



Development of Coconut Milk Paneer and Evaluation of its Quality Characteristics

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Coconut is a versatile product and has multiple uses. Coconut milk is essentially composed of high amount of protein, sugars, fats, vitamins, minerals. Some benefits of coconut milk paneer include, it is a good substitute for people with lactose intolerance and helpful for people suffering from malnutrition and support the immune system. A study was undertaken to formulate the development of paneer using coconut milk which is a good alternative for dairy product. From the study, it is concluded that an acceptable paneer can be prepared by using soy milk and coconut milk blend. Paneer made with coconut milk had higher protein, calcium and iron as compared to normal paneer. The nutritional quality of coconut milk was increased by addition of soy milk for developing paneer. The developed product consists of 1.27% ash content, 9.43% protein, 12.20% fat, 56.2% moisture and 1.15% sugar. The microbial quality of paneer was also analyzed on total plate count, total coliform count, which is under permissible limit and *Escherichia coli*, *Salmonella* and *Staphylococcus aureus* were also analyzed. All these micro organisms are absent in 25g sample of the developed coconut milk paneer. The quality of coconut milk paneer was also compared with normal paneer in both biochemical and microbial parameters to understand the acceptability of the developed product. It was observed that, the fat content and moisture content in coconut milk paneer was under the standard limit of normal paneer on analysis. But, the protein content, ash and sugar is more in coconut milk paneer. Thus the study concluded that coconut milk paneer which is a value added food developed from coconut can be used for better therapeutic health and is a good protein substitute for people suffering from lactose intolerance. This in turn also increases the wealth of coconut industry.



Introduction

Coconut is a versatile and indispensable food item for millions of inhabitants of South and South-East Asia and Pacific islands. It is one of the most sought-after ingredients in kitchen since it is used in almost each and every recipe. Coconut is considered as food and also as oil seed crop. The various coconut products offer vast scope for further development, value addition and commercialization

Coconut crop has the advantage that it is suitable for small holdings as well as for large holdings. Coconut plays an important role in poverty alleviation as well as in employment generation.

Several decades ago processing sector was mostly confined to few traditional products such as copra, coconut oil, desiccated coconut and coir. Today the processing sector has gradually progressed into a producing vast array of new products from its products and by-products. Among other products, the modern coconut industry is capable of producing two basic types of valuable products from coconuts for food uses: the traditional coconut oil and the coconut protein. Traditionally, the majority of coconut protein is recovered and used in the form of coconut milk, both full fat and defatted (or skimmed). However, few published reports have indicated that coconut protein could be used, along with coconut fat, to prepare highly acceptable and relatively inexpensive new types of dairy-like foods such as custard-like products, various types of cheeses (soft, Cheddar and blue cheeses), yogurt, paneer and drinks. A balanced diet that includes coconut milk keep the

heart healthy and protect against cardiovascular problems. Lauric acid, one of its key nutrients, has been found to reduce oxidative stress and blood pressure in hypertensive rats. This fatty acid also has antioxidant properties and aids in weight loss, which further enhances its cardio protective effects. It also support immune system and helps in weight loss. Coconut milk contains medium-chain triglycerides (MCTs), which researchers have linked with weight loss. MCTs stimulate energy through a process called thermogenesis, or heat production. MCTs work to reduce body weight and waist size. This also balances unstable gut micro biota. Findings of Wang Y, et.al; (2010) suggest that MCTs increase insulin sensitivity, and many researchers believe that this sensitivity promotes weight loss. Insulin is an essential hormone that breaks down glucose and controls blood sugar levels.

Coconut contain a lipid called lauric acid, and many researchers believe that lauric acid can support the immune system. Lauric acid has antimicrobial and anti-inflammatory properties and triggers apoptosis, cell death, in breast and endometrial cancer cells.

The present study helps in providing varieties in food preparation. Paneer recipes provide varieties in food preparation and a good source of calcium for most of the vegetarians. It also act as a protein source in vegan diet. It can be prepared either fried or in the form of curry. Different tasty dishes can be prepared from paneer using different flavours and preparation methods. Lastly, the product can also be taken by people who are allergic to

dairy products. Coconut milk paneer can be provided to those who are suffering from lactose intolerance. Lactose intolerance is a condition that occurs when a person does not produce enough lactase to break down the lactose in food. This is because people vary in the amount of lactose they can tolerate. When milk products are eliminated from the diet because of lactose intolerance, an important source of calcium and other vitamins and minerals are eliminated. To prevent this condition, coconut milk paneer is a better option to be adopted by all consumers, which can provide a source of calcium and other vitamins and minerals. The main objective of the study was to develop paneer using coconut milk instead of replacing cow's milk, to evaluate the acceptability of the paneer by sensory evaluation, to study the chemical composition of coconut paneer, to determine the micro organisms present in coconut paneer and finally to compare biochemical and microbial parameters of paneer made from coconut milk viz. cow's milk.

Materials and methods

The samples for the study were collected from a local market at a reasonable price. After, the samples were collected, the product for the study was developed using these samples.

A standard and traditional procedure was followed for the preparation of coconut milk paneer. The total solid content (TS) of the extracted coconut milk was analyzed on each trial for balancing the milk solids for effective preparation of coconut milk paneer. There were two consecutive trials undertaken to determine the total solid content

(TS) of coconut milk in the preparation of coconut milk paneer. In the first trial, the TS of coconut milk was 20.7 percent and in the second trial, the TS was 24.7 percent. The consistency of the paneer was almost similar in both trials. The standard TS value of coconut milk was maintained for the preparation of coconut milk paneer to improve the texture and quality of paneer. The TS of coconut milk paneer in trial 2 was approximately similar to TS of standard paneer.

Procedure

- The standardized milk was mixed with equal volume of soy milk in the ratio 50:50.
- This standardized milk with soymilk was heated to 85°C and was homogenized on continuous mechanical stirring.
- Allow the homogenized milk to heat further at a temperature of 85°C for 5-10 minutes. Do not allow the milk to be boiled. Just below the boiling temperature, add 20 ml of vinegar to separate the curd and whey water.
- Further stir and heat it for 2-3 minutes and allow the mixture for complete coagulation.
- Now cool the mixture for about 5 minutes and drain the separated curd from whey water using a muslin cloth.
- Drain out excess water.
- Keep the paneer to set overnight by pressing with proper weights to attain its consistency.
- Now cut the paneer into cubes and dip it in water for few seconds and remove.
- Pack the paneer blocks air tight and store under refrigerator.

Biochemical Analysis

Biochemical analysis is an important step in the development of healthier, safer and tastier food products. The fact that a product contains a certain component does not necessarily indicate its health-promoting effects and safety. The present study was also conducted with biochemical analysis to evaluate the amount of various biochemical parameters like ash (In Muffle Furnace), protein (Kjeldahl's Method), fat (Soxhlet Extraction), moisture (Hot Air Oven) and sugar (Absorbance in Calorimeter) present in the food sample.

Microbial Analysis

Microbiological analysis is the use of biological, biochemical, molecular or chemical methods for the detection, identification or enumeration of micro organisms in a material. It is often applied to disease causing and spoilage microorganisms. It helps to keep under control the proliferation of viruses, bacteria,

microorganism which may cause contamination, intoxication and analyze the shelf life of the food sample. The study also analyzed by microbial analysis on total plate count, *Staphylococcus aureus*, *E Coli*, *Salmonella* and Total Coliforms.

Results

► 1. Development of Coconut Milk Paneer

The TS percent of trial 2 (24.7%) gives the maximum yield of paneer of about 25g. TS of trial 1 (20.7%) gives lowest amount of paneer of about 20.5g. The consistency of paneer on each trial was similar.

► 2. Sensory Evaluation of Coconut Milk Paneer over Normal Paneer



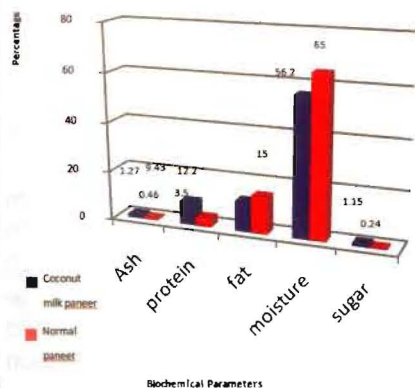
Trial 1

Trial 2

Sensory evaluation was conducted on paneer, which was prepared in to a recipe and was carried out using 9- point Hedonic Scale method by the taste panel members for appearance, taste, flavor texture, odour and overall acceptability. The results of the evaluation revealed that appearance, taste and flavour of coconut milk paneer got a good score. The taste was liked extremely by the taste panel. Texture and odour also got good scores. The overall acceptability of the product was very good.

► 3. Bio Chemical Analysis of Coconut Milk Paneer over Normal Paneer

The moisture content and fat content of the coconut milk paneer is about 56.2% and 12.2% respectively in the sample. Thus, the shelf life of the paneer is low due to higher moisture content. The sugar content is very low at about 1.15%. The amount of protein is 9.43% in the sample. Ash content is about 1.27%. While, according to the FSSAI Standards the moisture content and fat content of the normal paneer is about 65% and 15% respectively and the moisture and fat content of coconut milk paneer was under these permissible limits. Thus, it is observed that a low fat paneer can be prepared from coconut milk.



Coconut is a versatile product and has multiple uses. Coconut milk is enormously rich in vitamins and minerals. It also contains a significant amount of vitamin C and E. Coconut milk is essentially composed of high amount of protein, amino acids, water, sugars, fats, vitamins, minerals.

► 4. Microbial analysis of coconut milk paneer over normal paneer

- Total Plate Count

Total Plate Count was analyzed after a series of five dilutions and the count was under the standard permissible limit of 2.5×10^4 to 4.1×10^4 cfu/gm.

Coconut milk Paneer	2.9×10^4 - 4cfu/gm (25g Sample)
Normal Paneer (cow's milk)	2.2×10^4 - 4cfu/gm (25g Sample)

Total Coliform Count	
Coconut milk Paneer	4.1×10^1 cfu/gm (25g Sample)
Normal Paneer (cow's milk) (Standard Permissible limit)	3.9×10^1 to 7.6×10^1 cfu/gm (25g Sample)

All other parameters, *E.coli*, *Salmonella* and *Staphylococcus aureus* are absent in 25g sample of both coconut milk paneer and normal paneer made from cow's milk.

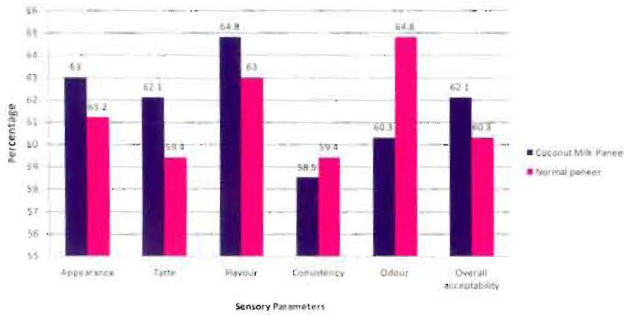
The developed product consists of 1.27% ash content, 9.43% protein, 12.20% fat, 56.20% moisture and 1.15% sugar. The microbial quality of paneer was also analyzed on total plate count, total coliform count, *Escherichia coli*, and *Salmonella* and *Staphylococcus aureus*. The total plate count and total coliform count were under the permissible limits and hence have good market acceptability and is not hazardous. All other micro organisms are absent in 25g sample of the developed coconut milk paneer. The quality of coconut milk paneer was also compared with normal paneer in both biochemical and microbial parameters to understand the acceptability of the developed product.

It was observed that, the fat content and moisture content in coconut milk paneer is under the standard permissible limit of normal paneer. But, the protein content, ash and sugar is more in coconut milk paneer. The protein content of normal paneer was 3.5%, ash 0.46% and 0.24% sugar in 100g of sample.

Paneer usually has lower shelf life due to its moisture content. It is fresh in first 3-4 days and later the quality gets reduced. Since, coconut milk paneer has good protein source than standard normal paneer, it can be better acceptable than normal paneer. On sensory evaluation, coconut milk paneer was better acceptable by the panel members than standard normal paneer made from cow's milk. There are slight changes in the appearance and taste, but the flavour, consistency and odour of coconut milk paneer was almost similar to normal paneer. The cost of coconut milk paneer is slightly higher than normal paneer but the quality and nutritive composition of coconut milk paneer is higher than normal paneer. Therefore, the product has good market acceptability.

Coconut is a versatile product and has multiple





uses. Coconut milk is enormously rich in vitamins and minerals. It also contains a significant amount of vitamin C and E. Coconut milk is essentially composed of high amount of protein, amino acids, water, sugars, fats, vitamins, minerals etc. Several food products can be developed using coconut and its products. In the present study, a new product, paneer is developed using coconut milk and the acceptability of paneer was tested. Thus it can be concluded from the study that coconut milk paneer was found to be more acceptable than the standard paneer made from cow's milk. Coconut milk paneer

is a good source of protein than standard normal paneer.

A low fat paneer can also be prepared from coconut milk. It consists of 1.27% ash content, 9.43% protein, 12.20% fat, 56.20% moisture and 1.15% sugar in which all the parameters were found to be under the standard limit given by FSSAI Standards and hence the scope of commercializing its production and marketing assumes its significance.

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