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Studies on preparation of sensory evaluation of flavoured milk from blends of buffalo milk and safflower milk using beet root powder as natural colourant

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Abstract

Safflower milk in particular has occupied a unique position in the diet of Indian population, because they form a major and cheap source of vegetable proteins, calories, minerals and some vitamins. Safflower contains no cholesterol and poly unsaturated fatty acid. Different product such as *kulfi*, *kheer*, *shrikhand*, *lassi* and *kalakand* are prepared from safflower milk. Considering nutritional importance of safflower milk in the present investigation it is decided to utilize blends with buffalo milk and beet root powder for preparation of flavoured milk. The product obtained was subjected for sensory evaluation by panel of judges. It was observed that the overall acceptability score for treatment T₁, T₂, T₃ and T₄ was 8.6, 8.3, 7.6 and 6.7, respectively. The cost of control flavoured milk was found to be highest for T₁ (Control) i.e., 37.13Rs. /lit. and lowest cost was recorded for treatment T₄ i.e., 29.78 Rs. /lit. The cost for treatment T₂ and T₃ were 34.68 and 32.23 Rs. /lit, respectively.

Keywords: Buffalo milk, safflower milk, beet root powder, sensory evaluation

Introduction

Milk has been used as an article of food since ancient times in India. Milk is an almost ideal food. It plays an important role in the diet. It is highly nutritious food which is rich in several nutrients, calcium, potassium, vitamins and proteins. People have been using cow milk since 6000, 8000 BC and 14th century, it has gained immense popularity as one of the healthiest foods. Milk is high in protein, bone forming minerals, health giving vitamins and provides energy giving lactose and milk fat. Besides, supplying essential fatty acid. India's milk production is 18.5 per cent of world milk production and now standing in first rank. Annual output about 163.6 million tonnes during 2016-17 and per capita availability in India is 351 grams per day by 2016-2017 (Anonymous, 2017) ^[1]. Out of total milk production 46 per cent is utilizes as fluides milk and remaining is convert into various milk products like paneer, rabri, basundi, cheese, ghee, ice-cream, channa, butter, yoghurt, dahi, etc. (Anonymous, 2017) ^[1].

Flavoured milk is prepared by adding flavour to more palatable for them who do not relish it as such. It should have 3.5 per cent fat and 8.5 per cent solid not fat. Lavoured milk is generally made from low fat milk. (1.5 per cent fat and 9 per cent SNF). It is flavoured, sweetened and heat treated for extending its shelf life. Few of the brand names of flavoured milk in market are "Energy" in Bombay, 'Vita' in Haryana and 'Verka' in Punjab. Now a day's, there is a trend for health foods. The health conscious consumers show great interest in low calorie milk and milk products

Flavoured milk receives considerable attention reflecting the growing awareness in the market. Skim milk is a by-product of dairy industry and is used to manufacture flavoured milk. The flavoured milk could be artificially flavoured milk or fruit flavoured milk. Safflower milk occupied a unique and important position in the diet because they form major and cheap sources of vegetable proteins, fat, minerals and calories. Safflower milk does not contain cholesterol and is rich in polysaturated fatty acids and have been shown to prevent an decreases in serum cholesterol on a high fat diet and thus considered anti-antherogenic.

Safflower milk seems to be useful for lactose intolerant people and infants allergic to cow and buffalo milk (Repate *et al.*, 2010) [9]. Safflower milk contains fat 4.55 per cent, Protein 2.30 per cent, Carbohydrate 2.21 per cent, ash 0.62 per cent and Total solids 9.68 per cent (Maske, 1997) [6].

Materials and Methods

Treatment Details

Treatments for the preparation of *Flavoured milk* from buffalo milk blended with different levels of safflower milk and natural colourant are as follows:

T₁-100 Parts of buffalo milk+0.5gm beet root powder

T₂-90 Parts of buffalo milk+10 parts of safflower milk+1.0gm beet root powder.

T₃-80 Parts of buffalo milk +20 parts of safflower milk+1.5gm beet root powder.

T₄-70 parts of buffalo milk +30 parts of safflower milk+2.0gm beet root powder

Preparation of Safflower Milk

Safflower milk was prepared as per the method described by Narawade *et al.*, (2003) with slight modifications. 200gm of safflower seeds were weighed and washed with hot water and then ground with addition of little amount of water in mixer. Final seed to water ratio was maintained as 1:5 so as to have consistency as that of buffalo milk. The milk was then filtered through muslin cloth to remove seed coat. To improve the heat stability, sodium hexameta-phosphate @0.2 per cent was added, Common salt @0.05 per cent and sugar @0.2 per cent were added to enhance its taste and acceptability. The milk was then boiled. The milk so obtained had creamy colour, nutty flavour, sweet taste and consistency as that of cow milk. The milk so obtained was used for blending with buffalo milk for preparation of flavoured milk.

Beet Root Extract

Selected fresh beet root in market washed in tap water and peeled and sliced with the help of knife after boiling the slices at 80°C, then cooled the slices are taken in muslin cloth and pressed in basket press. The beet root extract obtained was stored at refrigeration temperature

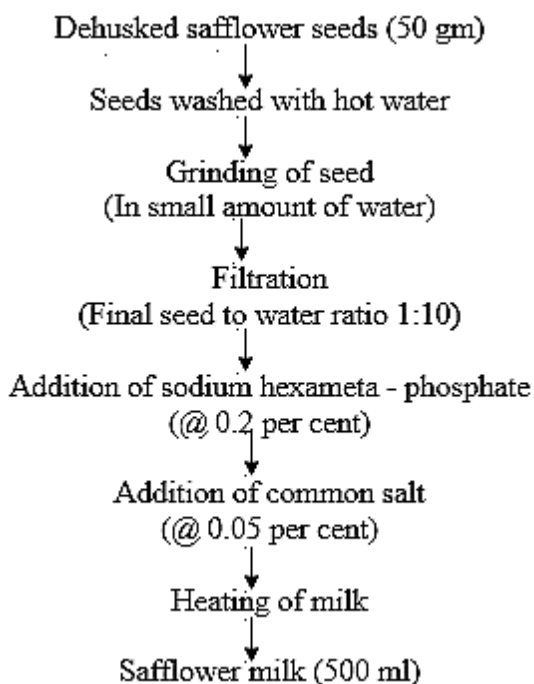


Fig 1: Flow chart for preparation of safflower milk

Preparation of Flavoured Milk

For preparation of flavoured milk the procedure given by De (1982) [2] was followed by slight modification.

The measured quantity of Buffalo milk/safflower milk was taken. The milk was filtered through muslin cloth. The Buffalo/safflower milk was standardized to 3.0 per cent fat and 9.0 per cent SNF. Milk was heated to 75 °C, and then it was allowed to cool up to 5 °C. After cooling, colour and flavours were added in milk. Milk was filled in bottle and capping milk was stored in refrigerator.

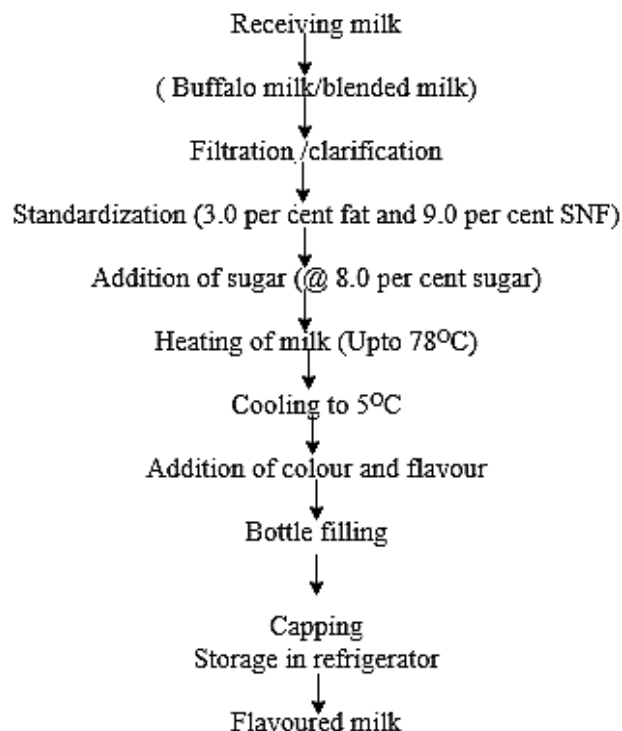


Fig 2: Flow diagram for preparation of flavoured milk

Sensory Evaluation

The flavoured milk prepared under different treatment combinations was subjected to sensory evaluation by a panel of judges for colour and appearance, flavour, consistency and mouth feel. The scoring was done on 9-points hedonic scale as described by (Gupta 1976) [4].

Statistical Analysis

The data obtained were analyzed statistically by using Completely Randomized Design as per method prescribed by Panse and Sukhatme (1985).

Cost of Production of Flavoured Milk

The various constituents required for manufacture of flavoured milk was rated as per prevailing market price and cost per litre of flavoured milk was worked out.

Result and Discussion

Sensory Score of Flavoured Milk

Colour and Appearance: The score obtained for colour and appearance of flavoured milk is tabulated in Table 1 it is observed that the mean score for colour and appearance of the flavoured milk ranges from 6.7 to 8.5. The mean score for treatment T₁, T₂, T₃ and T₄ is 8.5, 8.2, 7.6 and 6.7, respectively. It is clear from mean value that treatment T₁ scored highest followed by T₂, T₃ and T₄. This indicates that increasing the level of safflower milk in the blend decreased the score for colour and appearance of flavoured milk

significantly. As the proportion of safflower milk in the blend increase there is decrease in the intensity of pink colour.

This result is in agreement with Maske (1997) [6]. They prepared flavoured milk from safflower milk blended with cow milk and observed that increasing the proportion of safflower milk in cow milk blend there was decrease in colour and appearance score of flavoured milk.

Flavour

It is revealed from table 1 that the mean score for flavour of the flavoured milk ranges from 6.8 to 8.9. The mean score for T₁, T₂, T₃ and T₄ is 8.9, 8.6, 7.8 and 6.8, respectively. It is clear from mean value that treatment T₁ which is control scored the highest score followed by T₂, T₃ and T₄. This indicates that as the level of safflower milk in the blend increases the flavour score of flavoured milk decreases significantly. T₄ obtained 6.8 score which is acceptable.

The same observation was recorded by Katra and Bhargava (1994) [5]. They reported that *rasogolla* prepared from blends of soy milk and cow milk was inferior to cow milk *rasogolla*. Addition to soy milk in cow milk imparted a perceptible beany flavour and its intensity increased with increases in proportion of soy milk from 20 and 30 per cent.

Consistency

It is apparent from table 1 that means score for the consistency of flavoured milk was in the range of 6.8 to 8.8. The mean consistency score for treatment T₁, T₂, T₃ and T₄ is 8.8, 8.5, 7.7 and 6.8 respectively. Treatment T₁ had highest score followed T₂, T₃, T₄. This indicates that as the level of Safflower milk increases the consistency score of flavoured milk decreases significantly.

Maske (1997) [6] prepared safflower milk blended with buffalo milk. He observed that there was decrease in the consistency score of milk with increase in the proportion of safflower milk in the blend.

Mouth Feel

It is observed from the table 1 that the mean score for mouth feel of flavoured milk ranges from 6.5 to 8.4. The mean score

for T₁, T₂, T₃ and T₄ is 8.4, 8.1, 7.4 and 6.5 respectively. It is clear from mean value that treatment T₁ which is control scored the highest score followed by T₂, T₃ and T₄. This indicates that increasing the proportion of safflower milk in the blend decreases the score for mouth feel of flavoured milk significantly.

Narawade *et al* (2003) prepared *kheer* from safflower milk blended with buffalo milk He reported that there was decrease in taste score of *kheer* with increasing the proportion of safflower milk in the blend. This was due to little bitter taste of safflower milk. Dhanwade (2006) also prepared *Kalakand* from safflower milk blended with buffalo milk and stated that decrease in mouth feel score of *Kalakand* was due to increase in proportion of safflower milk in blend. Similar observation was reported.

Overall Acceptability

From table 1 it can be seen that the overall acceptability for treatment T₁, T₂, T₃, and T₄ was 8.6, 8.3, 7.6 and 6.7, respectively. Treatment T₁ had highest score followed by T₂, T₃, T₄. This clearly indicates that as the level of safflower milk increases the overall acceptability score decreases significantly. The overall acceptability score indicate collectively all the sensory scores. The mean of total sensory score indicate the overall acceptability of flavoured milk.

The results obtained were in agreement with Katra and Bhargava (1994) [5]. They prepared *rasogolla* from soy milk blends with cow milk. They observed that the overall acceptability score for *rasogolla* decreased with increased proportion of soy milk in the blend.

Conclusion

From the present investigation it can be concluded that, acceptable low cost flavoured milk can be prepared by using safflower milk blended with buffalo milk with addition of 7 per cent sugar, rose flavour and Beet root extract. It is also concluded that cost of production of flavoured milk of treatment T₀, T₂, T₃ and T₄ was comparatively less than control (T₁).

Table 1: Sensory score of flavoured milk

Treatments	Sensory Score				
	Colour and Appearance	Flavour	Consistency	Mouth Feel	Overall Acceptability
T ₁	8.5	8.9	8.8	8.4	8.6
T ₂	8.2	8.6	8.5	8.1	8.3
T ₃	7.6	7.8	7.7	7.4	7.6
T ₄	6.7	6.8	6.8	6.5	6.7
S.E. ±	0.067	0.063	0.046	0.062	0.033
CD at 5%	0.200	0.186	0.137	0.182	0.090

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