow milk is 3.0 per cent and sugar 7 per cent.
T_0 - Plain milk + 0.2 per cent rose flavour
T_1 - 96 parts plain milk + 4 parts gulkand
T_2 - 94 parts plain milk + 6 parts gulkand
T_3 - 92 parts plain milk + 8 parts gulkand

Methodology
Cow milk was heated to 35 to 40°C in a double packed stainless steel vat with constant stirring by a stainless steel ladle. Mixing of sugar, gulkand, stabilizer and preservative is done.
To prepare the gulkand *flavoured milk* the following formulations were used:

- Gulkand – 4, 6, 8 per cent by w/v of milk.
- Sugar 7 per cent by w/v of milk.
- Stabilizer-sodium alginate- 0.2 per cent by w/v of milk.

To prepare gulkand *flavoured milk* containing 7 per cent sugar was dissolved in some amount of warmed milk. The required amount of gulkand at the rate of 40, 60 and 80 g for 960, 940 and 920 ml of milk was taken and made a homogenous liquid with 50 ml warmed milk and mixed well. Then that mixture was grind in mixer. After that it was filtered through muslin cloth. Milk was heated until the sodium alginate was completely dissolved in the milk and mixed well in the boiling milk with constant stirring for 30 min. Allow milk to cool at 25 °C then added the filtered gulkand mixture and rose flavour as per treatment and mixed it properly. Then the *flavoured milk* was stored at 5 °C in refrigerator.

Flavoured milk **was prepared by adopting the procedure as shown in Fig. 3.1**

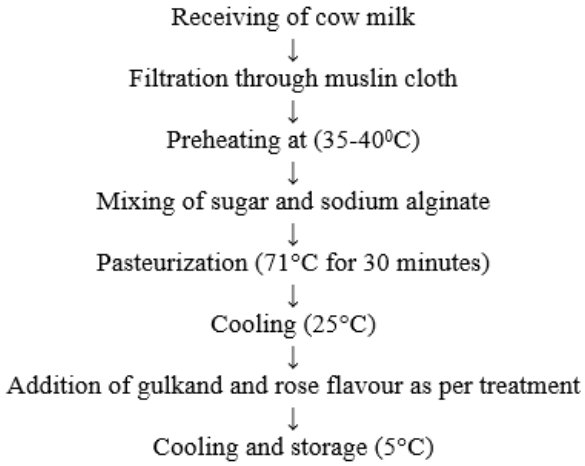

Fig 1: Flow diagram of manufacture of gulkand *flavoured milk*

Sensory evaluation of the product:
The product so obtained was subjected to organoleptic evaluation by the semi expert panel of judges. It was evaluated for colour and appearance, flavour, body and texture, sweetness and overall acceptability. Score card was provided to all judges, comparing "9-point hedonic scale" developed by Quarter Master Food and Container Institute, U.S.A. (Gupta, 1976).

Statistical analysis
The data were analyzed statistically by using Completely Randomized Design (CRD) as per Panse and Sukhatme (1985) [7]. The significance of the result was evaluated on the basis of critical difference. In all four replication was carried out.

Results and Discussion
Sensory evaluation of *flavoured milk* samples
The *flavoured milk* samples prepared from cow milk with gulkand with different levels were subjected for the sensory attributes such as colour and appearance, flavour, taste, consistency and overall acceptability by a semi trained panel of judges using a 9 point Hedonic scale The scores given by judges for different parameters were recorded and subsequently discussed in the paragraphs.

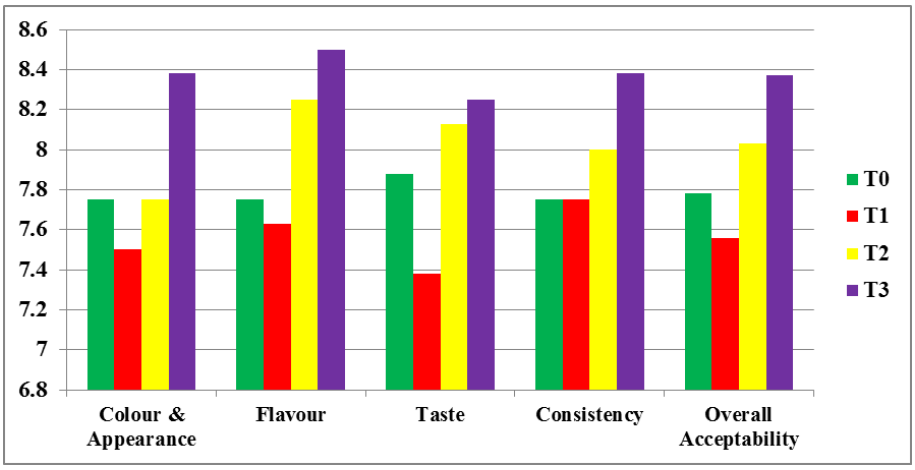

Fig 2: Sensory parameters in the paragraphs

Colour and appearance

The values of the gulkand *flavoured milk* in terms of colour and appearances for treatment T_0, T_1, T_2 and T_3 were 7.75, 7.50, 7.75 and 8.38, respectively. The treatment T_3 was recorded highest score than other treatments. The treatments T_1, T_2 and T_3 were found at par with each other. The effect of gulkand on colour quality of *flavoured milk* was noticeably faint brownish colour. The value recorded for colour and appearance of gulkand *flavoured milk* prepared from cow milk in present investigation are comparable with the finding of below mentioned research worker. Girase *et al.* (2017) [1], reported the colour and appearance score for gulkand burfi. The highest colour and appearance score (18.98 out of 20) of burfi prepared with addition of 6 per cent gulkand was superior over the rest of treatment and revealed that as the levels of gulkand increased, the score for colour and appearance of burfi also increased proportionately.

Flavour

The average means score of flavour for gulkand *flavoured milk* in treatment T_0, T_1, T_2 andT_3 were 7.75, 7.63, 8.25 and 8.50, respectively. The highest score for flavour was recorded for T_3 (8.50) followed by T_2 and T_0 whereas the lowest flavor score was recorded for treatment T_1 (7.63). Developed *flavoured milk* treatments were significant different from control. It is clearly indicated that preparation of *flavoured milk* by using gulkand for its flavour positively. The value recorded for flavour of gulkand *flavoured milk* in presented investigation was comparable with the finding of below mentioned research worker. Girase *et al.* (2017) [1], observed the flavour score for gulkand burfi. The flavour score for gulkand burfi treatment T_1, T_2, T_3 and T_4 were 39.36, 40.28, 41.46 and 42.54 respectively. Significantly highest score (42.54 out of 45) was obtained by burfi prepared with 6 per cent gulkand as compared to other treatments.

Taste

The average means score for taste of gulkand *flavoured milk* in treatment T_0, T_1, T_2 andT_3 were 7.88, 7.38, 8.13 and 8.25, respectively. The highest score for taste was recorded for T_3 (8.25) followed by T_2 and T_0 whereas the lowest taste score was recorded for treatment T_1 (7.38). Developed *flavoured milk* treatments were significant different from control. The value recorded for taste of gulkand *flavoured milk* in presented investigation was comparable with the finding of below mentioned research worker. Our finding was comparable with the work of Nadaf *et al.* (2012) [6], observed mean scores of taste of Shrikhand showed a significantly (p<0.05) increasing trend with increasing level of gulkand except sample GRS4. Kedare *et al.* (2018) [4], observed the taste score for *flavoured milk* enriched with lemongrass juice. The taste score for *flavoured milk* were for treatment T_0, T_1, T_2, T_3 and T_4 were 8.1, 8.56, 8.45, 8.7 and 7.4 respectively.

Consistency

The mean score for consistency of gulkand *flavoured milk* for treatment T_0, T_1, T_2 and T_3 were 7.75, 7.75, 8.0 and 8.38, respectively. The highest score for mouthfeel was recorded for treatment T_2 (8.25) and the lowest mouthfeel score was recorded for treatment T (8.38). Treatment T_3 was significantly superior over the rest of treatments, and at par with treatments T_0, T_1 and T_2. The value recorded for consistency of gulkand *flavoured milk* in presented investigation was comparable with the finding of below mentioned research worker. Jadhav and Pawar (2016) [2], studied influence of incorporation of blends of guar gum and acacia gum in the preparation of chocolate *flavoured milk*. The consistency score for sample A, B C, D and E were 7.5, 7.7, 7.8, 8.0 and 6.9 and revealed that as the level of addition of blend gum increased from 0.0 to 0.6 per cent decreased increased consistency score.

Overall acceptability

The mean overall score of acceptability of gulkand *flavoured milk* for the treatments T_0, T_1, T_2 and T_3 were 7.78, 7.56, 8.03 and 8.37, respectively. All treatments fall above the like moderately on 9 point hedonic scale having value more than 6. The highest overall acceptability score was observed in treatment T_3 i.e. (8.37). The lowest overall acceptability score was found in treatment T_1 (7.56) in gulkand *flavoured milk*. It was observed that all treatments were at par with each other. The different scientists studied on sensory attributes of *flavoured milk* and gave their parallel remarks to our findings. Girase *et al.* (2017) [1], observed the score for overall acceptability of burfi were 5.79, 6.98, 7.48 and 8.38 under the treatments 0, 2, 4 and 6 per cent, respectively The significantly highest score (8.38 out of 9) was observed by burfi prepared with 6 per cent of gulkand. Kavitkar *et al.* (2017) [3], observed the Overall scores increased from 7.10 for control to 7.90 for beetroot *flavoured milk*, by the addition of 4 ml BCE (Beetroot Colour Extract).

Conclusion

Flavoured milk with gulkand proved to be a one beverage for

all age group. It is nutrition, relishing, and refreshing. The present studies conduct that the beverage made with 92:8 milks to gulkand ratio to be the best in sensory quality.

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