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**Vibhali Bhandekar**  
 P.G. Student, Animal  
 Husbandry and Dairy Science,  
 Agriculture College, Nagpur,  
 Maharashtra, India

**VG Atkare**  
 Professor, Animal Husbandry  
 and Dairy Science, Agriculture  
 College, Nagpur, Maharashtra,  
 India

**Kavita Kadu**  
 Senior Research Assistant,  
 Animal Husbandry and Dairy  
 Science, Agriculture College,  
 Nagpur, Maharashtra, India

**Anchal Meshram**  
 P.G. Student, Animal  
 Husbandry and Dairy Science,  
 Agriculture College, Nagpur,  
 Maharashtra, India

**Correspondence**  
**Vibhali Bhandekar**  
 P.G. Student, Animal  
 Husbandry and Dairy Science,  
 Agriculture College, Nagpur,  
 Maharashtra, India

## Physico-chemical quality of Paneer sold in Nagpur city

**Vibhali Bhandekar, VG Atkare, Kavita Kadu and Anchal Meshram**

### Abstract

In all 75 samples of paneer were examined during the course of investigation which were collected from different regions viz., central, east, west, north and south region. From each region, 15 samples were collected and analyzed during three fortnight. 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 2017-2018. Chemical quality was analyzed in laboratory by legal method prescribed in ISI Hand book. Central, east, west, north and south region paneer samples contained on an average moisture 54.49, 51.32, 52.56, 50.33 and 52.79 per cent, fat 22.81, 26.40, 24.13, 27.17 and 24.40 per cent, protein 19.41, 17.91 18.59, 16.73 and 17.89 per cent, ash 1.81, 2.02, 1.88, 1.87 and 1.84 per cent, total solids 45.51, 48.68, 47.44, 50.67 and 47.21 per cent, respectively. During present study, it was found that paneer marketed in east region had better physico-chemical qualities than central, west, north and south paneer, which were fair but full fill standards of FSSAI (2006).

**Keywords:** Paneer, cottage cheese, chemical quality

### Introduction

India's estimated milk production in 2016-17 is 163.60 million tones. Estimated per capita availability in 2016-17 is 351 grams per day. India's milk production is 18.50 per cent of World milk production and now standing in first rank (Anonymous, 2017) [5]. Out of total milk production, 54.00 per cent milk is converted into various milk products while 46.00 per cent utilized as fluid milk. The milk products are categories like desiccated milk products (milk powder including IMF 3.50 per cent), concentrated milk products (khoa, basundi, rabri, peda burfi, etc. 6.50 per cent), fermented milk products (dahi, chakka, shrikhand 7.00 per cent), concentrated milk products (ghee and clarified butter 27.50 per cent), coagulated milk product (paneer and chhana 2.00 per cent) and frozen milk products, ice cream and other 1.00 per cent (Anonymous, 2015) [4].

Paneer is an important indigenous product which is obtained by heat treating the milk followed by acid coagulation using suitable acid viz., citric acid, lactic acid, tartaric acid, alum and sour whey. The whey formed is removed to some extent through filtration and pressing. Paneer represent one of the soft varieties of cheese family and is used in culinary dishes/snacks. About 5% of milk produce in India is converted into paneer (Chandan, 2007) [7].

The estimated market (traditional and organized sectors) of paneer in 2002-2003 was worth Rs.21 crores, and its production was 4,496 metric tonnes in 2004 (Joshi, 2007). Paneer contains all the milk constituents except for loss of some soluble whey proteins, lactose and minerals (Singh and Kanawjia, 1988). Paneer has a fairly high level of fat (22-25%) and protein (16 to 18%) and low level of Lactose (2.0-2.7%) (Kanawjia and Singh, 1996).

Paneer must be uniform and have a pleasing white appearance with a greenish tinge when made from buffalo milk and light yellow when made from cow milk. Paneer is characterized by a mild acidic flavour with slightly sweet taste and soft cohesive and compact texture. It is an excellent substitute for meat in India cuisine.

According to FSSAI Chhana or Paneer means, the product obtained from any variant of milk, with or without added milk solids, by precipitation with permitted acidulants and heating. It shall not contain more than 60.00 per cent moisture and milk fat content shall not be less than 50.00 per cent of the dry matter. The milk fat content of skim milk paneer shall not exceed 15 per cent of the dry matter. As per the Bureau of Indian standard (IS: 10984, Part III, 1983), the total plate count should not exceed  $2 \times 10^5$ , coliform count not more than 90 and yeast and

mould count not more than 250 cfu/g of paneer.

During recent years, paneer a heat-cum-acid coagulated product has become quite popular because of its high nutritive value, taste and excellent frying characteristics. Paneer contains almost all the protein and fats of milk besides an adequate amount of minerals and fat soluble vitamins. It is an ideal food for expectant and nursing mother, infants, growing children, adolescent and adults, being rich source of energy and animal proteins. It is a good source of all essential amino acids to the vegetarians. Its high protein and low sugar content, it is also recommended to diabetic persons. Although, the buffalo milk is best suited for paneer manufacture but good quality of paneer has also been made from cow milk or mixed milk with suitable treatments and/or modifications.

### 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 2017-2018.

In all 75 samples of paneer were examined during the course of investigation which were collected from different regions viz., central, east, west, north and south region. From each region, 15 samples were collected and analyzed during three fortnight. These paneer samples were collected by adopting stratified randomization technique. The samples were collected with due care to avoid contamination during collection process.

### Compositional analysis of paneer samples

The collected market paneer samples were subjected to the chemical analysis for moisture, fat, protein, ash and total solids.

### Determination of Moisture

Moisture content of paneer samples were determine as per procedure prescribed in ISI Hand book of SP: 18 (Part XI):1981<sup>[3]</sup>.

### Determination of Fat

Fat content of paneer was determine by the Soxhlet's extraction method as per procedure describe in A.O.A.C. (1990).

### Determination of Protein

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

### Determination of Ash

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

### 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<sup>[3]</sup>.

### Result and Discussion

In India, in the last few decades, the popularity of Paneer has spread from the northern parts to all over the country. Its growing popularity has led to its integration into the India cuisine. Now, it enjoys the status of a national delicacy. Their shelf life normally ranges from one to two days at ambient temperature, or six days refrigerated storage (5 to 10<sup>0</sup> C),

though freshness lost after three days. The physico-chemical properties and microbial quality of paneer is initially good during production time and it will gradually deteriorate during storage and marketing hence analytical quality of paneer resulted and discussed below.

### Moisture

Result with regard to chemical quality of paneer sold in Nagpur city (Table 1) it revealed that, the average values of moisture content of paneer samples sold in central, east, west, north and south region recorded as 54.49, 51.32, 52.56, 50.33 and 52.79 per cent, respectively. The maximum average moisture content recorded in central paneer and minimum in north paneer. The moisture content of paneer was found to be in close agreement with the results reported by Rajorhia *et al.* (1984)<sup>[15]</sup>, 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 and 50.00 per cent in Delhi. Likewise Desale *et al.* (2009)<sup>[8]</sup>, Naik *et al.* (2016)<sup>[14]</sup>, Vaquil *et al.* (2017)<sup>[17]</sup> and Wangdare *et al.* (2017)<sup>[18]</sup>, reported the moisture content of paneer samples were ranged from 38.51 to 67.00 per cent in market of Ahmednagar, Odisha, Hissar and Bengaluru city.

### Fat

The mean values of fat content of central, east, west, north and south regions paneer were recorded as 22.81, 26.40, 24.13, 27.17 and 24.40 per cent, respectively for this attributes. The maximum fat content recorded in north paneer collected samples followed by east, south, west and central 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 east 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)<sup>[8]</sup>, they noticed fat per cent in paneer collected from Ahmednagar city varied from 16 to 28 per cent while, Naik *et al.* (2016)<sup>[14]</sup> reported as 11 to 29.21 per cent fat in paneer marketed from Odisha.

### Protein

The mean values of protein content of paneer sold in central, east, west, north and south regions were recorded as 19.41, 17.91, 18.59, 16.73 and 17.89 per cent, respectively. The maximum average protein content of market paneer recorded by central region's paneer while minimum protein content was recorded by north region's paneer. Rajorhia *et al.* (1984)<sup>[15]</sup> 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)<sup>[8]</sup> reported that, protein content in paneer ranged from 15.06 to 20.33 per cent. Naik *et al.* (2016)<sup>[14]</sup> 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)<sup>[18]</sup> found that, protein content in paneer marketed in Bengaluru ranged between 18.00 to 23.00 per cent. These results are in conformity with the results of present study.

### Ash

The average values of ash content of central, east, west, north and south region paneer contributed 1.81, 2.02, 1.88, 1.87 and 1.84 per cent, respectively. The maximum percentage of ash was recorded by east while minimum ash content obtained in central region paneer. The findings of present investigation

are collaborative with the findings of Rajorhia *et al.* (1984)<sup>[15]</sup>, 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)<sup>[14]</sup> also reported that, ash per cent in Odisha paneer varies between 1.00 to 2.67 per cent.

### Total Solides

The mean values of central, east, west, north and south region paneer contributed 45.51, 48.68, 47.44, 50.67 and 47.21 per cent, respectively for total solids content. It was noticed that, north paneer recorded maximum percentage of total solids followed by east, west, south and central paneer. The total solids content of paneer recorded in present study are in close agreement with the results reported by, Aneja *et al.* (2002)<sup>[1]</sup> recorded total solids content of various types of traditional paneer like full fat paneer, low fat paneer, skim milk paneer and ultrafiltered paneer were as 46.04, 38.28, 35.42 and 30.63 per cent, respectively. While, Masud *et al.* (2007)<sup>[13]</sup> recorded as 52.92, 53.19 and 49.6 per cent, respectively.

**Table 1:** Average percent chemical composition of paneer sold in Nagpur city

S. No	Region	Chemical composition (%)				
		Moisture	Fat	Protein	Ash	Total Solids
1	Central	54.49	22.81	19.41	1.81	45.51
2	East	51.32	26.40	17.91	2.02	48.68
3	West	52.56	24.13	18.59	1.88	47.44
4	North	50.33	27.17	16.73	1.87	50.67
5	South	52.79	24.40	17.89	1.84	47.21
	SE(m)±	0.53	1.64	0.41	0.004	0.78
	C.D. at 5%	1.37	2.41	1.20	0.125	1.66

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