International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182 Print ISSN: 2349-5979
www.allsubjectjournal.com
Volume 2; Issue 12; December 2015; Page No. 09-11

Sensory and nutritional acceptability of low fat paneer prepared by optimization of milk by skim milk powder

[1]Shrish Chand Singh dikshit, [2]Shikha Kumari, [1]Praveen Kumar Singh

[1]Centre of Food Technology, University of Allahabad, Allahabad, India.

[2]Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, India.

Abstract
Paneer is an important indigenous nutritious and wholesome dairy product. It is of great value in diet because it is rich source of high quality protein, fat, minerals and vitamins but contributes to a considerable intake of fat in the diet. For those advised to consume low fat diet, it is important to develop products from skim milk. The present research work was conducted with the objectives 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. The experiment was conducted in research laboratory of "Dugdh Utpadak Sahkari Sangh" Limited and replicated 4 times and the data obtained during investigation was statistically analyzed using analysis of variance (ANOVA) technique. Sensory evaluation of the prepared paneer was carried out using nine point Hedonic Scale. The protein, ash and moisture content of the product were determined by AOAC (2005) [5] method, the fat content of the milk sample was determined by Gerber method and lactose was calculated by difference. The highest average score for overall acceptability of paneer (7.70) was recorded in T_1 followed by T_0 (7.37), T_1 (7.20) T_3 (6.66) and T_4 (6.25). Amongst the different combinations used of milk in a ratio of 2.5(fat):8.5(SNF) (T_2) is best in term of flavour, taste, body, texture and overall acceptability. The quality of this paneer is very well comparable to that of the control paneer which was prepared from buffalo milk standardized to 5 percent fat and 8.5 percent SNF. The paneer was found to have higher protein and lower fat as compared to standard milk paneer (control) and can therefore be helpful from the therapeutic point of view for the people suffering from chronic diseases.

Keywords: Paneer, wholesome, high protein, skim milk powder, chronic diseases.

Introduction
Paneer is an important in indigenous nutritious and wholesome dairy product. It is rich source of protein, fat, minerals and vitamins. Paneer is used as base preparation of the number of culinary dishes. Paneer is obtained through heat/acid coagulation of casein component of standardized buffalo's milk entrapping through complex physico-chemical interactions almost all the fat apart of denatured whey proteins and colloidal salts as well as a part of the soluble milk solids. Typically paneer is marble white in appearance, having slightly spongy body, close-knit texture and possessing a sweetish-acidic-nutty flavour. Patel (1991) observed that a good quality paneer can be made successfully with low cost by reducing its fat content up to 3-3.5% as against the 6% milk fat. From the nutritional point of view also, if the fat content is reduced or minimized then the product can be recommended for the both diabetic and hypertensive patients.

In the present scenario usually the paneer is manufactured from buffalo milk. The other potential and surplus raw material such as skim milk is left unutilized. Patel (1991) observed that the good quality Paneer could be made successfully with low cost by reducing the fat content to 3.0 and 3.5 percent as against the 6.0 percent milk fat. For the nutritional point of view also if the fat content reduced or minimized, then the product can be highly recommended for the diabetic patients and the patients of hypertension as well. (Choksy 2006) [6].

Researchers and Medical Board have considered milk fat as a possible risk factor especially for Coronary Heart Diseases (CHD). It is revealed by the reports that high dietary fat intake shortens clotting time of blood. Many nutritionists suggest that less than 30 percent of the calories should be through fats and oils. In view of the increasing occurrence of coronary complications there is considerable interest to reduce the milk fat in paneer with vegetable fat (Kanawjia 2001) [14]. The conventional paneer is quite rich in fat content which not only pushes up the prices of Paneer but also make it unsuitable to those consumers who are conscious of high fat and required relatively low fat Paneer. The present research work was conducted with the objectives 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.

Materials and Method
The experiment was conducted in research laboratory of "Dugdh Utpadak Sahkari Sangh" Limited. All the raw materials required like Buffalo milk, Skim milk, Skim milk powder and chemical reagents like Citric acid, Amyl alcohol, Gerber acid (H_2SO_4), Sodium Hydroxide (Conc.), Sulphuric acid (conc.), Phenolphthalein indicator, Zinc sulphate, Lactose, Mercuric oxide, Sodium sulphate, Boric acid, Methyl red indicator, Methyl blue indicator were procured from here itself.

Preparation of control milk: 1.5 liter whole milk standardized to 5 percent fat and 8.5 percent SNF was heated to a temperature of 85 ^{0}C. The heated milk was cooled to 70 ^{0}C (The desired

temperature for coagulation). Freshly prepared coagulation solution was heated to 70 ^{0}C prior to addition in order to maintain the coagulation temperature at 70 ^{0}C The one percent citric acid solution i.e. coagulant was added to milk with constant and gentle stirring till clear whey was separated out. After the coagulation of milk the steering was stopped and curd was allowed to settle in whey for about 5 minutes. Curd was separated from whey by pouring the content over a muslin cloth stretched over another empty vessel to collect the whey. The amount of obtained was measured and the separated curd was filled into a hoop lined cloth pressed for about 20-25 minutes. The pressed was removed from hoop and transferred to chilled water and placed on wooded to allow loose water to drain for about 10-15 minutes. It was packed in parchment butter paper and stored under the refrigeration condition.

Preparation of Experimental paneer: Milk was standardized to four different fat levels of 3 percent, 2.5 percent, 2 percent, 1.5 percent and SNF 8.5 percent by using the skimmilk and buffalo milk. This standardized milk was used for the preparation of experimental paneer.

Sensory evaluation of the prepared paneer was carried out using nine point Hedonic Scale. The protein, ash and moisture content of the product were determined by AOAC (2005) [5] method, the fat content of the milk sample was determined by Gerber method and lactose was calculated by difference. Standard milk in the ratio of 3:8.5, 2.5:8.5, 2:8.5, and 1.5:8.5 (fat: SNF) are called as treatments T_1, T_2, T_3 and T_4 respectively. The whole procudure was replicated 4 times and the data obtained during investigation was statistically analyzed using analysis of variance (ANOVA) technique.

Results and Discussion

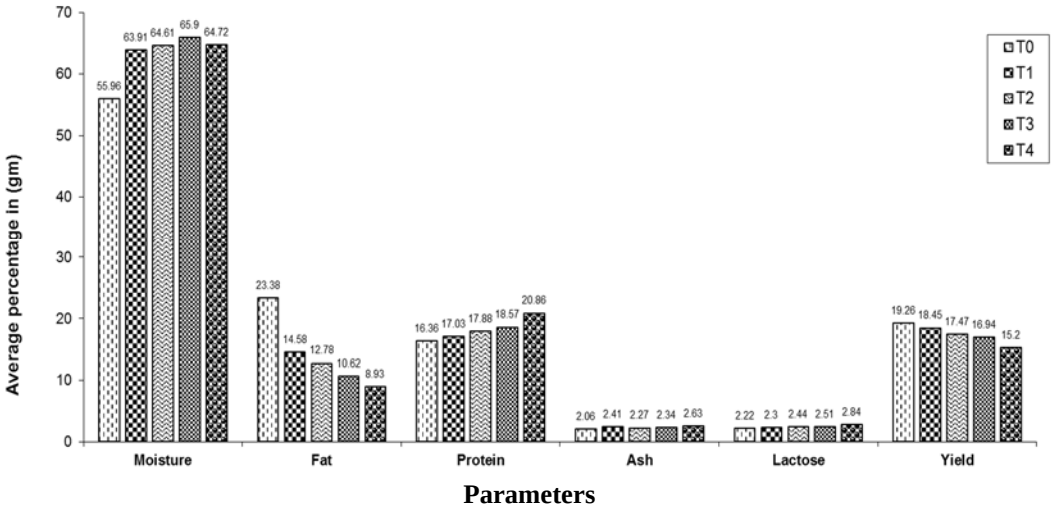

Fig 1: Average proximate analysis of control and experimental paneer (low fat) samples.

The highest average moisture percentage of 65.90 percent was recorded in T_3 followed by T_1 (63.91%), T_2 (64.61%), T_4 (64.72), and T_0 (55.49). Control paneer T_0 had the highest average fat content of 23.88 percent followed by T_1 (14.58%), T_2 (12.78%) and T_3 (10.62%) whereas, T_4 had lowest average fat content of 8.93 percent. The highest average percent of ash (2.36%) was recorded in T_4 followed by T_1 (2.41%), T_3 (2.34%) and T_2 (2.27%), whereas T_0 had lowest ash content of 2.06 percent. The highest average lactose percentage of 2.84 was recorded in T_4 followed by T_3 (2.51%), T_2 (2.44%), T_1 (2.30%) and T_0 (2.22%). The highest average percentage of yield 19.26 percent was recorded in T_0 followed by T_1 (18.45%), T_2 (17.47%), and T_3 (16.94%), whereas T_4 had lowest average yield content of 15.20 percent.

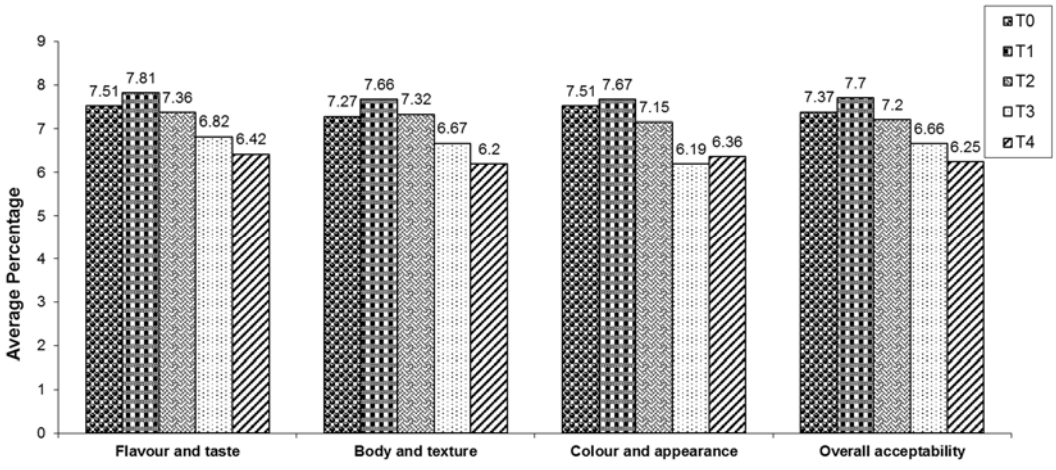

Fig 2: Average sensory scores of control and experimental paneer (low fat) samples.

The highest average score for flavour and taste of paneer (7.81) was recorded in T_1 followed by T_0 (7.51), T_2 (7.36), T_3 (6.82), and T_4 (6.42). Flavour and taste score of T_4 was significantly lower as compared to other treatments. Flavour and taste scores of paneer differed significantly ($p \leq 0.05$) between (T_0, T_3), (T_0, T_4), (T_1, T_3), (T_1, T_4), and (T_2, T_3) treatment combinations. While non-significant difference was found between (T_0, T_1), (T_0, T_2), (T_1, T_2) and (T_3, T_4) treatment combinations. The highest average scores for body and texture of paneer (7.66) was recorded in T_1 followed by T_0 (7.27), T_2 (7.32) and T_3 (6.67). Body and texture score of T_4 (6.20) was significantly lower as compared to other treatments. Body and texture scores of paneer differed significantly ($p \leq 0.05$) between (T_0, T_4), (T_1, T_3), (T_1, T_4), (T_2, T_3) and (T_2, T_4) treatment combinations, while non-significant difference was found (T_0, T_1), (T_0, T_2), (T_1, T_2), and (T_3, T_4) treatment combination. The highest average score for colour and general appearance of paneer (7.67) was recorded in T_1 followed by T_0 (7.51), T_2 (7.15) and T_3 (6.91). Colour and general appearance score of T_4 (6.36) was significantly lower as compared to other treatments. colour and general appearance score of paneer differed significantly ($p \leq 0.05$) between (T_0, T_2), (T_0, T_3), (T_0, T_4), (T_1, T_2), (T_1, T_3), (T_1, T_4), (T_2, T_4) and (T_3, T_4) treatment combinations, while non-significant difference was found between (T_0, T_1) and (T_2, T_3) treatment combinations. The highest average score for overall acceptability of paneer (7.70) was recorded in T_1 followed by T_0 (7.37), T_1 (7.20) T_3 (6.66) and T_4 (6.25). The significant difference ($p \leq 0.05$) in overall acceptability was found between (T_0, T_3), (T_0, T_4), (T_1, T_2), (T_1, T_3), (T_1, T_4), (T_2, T_3) and (T_2, T_4) treatment combinations, while non-significant difference was found only (T_0, T_2) treatment combinations.

References

1. Agrawal AK, Das H. Type of milk used for preparation, yield, Chemical composition and quality attributes of paneer, Indian J of Nutrition and Dietetics. 2000; 38:64-72.
2. Amirthaveni A, Vijayalakshami P. Effect of fish oil supplementsation on hyperlipidemic patients, Indian J of Nutrition and Dietics. 2003.
3. Aneja RP, Mathur BN, Chadan RC. Banerjee AK. Technology of Indian Milk Products. A Dairy India Publication, Delhi, 2001, 100-109.
4. Aneja SK. key note address delivered at the national seminar on recent advances in dairy processing, N.D.R.I, Karnal 1997, 112-117.
5. AOAC. Officinal methods of Analysis. Fourteenth edition. Association of Official Analytical Chemists, Washington, DC, 2005.
6. Bhukht Choksy, Neesha. Nutrition value of paneer, (FRom website, 2006. http://www.doctorndtv.dom/fag/detailarchived.asp?id=8353 and heading what).
7. Chaudhary R.L, Jha S.N, Makkar S.K, Narsaiah K.W. A mcehanized system for continuous production of Chana balls, Indian Patent Pending, 2002.
8. David J. Techonological advances in indigenous milk products Ist Ed. Vitab Mahal Agencies, 22-A, Sarojini Naidu Marg, Allahabad, 1, 3, 2006, 1, 2, 6-7, 113-126, 302.
9. De. S. Outlines of Dairy Technology 20th Ed. Oxford university press, New Delhi 1980-200; 479-48:467-470.
10. Eckle Combs W.B, Macy H. Milk and Milk products, 4th Ed. Tata Mc. Craw Hill Publishing company Limited, New Delhi, 1, 3, 4, 2002, 9; 1, 2, 14, 21, 86-87, 99, 266.
11. FAO. The U.N.D.P. Grameen Motsha Foundation Community Livestock Dairy Development Programme 2001.
12. Griffith I.F, Grayatt G.H, Cook R.J, Bucher H.C, Cook D.J. The influence of dietary and non-dietary calcium supplementation on blood pressure, An J of Hypirters. 1991; 12:84-92.
13. Hasan F. The effect of different packaging materials and storage temperature on chemimcal quality of Paneer, Indan J of Dairy Sci. 2003; 37(1):50-53.
14. Kanawjia SK. Technological diversification in paneer making, A report of N.D.R.T. Karnal, 2001, 32-37.
15. Kanawjia S.K, Rijvi S.S.H. Development of paneer from micro filtrate retentate, Indian Journal of Dairy Science. 2003; 57(4):577-584.
16. Kapoor OP. Role of vegetarian Diet in Health and Disease of Diabetes and Vegetarianism, 2007.
17. Kaur J, Bajwa U. Effect of milk fat content on some quality attributes of vegetable impregnated paneer, Sakaj 3 liveestock poultry product 2001; 17:20-25.
18. Khader V. Text book of Food Sci. and Techonology, ICAR, New Delhi 2001; 19:290.
19. Khalid Ismail M. The benefit of milk. Your Indian book bawarchi; Health and Nutrition. From website 2007. http://www.bawarchi.com/heath/milk2.html
20. Kumar HA, Ramanjaneyulo G, Venkateshaiah BV. Comparison of there coagulants in the preparation of paneer, Tropical Agricultural research 1998; (10):407-412.
21. Madhavan A. Recent developments in paneer technology, Indian- Dairyman 1991; 37(2):501-502.
22. Masud T. Effect of coagulation temperatures and strength of coagulant used on the composition of paneer, Indian J of Nutrition and Dietetics. 2002; 39(12):58-550.
23. Mathur BB. Indigenous milk product of India, Indian Dairyman 1991; 42(2):61-74.
24. Mukundan M, Mini J, Panithan K. Utilization of skimmilk filled with coconut milk for preparation of paneer, J of Veterinary Animal Sci. 1995; 26(11):6-8.
25. Menden E. Fat substitute - patent solution super flavours are questionable, Ernahrung 1993; 17(12):692-684.
26. Painter FM. Fishail monograph. Alternative Medicine Review 2000; 5(6):576-580.
27. Pal MA. Microbiologically related biochemical transformations in paneer during storage, Indian J of Microbiology. 1998; 38:21-23.