

## STUDY ON SENSORY EVALUATION AND SALE PRICE OF PANEER SOLD IN GONDIA CITY

J.S.Bhoyar<sup>1</sup>, V.G. Atkare<sup>2</sup> and A.S.Ingole<sup>3</sup>

### ABSTRACT

Samples of paneer collected from Gondia city during the year 2018-2019. The market paneer samples were collected from four regions viz., east, west, north and south region. Total 60 samples were examined during the course of investigation and 15 samples from each group had analyzed during three fortnights. Sensory score of colour and appearance were found to be (T<sub>1</sub>) 6.56, (T<sub>2</sub>) 7.02, (T<sub>3</sub>) 7.68 and (T<sub>4</sub>) 8.08, Body and texture was found to be (T<sub>1</sub>) 6.24, (T<sub>2</sub>) 6.90, (T<sub>3</sub>) 7.56 and (T<sub>4</sub>) 8.38, Flavour was found to be (T<sub>1</sub>) 6.46, (T<sub>2</sub>) 7.08, (T<sub>3</sub>) 7.68 and (T<sub>4</sub>) 8.28 and overall acceptability was found to be (T<sub>1</sub>) 6.48, (T<sub>2</sub>) 7.09, (T<sub>3</sub>) 7.60 and (T<sub>4</sub>) 8.19 in East, west, north and south region paneer samples, respectively. Higher score was observed in south region paneer. It was inferred that, sensory quality of south region paneer was good than north, west and east region paneer which were fair in quality.

The sale price of paneer obtained from south region was found to be Rs. 320 kg<sup>-1</sup> which was highest amongst all regions while, the lowest sale price of paneer was found in region of west and north regions i.e. Rs.280 kg<sup>-1</sup>. The sale price of paneer obtained from east region was found to be Rs.300 kg<sup>-1</sup>. The difference in sale price kg<sup>-1</sup> of paneer sold in Gondia city might be due to the quality parameters.

(Key words: Sensory attributes and sale price of paneer)

### INTRODUCTION

Paneer is an acid and heat coagulated indigenous milk product, which forms base for a variety of culinary dishes, stuffing materials for various vegetable dishes. Paneer contains entire milk casein, part of denatured 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 (50 g) 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 phosphorus and 1 mg iron (Aneja *et al.*, 2002).

Paneer is a popular heat and acid-coagulated Indian milk product analogous 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 days 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, soluble 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).

In Gondia city, preparation and marketing of the paneer is done on large scale by wholesalers, halwai and hotels, retailers and private dairies and almost entire paneer disposed off. So, far no work has been taken up to assess the quality of paneer marketed in these mandies. Hence, present paper planned to study sensory evaluation and sale price of paneer marketed in Gondia city.

### MATERIALS AND METHODS

Experimental trial was conducted in RBD with five replications and four treatments. Evaluation 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 of Gondia city. From each region, 15

- 
1. P.G. Student, Animal Husbandry and Dairy Science, College of Agriculture, Nagpur
  2. Professor (CAS), Animal Husbandry and Dairy Science, College of Agriculture, Nagpur
  3. Professor, Animal Husbandry and Dairy Science, College of Agriculture, Nagpur

samples were collected and analyzed during three fortnights. These paneer samples were collected by adopting stratified randomization technique.

The quality of paneer was judged by sensory evaluation in respect of colour and appearance, body and texture, flavour and overall acceptability by offering sample, to panel of 5 judges in each trial separately with the help of 9 point hedonic scale by Nelson and Trout (1964).

Sr. No.	Characters	Score
1	Colour and Appearance	09
2	Body and Texture	09
3	Flavour	09
4	Overall acceptability	09

## RESULTS AND DISCUSSION

### Sensory evaluation of paneer

The data pertaining Average scores of colour and appearance, body and texture, flavour and overall acceptability of paneer sold in Gondia city are presented in table 1.

**Table 1. Table for sensory evaluation of paneer**

Treat-ments	Collour & appearance (out of 9)	Body & Texture (out of 9)	Flavour (out of 9)	Overall acceptability (out of 9)
T <sub>1</sub> ( East)	6.56 <sup>d</sup>	6.24 <sup>d</sup>	6.49 <sup>d</sup>	6.48 <sup>d</sup>
T <sub>2</sub> ( West)	7.02 <sup>c</sup>	6.90 <sup>c</sup>	7.08 <sup>c</sup>	7.09 <sup>c</sup>
T <sub>3</sub> ( North)	7.68 <sup>b</sup>	7.56 <sup>b</sup>	7.68 <sup>b</sup>	7.60 <sup>b</sup>
T <sub>4</sub> ( South)	8.08 <sup>a</sup>	8.38 <sup>a</sup>	8.28 <sup>a</sup>	8.19 <sup>a</sup>
SE(m) ±	0.25	0.27	0.30	0.26
CD at 5%	0.76	0.83	0.92	0.80

Values with different superscripts differ significantly (P<0.05)

### Colour and appearance score

It is inferred from table 1 that, the average score of colour and appearance of east (T<sub>1</sub>), west (T<sub>2</sub>), north (T<sub>3</sub>) and south (T<sub>4</sub>) region paneer of Gondia city were found to be (T<sub>1</sub>) 6.56, (T<sub>2</sub>) 7.02, (T<sub>3</sub>) 7.68 and (T<sub>4</sub>) 8.08, respectively. The average scores obtained for colour and appearance of Gondia city differed significantly. South (T<sub>4</sub>) paneer samples were found to be superior over rest of the regions i.e., east (T<sub>1</sub>), west (T<sub>2</sub>) and north (T<sub>3</sub>), respectively with white colour in respect to average colour and appearance score.

Bhadekar *et al.* (2008) done sensory evaluation and overall acceptability of paneer from buffalo milk added with sago powder. They recorded sensory score and overall acceptability of sago powder paneer. Paneer was prepared from standardized buffalo milk mixed with sago powder (on W/W basis) T<sub>0</sub> (100 % buffalo milk), T<sub>1</sub> (99.7 % buffalo milk+ 0.3 % sago powder), T<sub>2</sub> (99.6 % buffalo milk + 0.4 % sago powder) and T<sub>3</sub> (99.5 % buffalo milk + 0.5 % sago powder).

The mean overall acceptability scores were observed as 8.91, 8.51, 7.96 and 7.40 for treatments T<sub>0</sub> (100 % buffalo milk), T<sub>1</sub> (99.7 % buffalo milk+ 0.3 % sago powder), T<sub>2</sub> (99.6 % buffalo milk + 0.4 % sago powder) and T<sub>3</sub> (99.5 % buffalo milk + 0.5 % sago powder), respectively.

Likewise, Maske *et al.* (2018) done sensory evaluation of paneer prepared by toned milk using sago powder. It was observed that, the overall acceptability score for sensory was 8.63, 7.88, 7.13 and 6.38, respectively for T<sub>1</sub> (100 % toned milk), T<sub>2</sub> (97.50 % toned milk + 2.50 % sago powder), T<sub>3</sub> (95.00 % toned milk + 5.00 % sago powder) and T<sub>4</sub> (92.50 % toned milk + 7.50 % sago powder). As the level of sago powder increased, the overall acceptability score was decreased. The highest score (8.63) for overall acceptability was found in T<sub>1</sub> (100 % toned milk) and lowest score (6.38) was found in T<sub>4</sub> (92.50 % toned milk + 7.50 % sago powder) treatment. These results are more or less similar with the findings of present study.

### Body and texture score

It is observed from table 1 that, the average score for body and texture attribute of paneer sold in Gondia city ranged from 6.24 to 8.38. The average score for body and texture of east (T<sub>1</sub>), west (T<sub>2</sub>), north (T<sub>3</sub>) and south (T<sub>4</sub>) paneer recorded as (T<sub>1</sub>) 6.24, (T<sub>2</sub>) 6.90, (T<sub>3</sub>) 7.56 and (T<sub>4</sub>) 8.38, respectively. Maximum average score was exhibited in south (T<sub>4</sub>) paneer (8.38) and minimum in east (T<sub>1</sub>) paneer (6.24). Differences in scores were found to be significant.

Reeta kumar and Kumbhar (2012) studied on sensory and textural properties of paneer using edible coating. They found colour and appearance, flavor, Body and texture and overall acceptability, adhesiveness of paneer in the range of 6.8 to 8.2. The combination of ingredients level of whey protein concentrate, glycerol, potassium sorbate and nisin were 10, 3, 0.7 and 5 ppm, respectively.

Singh *et al.* (2015) prepared low fat paneer from skim milk powder to find out the nutritive value as well as sensory acceptability. Sensory evaluation of the prepared paneer was carried out using score card. The highest average score for overall acceptability of paneer (7.70) was recorded in T<sub>1</sub> (standardized milk with 3% fat and 8.5 % SNF) followed by T<sub>0</sub> (standardized milk with 2.5 % fat and 8.5 % SNF) 7.37, T<sub>2</sub> (standardized milk with 2.5 % fat and 8.5 % SNF) 7.20, T<sub>3</sub> (standardized milk with 2 % fat and 8.5 SNF) 6.66 and T<sub>4</sub> (standardized milk with 1.5 fat and 8.5 SNF) 6.25. Almost the different combinations used of milk in a ratio of 2.5 (Fat): 8.5 (SNF) (T<sub>2</sub>) was the best in term of flavor, taste, body, texture and overall acceptability.

These results are more or less similar with the findings of present study.

### Flavour score

It is noticed from table 1 that, the average scores obtained for flavours of paneer sold in Gondia city ranged from 6.49 to 8.28 out of 9. The average values of east (T<sub>1</sub>), west (T<sub>2</sub>), north (T<sub>3</sub>) and south (T<sub>4</sub>) region paneer recorded T<sub>1</sub> (6.49), T<sub>2</sub> (7.08), T<sub>3</sub> (7.68) and T<sub>4</sub> (8.28), respectively. These differences were found to significant for flavour score.

Maximum average scores was contributed by south ( $T_4$ ) region paneer (8.28) whereas, minimum by east ( $T_1$ ) paneer (6.49). South ( $T_4$ ) paneer was significantly good in quality as compared to north ( $T_3$ ), west ( $T_2$ ) and east ( $T_1$ ) paneer for average flavour scores.

Singh *et al.* (2015) conducted study to optimize the fat percentage of low fat paneer prepared from skim milk powder and to find out the nutritive value as well as to assess the sensory acceptability of low fat paneer prepared. Sensory evaluation of the prepared paneer was carried out using score card. The highest average score for overall acceptability of paneer (7.70) was recorded in  $T_1$  (standardized milk with 3% fat and 8.5 % SNF) followed by  $T_0$  (standardized milk with 2.5 % fat and 8.5 % SNF) 7.37,  $T_2$  (standardized milk with 2.5 % fat and 8.5 % SNF) 7.20,  $T_3$  (standardized milk with 2 % fat and 8.5 SNF) 6.66 and  $T_4$  (standardized milk with 1.5 fat and 8.5 SNF) 6.25. When different combination standardized of milk was ratio of 2.5 (Fat): 8.5 (SNF) ( $T_2$ ) was found to be best in terms of flavour, taste, body, texture and overall acceptability.

These results are more or less similar with the findings of present study.

#### Overall acceptability score

It is found from table 1 that, the average overall acceptability of Gondia city paneer ranged from 6.48 to 8.19. However, the mean values of overall acceptability of paneer sample soled in east ( $T_1$ ), west ( $T_2$ ), north ( $T_3$ ) and south ( $T_4$ ) region contributed to ( $T_1$ ) 6.48, ( $T_2$ ) 7.09, ( $T_3$ ) 7.60 and ( $T_4$ ) 8.19, respectively. The maximum scores recorded in south ( $T_4$ ) region paneer samples (8.19), while minimum in east ( $T_1$ ) region paneer samples (6.48). The differences of score obtained for paneer sources were found to be significant whereas, south ( $T_4$ ) paneer was found superior over east ( $T_1$ ), west ( $T_2$ ) and north ( $T_3$ ) paneer in respect of overall acceptability. The sensory quality of paneer sold in south ( $T_4$ ) region was rated as good quality having 8.19 overall score, however the paneer from east ( $T_1$ ), west ( $T_2$ ) and north ( $T_3$ ) had sensory score as 6.48, 7.09 and 7.60, respectively and showed slightly hardness texture.

Singh *et al.* (2018) evaluated the impact of garlic paste addition on the sensory quality of buffalo milk paneer for the purpose of value added paneer was prepared with different levels of buffalo milk and garlic pastes as taste enhancer. Sensory quality was evaluated on parameter of colour and appearance, body & texture, taste and flavour and overall acceptability by using 9 point hedonic scale. There were five treatments which were replicated five times in varying proportion of buffalo milk (100, 98, 96, 94 and 92) and garlic paste (00, 2, 4, 6 and 8) were incorporated to assess the sensory acceptability  $T_2$  (98% buffalo milk + 2 % garlic paste) was found to be best treatment and recorded

highest score for colour and appearance (8.13), body and texture (8.11), flavour and taste (8.21) and overall acceptability (8.06).

Likewise Maske *et al.* (2018) also reported on sensory evaluation of paneer prepared by toned milk using sago powder. It was observed that, the overall acceptability score for sensory was 8.63, 7.88, 7.13 and 6.38, respectively for  $T_1$  (100 % toned milk),  $T_2$  (97.50 % toned milk + 2.50 % sago powder),  $T_3$  (95.00 % toned milk + 5.00 % sago powder) and  $T_4$  (92.50 % toned milk + 7.50 % sago powder). As the level of sago powder increased, the overall acceptability score was decreased. The highest score 8.63 for overall acceptability was found in  $T_1$  (100 % toned milk) and lowest score 6.38 was found in  $T_4$  (92.50 % toned milk + 7.50 % sago powder) treatment.

These results are in conformity with the results of present study.

#### Sale price of Paneer

Date regarding prevailing sale price  $\text{kg}^{-1}$  of paneer sold in Gondia city of various regions (Rs.) are given in table 2.

**Table 2. Sale price per kg of paneer sold in Gondia city (Rs.)**

Sr.No.	Particular	Cost $\text{kg}^{-1}$ (Rs.)
1.	East	300
2.	West	280
3.	North	280
4.	South	320

The sale price of paneer obtained from south region was found to be Rs.320  $\text{kg}^{-1}$  which was highest amongst all regions while the lowest sale price of paneer was found in region of west and north regions i.e. Rs.280  $\text{kg}^{-1}$ . The sale price of paneer obtained from east region was found to be Rs.300  $\text{kg}^{-1}$ . The difference in sale price  $\text{kg}^{-1}$  of paneer sold in Gondia city might be due to the quality parameters.

Bhandekar (2018) reported sale price of paneer in Nagpur city in the ranged between 280-320 Rs  $\text{kg}^{-1}$ . These results pertaining to sale price of paneer are in close agreement with the results of present study.

On contrary, the sale price of paneer in Gondia city found higher than the observation recorded by Shakuntala (2013), she reported price of paneer as 135.71 Rs  $\text{kg}^{-1}$ . Whereas Sweta and Bhongal (2013) and Sharma and Chandel (2016) found that, consumer price of paneer in the range between Rs.110 to Rs.140  $\text{kg}^{-1}$ .

## REFERENCES

- Aneja, R. P., B.N. Mathur, R. C. Chandan and A. K. Banerjee, 2002 Heat-acid coagulated products. In: Technology of Indian milk product, Dairy India Yearbook, A Dairy India Publication, New Dehli, pp. 133–142.
- Bhadekar, S. V., B. R. Deshmukh, S. V. Baswade, R. R. Mule and P. L. Gatchearde, 2008. Sensory evaluation and overall acceptability of paneer from Buffalo milk added with sago Powder. *J. Dairying, Foods and Home Sci.* **27**(2): 99-103.
- Bhandekar, V. A., V.G. Atkare, K. Kadu and A. Meshram, 2018. Physico-chemical quality of paneer sold in Nagpur city. *Int. J. Chemical studies.* **6**(4): 2517-2519.
- Jagannath, A., M. N. Ramesh and M. C. Varadaraj, 2001. Response surface model for predicting the behavior of yersinia enterocolitica in paneer-a heat and acid coagulated milk product of India. *Acta Hort.* **566**:487-491.
- Kanawjia, S. K. and S. Singh, 2000. Technological advances in paneer making. *Indian Dairyman.* **52**(10):45-50.
- Maske, T. M., B. C. Andhare, V. S. Dhumal and S. P. Shinde, 2018. Studies on sensory attributes of paneer prepared by toned milk using sago powder. *J. Pharmacognosy and Phytochemistry, SPI*:2853-2855.
- Nelson, J. A. and G. M. Trout, 1964. Judging dairy product 4<sup>th</sup> Edn. The olesen publishing Co. Milwankee official method of analysis chemist. Washigton.
- Reeta kumar, A. and B. K. Kumbhar, 2012. Study of Sensory and Textural Properties of Paneer using Edible Coating. Open Access Scientific Reports .[http://dx.doi.org/10.4172/ Sci.reports.5](http://dx.doi.org/10.4172/Sci.reports.5).
- Shakuntala, G. 2013. Comparative study of paneer preparation methods from conventional, buffalo milk and non-conventional soya prepared milk. *Bhartiya Krishi Anushandhan Patrika,* **28** (1):41-44.
- Sharma, M. and B. S. Chandel, 2016. Structure, conduct and performance of selected wholesale markets of intermediate dairy products in India-critical issues and concerns. *Indian J. Econ. and Dev.* **12**(1):133-141.
- Shweta, A. and T. S. Bhogal, 2013. Economics of production and marketing of milk products in cooperative sector. *Asian J. Dairy and Food Res.* **32** (3):195-198.
- Singh, A., P. Arora, K. Kishore and V. Singh, 2018. Sensory acceptability of value added buffalo milk paneer with different levels of garlic paste. *Int. J. Food. Sci. and Nurt.* **3**(6): 4555-4898.
- Singh, S. C., S. Kumari and P. K. Singh, 2015. Sensory and nutritional acceptability of low fat paneer prepared by optimization of milk by skim powder. *Int. J. Mulidisciplinaru Res. and Dev.* **2**: 9 -11.

**Rec. on 15.01.2020 & Acc. on 22.01.2020**