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Assessment of sensory and chemical quality of filled milk paneer

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Abstract

Filled milk paneer, prepared by replacing milk fat with 5.0 percent vegetable oils (ground nut, mustard or sunflower refined oils) blended at 45°C using one percent citric acid at 80°C coagulation temperature as well as milk paneer, prepared from 5.0 percent buffalo milk, were assessed for sensory and chemical quality. The appearance, flavor body and texture scores of filled milk paneer were almost same as for conventional milk paneer and thus were quite acceptable. The total solids, fat, protein, lactose and ash contents of various filled milk paneer did not differ significantly from one another and the chemical quality, in general, was comparable with milk paneer. The percent yield also did not differ significantly. A good, acceptable quality filled milk paneer could be prepared by replacing milk fat with five percent vegetable oils.

Keywords : Filled milk, vegetable oil, sensory quality, chemical attributes

Introduction

Traditional dairy products continue to play a significant role in the economic, social, religious and nutritional well being of people and are gradually becoming popular throughout the world. Milk and milk products are an important source of animal protein in Indian vegetarian diet, besides adding a variety to the diet (Dwivedi *etal*., 2014). 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 the proteins and fats present in milk besides being a rich source of minerals (calcium and phosphorus) and vitamins (fat-soluble vitamins). Variety of culinary dishes and snacks are made from paneer in addition to its direct consumption. The buffalo milk is best suited for paneer manufacture but good quality paneer has also been made from cow or mixed milk with suitable modifications (Yadav *etal.,* 2009; Dwivedi *etal.,* 2010).

Due to the ever growing demand of paneer by varied health conscious consumers, new types and varieties of paneer have been developed during recent years, Examples of these include skim milk paneer, low fat paneer, soy paneer, filled paneer, protein enriched filled paneer etc. Low-cost health promoting paneer can be made using skim milk added with vegetable oil. Such filled milk paneer, made from skim milk blended with vegetable oils contains all the milk solids except milk fat and processed in similar manner as milk paneer. The filled milk paneer is about one-third to one-fourth as costly as conventional paneer (Singh *etal.,* 2017) but rich source of poly unsaturated fatty acids and devoid of animal cholesterol, required for good health of human beings. The present paper reports data on the sensory and chemical quality as well as yield of filled milk paneer prepared using different vegetable oils.

Materials and Methods

Milk: Buffalo milk was obtained from the college dairy and standardized to 5.0 percent and 9.0 percent MSNF using skim milk obtained by separation of cream from buffalo milk.

Selection of vegetable oils : Three types of refined vegetable oil, namely ground nut, mustard and sunflower refined oils were purchased from the standard shops.

***Preparation of filled milk paneer* :** Filled milk paneer was prepared by replacing the milk fat by 5.0 percent vegetable oils, using blending temperature of

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45°C at 80°C coagulation temperature using one percent citric acid as coagulant according to Roy (1990) with certain modification. In each batch, then litre of filled milk (containing 5.0 percent vegetable fat) was heated to 90°C for five minutes and then cooled to 80°C (Roy and Singh, 1999). It was then coagulated with one percent citric acid, added slowly till clear whey separated out. The curd was allowed to settle for five minutes and then the whey drained out through muslin cloth. The coagulated mass was pressed in a rectangular hoop lined with muslin cloth by applying pressure (2Kg/cm2) and then dipped in chilled water for two hours and packaged in LDPE packs and stored at 5°C.

Milk paneer was made from buffalo milk (having five percent fat) according to Bhattacharya *etal.* (1971) with necessary modifications (Sachdeva, 1983; Dwivedi *etal.,* 2010).

Sensory quality : The sensory attributes of the product, viz appearance, flavour, body and texture were evaluated on a 9 point hedonic scale by a select panel of five experience judges as per BIS (1971).

Chemical quality : All the products were analyzed for total solids, fat, protein, lactose and ash contents according to BIS methods (1961,1964).

Yield : The yield of the product was calculated by dividing the weight of product obtained from a known quantity of milk/filled milk.

$$\text{Yield\%} = \frac{\text{weight of paneer/filled paneer} \times 100}{\text{weight of milk/filled milk}}$$

Results and Discussion

Results on sensory attributes of filled milk paneer prepared by replacing milk fat with 5.0 percent vegetable oil blended at 45°C using one percent citric acid at 80°C coagulation temp were collated with milk paneer made from standardizes buffalo milk contain 5.0 percent fat and such observations have been laid down in Table 1.

Results indicated that the appearance of filled milk paneer compared very well with the appearance of milk paneer. Only a very little difference was found in appearance score of milk paneer and filled paneer but such difference was insignificant. The flavour score (8.50 ± 0.10). Of milk paneer was definitely better than that of filled milk paneer but the flavour of filled milk paneer was very well liked by panelist and regarded to be almost at par with milk paneer.

Body and texture score of milk paneer was 8.04±0.08 and was significantly greater than that of filled milk paneer (mean 7.17 ± 0.20) but the body and texture of filled paneer was also quite acceptable. All filled milk paneer samples prepared using different vegetable oils elicited almost similar sensory scores and indicated that any of these oils could be used for preparation of good quality filled milk paneer.

Chemical quality : The chemical attributes of quality, viz. total solids, fat, protein, lactose and mineral (ash) contents of filled milk paneer were collated with the chemical attributes of conventional milk paneer with a view to gain insight into the nutritional richness of filled milk paneer.

Results in Table 2 revealed that the mean total slids content of filled paneer (47.67 ± 0.28%) compared very well with the total solids content of milk paneer (47.70 ± 0.45). The fat content of various types of filled milk paneer was also in consonance with the fat content of filled milk paneer. Similarly, the protein content of filled milk paneer (mean 18.96 ± 0.17 percent) was also in proximity with protein content of milk paneer (19.13 ± 0.12 percent). The data on lactose content of various types of paneer also varied within narrow limits. The ash (mineral) content also did not differ significantly among various paneers. The results further indicated that the chemical quality of all types

Table 1: Sensory attributes of filled milk paneer as compared to conventional milk paneer

S. No	Type of Oil and fat	Appearance	Flavour	Body and Texture
1	Milk Paneer	8.03±0.06	8.50 ±0.10	8.04±0.08
2	Filled Paneer (Ground nut Oil)	7.90±0.10	7.78±0.10	7.20±0.17
3	Filled Paneer (Mustard Oil)	8.00±0.15	7.65±0.11	7.15±0.03
4	Filled Paneer (Sunflower Oil)	7.90±0.50	7.69±0.20	7.15±0.09
5	Mean (Filled paneer)	7.94±0.24	7.69±0.20	7.17±0.20
	CD (p=0.05)	NS	NS	NS

NS = Non-significant

Values with different superscripts, a, b, in a row differ significantly (p0.01)

Table 2: Chemical quality and yield of filled milk paneer made from different vegetable oils

S. No.	Type of oil and fat	Total solids (%)	Fat (%)	Protein (%)	Lactose (%)	Ash (%)	Yield (%)
1	Milk fat	47.70 ±0.45	23.80 ±0.33	19.13 ±0.12	2.55 ±0.05	2.22 ±0.03	18.75 ±0.05
2	Ground nut oil	47.80 ±0.31	23.88 ±0.13	18.90 ±0.14	2.81 ±0.02	2.21 ±0.21	18.50 ±0.10
3	Mustard Oil	47.67 ±0.11	23.55 ±0.21	18.97 ±0.30	2.94 ±0.09	2.21 ±0.04	18.36 ±0.35
4	Sun flower oil	47.50 ±0.20	23.45 ±0.16	19.00 ±0.04	2.89 ±0.01	2.16 ±0.01	18.34 ±0.16
5	Mean (Filled paneer)	47.67 ±0.28	23.63 ±0.26	18.96 ±0.17	2.80 ±0.16	2.20 ±0.16	18.42 ±0.24
CD(p=0.05)		NS	NS	NS	NS	NS	NS

NS = Non -significant

of filled milk paneer was almost same and did not differ significantly from one another.

The yield, which is a quantitative attribute and is an indicator of a successful enterprise was also appraised. The yield of milk paneer from buffalo milk containing 5.0 percent fat was 18.75±0.05 percent. The yield of filled milk paneer replacing milk by vegetable oil at similar level was also almost same (18.42 ± 0.24 percent)

It was inferred from such results that a good, acceptable quality of filled milk paneer could be prepared by replacing milk fat with either ground nut, mustard or sunflower oil at five percent level of fat. Five percent oil replacement yielded almost similar product as 6.0 percent oil replacement (Singh *etal.,2017).* Hence, the former is more economical. Filled milk paneer has all the goodness of energy, proteins and rich minerals as milk paneer with additional benefits of poly unsaturated fatty acids and being devoid of animal cholesterol, blamed to be cause of coronary heart diseases.

Published literature are meagre on filled milk paneer made from vegetable oils as reported in this investigation to corroborate the present data. Our results are, however, in conformity with those of Roy and Singh (1999) who observed that hydrogenated vegetable oil and ground nut oil proved to be

better than soy oil. They further indicated that higher fat level (ie, 5.5% vs 3.5%) resulted in better acceptability of resulting filled paneer.

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