

Preparation and Shelf Life Extension of Fiber Enriched Paneer

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ABSTRACT- The present study was undertaken to make paneer enriched with fiber otherwise fiber deficient paneer. Coconut powder is in the form of fiber was included in the preparation of paneer. Paneer is one such product which is a regular dietary favorite among the Indians. Paneer has short life span at room temperature. So, the present study was aimed to assess the shelf life of salted paneer at different intervals in refrigeration temperature and physico-chemical attributes also. Paneer is prepared by combined action of acid coagulants and heat treatment of buffalo and cow milk or a combination thereof. Paneer have pleasant odour and characteristic mild acidic flavour. No extraneous coloring matter should be added to paneer at any stage. Paneer is a highly perishable product and has limited shelf life, largely because of its high moisture content. Its shelf life was reported to be only six days under refrigeration, though its freshness is lost within three days. The spoilage of paneer occurs mainly due to the growth of microorganisms, which bring about various physico-chemical changes. The growth of microorganisms can be delayed and shelf life of paneer be increased by addition of salt in the paneer. All treatment combinations were analyzed for a total viable count (bacteria) on nutrient agar and fungi on PDA and Coliform on Mcconkey agar. All the samples had bacteriological count ranging from 1×10^4 to 14×10^4 cfu/gm. And in all samples coliform was absent, so the product was found to be good and proper hygienic condition were maintain during the preparation, handling, and storage.

Key words: Paneer, Standard Plate Count, Chemical analysis, Yeast and mould count, Fiber

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INTRODUCTION

India is considered as an agrarian country in which major proportion of population is vegetarian, milk plays a pivotal role in Indian diet. The major portion of milk produced in India is consumed in the liquid form and the remaining is used to prepare value added products. Paneer, popularly known as Indian cottage cheese is prepared by heat-cum-acid coagulation of standardized buffalo milk (6% fat and 9% SNF)¹. About 5% of milk produced in India is converted into paneer². Paneer is a tempting, nutritious and delicious indigenous dairy product. It is an acid coagulated product and a rich source of high quality protein, fat and fat soluble vitamins and also minerals especially calcium and phosphorus. About 76.8% calcium and 68.3% magnesium of the original milk were retained in paneer.

Paneer retains about 90% fat and protein, 50% minerals and 10 percent lactose content of the original milk in concentrated form³. According to Prevention of Food Adulteration Act (2010)⁴ Paneer means "Product obtained from cow or buffalo milk or a combination thereof, by precipitation with sour milk, lactic or citric acids. It shall contain no more than 70% moisture and milk fat content should not be less than 50% expressed on dry matter". Bureau of Indian standard (BIS-1983)⁵ imposed maximum of 60% moisture and minimum of 50% fat in dry matter for paneer. Paneer has a short life span of about 5-7 days at refrigeration storage without much deterioration in the quality but freshness of paneer remains intact only for 3 days at refrigeration temperature⁶. At room temperature paneer does not keep good for more than one day. In order to increase the shelf life of paneer in this study surface treatment of salt was used. Due to the ever growing demand of paneer by varied health conscious people. This study was focused to develop new variety of fiber rich paneer by using coconut powder, which is a great food for gut bacteria and helps in overall intestinal health.

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MATERIALS AND METHODS

This study was conducted in 2014 at the Research laboratory of Warner school of Food and Dairy Technology SHIATS, (Deemed to be University) Allahabad, India.

Preparation of fiber rich paneer product:

Flow chart given below for the preparation of fiber rich paneer. For the preparation of experimental paneer milk was standardized to 5% fat and 8.5% SNF. Four different samples of experimental paneer with four different ratio of coconut powder were used for making experimental paneer. The milk was heated 82°C for five minutes then coconut powder is added to milk at a time in different ratio viz

(1.0%, 1.5%, 2.0%, 2.5%) then cooled at 70°C. The milk was coagulated with 1% citric acid and coagulum was collected on muslin cloth, and then pressed at 2-3 kg/cm² for 15 min. After that dipped in chilled water for 2-3 hours then drain off the loose water and sprinkle the salt at (1.5%, 2%, 2.5%) on the product then hygienically packed in plastic bags and stored at refrigeration temperature.

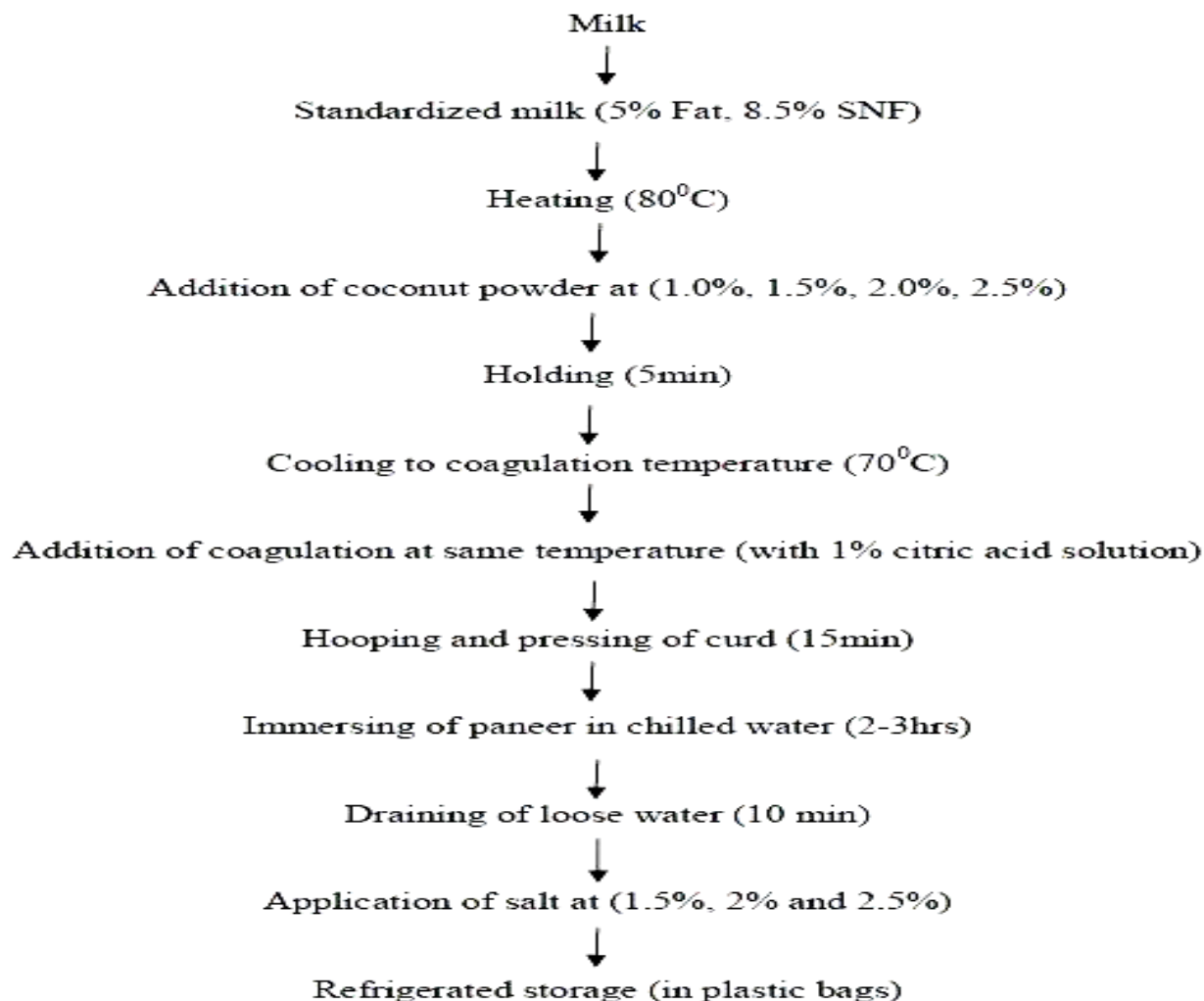


Fig. 1: Flow Chart for Preparation of Experimental Paneer

Chemical analysis of fiber rich paneer

The percentage moisture content of fiber rich paneer was determined as per the procedure of ICAR⁷. The fat percent was determined as per the procedure given in I.S. Handbook of Food Analysis⁸. The total protein, ash and total carbohydrate (fiber) were determined according to the method of AOAC⁹.

Microbiological Analysis of Paneer

Microbiological analysis of the paneer samples was carried out by the methods prescribed by Bureau of India Standard (BIS)¹⁰. The samples were examined for Standard Plate Count, Yeast and mould count and Coliform count.

STATISTICAL ANALYSIS

The data obtained for various parameters were analyzed statistically using analysis of variance and critical difference techniques.

RESULTS AND DISCUSSION

Effect of Physico-chemical Characteristic of Developed Product

In proximate analysis of developed product the fat and total carbohydrate content was found to be maximum in treatment combination (T₄). The moisture content was highest in T₀ (control) as compared to other treatment combination. The protein and ash contents were observed to be highest in T₁ (Table: 1) However it was also observed that there was significant effect of treatments on fat, total carbohydrate, moisture, protein and ash on developed product.

Table 1: Proximate composition of control and Experimental Paneer

Treatment	Moisture %	Fat %	Protein %	Ash %	Carbohydrate %	Fiber %	Total Solid %
T ₀	54.78	25	15.5	1.94	2.3	0	44.51
T ₁	54.06	26.09	16.10	3.28	3.14	0.571	45.27
T ₂	53.16	27.03	15.66	3.20	3.47	.851	46.73
T ₃	52.02	28.14	16.00	3.62	3.77	1.129	47.79
T ₄	50.82	28.68	15.53	3.26	4.41	1.422	48.41
F cal	5.036*	30.72*	4.68*	120.5*	156.89*	524*	37.40
Cd	1.506	0.594	0.672	0.158	0.4022	0.05	0.646

* Significant, F_{tab}- 2.18

Microbiological Quality on Storage at Refrigeration Temperature

The microbiological quality of the product at different storage intervals is shown in Table 2. On day 0 SPC in dry salted produced was 0.66. It was observed from the data that SPC had shown an increasing trend during entire storage period, an increase was observed to the level of 14X10⁴ cfu/gm at the end of storage (15th day), while yeast and mould was also increased upto 14x10⁴ cfu/gm. at the end of the storage. Presumptive Coliform was absent at all stages of storage.

Table 2: Microbiological Quality of fiber enrich paneer during storage under refrigeration temperature

Microbial count 10 ⁴ cfu/g.	Storage (Days)			
	0	5	10	15
Standard Plate count	0.66	3	4	14
Yeast & Mould Count	ND	1	2.3	14
Coliform count	ND	ND	ND	ND

ND- Non detectable

DISCUSSION

Standard Plate Count (SPC) had shown increasing trend with extended storage. However, on storage at refrigeration temperature, SPC was well within the permissible limits under (FSSAI) regulations¹¹ for paneer i.e. 50,000/gm up to 10 days. This may be attributed to the presence of salt. There was gradual rise in the SPC. As is evident from the table data with the advancement of storage period yeast and mould count crossed the permissible limits of FSSAI for paneer i.e. not more than 250/gm. Whereas the product was free from coliform count showed as an index of sanitation during the handling and processing of product.

CONCLUSIONS

We are concluded in this study, the fiber rich paneer product was hygienic and microbiologically safe. Prepared product had higher fiber content as compared to standardized paneer (control) which have no fiber content and can therefore be helpful from the therapeutic point of view for the people suffering from digestive disorder, diabetes, CHD and many other health problems.

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