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Storage related changes in sensory profile of paneer spread

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Abstract

Paneer was first prepared from standardized buffalo milk containing 6% fat and 9% SNF using one percent citric acid as coagulant at 80^{0}C coagulation temperature. Such paneer was used for making paneer spread by blending it with 10% whey and varying concentrations of salt (1.0, 1.5 and 2.0%) and preservatives (0.2% sodium benzoate or potassium metabisulphite) into a smooth paste consistency. The product was evaluated for sensory attributes when fresh (0 day) and on 05, 10 and 20 days to assess storage related changes in flavour, body and texture, appearance and overall acceptability of the product on a 9 – point hedonic scale. The studies revealed that the paneer spread was at its best when fresh but started losing sensory score as the period of storage advanced. The use of preservatives, viz potassium metabisulphite and sodium benzoate extended the shelf life of paneer spread to over 10 days. The use of salt had additive effect. It was inferred that 1.5% salt level and potassium metabisulphite were found superior to sodium benzoate and 2.0% salt concentration.

Key Words: Shelf life, paneerspread, ensory quality

Introduction

Traditional dairy products have played a significant role in economic, social, religious and nutritional well being of people and are gradually becoming popular throughout the world. In the context of present policy of globalization, the business leaders of the multinations are eliciting keen interest in the vast unexplored resources of Indian traditional wealth of knowledge in science and technology blended with the art and literature of the people of India.

Milk and milk products are the main and often the only source of animal protein in the Indian vegetarian diet. Milk products besides being an important source of protein also add variety to the diet. Dairy products also constitute a family of natural functional foods due to their established health related benefits. Nutritive value of paneer is fairly high as it contains almost all protiens and fats present in milk besides being a rich source of minerals and vitamins. Variety of culinary dishes and snacks are prepared from paneer in addition to its direct consumption. Although , the buffalo milk is best suited for paneer manufacture but good quality of paneer has also been made from cow or mixed milk with suitable modifications (Dharam Pal and Agrawala, 2007; Yadav *etal*, 2009 and Dwivedi *etal* 2010a).

Recently, a spread has been developed from paneer, which has pleasant taste and preferred over other spread on account of its nutty flavour. Presently, mainly two types of spread are available in market, namely butter and cheese spread, which are used along with bread in the breakfast. Butter spread is avoided by obese persons or those suffering from coronary heart diseases. Cheese spread is suitable for consumers of all age groups but is highly expensive. Contrarily, paneer spread would be cheaper but equally nutritious. The authors have recently reported standardization of methods for manufacture of paneer spread from buffalo milk (Dwivedi *etal.,* 2010b). The present study was aimed at determining the changes in sensory attributes of paneer spread during storage at refrigeration temperatures.

Materials and Methods

Preparation of Paneer Spread: The paneer prepared from standardized buffalo milk containing 6.0% fat and 9.0% MSNF using critic acid (1%) as coagulant at 80^{0}C coagulation temperature was adjudged as the best quality paneer from stand-point of sensory attributes and chemical and microbiological qualities (Dwivedi *etal.,* 2009; Dwivedi *etal.,* 2010a). Hence, paneer made as above was only used for preparation of paneer spread.

The paneer blocks were sliced into small pieces and blended with 10% of whey water. Salt (1.0, 1.5, 2.0%) and preservative (sodium benzoate or potassium

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metabisulphite, 0.2% each) were added to the paneer mass and blended thoroughly into a smooth paste like consistency. The product (paneer spread) was packaged in polystyrene cups and stored at 5^0C.

Sensory evaluation of Paneer spread: A 9-point hedonic scale was used to evaluate the flavor, body and texture, appearance and overall acceptability of the product by a selected panel of five experienced judges as per BIS (1971). The changes in sensory attributes were monitored on 0, 5, 10 and 20 days of storage of the product.

Results and Discussion

Effect of storage period on sensory attributes of paneer was studied at predetermined intervals, as delineated above, to assess the acceptability of the product.

Flavour Profile: The results (Table 1) indicated that the fresh product prepared with 1.5% added salt and potassium metabisulphite as preservative elicited the highest flavor score (8.80) than the product prepared using sodium benzoate preservative (8.60). At one and two percent levels of added salt, the flavour scores were somewhat lower in the products preparing using sodium benzoate or potassium metabisulphite preservatives. The preservatives sodium metabisulphite, however, elicited slightly better score than sodium benzoate at all levels of added salt. With advancement in storage period, the flavour score declined consistently. On fifth day, although the flavour score diminished, but it remained in good condition. Again, the paneer spread prepared from 1.5% added salt and potassium metabisulphite preservative obtained better scores that other treatments. On 10th day, the flavour score decreased further to around 6.0, indicating the acceptability of the product. On 20th day, the product was not acceptable on basis of flavour, as it declined to about 4.0.

Body and texture: The mean interactions between x (levels of added salt), y (preservatives) and z (storage period) on body and texture score of paneer spread, it was observed (Table 2) that the maximum body and texture score (8.60) was noted in samples prepared by using 1.5% salt, potassium metabisulphite and 0 day (fresh) storage period ($x_2y_2z_1$). Sodium benzoate elicited a little lower score than potassium metabisulphite in all treatment combinations. The scores for body and texture decreased consistently as the period of storage elapsed. The product remained acceptable upto 10 days, as far as body and texture was concerned. On 20th day, the body and texture of paneer spread was unacceptable.

Appearance: The mean interactions between xyz on colour and appearance of score of paneer spread (Table 3) revealed that the maximum score (8.70) was noted in samples made using 1.5% salt level, potassium metabisulphite as preservative and 0 day storage period ($x_2y_2z_1$). Similar combination using sodium benzoate obtained a little lower score (8.50) for appearance. As the period of storage elapsed, the scores for appearance of the product declined but the trend remained almost the same. The 2% level of added salt elicited lower scores for appearance than 1% level of added salt, irrespective of preservatives and period of storage. The product remained acceptable upto 10 days.

Overall acceptability: The scores for overall acceptability of paneer spread based on appearance, flavour and texture recorded in Table 4, suggested that the maximum overall acceptability score (8.70) was perceived in samples prepared by using 1.5% salt, potassium metabisulphite as preservative on 0 day storage ($x_2y_2z_1$). A slightly lower overall acceptability score was observed for samples made with sodium benzoate preservative (8.50). Other salt and preservative combinations yielded products with lower scores.

The overall acceptability score diminished with advancement in storage period. On fifth day, the product elicited lower scores for overall acceptability but it was in good condition and liked by panelists. On 10th day, the overall acceptability further declined but remained in fairly acceptable condition. The product was, however, not acceptable on 20th day as evidenced by overall acceptability scores declining around 4.0.

The results suggested that the paneer spread was at its best when fresh but started losing sensory scores as the period of storage advanced. The use of preservatives, viz. potassium metabisulphite and sodium benzoate extended the shelf life of paneer spread. The use of salt had additive effect.

Table 1: Changes in flavor score of paneer spread during storage

		Z_1	Z_2	Z_3	Z_4
X_1	Y_1	8.20	7.00	5.60	4.00
	Y_2	8.40	7.20	5.80	4.20
X_2	Y_1	8.60	7.40	6.00	4.40
	Y_2	8.80	7.6	6.20	4.60
X_3	Y_1	8.00	6.80	5.40	3.80
	Y_2	8.20	7.00	5.60	4.00

X_1, X_2 and X_3 – 1%, 2% and 3% salt ; Y_1 – sodium benzoate, Y_2 – potassium metabisulphite; Z_1, Z_2, Z_3 and Z_4 – 0, 5, 10 and 20 days of storage.

Table 2: XYZ mean for body and texture of paneer spread

		Z_1	Z_2	Z_3	Z_4
X_1	Y_1	8.00	6.80	5.50	3.80
	Y_2	8.20	7.00	5.60	4.00
X_2	Y_1	8.40	7.20	5.80	4.20
	Y_2	8.60	7.40	6.00	4.40
X_3	Y_1	7.80	6.60	5.20	3.60
	Y_2	8.00	6.80	5.40	3.80

X_1, X_2 and X_3 – 1%, 2% and 3% salt ; Y_1 – sodium benzoate, Y_2 – potassium metabisulphite; Z_1, Z_2, Z_3 and Z_4 – 0, 5, 10 and 20 days of storage.

Table 3: XYZ mean for colour and appearance of paneer spread

		Z_1	Z_2	Z_3	Z_4
X_1	Y_1	8.10	6.90	5.50	3.90
	Y_2	8.30	7.10	5.70	4.10
X_2	Y_1	8.50	7.30	5.90	4.30
	Y_2	8.70	7.50	6.10	4.50
X_3	Y_1	7.90	6.70	5.30	3.70
	Y_2	8.10	6.90	5.50	3.90

X_1, X_2 and X_3 – 1%, 2% and 3% salt ; Y_1 – sodium benzoate, Y_2 – potassium metabisulphite; Z_1, Z_2, Z_3 and Z_4 – 0, 5, 10 and 20 days of storage.

Table 4: XYZ mean for overall acceptability of paneer spread

		Z_1	Z_2	Z_3	Z_4
X_1	Y_1	8.10	6.90	5.50	3.90
	Y_2	8.30	7.10	5.70	4.10
X_2	Y_1	8.50	7.30	5.90	4.30
	Y_2	8.70	7.50	6.10	4.50
X_3	Y_1	7.90	6.70	5.30	3.70
	Y_2	8.10	6.90	5.50	3.90

X_1, X_2 and X_3 – 1%, 2% and 3% salt ; Y_1 – sodium benzoate, Y_2 – potassium metabisulphite; Z_1, Z_2, Z_3 and Z_4 – 0, 5, 10 and 20 days of storage.

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