Studies on physico-chemical quality of Shrikhand sold in Kolhapur city

VB Jaybhay, DK Kamble and SR Jadhav

Abstract
Shrikhand is one of the important fermented milk products which derives its name from the Sanskrit Word “shrikkhīrni” meaning a curd prepared with added sugar flavoring agent, fruits and nuts. Shrikhand is popular in western part of southern peninsula of India. Hence, present study was undertaken to evaluate the quality of shrikhand sold in Kolhapur city for its sensory, chemicals and microbial qualities. Preliminary survey was conducted and on the basis of survey five brands of shrikhand were selected, coded with KS1, KS2, KS3, KS4, and KS5. Packed pouch (package) of selected brands were collected from the market and brought to laboratory under condition for further analysis. In this study physico-chemical properties for moisture, total solids, fat, protein, reducing sugar, acidity and pH, were examined. Significant (P<0.05) difference were also recorded in all the chemical quality of shrikhand sold in Kolhapur city. The average of moisture content in samples 40.50% to 44.09%. The maximum moisture content maximum 44.09% was observed in the KS1 sample and minimum moisture 40.50% was observed in the KS2 sample. The total solid content in samples was 55.50% to 59.13%. Sample KS3 content maximum 59.13 TS and Sample KS4 content minimum 55.50 TS. The fat content in shrikhand samples were 8.33, 8.10, 5.73, 7.57 and 7.00 whereas the average protein content were 7.10, 7.12, 5.5, 5.75 and 7.20 in KS1, KS2, KS3, KS4 and KS5 respectively. However, the mean of total sugar content of shrikhand samples in KS1, KS2, KS3, KS4 and KS5 were 42.32, 43.43, 43.83, 43.25 and 41.68 percent respectively. The average acidity (% LA) of market sample of shrikhand KS1, KS2, KS3, KS4, KS5 were 1.01, 1.20, 1.45,1.00, and 1.50, respectively whereas, the pH in shrikhand sample was ranged from 4.00 to 5.13. The ash content in market sample of shrikhand ranged from 0.75 to 0.90.

Keywords: Shrikhand, physico-chemical, Kolhapur city

Introduction
Fermented or cultured dairy products constitute a vital component of the human diet in India as in many other regions of the world. Dahi, lassi, mishiti dahi and shrikhand like milk products figure prominently in people’s diet in different parts of India. There are more than 400 type of fermented dairy products are prepare in the world some of them are kefir, kumiss, Bulgarian sour milk, dahi, yoghurt, acidophilus milk, lassi, Shrikhand etc. Shrikhand is fermented and sweetened milk product of Indian origin which is derived from Sanskrit word ‘shrikkhīrni’ meaning a curd prepared with addition of sugar, flavouring material, dried fruits etc. It is regularly consumed in Gujarat, Maharashtra and certain parts of Karnataka, Madhya Pradesh and Rajasthan in addition to these places, because of its typical sweet-sour taste, it is becoming popular in other parts of country. Shrikhand has a typical semi-solid consistency with a characteristic smoothness, firmness and palatability that make it suitable for consumption directly after meal or with ‘puree’ or bread. Kolhapur is the top most districts in buffalo milk production in Maharashtra. At present, Kolhapur District Milk Union (Gokul), Warna Milk Union, Yelgud Milk Union, Shahu Milk Union are the key leader in collecting and processing of milk in the district. Consumption of milk and milk products in the Kolhapur city is also quite high due to economic status and awareness of the people about nutritional importance of milk and milk products in the diet (Patange et al., 2011) [9]. Number of branded Shrikhand is being prepared and marketed in Kolhapur district. There are no microbiological standard for shrikhand in PFA, however, BIS (IS: 5432-1980) has given the limit of 50 cfu/g for yeast and molds count and 10cfu/g for coliform. Since then no information on sensory, chemical and microbiological quality of shrikhand in this area is available whereas, on other side, the product growth in the market has increased substantially in last few years. Hence, the present study deals with the analysis of differently branded Shrikhand sold in Kolhapur city.
Materials and Methods

Materials

For analytical purpose i.e. sensory, chemical, microbial characteristics of shrikhand samples in the laboratory, following material has been used.

Selection of brands of Shrikhand

Preliminary survey was conducted in the Kolhapur market, to know the brands and to ascertain the availability of shrikhand throughout the study period. On the basis of survey, five brands of shrikhand have been selected and considered for this study.

Chemical analysis of Shrikhand

Shrikhand samples were analyzed for its chemical parameters by adopting standard procedure as listed. Shrikhand samples (market and laboratory made) were analyzed as; fat was determined by Gerber method. Moisture content was determined by the gravimetric method as described in AOAC (2000). Total solids were determined by subtract moisture from total weight of product used for analysis. Total protein content in Shrikhand was determined using kjeldhal method (AOAC, 2000). Lactose of shrikhand sample was determined by the method described in IS: SP 18 (Part XI, 1981).

Table 1: physico-chemical composition of shrikhand sold in Kolhapur city

<table>
<thead>
<tr>
<th>Shrikhand samples</th>
<th>Moisture (%)</th>
<th>TS (%)</th>
<th>Protein (%)</th>
<th>Reducing sugar (%)</th>
<th>Non-reducing sugar (%)</th>
<th>Acidity (%)</th>
<th>pH</th>
<th>Ash (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS1</td>
<td>43.84±0.07</td>
<td>56.07±0.22</td>
<td>8.33±0.08</td>
<td>7.10±0.04</td>
<td>5.92±0.13</td>
<td>36.40±0.11</td>
<td>1.01±0.05</td>
<td>5.00±0.15</td>
</tr>
<tr>
<td>KS2</td>
<td>42.73±0.20</td>
<td>57.27±0.32</td>
<td>8.10±0.04</td>
<td>7.12±0.18</td>
<td>6.06±0.10</td>
<td>37.37±0.08</td>
<td>1.20±0.04</td>
<td>0.90±0.05</td>
</tr>
<tr>
<td>KS3</td>
<td>46.62±0.19</td>
<td>53.28±0.14</td>
<td>5.73±0.06</td>
<td>5.5±0.03</td>
<td>3.52±0.09</td>
<td>30.31±0.08</td>
<td>1.45±0.03</td>
<td>0.85±0.09</td>
</tr>
<tr>
<td>KS4</td>
<td>45.31±0.20</td>
<td>55.11±0.08</td>
<td>7.57±0.05</td>
<td>5.75±0.06</td>
<td>6.23±0.08</td>
<td>37.02±0.29</td>
<td>1.00±0.03</td>
<td>0.07±0.13</td>
</tr>
<tr>
<td>KS5</td>
<td>46.00±0.15</td>
<td>54.11±0.36</td>
<td>7.00±0.09</td>
<td>7.20±0.06</td>
<td>3.13±0.05</td>
<td>38.55±0.13</td>
<td>1.50±0.06</td>
<td>0.07±0.15</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.10</td>
<td>0.07</td>
<td>0.06</td>
<td>0.08</td>
<td>0.10</td>
<td>0.06</td>
<td>0.09</td>
<td>0.11</td>
</tr>
<tr>
<td>CD at 5%</td>
<td>0.36</td>
<td>0.21</td>
<td>0.28</td>
<td>0.34</td>
<td>0.28</td>
<td>0.26</td>
<td>0.25</td>
<td>0.32</td>
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<td></td>
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<td></td>
<td>0.10</td>
<td></td>
</tr>
</tbody>
</table>

Total solids

The average values of TS content of sample which observed significant (P<0.05). Sample KS2 content max (57.27 ± 0.32%) TS and showed superiority over others which was at par with sample KS1 (56.07 ± 0.22%). Sample KS1 (53.28 ± 0.14%) was found inferior with respect to TS. Which was at par with sample KS3 (54.11 ± 0.36%).

Fat

Fat is an important constituent and which improves the taste and richness of the products. The mean values pertaining to fat content in market samples presented in table 4.8 and fig 4.8 values in the table are statistically significant (P<0.05). Sample KS3 content maximum (8.33 ± 0.08%) fat and showed superiority over others while sample KS1 content minimum (5.73 ± 0.06%) fat and inferior to all samples.

Protein

The average values pertaining to protein content in market samples presented in table 4.9 and in fig 4.9 statistically significant (P<0.05) variations where observed in these values. The maximum protein (7.20 ± 0.06%) observed in the KS2 sample. This was superior to another sample. KS1, KS3 and KS5 are at par to each others. Whereas sample KS3 observed inferior with minimum (5.5 ± 0.03%) protein content. The range of protein content observed in present study is in close approximation with the values reported by Sharma and Zarewala (1980).

Reducing and non – reducing sugar content was determined as per lane-eyon method of SP: 18 (part XI, 1981). The pH of shrikhand samples was determined by using digital pH meter following the procedure stated in IS: 1479 (part – II, 1961).

Statistical analysis

Randomized Block Design (RBD) with six replications was used for analysis of data (Panse and Sukhatme, 1985).

Results and Discussion

The market samples of shrikhand were analyzed chemically for its constituent’s viz., moisture, total solids, fat, protein, reducing and non-reducing sugar, acidity and pH. Results are presented and discussed as follows.

Moisture

The average values of moisture content in samples are presented in table 4.6 and fig 4.6 which showed significant (P<0.05) variation. The maximum moisture (46.62 ± 0.19%) was observed in the KS1 sample, which was inferior to others, while minimum moisture (42.73 ± 0.20%) was observed in the KS2 sample. The moisture content of KS2 sample was at par with sample KS3 (43.84 ± 0.07%).

Reducing sugar (Lactose)

Average values pertaining to reducing sugar content in market samples are depicted in table 4.10 and fig 4.10 observed values were statistically significant (P<0.05) sample KS1 was with maximum (6.23 ± 0.08%) reducing sugar and at par with sample KS2 (6.06 ± 0.10%) while sample KS3 was with minimum (3.13 ± 0.05%) reducing sugar. Lactose content of shrikhand depends on the extent of lactose degradation, moisture content of shrikhand Bogra et al. (2000).

Non reducing sugar (Sucrose)

The average values pertaining non reducing sugar content in market samples, significant (P<0.05) variations were observed in these values. On the basis of statistical analysis sample S1 was inferior with maximum (40.31 ± 0.08%) non reducing sugar, while sample KS1 was superior with minimum (36.40 ± 0.11) non reducing sugar which was at par with sample KS2 and KS4 similar range of total sugar was also recorded by Sakore (1998) . Sugar slowed down the chemical changes due to fermentation Bogra et al. (2000). Higher value of sugar indicated that product has more aldehyde and ketone group. Higher the free aldehyde group will reduce the shelf life of product.

Acidity

The average values of acidity of market sample presented in table 4.12 and fig 4.12 statistically significant (P<0.05) variation were observed in these values. Sample KS3 showed
maximum (1.50 ±0.06%) acidity and was inferior to other sample. Sample KS3 is at par with sample KS5. Sample KS1 and S4 were superior and at par with minimum acidity (1.04%).

pH
The average value of pH market samples presented in table 4.13 and fig 4.13 statistically significant (P<0.05) variations were observed in these values. Sample S5 showed minimum (4.00 ± 0.05) pH and which was inferior to other sample. Sample KS3 was at par with KS1 and KS2. Sample KS2 and KS4 were superior with maximum (5.13 ± 0.07) pH.

Ash
The ash content ranged from 0.75 to 0.90 percent. It was observed that mean of ash content in shrikhand samples were ranged from 0.75 ± 0.05 to 0.90 ± 0.05 percent.

Conclusion
From the result it is concluded, that on the basis of, chemical quality studied here, KS1 and KS4 brands of shrikhand was significantly superior over the other brand under study. There was significant variation in respect of fat, protein, sucrose, total sugar and total solids content in all of the shrikhand samples examined. The wide variation was found among the market shrikhand, due to disorganized, lack of awareness to maintain hygienic and nutrition condition in shrikhand. Therefore, to make quality shrikhand, KS3 and KS5 brands is suggested to adopt proper hygiene condition and use good quality raw materials. It is also need to establish quality standards and enforcement of restriction on the quality of shrikhand in market, which is not appeared from the present study.

References