



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2018; 6(5): 874-878

© 2018 IJCS

Received: 19-07-2018

Accepted: 23-08-2018

Omveer Singh

M. Sc. (Dairy Technology)
Scholar, Warner College of Dairy
Technology, SHUATS,
Allahabad, Uttar Pradesh, India

Puneet Arora

Assistant Professor, Warner
College of Dairy Technology,
SHUATS, Allahabad, Uttar
Pradesh, India

Binod Kumar Bharti

Assistant Professor cum Jr.
Scientist, SGIDT Bihar Animal
Sciences University, Patna,
Bihar, India

Shiv Bhushan Singh

Ph. D. (Dairy Technology)
Scholar, Warner College of Dairy
Technology, SHUATS,
Allahabad, Uttar Pradesh, India

Akhilesh

M. Sc. (Dairy Technology)
Scholar, Warner College of Dairy
Technology, SHUATS,
Allahabad, Uttar Pradesh, India

Keerti Singh Yadav

M. Sc. (Dairy Technology)
Scholar, Warner College of Dairy
Technology, SHUATS,
Allahabad, Uttar Pradesh, India

Correspondence**Omveer Singh**

M. Sc. (Dairy Technology)
Scholar, Warner College of Dairy
Technology, SHUATS,
Allahabad, Uttar Pradesh, India

International Journal of Chemical Studies

Sensory attributes for preparation of Paneer by using Buffalo milk and mint

Omveer Singh, Puneet Arora, Binod Kumar Bharti, Shiv Bhushan Singh, Akhilesh and Keerti Singh Yadav

Abstract

Paneer an indigenous milk product prepared by acid and heat coagulation of milk is most popular in India. Paneer quality are based on the scores for flavour, body and texture, color and appearance. Buffalo milk is considered most suitable than cow milk for making paneer. Mint leaves and extracts are natural sources of antioxidant and biologically active. The present investigation was undertaken with object of studying the standard procedure of preparation of paneer by using buffalo milk and mint and studied for its sensory properties. In the present study T₀, T₁, T₂, T₃ and T₄ were formulated in which paneer was prepared by using buffalo milk and mint was in the ratio of (100:00, 98:2, 96:4, 94:6 and 92:8) respectively. The sensory score for overall acceptability of mint paneer of treatments T₀, T₁, T₂, T₃ and T₄ was found to be 7.73, 7.93, 8.06, 7.66 and 7.42 respectively. Overall acceptability score of paneer by using buffalo milk and mint and control milk, highest mean score of overall acceptability was recorded in T₂ (8.06) followed by T₁ (7.93), T₀ (7.73), T₃ (7.66) and T₄ (7.42). It was found that among all treatments T₂ (8.06) higher score in sensory evaluation and considered as optimized product of mint paneer.

Keywords: paneer, buffalo milk, mint, body and texture, overall acceptability

Introduction

Paneer an indigenous milk product prepared by acid and heat coagulation of milk is most popular in India. It is obtained from cow or buffalo milk or a combination there of by precipitation with sour milk, lactic or citric acid at high temperature (Sachdeva and Singh, 1987) [17]. Paneer is an important indigenous milk product which is obtained by heating the milk followed by acid coagulation by using suitable coagulant such as citric acid, lactic acid, tartaric acid, sour whey. The whey is removed to some extent through filtration and pressing. Paneer represents one of the soft varieties of cheese family and is used in culinary dishes and snacks. About 5% of milk produced in India is converted into paneer (Chandan 2007) [6]. Precipitation of paneer involves the formation of large structural aggregates of proteins in which milk at other colloidal and soluble solids and entrapped with whey. Texture is an important fundamental sensory property of all foods. It is an important quality attribute as it affects processing, handling and influence shelf life as well as consumer acceptance. In the Paneer, texture is an important property as the points of consumer's acceptance and satisfaction. (Bourne *et al.*, 1981) [5]. Paneer contains all the milk constituents except for loss of some soluble whey proteins, lactose and minerals (Singh and Kanawjia 1988) [20]. Paneer have a desirable sensory attribute. It must have a characteristic pleasant flavour, mildly acidic and sweet (nutty). Its body and texture must be compact and smooth, its colour and appearance must be uniform, pleasing white, with a greenish tinge in the case of buffalo milk paneer and light yellow in the case of cow milk paneer (Desai 2007) [8]. Quality of paneer are based on the scores for flavour, body and texture, color and appearance and packaging (Patil and Gupta 1986) [14]. Paneer prepared from goat milk, which was of unacceptable quality due to lack in compactness (Shukla *et al.*, 1988) [19]. Sensory score of paneer decreased with an increase in the strength of citric acid solution for heat treatment meted to milk (Rao *et al.*, 1984) [16].

Milk is an almost ideal food having high nutritive value. It supplies body building proteins, bone forming minerals and energy giving lactose and fat. Besides supplying certain essential fatty acids, it contains the above nutrients in an easily digestible and assimilable form (Vishweshwar and Krishnaiah, 2005) [22]. Milk is the most versatile of all the animals desired food commodities and is a basic source for many of its physical forms like ghee, cheese,

yoghurt, ice cream, powder milk and many other forms of fluid milk (Khan *et al.*, 2007) ^[10]. Buffalo milk is better suited for making paneer compared to cow because latter it produces soft, weak and fragile product that is considered unsuitable for cooking purposes. The superior quality of paneer from buffalo milk is due to its physico-chemical properties as compared to those of cow milk. Buffalo milk has larger fat globules and casein micelles, higher concentrations of solid fat, casein, calcium, phosphorus and salvation properties of casein micelles compared to cow milk (Sindhu 1996) ^[21]. Cow milk paneer has a soft and spongy body and a relatively open texture whereas, buffalo milk paneer has firm and spongy body and a close texture. Buffalo milk is considered most suitable than cow milk for making paneer (Masud *et al.* 1992) ^[11] due to fat globules and casein micelles of bigger size and higher concentration of fat in buffalo milk as compared to cow milk. higher fat content in milk helps in making a paneer which is soft, mellow, spongy and rich in flavor (Singh *et al.*, 1984) and also allows the product to withstand the cooking rigorous while lowering of fat content makes the product hard, elastic and dry (Emmons *et al.*, 1980; Chawla *et al.*, 1985) ^[9, 7].

Mint (peppermint) is a perennial aromatic herb belonging to the family *Labiatae* and it is an important culinary plant. Peppermint commonly used as medicinal herb because benefit in building the immune system and fighting infections. Peppermint essential oil has antibacterial activities because it was contained menthol (Schuhmacher *et al.*, 2003) ^[18]. The aroma of peppermint has been found to enhance memory (Moss *et al.*, 2008) ^[12]. Mint leaves have anti-bacterial. Chew mint leaves to fight harmful bacteria in the mouth, teeth and tongue. The mint leaves are useful in the treatment of diabetes, diarrhea, fevers, hypertension, jaundice, nausea, pain, respiratory and urinary tract infections (Anonymous, 1999; Anonymous 2004) ^[1, 2]. Peppermint are commonly used as a local anesthetic agent in cold and cough preparations and in liniments for insect bites, eczema, poison ivy, toothaches, and musculoskeletal pain (Murray, 1995; Peirce, 1999) ^[13, 15]. One animal study has suggested that peppermint may have radio protective effects in patients undergoing cancer treatment.

Materials and Methods

The experiment "Sensory attributes for preparation of Paneer by using Buffalo Milk and Mint" was carried out in food research lab, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad-211007, U.P. (India).

Procurement of ingredients

Milk was purchase from Aggies Dairy, SHUATS, Allahabad. Mint was purchase from local market of Allahabad. Citric acid was procured from Dairy Technology Lab, WCDT, SHUATS.

Standardization of milk

Milk was standardized to 4.5% Fat and 9% solid not fat.

Treatment Combination of buffalo milk and mint

T₀-Control prepared from buffalo milk and mint (100:00)

T₁-Experimental sample prepared from buffalo milk and mint (98:2)

T₂-Experimental sample prepared from buffalo milk and mint (96:4)

T₃-Experimental sample prepared from buffalo milk and mint (94:6)

T₄-Experimental sample prepared from buffalo milk and mint (92:8)

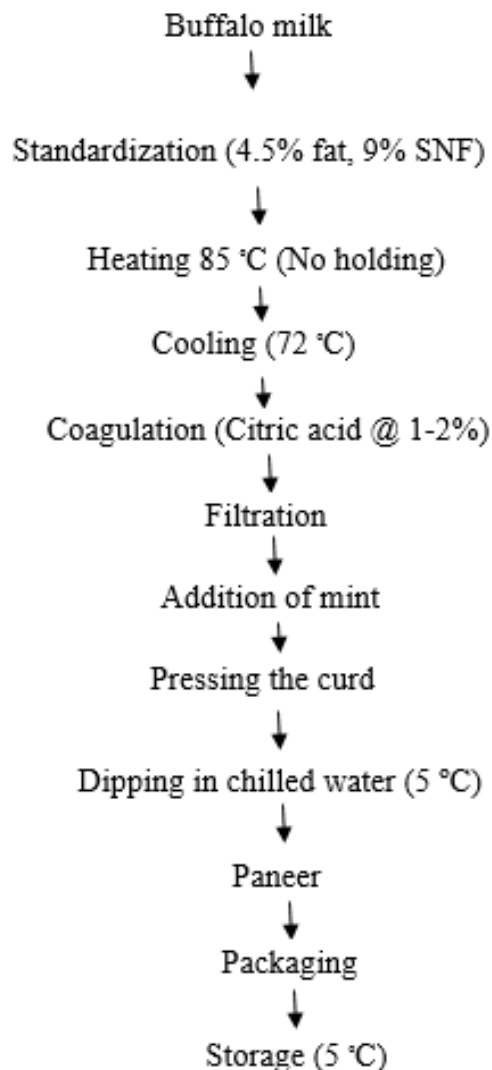


Fig 1: Flow diagram for manufacturing of Paneer by using buffalo milk and mint

Organoleptic quality

Sensory characteristics was using by 9 point hedonic scale by trained panelist.

Statistical Analysis

The data was analyzed statistically by WASP software and Excel software and Analysis of variance at 5% level of significance.

Number of treatments	-	5
Number of replications	-	5
Total number of samples	-	25

Results and Discussion

Sensory Evaluation of Paneer by using Buffalo Milk and Mint

The sensory evaluation of Paneer samples was done by a panel of judge using a 9 point hedonic scale. Five experienced members of the Warner college of Dairy Technology department have served as a judging team and evaluated the samples of different treatments of Paneer by using Buffalo Milk and mint. Numerical score was allocated for colour and

appearances, body and texture, flavour, and taste & overall acceptability of Paneer by using Buffalo Milk and Mint. The numerical score was as an indication of the quality. The present study was undertaken for development of paneer by using Buffalo Milk and mint consumed in India. The results obtained from the analysis are presented on the basis of Organoleptic characteristics of paneer by using Buffalo Milk and mint.

Table 1: The different parameters of control and experimental paneer by using Buffalo Milk and mint

Parameter	T ₀	T ₁	T ₂	T ₃	T ₄
2. Organoleptic scores (9 point hedonic scale)					
Colour and Appearance	7.88	7.92	8.13	7.72	7.13
Body and Texture	7.79	7.84	8.11	7.66	7.43
Flavour and Taste	7.63	7.98	8.21	7.58	7.16
Overall Acceptability	7.73	7.90	8.06	7.66	7.42

Colour and Appearance

The data pertaining to Colour and Appearance in control and experimental paneer by using buffalo milk and mint sample of different treatments are presented in table 1(a). The table reveals that the mean value of treatment T₀, T₁, T₂, T₃ and T₄ was found to be 7.88, 7.92, 8.13, 7.72 and 7.13 respectively. Colour and Appearance of paneer by using buffalo milk and mint and control milk, highest mean value of Colour and Appearance score was recorded in T₂ (8.13) followed by T₁(7.92), T₀(7.88), T₃(7.72) and T₄(7.13), further the data was subjected to statistically analysis and the same is presented in table.

Table 1(a): Colour and Appearance count in control and experimental paneer by using Buffalo Milk and mint

Replication	Treatment	Treatment				
		T ₀	T ₁	T ₂	T ₃	T ₄
R ₁		8.17	7.80	8.10	7.60	7.10
R ₂		8.00	7.63	7.88	7.70	7.03
R ₃		7.87	8.17	8.33	7.83	7.10
R ₄		7.35	8.00	8.20	7.90	7.20
R ₅		8.00	8.00	8.14	7.58	7.20
	Mean	7.88	7.92	8.13	7.72	7.13
Range	Minimum	7.35	7.63	7.88	7.58	7.03
	Maximum	8.17	8.17	8.33	7.90	7.20
F-test		S				
C.D. at 5% level		0.27				
S. Ed. (±)		0.13				

It was observed from ANOVA, the F (Cal) value (17.65) was greater than the table value of F (3.01) at 5% level of significance. Therefore, the difference was significant, indicating significant effect of treatments on colour and appearance score. The significant difference obtained from further analyzed statistically to find out the C.D. value between and within the different treatment combinations. The difference between the mean values of T₀-T₄ (0.75), T₁-T₄ (0.79), T₂-T₃ (0.41), T₂-T₄ (1.00) and T₃-T₄ (0.59) was greater than the C.D. value, 0.27. Therefore, the difference was significant and the difference between the mean values of T₀-T₁ (0.04), T₀-T₂ (0.25), T₀-T₃ (0.16), T₁-T₂ (0.21) and T₁-T₃ (0.20) was lesser than the C.D. value, 0.27. Therefore, the difference was non- significant

Body and texture

The data pertaining to body and texture in control and experimental paneer by using buffalo milk and mint sample of different treatments are presented in table 2 (a). The table

reveals that the mean value of treatment T₀, T₁, T₂, T₃ and T₄ was found to be 7.79, 7.84, 8.11, 7.66 and 7.43 respectively. Body and texture of paneer by using buffalo milk and mint and control milk, highest mean body and texture percent was recorded in T₂ (8.11) followed by T₁ (7.84), T₀ (7.79), T₃ (7.66) and T₄ (7.43), further the data was subjected to statistically analysis and the same is presented in table.

Table 2(a): Body and texture score in control and experimental paneer by using Buffalo Milk and mint

Replication		Treatment				
		T ₀	T ₁	T ₂	T ₃	T ₄
R ₁		8.00	7.80	7.80	7.10	7.10
R ₂		7.80	7.60	8.20	7.67	7.33
R ₃		7.67	7.80	8.00	7.83	7.67
R ₄		7.86	8.00	8.10	8.00	7.60
R ₅		7.60	8.00	8.43	7.71	7.43
	Mean	7.79	7.84	8.11	7.66	7.43
Range	Minimum	7.60	7.60	7.80	7.10	7.10
	Maximum	8.00	8.00	8.43	8.00	7.67
F-test		S				
C.D. at 5% level		0.29				
S. Ed. (±)		0.14				

It was observed from the result of ANOVA, the F (Cal) value (6.70) was greater than the table value of F (3.01) at 5% level of significance. Therefore, the difference was significant, indicating significant effect of treatments on body and texture score. The significant difference obtained further analyzed statistically to find out the C.D between and within the different treatment combinations. The difference between the mean values of T₀-T₂ (0.32), T₀-T₄ (0.36), T₁-T₄ (0.41), T₂-T₃ (0.45) and T₂-T₄ (0.68) was greater than the C.D. value, 0.29. Therefore, the difference was significant and the difference between the mean values of T₀-T₁ (0.05), T₁-T₂ (0.27), T₁-T₃ (0.18) and T₃-T₄ (0.23) was lesser than the C.D. value, 0.29. Therefore, the difference was non- significant.

Flavour and taste score in control and experimental paneer by using Buffalo Milk and mint

The data regarding flavour and taste score in control and experimental paneer by using Buffalo Milk and mint sample of different treatments are presented in table 3(a). The table reveals that the mean value of treatment T₀, T₁, T₂, T₃ and T₄ was found to be 7.63, 7.98, 8.21, 7.58 and 7.16 respectively. Flavour and taste of paneer by using buffalo milk and mint and control milk, highest mean score of flavour and taste score was recorded in T₂ (8.21) followed by T₁ (7.98), T₀ (7.63), T₃(7.58) and T₄ (7.16), further the data was subjected to statistically analysis and the same is presented in table. The flavor score of paneer decreased with decrease in the fat content of original milk (Bhattacharya *et al.*, 1971) [4].

Table 3(a): Flavour and taste percent in control and experimental paneer by using Buffalo Milk and mint

Replication		Treatment				
		T ₀	T ₁	T ₂	T ₃	T ₄
R ₁		8.05	7.40	7.60	7.10	7.30
R ₂		7.30	8.00	8.50	7.65	7.00
R ₃		7.83	8.17	8.33	8.00	7.50
R ₄		7.40	8.20	8.20	7.60	7.00
R ₅		7.57	8.14	8.42	7.57	7.00
	Mean	7.63	7.98	8.21	7.58	7.16
Range	Minimum	7.30	7.40	7.60	7.10	7.00
	Maximum	8.05	8.20	8.50	8.00	7.50
F-test		S				
C.D. at 5% level		0.39				
S. Ed. (±)		0.19				

It was observed from the result of ANOVA, the F (Cal) value (9.35) was greater than the table value of F (3.01) at 5% level of significance. Therefore, the difference was significant, indicating significant effect of treatments on flavour and taste score. The significant difference thus obtained further analyzed statistically to find out the C.D between and within the different treatment combinations. The difference between the mean values of T₀-T₂ (0.58), T₀-T₄ (0.47), T₁-T₃ (0.40), T₁-T₄ (0.82), T₂-T₃ (0.63), T₂-T₄ (1.05) and T₃-T₄ (0.42) was greater than the C.D. value, 0.39. Therefore, the difference was significant and the difference between the mean values of T₀-T₁ (0.35) and T₁-T₂ (0.23) was lesser than the C.D. value, 0.39. Therefore, the difference was non- significant

Overall acceptability score in control and experimental paneer by using buffalo milk and mint

The data regarding Overall Acceptability score in control and experimental paneer by using Buffalo Milk and mint leaf sample of different treatments are presented in table 4 (a). The table reveals that the mean value of treatment T₀, T₁, T₂, T₃ and T₄ was found to be 7.73, 7.93, 8.06, 7.66 and 7.42 respectively. Overall acceptability score of paneer by using buffalo milk and mint and control milk, highest mean score of overall acceptability was recorded in T₂ (8.06) followed by T₁ (7.93), T₀ (7.73), T₃ (7.66) and T₄ (7.42), further the data was subjected to statistically analysis and the same is presented in table.

Table 4: (a) Overall Acceptability percent in control and experimental paneer by using Buffalo Milk and mint

Replication	Treatment				
	T ₀	T ₁	T ₂	T ₃	T ₄
R ₁	7.87	7.90	8.00	7.60	7.70
R ₂	7.81	7.77	7.90	7.07	7.12
R ₃	7.80	7.89	8.11	7.90	7.61
R ₄	7.50	8.00	8.08	7.80	7.33
R ₅	7.67	7.95	8.20	7.91	7.33
Mean	7.73	7.93	8.06	7.66	7.42
Range	Minimum	7.50	7.77	7.90	7.07
	Maximum	7.87	8.00	8.20	7.91
F-test	S				
C.D. at 5% level	0.25				
S. Ed. (±)	0.12				

It was observed from the result of ANOVA, the F (Cal) value (8.72) was greater than the table value of F (3.01) at 5% level of significance. Therefore, the difference was significant, indicating significant effect of treatments on Overall acceptability. It was further observed from significant difference analyzed statistically to find out the C.D between and within the different treatment combinations. The difference between the mean values of T₀-T₂ (0.33), T₀-T₄ (0.31), T₁-T₃ (0.24), T₁-T₄ (0.48), T₂-T₃ (0.40) and T₂-T₄ (0.64) was greater than the C.D. value, 0.25. Therefore, the difference was significant and the difference between the mean values of T₀-T₁ (0.17), T₁-T₂ (0.16) and T₃-T₄ (0.24) was lesser than the C.D. value, 0.25. Therefore, the difference was non- significant.

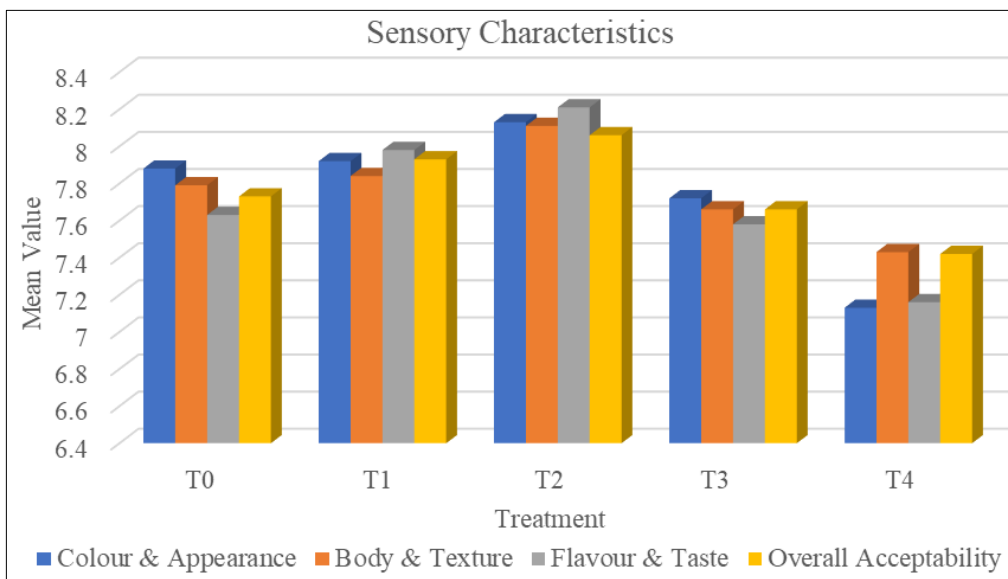


Fig 2: Graphical representation of Sensory characteristics of mean value for paneer by using buffalo milk and mint

Conclusion

The highest mean Colour and Appearance score for paneer by using buffalo milk and mint was recorded in the sample of T₂ (8.13) and lowest value was recorded in the sample of T₄ (7.13). It is therefore, concluded that there was significant difference between treatment T₀-T₄, T₁-T₄, T₂-T₃, T₂-T₄ and T₃-T₄. Similarly, the highest mean Body and Texture score was recorded in the sample T₂ (8.11) and lowest value was recorded in the sample of T₄ (7.43). It is therefore, concluded that there was significant difference between T₀-T₂ T₀-T₄, T₁-T₄, T₂-T₃ and T₂-T₄. The highest mean Flavor and Taste score was recorded in the sample of T₂ (8.21) and lowest score was recorded in the sample T₄ (7.16). It is therefore concluded that

there was significant difference between T₀-T₂, T₀-T₄, T₁-T₃ T₁-T₄, T₂-T₃, T₂-T₄ and T₃-T₄. Similarly, the highest mean highest overall acceptability score for paneer by using buffalo milk and mint was recorded in the sample of T₂ (8.06) and lowest score was recorded in the sample followed by T₄ (7.42). It is therefore, concluded that there was significant difference between T₀-T₂, T₀-T₄, T₁-T₃, T₁-T₄ T₂-T₃ and T₂-T₄ and all treatment was significant which may be ascribed to addition of different level of mint leaf in treatments. It was concluded that highest score was observed in T₂ among the all sensory characteristics of colour and appearance, body and texture, flavour and taste and overall acceptability.

Acknowledgement

The authors are thankful to the Incharge Aggies Dairy, SHUATS, Allahabad and Dean, Warner College of Dairy Technology, Sham Higginbottom University of Agriculture, Technology and Sciences, Allahabad (U.P.) for providing the facilities required for conducting the research work.

References

1. Anonymous. Drugdex Drug Evaluations. Peppermint. Greenwood Village, Colorado: Thomsen Greenwood Village, Colorado, USA: Thomson micromedex Inc, 1999.
2. Anonymous. Menthae Piperitae, WHO Monographs on Selected Medicinal Plants Geneva Switzerland, Department of Essential Drugs and Other Medicines, World Health Organization. 2004; 2:188-205.
3. Baliga MS, Rao S. Radio protective potential of mint: A brief review. *Journal Cancer Research Ther.* 2010; 6(3):255-262.
4. Bhattacharya DS, Mathur ON, Srinivasan MR, Samlik O. Studies on the method of production and shelf life of paneer. *Journal Food Science Technology.* 1971; 8:17-120.
5. Bourne MC, Comstock SH. Effect of degree of compression on texture profile parameters. *J Texture studies.* 1981; 12:201-216.
6. Chandan RC. Manufacturing of paneer. In: Gupta S (ed) Dairy India. Dairy India Yearbook, New Delhi. 2007, 411
7. Chawla AK Singh. Development of low fat paneer. *Indian Journal of Dairy science.* 1985; 38(4):280-283.
8. Desai HK. Sensory profile of traditional dairy products. In: Gupta S (Ed) Dairy India. Dairy India Yearbook, New Delhi, 2007, 408.
9. Emmons DB, Kalab M, Larmond E, Lowrie RJ. Milk gel structure. X. Texture and microstructure in Cheddar cheese made from whole milk and from homogenized low-fat milk. *J Texture Stud.* 1980; 11:15-34.
10. Khan MAS, Islam MN, Siddiki MSR. Physical and chemical composition of swamp and water buffalo milk: a comparative study. *Ital. J Ani. Sci.* 2007; 6(2):1067-1070.
11. Masud T, Athar IH, Shah MA. Comparative study of paneer making from buffalo and cow milk. *Asian Australian J Of Ani. Sci.* 1992; 5:563-565.
12. Moss Mark, Hewitt Steven, Moss Lucy, Wesneskieth. Modulation of cognitive performance and mood by aromas of peppermint and ylang- ylang. *The International journal of Neuroscience.* 2008; 118(1):59-77.
13. Murray MT. The healing power of herbs: the enlightened person's guide to the wonders of medicinal plants. Rocklin, CA: Prima Pub, 1995, 410.
14. Patil GR, Gupta SK. Some Aspects of sensory evaluation of paneer. *Indian Dairyman.* 1986; 38(3):135-140.
15. Peirce A. The American pharmaceutical association practical guide to natural medicines. New York: William Morrow and Company, Inc, 1999
16. Rao NM JT, Rao BVR. Paneer from buffalo milk. *Indian Journal Dairy Science.* 1984; 37(1):50-53.
17. Sachdeva S, Singh S. Use of non-conventional coagulants in the manufacture of paneer. *J Food Sci Technol.* 1987; 24:317-319.
18. Schuhmacher A, Reichling J, Schnitzler P, Virucidal. effect of peppermint oil on the enveloped herpes simplex virus type 1 and type 2 in vitro. *Phyto. Med.* 2003; 10:504-510.
19. Shukla FC, Gill GS, Sekhan KS. Studies on the manufacture of paneer from different type of milk. 2nd Int. Food Convention and Exhibition, C.F.T.R.I., Mysore, 1988, 97.
20. Singh S, Kanawjia SK. Development of manufacturing technique for paneer from cow milk. *Indian J Dairy Sci.* 1988; 41:322-325.
21. Sindhu JS. Suitability of buffalo milk for products manufacturing. *Indian Dairyman.* 1996; 48(2):41-47.
22. Vishweshwar SK, Krishnaiah N. Food and nutritive value of milk. Quality control of milk and processing, State Institute of Vocational Education Director of Intermediate Education Govt. of Andhra Pradesh, India, 2005, 10.