Studies on Organoleptic Evaluation of Shrikhand Prepared From Soya Milk Blended With Cow Milk.

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ABSTRACT
Shrikhand was prepared from soya milk by blending of cow milk at 10 per cent, 20 per cent and 30 per cent with 60 per cent sugar on the weight basis of chakka. The product obtained was subjected for organoleptic evaluation by panel of judges. It was observed that the colour and appearance score for treatment T₁, T₂, T₃ and T₄ was 6.88, 7.13, 7.25 and 7.63, respectively. Flavour score was 6.25, 6.88, 7.00 and 7.38 respectively. Body and texture was 6.75, 7.25, 7.50 and 7.75, respectively. Sweetness score was 7.00, 7.13, 7.25 and 7.50, respectively. It was observed that the overall acceptability score for sensory was 6.72, 7.10, 7.25 and 7.57, respectively for T₁, T₂, T₃ and T₄. It was observed that as the level of cow increased the overall acceptability score increased.

KEY WORDS- Shrikhand, chakka, soya milk, cow milk

INTRODUCTION
Shrikhand is a semi-solid, sweetish-sour fermented milk product is prepared by fermentation of milk with lactic acid bacteria expulsion of whey from the curd to yield chakka and by adding it with sugar, flavoring agent, fruits and nuts. It is popular in western part, especially in Maharashtra, Gujarat and Karnataka. It is known for its high nutritive, characteristic flavor, taste, palatable nature and possible therapeutic value. It is very refreshing particularly during summer months [9]. Generally cow or buffalo milk is used for manufacture of chakka which gives higher overrun and receives consumer’s preference [2]. Fermentation preserves the food, and produce beneficial enzymes, B-vitamins, Omega-3 fatty acids, and various strains of probiotics. Natural fermentation of foods has also been shown to preserve nutrients in food and break the food down to a more digestible form [17]. Typically shrikhand constitutes 39.0% moisture and 61.0% of total solids of which 10.0% is fat, 11.5% proteins 78.0% carbohydrates and 0.5% ash, on a dry matter basis. It has a pH of about 4.2–4.4. The advantage of shrikhand is that the shelf-life of shrikhand is more than milk and dahi. [3].

The rapid growing population in the developing countries is facing acute shortage of protein in diet, which inadvertently has led to an increase in the instances of malnutrition [16]. The implication of using the two different milk sources in the diet is the high contents of protein and fat. The total energy value of the milk is from the fat content hence, higher fat content is an indication of more total energies available [4]. Soybean is, primarily, an industrial crop, cultivated for oil and protein. As the world population expands, there will be a greater pressure for the consumption of plant products. Today soybean is one of the most economical and valuable agricultural commodities because of its unique chemical composition and multiple uses as food, feed and industrial materials. Soybean has the highest protein content among cereal and other legume species, and the second highest oil content among all food legumes. Soya milk is a plant based drink produced by soaking dried soybeans and grinding them in water and contains protein 2.86 g, fat 1.61 g and carbohydrate 1.74 g per 100 gm and the energy value is 33 kcal (138KJ) per 100 gm.
It is inexpensive, highly digestible; it is rich in water soluble protein, carbohydrate and oil nutrient. It is rich in polyunsaturated fatty acids, linoleic acid [7]. Soy protein isolate has a Protein Digestibility Corrected Amino Acid Score (PDCAAS) of 100% which means that it has all the essential amino acids required to support growth and maintenance. It is also good source of lecithin and vitamin E [8].

Soya milk contains greater amounts of the amino acids arginine, alanine, aspartic acid and glycine. Arginine slows the growth of cancers by strengthening the immune system, alanine aids in the metabolism of sugars, aspartic acid increases stamina and plays a vital role in metabolism by acting as an antioxidant, glycine is necessary for brain and nervous system functioning and muscle/energy metabolism [18]. Soya milk resembles bovine milk in physical appearance and consistency and contains less amount of fat and higher amount of Fe and Cu as compared to cow milk, therefore it can be blended with milk [19].

In recent years farmers of Maharashtra have given overwhelming response to soybean cultivation. Acceptability of soya milk products is less as compared product made from cow milk, therefore, for fulfilling the requirement, there is a wide scope for replacement of soya milk by cow milk in preparation of various milk products, viz. Soya milk, Soya Paneer, Soya Amrakhand, Soya Fortified Biscuits etc.

**Preparation of Soya Milk**

![Flowchart for preparation of soya milk]

**Preparation of Shrikhand**

*Shrikhand* was prepared as procedure given by Aneja *et al.* [1] with slight modification. The soya milk and cow milk was mixed as per treatment combinations. Then the milk was heated at 95°C for 5 minute and cooled up to temperature 37°C. After cooling the standard culture was added in milk @ 2 per cent and incubated at 37°C for 10-12 hrs. The curd so obtained was tied in muslin cloth and hanged for drain off the whey for 6-8 hrs. The *chakka* and whey obtained after draining were weighed. The *chakka* was used as base material for preparation of *shrikhand*. This *chakka* was mixed with ground sugar @ 60 per cent by weight of *chakka* and cardamom @ 1 gm/kg was added as flavouring agent. Control *shrikhand* was prepared using soya milk only and adopting the same procedure and stored at 5°C for further studies.
Soya milk + Cow milk (as per treatments)

Heating / Boiling (at 95°C for 5 min)

Cooling (37°C)

Inoculation @ 2 % standard dahi culture

Incubation (at 37°C for 10-12 hrs.)

Dahi

Drainage of whey through a muslin cloth for 6-8 hrs.

Chakka

Addition of sugar and cardamom (Sugar 60% weight of Chakka)

(Cardamom @ 1 g/kg)

Kneading

Packaging

Storage (5°C)

Fig. No.2 Flow chart for preparation of shrikhand [1]

RESULT AND DISCUSSION
Organoleptic / sensory evaluation of Finished Product

In the process of food development the sensory evaluation are the main steps, without which others effects may be fruitful less. When product pass in this stage, then the achievement be in the hands of developers. The acceptability of soya milk blended with cow milk was measured in terms of sensory attributes such as, colour and appearance, flavour, body and texture, sweetness and overall acceptability using 9 point hedonic scale by a panel of five semi-expert judges. The data so obtained were analyzed using Completely Randomized Block Design (CRBD) and shown in forth coming table 1.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Parameters</th>
<th>Treatments</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>S.E.</th>
<th>C.D. at 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Colour and Appearance</td>
<td>T1</td>
<td>6.88b</td>
<td>7.13b</td>
<td>7.25ab</td>
<td>7.63a</td>
<td>0.13</td>
<td>0.40</td>
</tr>
<tr>
<td>2)</td>
<td>Flavour</td>
<td>T2</td>
<td>6.25c</td>
<td>6.75b</td>
<td>7.00b</td>
<td>7.38a</td>
<td>0.11</td>
<td>0.35</td>
</tr>
<tr>
<td>3)</td>
<td>Body and Texture</td>
<td>T3</td>
<td>6.75c</td>
<td>7.25b</td>
<td>7.50ab</td>
<td>7.75a</td>
<td>0.12</td>
<td>0.38</td>
</tr>
<tr>
<td>4)</td>
<td>Sweetness</td>
<td>T4</td>
<td>7.00b</td>
<td>7.13b</td>
<td>7.25ab</td>
<td>7.50a</td>
<td>0.09</td>
<td>0.29</td>
</tr>
<tr>
<td>5)</td>
<td>Overall Acceptability</td>
<td>T5</td>
<td>6.72c</td>
<td>7.10b</td>
<td>7.25ab</td>
<td>7.57a</td>
<td>0.11</td>
<td>0.34</td>
</tr>
</tbody>
</table>

The mean score of colour and appearance for the treatments T1, T2, T3 and T4 were 6.88, 7.13, 7.25 and 7.63, respectively. The lowest colour and appearance score was recorded for treatment T1 (6.88 per cent). This indicates that the higher proportion of soya milk in the control sample (T1) decreased the colour and appearance score of shrikhand. Dull colour and appearance was observed in control sample. Treatment T1 was significantly at par with T2 and T3. While, treatment T3 was significantly at par with T4 and the treatment T4 was significantly differ from treatment T1 and T3. Similar result observed by Chaudhary [5] decreased average score for colour and appearance in the kheer prepared from soya milk plus cow milk as the soya milk increased in the proportion of the cow milk. Kumar et al. [12] also found similar trends the appearance score showed a declined trend with increased in apple pulp, though the decline was non-significant.
The score of flavour attribute for the treatments T\(_1\), T\(_2\), T\(_3\) and T\(_4\) are 6.25, 6.75, 7.00 and 7.38, respectively. Flavour score was lowest for T\(_1\) (6.25) and highest in T\(_4\) (7.38). As the proportions of soya milk in T\(_1\) was more there was decrease in flavour score due to the beany flavor in finished product. Treatments T\(_2\) and T\(_3\) were significantly at par to each other. Whereas T\(_1\) and T\(_4\) significantly differs from rest of treatments. Similar result found by Chede [6] observed that concentration of soya milk increased the flavour score of prepared \textit{shrikhand} was decreased and the Krupal [11] also studied that the proportion of soymilk increased there was decrease in flavour score of \textit{yoghurt}.

The mean score for body and texture of \textit{shrikhand} was recorded for treatment T\(_1\), T\(_2\), T\(_3\) and T\(_4\) was 6.75, 7.25, 7.50 and 7.75, respectively. This indicates that increased proportion of soya milk in the blend decreased the score for body and texture of the \textit{shrikhand}. It was observed that treatment T\(_1\) significantly differs over T\(_2\), T\(_3\) and T\(_4\). Treatment T\(_2\) was at par with T\(_3\) while T\(_4\) was at par with T\(_3\). Similar result to be initiated by Nadaf \textit{et al.} [13] decreasing trend in the body and texture score of \textit{yoghurt} prepared from cow milk blended with soymilk and \textit{shrikhand} prepared by using different level of \textit{gulkhand}, respectively. Chaudhary [5] was also reported that the average score in the \textit{kheer} prepared from soy and cow milk decrease body and texture score of \textit{kheer} by increasing level of soya milk. Score of sweetness for the treatments T\(_1\), T\(_2\), T\(_3\) and T\(_4\) as, 7.00, 7.13, 7.25 and 7.50, respectively. Treatment T\(_1\) was significantly at par with T\(_2\) whereas T\(_2\) was significantly at par with treatment T\(_3\), but the treatment T\(_4\) significantly differs from treatments T\(_1\) and T\(_2\). Similar result was noticed by Narayan and lingam [14] on banana blended \textit{shrikhand} was no significant difference in sweetness in all the treatment samples indicating that the sugar blended was equal in all treatments. The overall acceptability score of \textit{shrikhand} for treatment T\(_1\), T\(_2\), T\(_3\) and T\(_4\) was 6.72, 7.10, 7.25 and 7.57, respectively. The lowest score of overall acceptability was recorded for treatment T\(_1\) (6.72 per cent) and the highest overall acceptability score was recorded for treatment T\(_4\) (7.57 per cent). It is observed that the overall acceptability score were found to be in increasing order from T\(_1\) to T\(_4\). As the proportion of cow milk in the blend increased there was increase in overall acceptability of finished product. It was observed that treatment T\(_4\) significantly differ from T\(_1\) and T\(_2\) but treatment T\(_4\) was significantly at par with T\(_3\). While treatment T\(_1\) was at par to treatment T\(_2\).

The acceptability score was reduced proportionately with the increased in proportion of soya milk. This result was also in agreement with the results noted by Krupal [11] and Yadav \textit{et al.} [19] and Katara and Bhargava [10] observed that the overall acceptability score for \textit{rasogolla} increased with increased proportion of cow milk in the blend.

**CONCLUSION**

Since from current investigation it can be concluded that treatment T\(_4\) with 75 per cent soya milk and 25 per cent cow milk was significantly superior over treatment T\(_1\), T\(_2\) and T\(_3\) which had the highest sensory score with respect to colour and appearance, flavor, body and texture, sweetness,. It was observed that the overall acceptability score increased as proportion of cow milk is increased. Use of soya milk to
produce shrikhand can be made effectively but efforts should be taken to remove the beany flavour of soya milk and products made from soya milk.

REFERENCES