Preparation of strawberry Lassi

B.K. GHULE, R.J. DESALE, M.S. GAVHANE AND M.C. KHORE

ABSTRACT: In present study of strawberry fortified Lassi the chemical composition observed as fat content ranges from 3.25 to 3.11, protein from 3.64 to 3.78, lactose from 3.73, to 3.82, total sugar 13.92 to 16.29, ash from 0.73 to 0.8. Acidity (% LA) from 0.90 to 1.02 and pH from 4.13 per cent, respectively. The fat content of Lassi samples is decreases as increase in the level of strawberry pulp while lactose content is increases as increase in the level strawberry pulp. The overall acceptability for sensory score for Lassi prepared by using 5 per cent strawberry pulp is (8.09 to 7.90). The mean lactobacilli count was observed to be 4.33 × 10^7 cfu/ml lit was observed that Lassi samples under study did not show presence of any yeast and mould growth. The cost for the sensorial superior combination Lassi prepared with 8 per cent sugar and 5 per cent strawberry pulp could make a 200 ml serving at Rs. 6.80 which may be sufficiently lower with the value added and nutritionally enriched combination of strawberry pulp.

KEY WORDS: Dahi, Lassi, Strawberry pulp

The objectives laid down for present research work are as follows:
- Preparation of *Lassi* by using various levels of strawberry pulp.
- To study the sensory, chemical and microbial quality of strawberry *Lassi*.
- To estimate the cost of preparation of strawberry *Lassi*.

**MATERIAL AND METHODS**

Sample of cow milk was obtained from the herd maintained at the cattle project of University. LF-40 starter culture was used for making of *dahi* in the laboratory. Distilled water was used for preparation of *Lassi* throughout the study period. Level of water and sugar were kept constant for 10 and 8 per cent, respectively (Fig. A).

![Flow chart for preparation of strawberry Lassi](image)

**Sensory evaluation of Lassi**:

*Lassi* samples prepared under this study were evaluated sensorily by the panel of six semi–trained judges adopting 9 point Hedonic scale. A score card given by Dharampal and Gupta (1985) with slight modification (Ashwani, 1992) was used for sensory evaluation of *Lassi*.

**Chemical analysis of Lassi**:

The *Lassi* samples were analyzed for chemical parameters by adopting standard procedure given below.

- Fat was determined by Gerber method as per procedure stated in IS: 1224 (Part-I), 1977.
- Nitrogen content was determined by semi-micro Kjedhal method as described by Menefee and Overman (1940). This was multiplied by 6.25 to get per cent protein.
- Acidity of *Lassi* samples were determined as per procedure stated in IS: 1479 (Part I) 1960.
- pH of *Lassi* determined by using digital pH meter following the procedure stated in IS: 1479 (Part-II) 1961.
- Lactic acid bacteria (LAB) count of *Lassi* sample was determined using Lactose Purple Agar (LPA) and MRS Agar media, respectively by pour plate technique suggested by Prajapati (1997). Yeast and mould count of *Lassi* sample were taken as per described in IS: 5403 (1969) using Potato Dextrose Agar (PDA).
- The coliform count of *Lassi* samples was determined as per procedure given in IS: 5403 (1969) using Potato Dextrose Agar (PDA).
as per procedure described in IS:5550 (1970) using McConkey’s Agar.

**Statistical design :**

The research data was tabulated carefully and statistically analyzed by using Completely Randomized Design (CRD) test as described by Snedecor and Cochran (1967).

**Treatment combinations :**

- $T_0$: control sample
- $T_1$: control sample + 2.5 per cent strawberry pulp,
- $T_2$: control sample + 5 per cent strawberry pulp,
- $T_3$: control sample + 7.5 per cent strawberry pulp.

**Cost estimation of manufacturing Lassi :**

The cost estimation (Rs./kg) of the product was worked out by taking into account the prevailing market rates of the ingredients as well as other charges used for preparation of strawberry Lassi.

**RESULTS AND DISCUSSION**

The results of the present study as well as relevant discussions have been presented under following sub heads and Table 1 to 3.

**Chemical composition of strawberry pulp :**

Strawberry pulp used for preparation Lassi was analyzed for chemical parameters. The average values

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**Table 1 : Chemical evaluation of strawberry Lassi**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fat (%)</th>
<th>Protein (%)</th>
<th>Lactose (%)</th>
<th>Ash (%)</th>
<th>Total sugar (per cent)</th>
<th>Total solid (%)</th>
<th>Acidity (% LA)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_0$</td>
<td>3.25&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.64&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.73&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.73&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13.92&lt;sup&gt;d&lt;/sup&gt;</td>
<td>25.17&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.02&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.31&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>$T_1$</td>
<td>3.21&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.68&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.75&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>14.73&lt;sup&gt;c&lt;/sup&gt;</td>
<td>26.17&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.98&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.28&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>$T_2$</td>
<td>3.11&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.73&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.79&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.82&lt;sup&gt;c&lt;/sup&gt;</td>
<td>15.50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27.05&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.92&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.17&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>$T_3$</td>
<td>3.05&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.78&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3.82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.85&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.29&lt;sup&gt;a&lt;/sup&gt;</td>
<td>27.88&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.90&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.13&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

S.E. (+) 0.011 0.017 0.010 0.01 0.016 0.014 0.011 0.011
C.D. (P=0.05) 0.033 0.033 0.032 0.03 0.049 0.044 0.035 0.030

Result Significant Significant Significant Significant Significant Significant Significant Significant

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**Table 2 : Sensory evaluation score of strawberry Lassi**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Colour and appearance</th>
<th>Flavour</th>
<th>Body and texture</th>
<th>Acidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_0$</td>
<td>7.56</td>
<td>7.12</td>
<td>7.38</td>
<td>7.19</td>
</tr>
<tr>
<td>$T_1$</td>
<td>7.68</td>
<td>7.65</td>
<td>7.83</td>
<td>7.21</td>
</tr>
<tr>
<td>$T_2$</td>
<td>8.02</td>
<td>7.90</td>
<td>8.09</td>
<td>7.24</td>
</tr>
<tr>
<td>$T_3$</td>
<td>7.73</td>
<td>7.62</td>
<td>7.86</td>
<td>7.27</td>
</tr>
</tbody>
</table>

S.E. (+) 0.027 0.026 0.039 1.03
C.D. (P=0.05) 0.081 0.0079 0.12 0.03

Result Significant Significant Significant Significant

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**Table 3 : Lactic acid bacteria (LAB) count of Lassi**

<table>
<thead>
<tr>
<th>Lassi samples</th>
<th>Lactobacilli (X 10&lt;sup&gt;7&lt;/sup&gt; cfu /ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_0$</td>
<td>4.33</td>
</tr>
<tr>
<td>$T_1$</td>
<td>3.55</td>
</tr>
<tr>
<td>$T_2$</td>
<td>3.35</td>
</tr>
<tr>
<td>$T_3$</td>
<td>3.30</td>
</tr>
</tbody>
</table>
for protein, carbohydrates and ash content were found 0.67, 7.70 and 0.42 per cent, respectively.

Chemical evaluation of Lassi:

Fat content of strawberry pulp fortified Lassi ranges from 3.25 to 3.11 per cent. The higher fat content is observed control treatment. The fat content of Lassi samples is decreases as increase in the level of strawberry pulp. Protein content ranges from 3.64 to 3.78. Lactose content ranges from 3.73, to 3.82. Lactose content is increases as increase in the level strawberry pulp. Total sugar content ranges from 13.92 to 16.29. The ash content ranges from 0.73 to 0.85. Total solid content observed to be 25.7, 26.17 to 27.88 per cent. Acidity (% LA) ranges from 0.90 to 1.02 per cent. The pH values observed from 4.13 and 4.31 (Table 1).

Sensory evaluation of Lassi:

The highest sensory evaluation shown for colour and appearance, body and texture and flavour is for Lassi prepared by using 5 per cent strawberry pulp with the score 8.02, 8.09 and 7.90, respectively (Table 2).

Microbial evaluation of strawberry Lassi:

Lactic acid bacterium:

The mean lactobacilli count was observed to be $4.33 \times 10^7$ cfu/ml in $T_0$ and $T_2$ Lassi samples, respectively.

Yeast and mould count:

The Lassi samples were evaluated for yeast and mould count by pour plate technique. It was observed that both Lassi samples under study did not show presence of any yeast and mould growth.

Coliform count:

The presence of coliforms in milk and milk products is suggestive of unsanitary condition or practices followed during production, processing, handling and storage. Hence, the Lassi samples of present study were subjected to determination of coliform count. The dilutions ($10^{-1}$ and $10^{-2}$) were cultured on McConkey’s agar by the pour plate technique where in coliforms were not detected in any of the Lassi samples, which is an indicative that the Lassi samples were free from coliforms and hence, safe for consumption.

Cost structure of strawberry Lassi:

All the ingredients required for preparation of Lassi were rated as per prevailing market prices (2010–2011). The cost of production of strawberry Lassi was comparatively more or similar (Rs. 34.00 per kg) than control Lassi (Rs. 31.86 per kg). The cost for the sensorial superior combination $T_1$ (8 % sugar and 5 % strawberry pulp) could make a 200 ml serving at Rs. 6.80 which may be sufficiently lower with the value added and nutritionally enriched combination of strawberry pulp.

Conclusion:

It may be concluded that, the Lassi of good quality and with more acceptability we prepared having beneficial, value added and nutritionally enriched product.

LITERATURE CITED


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