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Sadhana Chauhan
College of Food and Dairy
Technology, 2. Dept. of Home
Science, Allahabad Agricultural
Institute, Deemed University,
Allahabad- 211007, India.

Ramesh Chandra
College of Food and Dairy
Technology, 2. Dept. of Home
Science, Allahabad Agricultural
Institute, Deemed University,
Allahabad- 211007, India.

Shukla S
College of Food and Dairy
Technology, 2. Dept. of Home
Science, Allahabad Agricultural
Institute, Deemed University,
Allahabad- 211007, India.

Correspondence
Sadhana Chauhan
College of Food and Dairy
Technology, 2. Dept. of Home
Science, Allahabad Agricultural
Institute, Deemed University,
Allahabad- 211007, India.

Process Optimisation and shelf life extension of fiber enriched paneer

Sadhana Chauhan, Ramesh Chandra and Shukla S

Abstract

Value added paneer was prepared to improve the fiber content in the otherwise fiber deficient paneer. Coconut powder at different levels was included in the preparation of paneer. Sensory analysis was carried out on the fiber enriched paneer. It was found that there was no significant difference in the flavour and taste and overall acceptability between the fiber enriched paneer and control sample. In addition to fried fiber enriched was also carried out for sensory evaluation. In fried paneer there was significant difference was found in colour and appear, flavour and taste and body and texture. Which may be due to the addition of coconut powder. Proximate nutrient analysis was also carried out for fiber enriched paneer and result was found to be significant difference between control and fiber enriched paneer sample. However, this fiber enriched paneer had on overall acceptability as well as used as a value added product.

Keywords: Optimisation, extension, fiber enriched, nutritious

1. Introduction

Paneer, a popular indigenous nutritious and wholesome dairy product. It is of great value in the diet because it is a rich source of high quality protein, fat, minerals and vitamins. Paneer is an important indigenous dairy product, which is used as a base material for preparation of large numbers of culinary dishes. It is a type of pressed chhana and somewhat resembles unripened cheese that carries a lot of market potential. About 47% of milk produced in India is converted into paneer, dahi, chhana, khoa etc. (FAO, 2001) [1]. Paneer obtained by heat and acid coagulation of milk. It is non-fermentative, non-rennet, non-melting and unripened types of cheese similar to the white cheese (Chandan 2007) [2]. According to FSSAI (2011) [3], Chhanna or paneer shall not contain more than 70.0 percent moisture and the milk fat content shall not be less than 50.0 percent of the dry matter. Bureau of Indian Standard (BIS, 1983) [4] permits maximum of 60% moisture and minimum of 50% fat in dry matter for paneer. Good quality paneer is characterized by a marble white colour, sweetish, mildly acidic taste, nutty flavour, spongy body and closely knit, smooth texture. Paneer has a fairly high level of fat (22-25%) and protein (16-18%) and a low level of lactose (2.0-2.7%) (Kanawjia and Singh 1996) [5]. Over and above its high protein content and digestibility, the biological value of protein in paneer is in the range of 80 to 86 (Khan and Pal 2011) [6].

However, since milk is devoid of dietary fiber, paneer has no fiber content. In the present study, value addition of paneer with coconut powder as a source of dietary fibre was attempted.

Coconut has high fibre content in it and also offers high level of manganese, potassium and phosphorus, it does not contain cholesterol. In the present study, paneer was designed to contain fibre. The paneer thus designs was subjected to sensory and chemical analysis.

2. Materials and Methods

Collection of ingredients: All ingredients (Milk, coconut powder and salt) were procured from local market of Allahabad.

2.1 Analysis of milk

2.1.1 Fat

Fat percentage of whole milk and skimmed milk was determined by Gerber method as per the procedure laid down in BIS [7].

2.1.2 SNF

Determination of solid not fat in whole milk and skim milk was done by using Richmond's formula as per BIS.

2.1.3 Standardization of whole milk

Whole milk was standardized to 5 percent fat and 8.5 percent SNF.

2.2 Preparation of control and experimental paneer

The standardized milk was heated up to 82 °C and hold for 5 minutes then coconut powder is added in to milk at a time in different concentration i.e. 1%, 1.5%, 2.0% and 2.5%, then cooled at 70 °C. The milk was coagulated with 1% citric acid. Stirring was stopped and the curd was then allowed remain in whey for 5 min after that coagulum was collected on muslin cloth then pressed for 15 minutes then immersion of paneer in chilled water, it was then placed on draining rack for 10 minutes to drain off loose water and sprinkle the salt on the developed product and stored in plastic pouches in refrigerator till used for organoleptic evaluation and chemical analysis.

2.3 Chemical analysis of develop product

The percentage moisture content of fiber rich paneer was determined as per the procedure of ICAR [8]. The fat percent was determined as per the procedure given in I.S. Handbook of Food analysis [9]. The total protein, Ash and total carbohydrate, fiber were determined according to the method of AOAC [10].

2.4 Sensory evaluation of paneer

These designer paneer were subjected to sensory evaluation using nine point hedonic scale. Sensory attributes were evaluated by a five trained pannel for colour and appearance, flavour and taste, body and texture and over all acceptability.

2.5 Statistical analysis

The data obtained from the experiment were statistically analysed using analysis of variance technique and critical difference.

3. Results and Discussion

3.1 Sensory Quality of fiber rich paneer

It can be seen from Table I that developed paneer sample of T₁ and T₂ had the highest score of (7.53) for colour and appearance followed by T₃(7.6), T₄(7.53) and T₀ (7.4) but it is also clear from the table I that there was no significant different between the treatmats. The mean score for flavour and taste sample T₀, T₁, T₂, T₃, T₄, were 6.80, 7.66, 7.53, 7.56 and 7.3 respectively Table I also depicts that there was also a non-significant effect on treatments of the overall acceptability of developed product. The main score for body and Texture of paneer sample T₀, T₁, T₂, T₃, andT₄, were 7.43, 7.66, 7.66, 7.53, and 7.43 respectively. Table I shows that there was a non-significant effect on addition of coconut powder on colour and appearance and overall acceptability of developed paneer.

Table 1: Average Organoleptic Score of Control and Experimental paneer.

Treatments	Colour and Appearance	Flavour and Taste	Body and Texture	Over all Acceptability
T ₀	7.4	6.80	7.43	7.46
T ₁	7.76	7.66	7.66	7.4
T ₂	7.76	7.53	7.66	7.53
T ₃	7.6	7.56	7.53	7.66
T ₄	7.53	7.3	7.43	7.53
F Cal	.165 ^{NS}	11.16*	3.65*	1.405 ^{NS}
cd	-	-	-	-

* Significant NS-Non Significant f tab= 2.18

3.2 Effect on Physico-Chemical characteristics of fiber enrich paneer

In proximate analysis of developed product the fat and total carbohydrate content was found to be maximum in treatment T₄ the moisture content as compared to other treatments. The

protein and ash contents were observed to be highest in T₁ (Table: II). However it was also observed that there was significant effect of treatment on fat, total carbohydrate, moisture, protein and ash on developed product

Table 2: 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	4451
T ₁	54.06	26.09	16.10	3.28	3.14	.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	.594	.672	.158	.4022	-.0505	.646

* Significant Ftab- 2.18

4. Summary and Conclusion

The present research work was conducted with the objective to study the using coconut powder with standardized milk (5% fat and 8.5% SNF) in various concentration (1%, 1.5%, 2%, 2.5%) for the preparation of fiber enrich paneer on the basis of sensory and nutritional quality. Results obtained reveals that coconut powder in a feasible proportion with milk can be used to prepare fiber enrich paneer and there is significant effect of treatment on the sensory quality of paneer. Amongst the different combination used coconut powder percentage (1.5%

and 2%) T₂ and T₃ were best in terms of flavour and taste as well as body and texture. Fiber enriched paneer prepared from coconut powder had higher protein, fiber, ash and total solids as compared to standard milk paneer (control) and can therefore be helpful from the therapeutic point of view for the people suffering from digestive disorder, gut health, diabetes, CHD and obesity.

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