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## Studies on physicochemical quality and microbial parameters of functional coconut paneer

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### Abstract

With the current upward trend in national and international health awareness among the consumers, the demand for functional food has increased. This has forced the food industry for launching indigenous dairy products in the market with acceptable sensory characteristics. The present study was undertaken with different levels (95:05, 90:10, 85:15) of buffalo milk and coconut milk. The product was analyzed for organoleptic attributes (taste and flavour, colour and appearance, body and texture) by trained panelist using 9 point hedonic scale. Chemical quality (moisture, fat, protein, total solids, yield) and microbial quality (SPC, yeast and mould, coliform) were also analyzed. The coconut paneer with 90:10 ratio of buffalo milk and coconut milk was found to be best among others. Thus as far as product acceptability judged by organoleptic evaluation the treatment can be rated as  $T_0 > T_1 > T_2 > T_3$ .

**Keywords:** Paneer, buffalo milk, coconut milk.

### Introduction

Paneer is popular indigenous variety of soft cheese (David, 2009) [2]. Paneer is obtained by acid and heat coagulation of milk. Good quality paneer is characterized by a white colour, sweetish mildly acidic and nutty flavour, spongy body and a close knit structure. Paneer is highly nutritious since it remains about 90% fat and protein, 50% minerals and 10% lactose of the original milk. About 5% of the total milk produced in India is converted to paneer (Mathur, 1995) [5]. Paneer is nutritious and wholesome food. It provides one of the methods of conserving, preserving and prolonging shelf life of milk solids in highly concentrated form. Coconut milk and fat is an excellent source for preparation of filled milk, infant formulae and margarine. It is popular for its characteristic nutty flavour and nutritional content. Coconut milk is extracted from freshly grated Coconut meat, it undergoes progressive deterioration and after a few hours at room temperature (28<sup>o</sup> C-30<sup>o</sup> C), it is spoiled. This spoilage is attributed to its high content of fat, moisture and other organic compound. Coconut is an indispensable ingredient in many of the traditional cuisines of Southeast Asian countries including India. Fat in coconut is similar to fat in mother's milk and have similar nutritional effects. Coconut fat helps to maintain a healthy ratio of omega-6 (w-6) and omega-3 (w-3) fatty acids, when consumed as a part of a diet. In the present study, coconut milk is used for the preparation of paneer in various combinations with buffalo milk for making value added product using the technique of manufacture as recommended by Venketeshwaria *et al.*, (2003) [6].

### Materials and Methods

First of all coconut milk was prepared from fresh coconut kernels. It was then standardized to 6% fat and 9% SNF. Now Blending of buffalo milk and coconut milk was done in 95:05 (T<sub>1</sub>), 90:10 (T<sub>2</sub>) and 85:15 (T<sub>3</sub>) ratio. The blended milk was then heated at 82°C and cooled at 72°C. It was then coagulated with 2% citric acid. Whey is then drained off from the curd and sent for hooping and pressing. After taking it out the product is dipped in chilled water (4-5°C) for 2-3 hours. Thus the product was ready to serve. The samples were analyzed for physicochemical, microbial and organoleptic qualities as per procedure laid down by Manual in Dairy Chemistry and dairy microbiology (1972)

**Table 1:** Details of different treatments using Coconut milk for preparation of Coconut Paneer

Materials%	Different treatments for Coconut Paneer			
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Coconut milk	-	05	10	15
Buffalo milk	100	95	90	85

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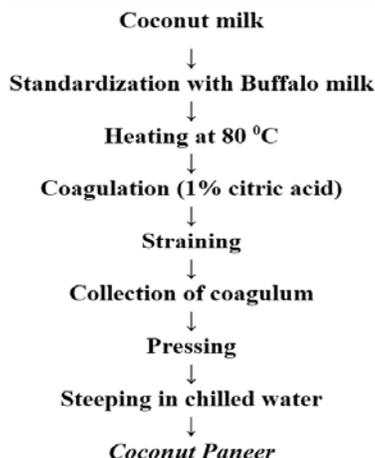


Fig 2: Flow chart for preparation of Functional Coconut Paneer

**Statistical analysis**

The data obtained on different aspects as per plan were tabulated and statistically analyzed as per Chandel (1991) [1].

**Result and Discussion**

**Average of physicochemical parameters in Control and Functional Coconut Paneer**

Table -2 showed Average of physicochemical parameters in Control and Functional Coconut Paneer

**Fat content**

The highest mean for fat content percentage in coconut milk blended paneer was found in T<sub>3</sub> (27.64), followed by T<sub>2</sub> (26.78), T<sub>1</sub> (26.32) and T<sub>0</sub> (26.04). The treatments varied

significantly due to the addition of coconut milk. F Value was 17.185, indicating significant effect of treatment on fat percentage (Fig. 2).

**Total solid percentage**

The highest mean for total solid percentage content was found in T<sub>0</sub> (48.06), followed by T<sub>1</sub> (47.31), T<sub>2</sub> (47.19) and T<sub>3</sub> (47.05). There was significant difference found among the treatments. F Value was 12.074, indicating significant effect of treatment on total solid percentage (Fig. 2).

**Acidity percentage**

The highest mean value acidity percentage in coconut milk blend paneer was found in T<sub>0</sub> (0.24), followed by T<sub>2</sub> (0.22), T<sub>3</sub> (0.22) and T<sub>1</sub> (0.21). The acidity percentage did not differ significantly. F Value was 1.798, indicating no significant effect of treatment on acidity percentage (Fig. 2).

**Protein**

The highest mean for protein percentage was found in T<sub>0</sub> (18.06), followed by T<sub>3</sub> (17.89), T<sub>2</sub> (17.74) and T<sub>1</sub> (17.57). There was significant difference found among the treatments. F Value was 9.165, indicating significant effect of treatment on protein percentage (Fig. 2).

**Moisture**

The highest mean value for moisture was found in T<sub>3</sub> (52.92), followed by T<sub>2</sub> (52.80), T<sub>1</sub> (52.69) and T<sub>0</sub> (51.94). The moisture percentage content differed significantly among the treatments. F Value was 12.095, indicating significant effect of treatment on moisture percentage. Therefore, it may be suggested that the product was as good as control (Fig. 2).

Table 2: Average of different physicochemical parameters of Control and Functional Coconut Paneer

Parameters (%)	Control and Functional Coconut Paneer				F Value	CD
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
Fat	26.04	26.32	26.78	27.64	17.185*	0.515
Total Solids	48.06	47.31	47.19	47.05	12.074*	0.389
Acidity	0.24	0.21	0.22	0.22	1.798**	-
Protein	18.06	17.57	17.74	17.89	9.165*	0.211
Moisture	51.94	52.69	52.80	52.92	12.095*	0.386

\* Significant at 5 % level  
 \*\* Non-significant at 5 % level

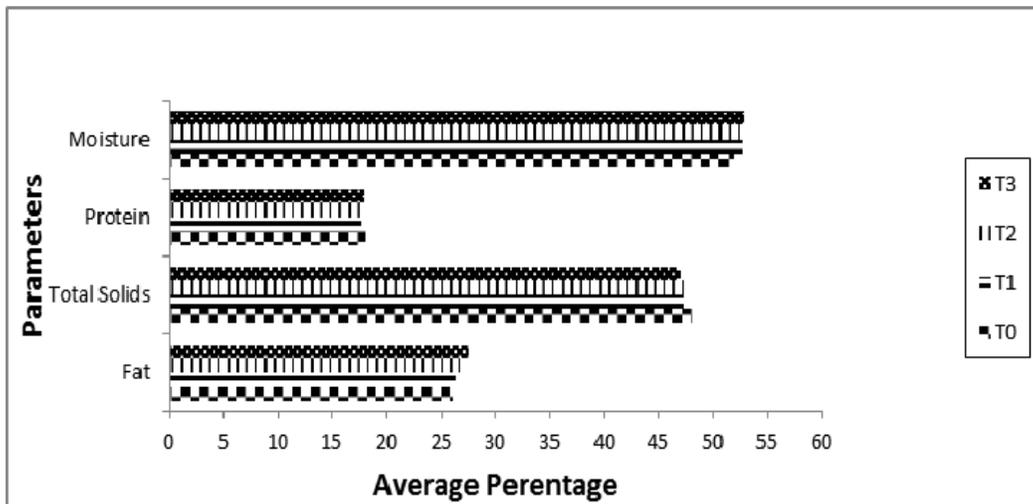


Fig 2: Average of different physicochemical parameters of Control and Functional Coconut Paneer

**Average of different Microbial parameters of Control and Functional Coconut Paneer**

Table- 3. The highest mean for Standard Plate Count in coconut milk blend paneer was found in T<sub>0</sub> (45.20), followed by T<sub>1</sub> (36.40), T<sub>3</sub> (36.00) and T<sub>2</sub> (35.60). The differences were significant. F Value was 12.76, indicating significant effect of treatment. The highest mean for Yeast and mould count was

found in T<sub>3</sub> (14.00), followed by T<sub>0</sub> (13.60), T<sub>2</sub> (12.80) and T<sub>1</sub> (12.40). F Value was 0.444, indicating no significant effect of treatment. The differences were non-significant. All the samples of coconut milk blend paneer did not show the presence of coliform. Thus product proved to be of good quality.

**Table 3:** Average of microbial parameters of Control and Functional Coconut Paneer

Parameters (%)	Control and Functional Coconut Paneer				F Value	CD
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
Standard Plate count (10 <sup>3</sup> /ml)	45.20	36.40	35.60	36.00	12.76*	3.944
Yeast and mould count(10 <sup>2</sup> /ml)	13.60	12.40	12.80	14.00	0.444**	-
Coliform count (10 <sup>1</sup> /ml)	Nil	Nil	Nil	Nil	-	-

\* Significant at 5 % level

\*\* Non-significant at 5 % level

**Conclusion**

From the present investigation it may be concluded that an acceptable low cost paneer can be prepared by using buffalo milk and coconut milk blend. The cost of production of paneer (T<sub>1</sub>, T<sub>2</sub>, & T<sub>3</sub>) was comparatively less than control. So it is has a good market potential for Indian market.

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