Physico-chemical quality of Paneer sold in Gondia city

JS Bhoyar, VG Atkare and Ku Vibhali A Bhandekar

Abstract
In all 60 samples of paneer were examined during the course of investigation which were collected from different regions viz., east, west, north and south region of Gondia city. From each region, 15 samples were collected and analyzed during three fortnights. These paneer samples were collected by adopting stratified randomization technique and analyzed them for their physico-chemical quality in Animal Husbandry and Dairy Science Section, college of Agriculture, Nagpur during year 2018-2019. Chemical quality was analyzed in laboratory by legal method prescribed in ISI Hand book. East, west, north and south region paneer samples contained on an average moisture 53.70, 53.19, 53.14 and 52.36 per cent, fat 23.99, 24.36, 24.53 and 25.93 per cent, protein 19.95, 20.51, 19.62 and 19.70 per cent, ash 1.58, 1.56, 1.73 and 1.63 per cent, total solids 46.30, 46.81, 46.86 and 47.64 per cent, pH 5.15, 5.32, 5.22 and 5.45 contain, acidity 0.55, 0.54, 0.57 and 0.56 per cent, respectively. During present study, it was found that paneer marketed in south region had better physico-chemical qualities than east, west and north paneer, which were fair but full fill standards of FSSAI (2006).

Keywords: Paneer, cottage cheese, chemical quality

Introduction
Paneer is an acid and heat coagulated indigenous milk product, which froms base for a variety of culinary dishes, stuffing materials for various vegetable dishes. Paneer contains entire milk casein, part of denaturized whey proteins, almost all fat, colloidal salts and soluble milk solids in proportion to the moisture retained. Paneer contains about 40 per cent total solids which include 17.5 per cent proteins, 25 per cent fat, 2 per cent carbohydrates and 1.5 per cent minerals, which is one of the major sources of animal protein for vegetarian people. Standard serving size (50g) of paneer contains 156 calories, of which 108 calories from fat. It also contains minerals on an average 10 mg sodium, 16 mg potassium, 138 mg calcium, 102 mg phosphorous and 1 mg iron (Aneja et al., 2002).

Paneer is a popular heat and acid-coagulated Indian milk product analogous to the to the western cottage cheese. It is prepared by coagulating milk with citric acid and pressing the resulting curd into block or cubes. The product has a shelf life of 6 day at 10 °C (Jagannath et al., 2001). Paneer consists usually of the insoluble salts and colloidal materials together with part of the moisture of serum of the original milk in which are contained lactose, whey proteins, solubal fats, vitamins and other milk components, it contains approximately 53-55 % moisture, 23-26 % fat, 17-18 % protein, 2- 2.5 % carbohydrate and 1.5-2.0 % minerals (Kanawjia and singh., 2000).

Materials and Methods
The present investigation on evaluating physico-chemical qualities of paneer samples was carried out in the laboratory of Animal Husbandry and Dairy Science section, College of Agriculture, Nagpur during year 2018-2019. In all 60 samples of paneer were examined during the course of investigation which were collected from different regions viz., east, west, north and south region. From each region, 15 samples were collected and analyzed during three fortnights. These paneer samples were collected by adopting stratified randomization technique.

Compositional analysis of paneer samples
The collected market paneer samples were subjected to the chemical analysis for moisture, fat, protein, ash, total solids, pH and acidity.
Determination of Moisture
Moisture content of paneer samples were determined as per procedure prescribed in ISI Handbook of SP: 18 (Part XI): 1981 [3].

Determination of Fat
Fat content of paneer was determined by the Soxhlet’s extraction method as per procedure describe in A.O.A.C. (1990) [19].

Determination of Protein
Protein content of paneer samples were determined by micro Kjeldahal method as recommended in IS: 1165 (1967) [11].

Determination of Ash
The ash per cent was determined by the method recommended in B.I.S Handbook of food analysis IS: 1165 (1967) [11].

Determination of total solids
Total solids content of paneer samples were determine by subtracting the moisture content in the samples as per the procedure given by SP: 18 (Part XI): 1981 [3].

Determination of pH
The pH of paneer was determined by blending 10 g of paneer with 10 ml of glass distilled water and dipping the electrode directly into the slurry as per the procedure followed for cheddar cheese ISI: (1981 b).

Determination of Acidity
The Acidity of paneer of paneer was determined as per the procedure mentioned in AOAC (1995) [5].

Results and Discussion
The physico-chemical properties of paneer is initially good during production time and it will gradually deteriorate during storage and marketing. The data of physico-chemical quality presented in Table 1 and discussed below.

Moisture
Result with regards to chemical quality of paneer sold in Gondia city (Table 1) it revealed that, the average values of moisture content of paneer samples sold in east, west, north and south region recorded as 53.70, 53.19, 53.14 and 52.36 per cent, respectively. The maximum average moisture content recorded in east paneer and minimum in south paneer. The moisture content of paneer was found to be in close agreement with the results reported by Rajorhia et al. (1984) [18], recorded overall moisture content of samples varied from 38.65 to 67.23 with an average of 50.72 per cent in NDRI, 51.91 per cent in Karnal, 50.00 per cent in Delhi. Likewise, Desale et al. (2009) [11], Naik et al. (2016) [16], Vaquil et al. (2017), Wangdare et al. (2017) and Bhandekar et al. (2018) [9] reported the moisture content of paneer samples were ranged from 38.51 to 67.00 per cent in market of Ahmednagar, Odisha, Hissar Bengaluru and Nagpur city.

Fat
The mean values of fat content of east, west, north and south regions paneer were recorded as 23.99, 24.36, 24.53 and 25.93 per cent, respectively for this attributes. The maximum fat content recorded in south paneer collected samples followed by north, west and east paneer. So, paneer samples of all regions meet the FSSAI specification (FSSAI, 2006) in respect of fat content (not less than 50 per cent of dry matter). However, fat content of north and west paneer were more or less similar.

More or less similar observations for fat per cent in paneer were also recorded by Desale et al. (2009) [11] they noticed fat per cent in paneer collected from Ahmednagar city varied from 16 to 28 per cent while, Naik et al. (2016) [16] reported as 11 to 29.21 per cent fat in paneer marketed from Odisha and Bhandekar et al. (2018) [9] reported as 20.81 to 27.50 per cent fat in paneer marketed in Nagpur city.

Protein
The mean values of protein content of paneer sold in east, west, north and south regions were recorded as 19.95, 20.51, 19.62 and 19.70 per cent, respectively. The maximum average protein content of market paneer recorded by west region’s paneer while minimum protein content was recorded by north region’s paneer.

Rajorhia et al. (1984) [18] noticed that, protein content of paneer in NDRI varied from 17.27 to 18.74 whereas, in Karnal and Delhi in the range of 12.41 to 20.85. Desale et al. (2009) [11] reported that, protein content in paneer ranged from 15.06 to 20.33 per cent. Naik et al. (2016) [16] recorded that, protein content of paneer collected from Odisha varies between 12.40 to 21.69 per cent with normal level of about 18.00 per cent in every zone. Wangdare et al. (2017) found that, protein content in paneer marketed in Bengaluru ranged between 18.00 to 23.00 per cent and Bhandekar et al. (2018) [9] also noticed protein per cent in paneer collected from Nagpur city varied from 16 to 19.41 per cent. These results are comparable with the results of present study.

Ash
The average values of ash content of east, west, north and south region paneer contributed 1.58, 1.56, 1.73 and 1.63 per cent, respectively. The maximum percentage of ash was recorded by north while minimum ash content obtained in west region paneer.

The findings of present investigation are collaborative with the findings of Rajorhia et al. (1984) [18] they recorded overall ash per cent in paneer from NDRI, Karnal and Delhi ranged from 1.00 to 2.91 per cent. Naik et al. (2016) [16] also reported that, ash per cent in Odisha paneer varies between 1.00 to 2.67 per cent. Likewise, Bhandekar et al. (2018) [9] also reported that, ash per cent in paneer varies between 1.81 to 2.02 per cent marketed in Nagpur city.

Total Solides
The mean values of east, west, north and south region paneer contributed 46.30, 46.81, 46.86 and 47.64 per cent, respectively for total solids content. It was noticed that, south paneer recorded maximum percentage of total solids followed by north, west and east paneer.

The total solids content of paneer recorded in present study are in close agreement with the results reported by, Aneja et al. (2002) [2] recorded total solids content of various types of traditional paneer like full fat paneer, low fat paneer, skim milk paneer and ultra-filtered paneer were as 46.04, 38.28, 35.42 and 30.63 per cent, respectively. While, Masud et al. (2007) recorded as 52.92, 53.19 and 49.6 per cent and Bhandekar et al. (2018) [9] also reported that, total solids per cent in Nagpur city paneer varies between 45.51 to 50.33 per cent, respectively.
pH
The mean values of pH content of east, west, north and south regions paneer were recorded as 5.15, 5.32, 5.22 and 5.45, respectively. These differences were found to be significant for pH content. However, the maximum pH content recorded in south paneer collected samples followed by, north, west and east paneer.

The pH content of paneer recorded in present study are in close agreement with the results reported by, Agnihotri and Pal (1996) [1] in freshly prepared goat milk paneer (5.69 to 6.13). Biradar et al. (2012) [10] in paneer prepared by blending soy milk and buffalo milk at different levels (5.78 to 6.00). Archana et al. (2012) [8] in freshly prepared milk paneer (5.78).

Acidity
The average values of acidity content of east, west, north and south region paneer is 0.55, 0.45, 0.57 and 0.56 per cent, respectively. The maximum percentage (0.57%) of acidity was recorded by north region paneer samples fallowed by south, east and west collected paneer samples.

The acidity per cent of paneer recorded in present study are in close agreement with the results reported by, Goyal et al. (2007) [12] reported acidity of market paneer which was ranged from 0.30 to 0.72 per cent. And Vaquil et al. (2017) reported less acidity content in paneer samples, which ranged from 0.25 to 0.44 per cent in market of Hisar city.

Table 1: Average chemical composition of paneer sold in gondia city

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Region</th>
<th>Chemical composition (%)</th>
<th>pH</th>
<th>Acidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Moisture</td>
<td>Fat</td>
<td>Protein</td>
</tr>
<tr>
<td>1</td>
<td>East</td>
<td>53.70</td>
<td>23.99</td>
<td>19.95</td>
</tr>
<tr>
<td>2</td>
<td>West</td>
<td>53.19</td>
<td>24.36</td>
<td>20.51</td>
</tr>
<tr>
<td>3</td>
<td>North</td>
<td>53.14</td>
<td>24.53</td>
<td>19.62</td>
</tr>
<tr>
<td>4</td>
<td>South</td>
<td>52.36</td>
<td>25.93</td>
<td>19.70</td>
</tr>
<tr>
<td></td>
<td>SE(m) ±</td>
<td>0.91</td>
<td>0.53</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>C.D at 5%</td>
<td>2.99</td>
<td>1.60</td>
<td>2.27</td>
</tr>
</tbody>
</table>

References: