Sensory Evaluation of different levels of Goat milk and Banana pulp on quality of fruit Yoghurt

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Abstract
Yoghurt is a snow white, custard like fermented milk product, obtained through the controlled lactic acid fermentation of milk by *Lactobacillus bulgaricus* and *Streptococcus thermophiles*. A study was undertaken by using different levels of Goat milk and Banana pulp i.e. T1 (90:10), T2 (85:15), T3 (80:20) respectively. Experimental fruit yoghurt mix was standardized to 4.0% fat, 11.5% solids not fat, 10% sugar and 2% culture adjusted to 25.2% total solids. Yoghurt samples for different treatments were analyzed for organoleptic attributes (colour and appearance, body and texture, taste and flavour) by trained panelist using 9 point hedonic scale. The highest mean value for body and texture were found in T3 (8.34). The highest mean value for flavour and taste was found in T3 (8.16). The fruit yoghurt obtained from T3 (80:20) ratio was the best product among all treatments. Thus, as far as product acceptability judged by organoleptic evaluation, the treatment can be rated as T3 > T0 > T2 > T1.

Keywords: Goat milk, Banana pulp, Fruit yogurt.

Introduction
Fermented milk products have been the essential part of our food consumption; since ancient times. The symbiosis of two most important microorganisms, i.e., *Lactobacillus bulgaricus* and *Streptococcus thermophiles* resulted in lactic acid fermentation to convert milk into a fermented milk product known as Yoghurt. It is an exotic product but now very much accommodated as an Indian fermented milk product, because of its nutritional and therapeutic value like *Dahi* “curd”. Yoghurt is a low caloric diet.it can serve as an alternative source of calcium for people, who are lactose intolerant.it can help in stimulation of immune system, reduction in bacterial enzymes and reduction of serum cholesterol.it also help in anti-tumor activity, Folic acid and vitamin B synthesis and enhance mineral bioactivity (David, 2012) [5]. Yoghurt is a famous fermented dairy product which plays an important role in preventing gastrointestinal infections which causes diarrhea. It also reduces the chances of cancer and lowers the blood cholesterol (Gilliland, 1979) [6]. Mudgal and Devendra (1999) [8] remarked that after cow, buffalo, is the most important dairy species. In India, goat’s milk in general is considered to be inferior to cow’s or buffalo’s milk and is entirely use for beverage purpose. Yoghurt prepared from goat milk has been widely accepted for infants and convalescents because of its easy digestibility. Goat milk is more digestible than cow and buffalo’s milk because smaller average size of the fat globules (Jennes and Patton 2005) [7]. Goat milk yoghurt did not show any whey off but preferred for its smooth body and texture and sharp flavour. By the addition of fruit pulps in yoghurt its nutritional content viz. proteins and vitamins enhanced without compromising its palatability. This filler will also give nutritious product at an economic rate, which will make the product further popular in domestic and international market. In this study effort has been made to prepare good quality yoghurt from goat milk and banana pulp using the technique of manufacture as recommended by Balasubramanayam et al., (1991) [3].

Material and Methods
First of all fresh goat milk was collected and standardized for 4% fat and 11.5% SNF using spray dried skim milk powder. Then the milk was heated at 85 °C for 5 minutes. Sugar was added @ of 10% of milk. It was then cooled at 42 °C. Milk was then inoculated with 2% culture. At this stage banana pulp was added @ 10, 15 and 20%. The mix was then sent for incubation at 42 °C. After that yoghurt was filled in the cups and sent for storage under refrigeration. Thus the yoghurt was ready (Figure 1).
Table 1: Details of different treatments for making Banana pulp fruit Yoghurt.

<table>
<thead>
<tr>
<th>Materials (%)</th>
<th>Different treatments</th>
<th>Banana pulp fruit Yoghurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goat milk</td>
<td>T0</td>
<td>100</td>
</tr>
<tr>
<td>Banana pulp</td>
<td>-</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 2: Average of different Organoleptic Parameters of the Control and Banana pulp fruit Yoghurt.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control and Banana pulp fruit Yoghurt</th>
<th>F value</th>
<th>C.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour and Appearance</td>
<td>T0  8.30, T1 8.02, T2 7.70, T3 7.78</td>
<td>50.884*</td>
<td>0.11</td>
</tr>
<tr>
<td>Body and Texture</td>
<td>T0  8.24, T1 7.68, T2 7.98, T3 8.34</td>
<td>11.837*</td>
<td>0.25</td>
</tr>
<tr>
<td>Flavour and Taste</td>
<td>T0  8.04, T1 7.92, T2 7.94, T3 8.16</td>
<td>4.246*</td>
<td>0.25</td>
</tr>
</tbody>
</table>

* Significant at 5 % level  
** Non-significant at 5 % level

Results and Discussion

Organoleptic Evaluation of the prepared product

Freshly prepared control and Banana pulp fruit Yoghurt were served for evaluation to panel members consisting of 5 experienced persons. 9 point hedonic scale proforma was used as suggested by Amerine et al. (1965) [1].

Statistical analysis

The data obtained on different aspects as per plan were tabulated and statistically analyzed as per Chandel (1991) [4].
Table 3: Overall acceptability of the Control and Banana pulp fruit Yoghurt.

<table>
<thead>
<tr>
<th>Replication</th>
<th>Control and Banana pulp fruit Yoghurt</th>
<th>F value</th>
<th>C.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T₀</td>
<td>T₁</td>
<td>T₂</td>
</tr>
<tr>
<td>R₁</td>
<td>8.70</td>
<td>7.9</td>
<td>7.8</td>
</tr>
<tr>
<td>R₂</td>
<td>8.50</td>
<td>7.8</td>
<td>8.3</td>
</tr>
<tr>
<td>R₃</td>
<td>8.20</td>
<td>7.7</td>
<td>8.2</td>
</tr>
<tr>
<td>R₄</td>
<td>8.06</td>
<td>7.6</td>
<td>8.0</td>
</tr>
<tr>
<td>R₅</td>
<td>8.04</td>
<td>7.5</td>
<td>8.1</td>
</tr>
<tr>
<td>Mean</td>
<td>8.30</td>
<td>7.70</td>
<td>8.28</td>
</tr>
</tbody>
</table>

* Significant at 5 % level  
** Non-significant at 5 % level

Overall acceptability scores for Control and Banana pulp fruit Yoghurt

Table 3 and fig.2 showed the highest mean value for overall acceptability of the control and banana pulp fruit yoghurt was found in T₀ (8.3), followed by T₂ (8.28), T₃ (7.80) and T₁ (7.70). F Value was 3.621, indicating significant effect of treatment on Overall acceptability. The data differed significantly among the treatments, thus showed the acceptability of the fruit yoghurt from goat milk and banana pulp.

Table 4: Average of different Microbial Parameters of the Control and Banana pulp fruit Yoghurt.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control and Banana pulp fruit Yoghurt</th>
<th>F value</th>
<th>C.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T₀</td>
<td>T₁</td>
<td>T₂</td>
</tr>
<tr>
<td>Yeast and mold count ((10^2)cfu/g)</td>
<td>7.0</td>
<td>8.4</td>
<td>7.6</td>
</tr>
<tr>
<td>Coliform count ((10^1)cfu/g)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

* Significant at 5 % level  
** Non-significant at 5 % level

Average of different Microbial Parameters of the Control and Banana pulp fruit Yoghurt

Table 4 showed the highest mean value for yeast and mold count in fruit yoghurt was found in T₁ (8.4), followed by T₂ (7.6), T₃ (7.2) and T₀ (7.0). There were no significant differences found among the treatments. There were no coliform found in all the treatments, thus indicated proper hygiene was followed during the trials.

Conclusion

The results obtained from the statistical analysis revealed that the goat milk and banana pulp can be satisfactorily used to manufacture fruit yoghurt. Fruit yoghurt contain 20% banana pulp (T₃) found to be best among all the treatments.

References