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Mhetre Suhas

Department of Animal
Husbandry and Dairy Science,
College of Agriculture, Latur,
Maharashtra, India

Andhare Balasaheb

Department of Animal
Husbandry and Dairy Science,
College of Agriculture, Latur,
Maharashtra, India

Deshmukh Akshay

Department of Animal
Husbandry and Dairy Science,
College of Agriculture, Latur,
Maharashtra, India

Effect of gulkand on physico chemical properties of the flavoured milk prepared by using Gulkand

Mhetre Suhas, Andhare Balasaheb and Deshmukh Akshay

Abstract

The present study was carried out to develop Gulkand flavoured milk. The ratio for Milk and gulkand was for treatment T₁ 96:4, T₂ 94:6, T₃ 92:8 and T₀ rose flavoured milk (0.2 per cent) rose flavour and sodium alginate as stabilizer (0.2%), in the formulation. The flavoured milk is analyzed for physico chemical analysis. Physico chemical analysis showed that fat, protein and moisture content of the flavoured milk is decreased with increase in gulkand levels while total solids, total sugar and ash increases with increase in the gulkand levels.

Keywords: Flavoured milk, Gulkand

Introduction

India is largest milk producer in world with annual production over 176.35 MT in 2017-2018 (Annual report 2017-2018) [2]. Milk is regarded as rich source of nutrients as it contains high quality protein, lactose, flavor enriching fat, essential fatty acids, vitally essential amino acids, minerals and galaxy of water soluble and fat soluble vitamins in well balanced form. It is because of this a complete food. It contains the above nutrients in an easily digestible and assailable form. In India out of total milk production 46% of milk is consume in liquid form and 47.7% is converted to indigenous milk products like dahi, chakka, shrikhand, khoa, basundi, pedha, channa, paneer, butter, ghee, curd etc. (Annual report 2017-2018) [2].

Plain milk is most consumed liquid product, but when this milk is converted to *flavoured milk* that will be more acceptable by the peoples of all age groups. *Flavoured milk* is the second largest widely consumed liquid dairy product after plain milk, having numerous nutritional as well as physiological benefits. It contains same essential 9 nutrients as the milk. Adding flavour and colour to milk increases its palatability value. Some natural as well as artificial flavours are used in the preparation of *flavoured milk*. *Flavoured milks* 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 milks* (Tiwari and Asgar, 2017) [13]. *Flavoured milks* 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 milks* (Tiwari and Asgar, 2017) [13].

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) [12]. Gulkand or rose petal jam is one of the most delicious ayurvedic preparations which have been used from ancient times for good health. It has been traditionally used as a cooling tonic to fight fatigue, lethargy, hyperacidity, dysmenorrhoea, fluid retention and heat-related conditions. It is also good for memory and used as good blood purifier. Gulkand is considered both as a tonic and laxative (Rode and Ogale, 1984) [10]. *Rosa damascena*, *R. chinensis*, *R. gallica*, *R. pomifera*, *R. centifolia* and *R. bourboniana* are used for preparing gulkand (Jat *et al.*, 2018) [7].

Corresponding Author:

Mhetre Suhas

Department of Animal
Husbandry and Dairy Science,
College of Agriculture, Latur,
Maharashtra, India

Material and Methods

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.

T₀ - Plain milk + 0.2 per cent rose flavour

T₁ - 96 parts plain milk + 4 parts gulkand

T₂ - 94 parts plain milk + 6 parts gulkand

T₃ - 92 parts plain milk + 8 parts gulkand

Flavoured milk was prepared by adopting the procedure as shown in Fig. 1.

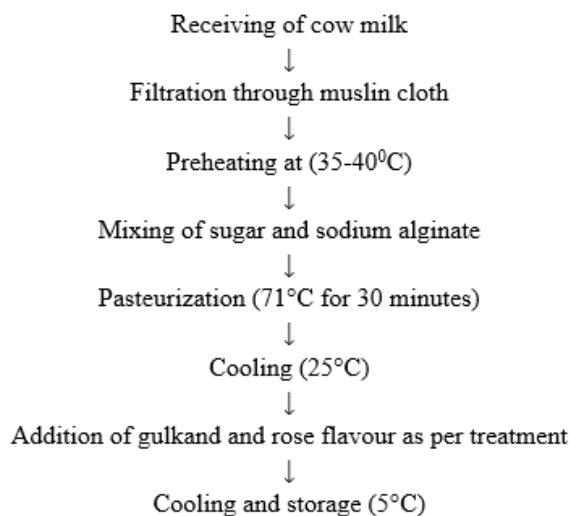


Fig 1: Flow diagram of manufacture of Gulkand *flavoured milk*

Physico-chemical analysis of *Flavoured milk*

Flavoured milk samples of different treatments were subjected for analysis *viz*: titratable acidity, pH, fat, protein, total sugar, moisture, total solid, ash, viscosity.

1. Determination of fat

Fat content of gulkand *flavoured milk* was determined by Gerber's method described in IS: SP (part XI) (1981) [6].

2. Determination of protein

The protein content of *flavoured milk* was determined by the Micrikjeldhal method as described in IS: SP (1981) [6] A.O.A.C. (Part XI) 1981 [6].

3. Determination of total sugar

Total sugar content of *flavoured milk* was determined by the

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.

volumetric (lane- Eynon) method as a described in IS: SP: 18 (Part XI) [6] 1981.

4. Determination of Moisture

The moisture content of gulkand *flavoured milk* was determined by the method described in IS: SP (Part XI) 1981 [6].

5. Determination of Total Solid

Total solids of gulkand *flavoured milk* was determined by the method described in IS: SP (Part XI) 1981 [6].

6. Determination of ash

The total ash of gulkand *flavoured milk* was determined by the method described in IS: SP (Part XI) 1981 [6].

Statistical analysis

The data were analyzed statistically by using Completely Randomized Design (CRD) as per Panse and Sukhatme (1985) [9]. The significance of the result was evaluated on the basis of critical difference. In all four replication was carried out.

Results and Discussion

Physico-Chemical Properties of Gulkand Flavoured milk

The *flavoured milk* samples prepared by using gulkand objected to physico-chemical analysis *viz.* fat, protein, total sugar, moisture, total solids, ash, along with its control. The results obtained on account of this parameter are presented in following paragraphs.

Fat

The average fat content in gulkand *flavoured milk* as 2.86, 2.73, 2.65 and 2.51 per cent for treatment T₀, T₁, T₂ and T₃, respectively. The highest fat content was recorded for treatment T₀ (2.86) and the lowest fat content was recorded for treatment T₃ (2.51) per cent. Above observations clearly indicate that, as the adding of gulkand in to the cow milk increased, the fat content in the finished product was decreased statistically at 5 per cent level in as compared to control treatment but gulkand added treatments were at par with each other. The values recorded and trends observed for fat content in the present investigation were comparable with the findings of Nadaf *et al.* (2012) [8], studied that increase in the quantity of gulkand and rose petal powder decreases the fat content of the shrikhand. Also similar trends were observed by Girase *et al.* (2017) [5], in their study they found decreased trend for fat content in burfi prepared by using gulkand and mentioned the reason that lower fat content in gulkand used to prepare *flavoured milk* as compared to cow milk.

Protein

The average protein content of the *flavoured milk* samples was found to be 3.03, 2.98, 2.87 and 2.78 per cent for treatment T₀, T₁, T₂ and T₃ respectively. The protein content in formulated product was ranged between 2.78 to 3.03 per cent. The highest protein content was recorded for control treatment T₀ i.e. 3.03 per cent and the lowest protein content was recorded for treatment T₃ i.e. 2.78 per cent. There was significantly difference between the protein content of alternative treatment.

The protein content in developed product was decreased due to the less amount of protein in the gulkand. The value recorded for protein of gulkand *flavoured milk* in presented investigation was comparable with the finding of below mentioned research worker. Nadaf *et al.* (2012) [8], observed that the increase in quantity of gulkand and rose petal powder decreases the protein content of the shrikhand significantly and reported that protein content ranges from 10.4 ± 0.73 to 9.44 ± 0.05 per cent. Similar result also observed by Girase *et al.* (2017) [5], studies on preparation of gulkand burfi from cow milk and observed that the increase in quantity of decreases the protein content of burfi ranged from 14.64 to 12.47 per cent.

Total Sugar

The average total sugar per cent in gulkand *flavoured milk* were 7.89, 8.22, 8.71 and 9.16 per cent for treatment T₀, T₁, T₂

and T₃ respectively. The total sugar content in formulated product was ranged between 7.79 to 9.16 per cent. Due to addition of gulkand in the milk the total sugar content is increased. The highest total sugar content was recorded for control treatment T₃ i.e. 9.16 per cent and the lowest total sugar content was recorded for treatment T i.e. 7.89 per cent. The value recorded for total sugar of gulkand *flavoured milk* in presented investigation was comparable with the finding of below mentioned research worker. Borse *et al.* (2012) [3] studied on effect of different levels of gulkand on quality of burfi prepared from cow milk and reported increase in the levels of gulkand resulted significant increase in total sugar content of burfi. Sonwalkar *et al.* (2017) [11], observed the total sugar content of *flavoured milk* varied significantly with the values of 13.97, 14.52, 15.15 and 16.49 per cent at 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp, respectively. With the increase in the level of jackfruit pulp, there was significant increase in the total sugar content *flavoured milk*.

Moisture

The average moisture content of the product i.e. gulkand *flavoured milk* was found to be 81.37, 81.13, 81.06 and 80.73 per cent for treatments T₁, T₂, T₃ and T₄, respectively. It was also observed that the moisture content was in decreasing order from treatment T₀ to T₃, this might be due to the increase in the proportion of gulkand has low moisture content as compare to cow milk. Dalim *et al.* (2012) [4], reported that moisture content remarkably higher ($p < 0.05$) in chikoo *flavoured milk*- based beverage (84.0 ± 0.08%) compared to that of banana *flavoured milk* based beverage (83.57 ± 0.03%). It could be argued that both type of flavoured beverage were prepared from skimmed buffalo milk of similar batch and with similar processing technique. However, the variation moisture content of the products could be attributed with fruits moisture that is considerably varied from one another.

Total solids

The average total solids content of the finished product were found to be 18.77, 18.87, 18.94 and 19.0 per cent for treatment T₀, T₁, T₂ and T₃, respectively. The highest total solids content was recorded for treatment T₃ i.e. 19.0. The lowest total solids contents was recorded for treatment T₀ i.e. 18.77. It was observed from above findings that as the adding of gulkand increase, the total solids content of the finished product was also increased from treatment T₀ to T₃. All treatments were found at par between them. Ahire *et al.* (2012) found the average total solid per cent of different samples of gulkand ice-cream highest for treatment T₃ (38.46) and lowest for treatment T₀ 36.61 and noticed that per cent levels of gulkand increased, the total solids content of ice-cream increased. Sonwalkar *et al.* (2017) [11], reported that the total solid content of *flavoured milk* increased significantly with increase in level of jackfruit pulp. The average values for 2.5, 5, 7.5 and 10.0 percent levels of jackfruit pulp were 18.21, 18.48, 18.91 and 19.53 percent, respectively.

Table 1: Physico-Chemical Properties of Gulkand Flavoured milk

Treatment	Fat	Protein	Total Sugar	Moisture	Total Solids	Ash
T ₀	2.86	3.03	7.89	81.37	18.77	0.8
T ₁	2.71	2.98	8.22	81.13	18.87	0.85
T ₂	2.67	2.87	8.71	81.06	18.94	0.89
T ₃	2.52	2.78	9.16	80.73	19	0.93

Ash

The average ash per cent in gulkand flavoured milk were 0.80, 0.85, 0.89 and 0.93 per cent for treatment T₀, T₁, T₂ and T₃, respectively. The values recorded were found to be increasing order from treatment T₁ to T₃. The treatment T₁ and T₂; T₃ and T₄ were at par with each other whereas treatment T₁ with T₃, T₄ has significantly different with each other. The ash per cent was highest in T₃ samples i.e. 0.93 and lowest in control and T₀ (0.80 per cent) in gulkand flavoured milk, respectively. The values recorded in ash content in the present investigation were comparable with below mentioned research. Nadaf *et al.* (2012)^[8], reported that the ash content of the shrikhand was significantly increasing ($P < 0.05$) with increasing quantity of gulkand. The lowest ash content was measured in the control sample (0.40±0.05) and highest for sample GRS4 samples (0.67±0.07). This may be due to higher content of minerals in gulkand. Sonwalkar *et al.* (2017)^[11], reported that ash content of flavoured milk increased significantly with increase in the level of jackfruit pulp. The average values for 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp were 0.847, 0.898, 0.919 and 0.960 per cent, respectively. The ash content was gradually increased from 0.847 to 0.960 percent with the raising levels of jackfruit pulp.

Conclusion

There low in fat, protein and moisture content of gulkand flavoured milk and high in total sugar, total solids and ash content of the gulkand flavoured milk. It was observed that as the level of gulkand increased, there was increase total sugar, total solids, ash and decrease in moisture, fat, and protein content of gulkand flavoured milk. Flavoured milk is nutritious, refreshing, healthful and light.

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