PREPARATION OF GOLDEN KULFI FROM BUFFALO MILK BLENDED WITH SAFFLOWER MILK

Department of Animal Husbandry and Dairy Science,
Marathwada Agricultural University, Parbhani-431 402, India

ABSTRACT

In the present study attempt has been made to develop golden kulfi from buffalo milk and safflower milk with most economic alternative. Golden kulfi prepared from different proportions of buffalo milk and safflower milk is as 100:0 (T0), 80:20 (T1), 60:40 (T2), 40:60 (T3). The sensory score for overall acceptability of Golden kulfi of treatments T0, T1, T2, and T3 were 8.54, 8.08, 7.69 and 6.99, respectively. It was observed that though the Golden kulfi prepared from 80 parts buffalo milk and 20 parts safflower milk (T1) was closer to control in acceptability. The acceptability for treatment T2 and T3 was rated between like moderately to like very much for all sensory attributes. On an average the golden kulfi of treatment T1 contained 11.30 per cent fat, 8.95 per cent protein, 33.54 per cent total solid, 22.01 per cent SNF, 18.58 per cent sucrose and 1.90 per cent ash. Cost of production of golden kulfi of T0 treatment was Rs.47.89/kg which was drop down to Rs.43.98 (T1), 37.78 (T2) and 32.78 (T3). The main advantage of using safflower milk is that it does not contain cholesterol. It is rich in polyunsaturated fatty acids, which helps in reducing blood cholesterol.

Key words : Golden kulfi, Buffalo milk, Safflower milk.

INTRODUCTION

Kulfi is traditionally prepared from cow or buffalo milk or by the mixture thereof. The buffalo milk, since the time immorial has made an incalculable contribution to nutrition of mankind in Asian countries and others as well. However, in recent years a large portion of recent world population has hypolactasia (low level of lactose in the intestinal mucosa) resulting lactose intolerance. Thus, for those population suffers from lactose intolerance may have a suitable substitute as safflower milk. Safflower milk is reported as a substitute for whole milk (Mhaske, 1997).

A number of medicinal products based on powder of safflower petals have been developed and are being used for treating coronary heart -diseases, hypertension, renal thrombosis etc. (Sarojini et al., 1995).

This safflower has long been used as a source of yellow and red dyes for clothing and food. The safflower pigment has curative effects for disease like lack of oxygen, coronary heart diseases, myocardial infarction, renal thrombosis. safflower petals in large doses are diaphoretic, luxative and sedative stimulant. Safflower red pigment are also known as an important medicinal substance to reduce blood pressure rapidly. So this petal extract can be used for development of golden colour of kulfi.

MATERIAL AND METHODS

Present investigation was carried out at Department of Animal Husbandry and Dairy Science, College of Agriculture, M.A.U. Parbhani. Buffalo milk required for study was procured from University Dairy Farm. Pure safflower seed for preparation of safflower milk was obtained from University Central Farm. The safflower petal extract was prepared by 30 gm of dry safflower petals in 100 ml of drinking water. Sodium alginate was used as stabilizer. Vanilla flavour and cane sugar was obtained from local market. The safflower milk was prepared from safflower seed as under.
Preparation of safflower milk: The safflower milk was prepared as per the method given by Maske (1997). Two hundred grams of safflower seeds were weighed and washed with hot water and grinded in domestic mixture with little amount of water and filtered through muslin cloth (seed:water ratio 1:5) so as to have consistency as that of cow milk. For better heat stability and taste sodium hexameta phosphate was @ 0.2 per cent, common salt @ 0.05 per cent and sugar @ 13 per cent were added to enhance its acceptability. The milk so obtained was then boiled. The milk so prepared had creamy colour, nutty flavour, sweet taste and consistency as that of cow milk.

Blending of buffalo milk with safflower milk: For preparation of golden kulfi, following blends of buffalo milk and safflower milk were studied.

\[
\begin{align*}
T_0 & : 100 \text{ per cent buffalo milk (Control)} \\
T_1 & : 80 \text{ per cent buffalo milk} + 20 \text{ per cent safflower milk} \\
T_2 & : 60 \text{ per cent buffalo milk} + 40 \text{ per cent safflower milk} \\
T_3 & : 40 \text{ per cent buffalo milk} + 60 \text{ per cent safflower milk}
\end{align*}
\]

Preparation of golden kulfi: Golden kulfi was prepared as per method given by Salooja (1979).

\[
\begin{align*}
\text{Milk} & \quad \downarrow \\
\text{Standardization (4.5% fat)} & \quad \downarrow \\
\text{Concentration (2:1)/(3:1) of milk by heating} & \quad \downarrow \\
\text{Addition of cream (20 per cent by weight)} & \quad \downarrow \\
\text{Add safflower petal extract to have golden colour @ 3.0%} & \\
\text{Addition of sugar @ 13 per cent} & \quad \downarrow \\
\text{Add stabilizer sodium alginate @ 0.15%} & \\
\text{Add flavour (vanilla) @ 0.5 ml/lit} & \quad \downarrow \\
\text{Cool and fill in kulfi cone} & \\
\text{Freezing of mix in deep freeze (4-6 hrs.)} & \quad \downarrow \\
\text{Kulfi} & 
\end{align*}
\]

The product was evaluated for its sensory quality by using panel of judges using a 9 point hedonic scale as described by Gupta (1999). The golden kulfi was analysed for fat as per method described by Verma and Garg (1965), protein by A.O.A.C. (1965), total solid by ISI:2802 (1964), sucrose by ISI Handbook of food Analysis Part XI (1981), SNF by difference calculated from total solid and the fat content and ash by IS:1479 Part II (1961). Cost of golden kulfi was worked out by considering cost of ingredient and processing cost. The results obtained during course of investigation were subjected to statistical analysis by using factorial completely randomized design using 6 replications as described by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

Chemical composition of golden kulfi prepared from different blends of buffalo milk and safflower milk was studied and presented in Table 1. The fat contents for treatment \( T_0, T_1, T_2 \), and \( T_3 \) were 11.41, 11.30, 11.17, 11.15; protein 9.75, 8.95, 9.15, 7.23; total solid 35.20, 33.54, 31.09, 25.75; SNF 23.90, 22.01, 19.70, 14.75; sucrose 13.61, 13.58, 13.26, 13.49 and ash 2.00, 1.90, 1.80, 1.65 per cent, respectively. The golden kulfi prepared from 40:60 blends of buffalo milk and safflower milk had some what lower fat, protein, total solid and ash content compared to control golden kulfi. Similar findings were reported by Salooja and Balchandran (1982).

Sensory evaluation of golden kulfi: Sensory score of golden kulfi (Table 2) gradually decreased as the proportion of safflower milk in the blend increases. The colour and appearance score of different blends of golden kulfi ranged between 8.35 to 7.80. This may be due to the pale yellow colour of safflower milk. Flavour score of golden kulfi also decreased from 8.36 to 6.97 due to characteristic of oily flavour of safflower milk. This may due to slight bitter taste of safflower milk and as concentration of safflower milk increased the acceptability was decreased.

Maske (1997) reported that acceptability of flavour decreased linearly with increasing amount of safflower milk in the blend.

The body and texture score was influenced by the proportion of safflower milk. It ranged from 8.71 to 6.95. The taste score of golden kulfi
decreased from 8.55 to 6.92 as the proportion of safflower milk increased in the blend. This may due to slight bitter taste of safflower milk and as concentration of safflower milk increased the acceptability was decreased.

Narwade (1999) reported that there was decreased in taste score of kheer with increase in proportion of safflower milk in blend.

The overall acceptability score of golden kulfi decreased from 8.54 to 6.90. It was observed that increased proportion of safflower milk in the blend decreased overall acceptability score of golden kulfi. The golden kulfi of treatment T₂ and T₃ was rated between like moderately to like very much. The score for treatment T₃ was rated between slightly to like moderately. It was proved that blending of safflower milk with buffalo milk to the maximum extent of 60:40 was acceptable and most economical. Similar findings were reported by Mhaske (1997).

### Cost of production

The cost of production of golden kulfi prepared from different blends of buffalo milk and safflower milk was calculated and presented.

### Table 1. Chemical composition of golden kulfi from different blends of safflower milk

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fat %</th>
<th>Protein %</th>
<th>T.S. %</th>
<th>SNF %</th>
<th>Sucrose %</th>
<th>Ash %</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₀</td>
<td>11.41</td>
<td>9.75</td>
<td>35.20</td>
<td>23.90</td>
<td>13.61</td>
<td>2.00</td>
</tr>
<tr>
<td>T₁</td>
<td>11.30</td>
<td>8.95</td>
<td>33.54</td>
<td>22.01</td>
<td>13.58</td>
<td>1.90</td>
</tr>
<tr>
<td>T₂</td>
<td>11.17</td>
<td>8.15</td>
<td>31.09</td>
<td>19.70</td>
<td>13.26</td>
<td>1.80</td>
</tr>
<tr>
<td>T₃</td>
<td>11.15</td>
<td>7.23</td>
<td>25.75</td>
<td>14.75</td>
<td>13.49</td>
<td>1.65</td>
</tr>
</tbody>
</table>

M. SE±: 0.104, SE = Standard error, C.D. at 5% 0.12

### Table 2. Effect of different safflower milk blends on sensory score of golden kulfi (score out of 9)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Flavour</th>
<th>Body and texture</th>
<th>Colour and appearance</th>
<th>Taste</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₀</td>
<td>8.36</td>
<td>8.71</td>
<td>8.35</td>
<td>8.55</td>
<td>8.54</td>
</tr>
<tr>
<td>T₁</td>
<td>8.31</td>
<td>8.35</td>
<td>8.20</td>
<td>8.21</td>
<td>8.08</td>
</tr>
<tr>
<td>T₂</td>
<td>7.29</td>
<td>7.73</td>
<td>8.05</td>
<td>7.93</td>
<td>7.69</td>
</tr>
<tr>
<td>T₃</td>
<td>6.97</td>
<td>6.95</td>
<td>7.80</td>
<td>6.92</td>
<td>6.90</td>
</tr>
</tbody>
</table>

M. SE±: 0.046, SE = Standard error, C.D. at 5% 0.12

### Table 3. Cost of production of golden kulfi for various treatments (per kg)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Rate</th>
<th>Qty.</th>
<th>Amt. (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buffalo milk</strong> (Standardized)</td>
<td>Rs.11/lit 2.82</td>
<td>31.02</td>
<td></td>
</tr>
<tr>
<td><strong>Safflower milk</strong></td>
<td>Rs.2.06/kg</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Sugar @ 13%</td>
<td>Rs.15/kg</td>
<td>130 gm</td>
<td>1.95</td>
</tr>
<tr>
<td>Flavour @Rs.19/20ml</td>
<td>Rs.15/lit</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Safflower petal extract</td>
<td>Rs.15/lit</td>
<td>30 ml</td>
<td>0.45</td>
</tr>
<tr>
<td>Misc. charges</td>
<td>–</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>–</td>
<td>47.89</td>
<td>37.78</td>
</tr>
</tbody>
</table>

The stabilizer and cream added was of same quantity and rate in each treatment.
in Table 3. Based on experimental trails the quantities of ingredients required for preparing 1 kg golden kulfi were worked out. The cost was calculated on the basis of market price of ingredients. The cost of production from buffalo milk (T₀) was Rs.47.89, which decreased to 43.98 (T₁) 37.78 (T₂) and Rs.32.78 (T₃), respectively. This proved that cost of golden kulfi can be minimized by using buffalo and safflower milk.

CONCLUSION
Based on above results, it may be concluded that the golden kulfi prepared from buffalo milk and safflower milk blend (60:40) was acceptable. The main advantage of using safflower milk in the blend is that it does not contain cholesterol. It is rich in polyunsaturated fatty acids, which helps in reducing blood cholesterol. The advantage of safflower petal extract is that it gives golden colour to the milk and it has got medicinal value and is reported to be useful in treatment of cardiovascular diseases, hypertension, renal thrombosis, blood circulation and in treatment of gynaecological diseases.

REFERENCES