MANUFACTURE OF GOLDEN MILK SHAKE FROM COW MILK 
BLENDED WITH SAFFLOWER MILK

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ABSTRACT
Golden milk shake from different proportions of safflower milk and cow milk i.e. 30:70 (T₁), 40:60 (T₂), 50:50 (T₃) and 100% cow milk (T₀) was prepared and studied for its acceptability. Golden milk shake prepared from 70 parts cow milk and 30 parts safflower milk was closer to control in acceptability; Golden milk shake prepared from 50 parts of cow milk and 50 parts of safflower milk was also acceptable, scoring between like moderately to like very much, for all sensory attributes. The cost of production of Golden milk shake prepared from safflower milk:cow milk (50:50) blend was Rs. 11.30 and was more economical than control. Good quality Golden milk shake could be prepared by blending cow milk with safflower milk (50:50) with addition of 8% cane sugar and safflower petal extract having known therapeutic value.

INTRODUCTION
Milk is regarded as rich source of nutrients as it contain high quality proteins, lactose, flavour enriching fat. The perfect composition of milk not only recommends itself for growing children but also suited to satisfy energy needs of adult. Flavoured milks are milks to which sugar, flavouring agents, colouring matters are added. Flavoured milks are more palatable to those who don’t relish plain cow and buffalo milk.

In spite of remarkable increase in milk production, the milk and milk products are out of reach of the vulnerable groups of weaker sections of society due to high cost. This calls for development of low cost substitute for milk and milk products. Utilization of safflower milk in manufacture of this product will not only bring down it’s cost but will make it within the reach of vulnerable group of people. Such milk will be useful for those people who are allergic to cow or buffalo milk or people suffering from heart ailments, as safflower milk contains polyunsaturated fatty acids which helps in lowering blood cholesterol (Guimiao and Villi, 1985). Safflower petals are used for treatment of coronary heart disease, hypertension, renal thrombosis, gynaecological diseases, etc. (Sarojini et al., 1995). It is useful for treatment of cerebral thrombosis and embolism (Zhang, 1996). It is also used as substitute for saffron in treating measles and exanthematous diseases and imparts a golden colour to the milk.

Looking to the diversified benefits of safflower milk and medicinal value of safflower petals, Golden milk shake was prepared from safflower milk blended with cow milk with addition of safflower petal extract to have a golden colour to milk.

MATERIAL AND METHODS
During the process of present investigation on preparation of golden milk shake from safflower milk blended with cow milk, the material and method adopted are delineated here under.

Cow milk: Cow milk required for research work was obtained from the herd maintained at Cattle Cross Breeding Project, Marathwada Agricultural University, Parbhani.

Safflower petal extract: The safflower petal extract was prepared by adding 30 g of dry safflower petals to 1000 ml of water.

Flavour: Orange flavour was used for preparation of Golden milk shake

Stabilizer: Sodium alginate was used @ 0.4 per cent as stabilizer for preparation of golden milk shake.
Preparation of safflower milk: The safflower milk was prepared as per method given by Maske (1997). Two hundred g of safflower seed were weighed, washed with hot water and then blended in mixture. Final seed to water ratio was maintained as 1:5 so as to have consistency as that of cow milk. The milk was then filtered to remove seed coat. To improve its heat stability sodium hexametaphosphate was added @ 0.2 per cent, common salt 0.05 % and sugar @ 0.2 per cent was added to enhance its taste and acceptability. The milk was then brought to boiling and milk obtained had cream colour, nutty flavour and consistency as that of cow milk.

Treatments details:
- \( T_1 \): 100 per cent cow milk
- \( T_1 \): 70 per cent cow milk + 30 per cent safflower milk
- \( T_2 \): 60 per cent cow milk + 40 per cent safflower milk
- \( T_3 \): 50 per cent cow milk + 50 per cent safflower milk

Golden milk shake was prepared by following the standard procedure described by Sharma and Gupta (1978) with slight modification.

Golden milk shake

The product was evaluated for its sensory quality by panel of judges using 9 point hedonic scale (Amerine et al., 1965).
Chemical analysis:

Chemical analysis of Golden milk shake was done as per method delineated below:

Fat was determined as per Gerber’s method described in ISI (1958), IS-1224 (Part-II), protein as per Microkjeldahl’s method described in A.O.A.C. (1965), carbohydrate (ISI, 1981), total solid, titrable acidity, ash (ISI, 1961), IS-1479 (Part-II), pH was determined by using digital pH meter.

Statistical Analysis:

The results obtained during the course of investigation were subjected to statistical analysis by using Completely Randomized Design as described by Panse and Sukhatme (1967).

Cost of production:

The cost of Golden milk shake was worked out by considering the cost of ingredients and processing cost.

**RESULTS AND DISCUSSION**

Chemical composition:

Chemical composition of Golden milk shake prepared from cow milk and its blends with safflower milk was studied and is presented in Table 1. The protein, total solid, sugar and ash content for treatment T₀, T₁, T₂ and T₃ were 4.50, 3.22, 23.44, 14.08 and 0.68; 3.00, 2.98, 21.91, 13.73 and 0.66; 2.98, 2.80, 21.54, 13.55 and 0.64 per cent, respectively. The protein, carbohydrate, ash, total solids decreased as proportion of safflower milk in the blend increased. This decrease might be due to lower total solids of safflower milk as compared to buffalo milk (Maske, 1997).

The per cent lactic acid and pH for treatment T₀, T₁, T₂ and T₃ were 0.13, 0.13, 0.12 and 0.12 respectively.

Organoleptic quality of Golden milk shake:

The sensory score of Golden milk shake has been given in Table 2. The colour and appearance scores of different blends of Golden milk shake ranged between 7.89 to 8.45. It was further observed that as proportion of safflower milk in blend increased, colour and appearance score of Golden milk shake decreased. This may be attributed to dull appearance of safflower milk. Golden milk shake prepared from cow milk has maximum score of 8.45 followed by T₁, T₂ and T₃ (8.31, 8.23, 7.89).

Gadhave (2001) prepared paneer from safflower milk blended with buffalo milk and observed the same trend.

Mean flavour scores for Golden milk shake prepared from cow milk blended with safflower milk ranged from 7.54 to 8.27. As proportion of safflower milk increased in Golden milk shake the flavour score decreased. Golden milk shake prepared from cow milk (T₀) had maximum score of 8.27 followed by T₁, T₂ and T₃ (8.00, 7.88, 7.64).

Repate (2001) prepared flavoured milk and observed that decrease in flavour score was

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fat %</th>
<th>Protein %</th>
<th>Total solids %</th>
<th>Sugar %</th>
<th>Ash %</th>
<th>Acidity %</th>
<th>pH</th>
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<tbody>
<tr>
<td>T₀</td>
<td>4.50</td>
<td>3.22</td>
<td>23.44</td>
<td>14.08</td>
<td>0.68</td>
<td>0.13</td>
<td>6.49</td>
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<tr>
<td>T₁</td>
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<td>3.00</td>
<td>22.29</td>
<td>16.04</td>
<td>0.66</td>
<td>0.13</td>
<td>6.49</td>
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<tr>
<td>T₂</td>
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<td>2.98</td>
<td>21.91</td>
<td>13.73</td>
<td>0.66</td>
<td>0.12</td>
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<tr>
<td>T₃</td>
<td>4.50</td>
<td>2.80</td>
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<td>13.55</td>
<td>0.64</td>
<td>0.12</td>
<td>6.51</td>
</tr>
</tbody>
</table>

SE = Standard error
CD = Critical difference at 5 %
NS = Non-significant.

Gadhave (2001) prepared paneer from buffalo milk blended with safflower milk and observed the same trend.

The per cent lactic acid and pH for treatment T₀, T₁, T₂ and T₃ were 0.13, 6.49; 0.13, 6.49; 0.12, 6.50 and 0.12, 6.51, respectively.

Organoleptic quality of Golden milk shake:

The sensory score of golden milk shake has been given in Table 2. The colour and appearance scores of different blends of Golden milk shake ranged between 7.89 to 8.45. It was further observed that as proportion of safflower milk in blend increased, colour and appearance score of Golden milk shake decreased. This may be attributed to dull appearance of safflower milk. Golden milk shake prepared from cow milk has maximum score of 8.45 followed by T₁, T₂ and T₃ (8.31, 8.23, 7.89).

Gadhave (2001) prepared paneer from safflower milk blended with buffalo milk. He reported that as proportion of safflower milk in blend increases, there is decrease in colour and appearance score of paneer.

Mean flavour scores for Golden milk shake prepared from cow milk blended with safflower milk ranged from 7.54 to 8.27. As proportion of safflower milk increased in Golden milk shake the flavour score decreased. Golden milk shake prepared from cow milk (T₀) had maximum score of 8.27 followed by T₁, T₂ and T₃ (8.00, 7.88, 7.64).

Repate (2001) prepared flavoured milk and observed that decrease in flavour score was
Mean consistency score of Golden milk shake was influenced by proportion of safflower milk. Mean consistency score of Golden milk shake prepared from different blends ranged from 7.41 to 8.21. The maximum consistency score was 8.21 for Golden milk shake prepared from cow milk (T₀) followed by T₁, T₂, and T₃ (8.03, 1.84, 7.41). As the proportion of safflower milk in blend increased consistency score decreased.

Mean mouthfeel score for golden milk shake ranged from 7.00 to 8.53. It was observed that as proportion of safflower milk increased in Golden milk shake, mouthfeel score decreased. Golden milk shake prepared from 100 % cow milk had maximum score followed by T₁, T₂, T₃ (8.21, 7.94, 7.46).

Dhanwade (2000) prepared kalakand from safflower milk blended with buffalo milk and reported that overall acceptability score decreased with increased proportion of safflower milk in blend.

Cost of production of Golden milk shake:

The cost of production of Golden milk shake is presented in Table 3. Based on experimental trial the quantity of ingredients required for preparing 1 lit Golden milk shake was calculated on the basis of market price of ingredients. The cost of production of 1 lit Golden milk shake from cow milk was Rs. 16.27 which decreased to Rs. 13.28, 12.28, 11.30 for treatment T₁, T₂ and T₃, respectively. As proportion of safflower milk in the blend increased there was decrease in cost of Golden milk shake. Based on above results it may be concluded that Golden milk shake prepared from 50:50 blend of cow milk and safflower milk with addition of safflower petal extract could be recommended as it was sensorily acceptable and costed Rs.
Golden milk shake prepared from 70 parts cow milk and 30 parts safflower milk was closer to control in acceptability; Golden milk shake prepared from 50 parts of cow milk and 50 parts of safflower milk was also acceptable, scoring between like moderately to like very much, for all sensory attributes. The cost of production of Golden milk shake prepared from safflower milk:cow milk (50:50) blend was Rs. 11.30 and was more economical than control. Good quality Golden milk shake could be prepared by blending cow milk with safflower milk (50:50) with addition of 8 % cane sugar and safflower petal extract having known therapeutic value.

REFERENCES