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Quality Analysis of Dairy Products – A Novel Approach

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***Abstract*: The aim of the current comparison study was to evaluate the viability and quality of yoghurt made with cow milk, varying amounts of coconut milk which is fermented using industry starting culture. The purpose of this study is to examine the impact of adding coconut milk to yoghurt. For creating the yoghurt recipe, Design Expert version 10 D-optimal design was used. The obtained coconut milk-incorporated yoghurt formulations. The samples were evaluated for customer acceptability using sensory evaluation using a quality rating technique. Each panelist assigned a score based on the food's color, flavor, aroma, and texture. Based on these quality indicators and the results of the sensory analysis Persons who have somewhat lactose intolerant can eat yoghurt without experiencing any negative effects, it has nutritional benefits beyond those of milk. Most of the lactose in the milk precursor has been converted to lactic acid by the bacterial culture, Due to its probiotic properties, yoghurt is also used medically to treat a number of gastro intestinal diseases and to avoid antibiotic-related diarhoea Yogurt flavors and fruits have been increasingly popular in recent years. Therefore, consuming symbiotic foods that contain prebiotics (fibers) and probiotics (lactic acid bacteria) would offer added nutritional benefits that can help boost overall health and well-being. Therefore, the objective of this study is to produce yoghurt enriched with coconut milk and to determine the physicochemical, microbial, sensory qualities and overall acceptability of the product.**

***Keywords*: yoghurt, fermented food, probiotics, lactose intolerance.**

1. Introduction

Yogurt plays an important part in human nutrition, and man was aware of these products' benefits even in the early stages of civilization. These goods have always been a crucial part of a healthy diet. The International Dairy Federation defines a yogurt product as a milk product made from skim milk. Depending on the optimum temperature ranges in which they work, the microorganisms used as starters for the manufacture of cultured dairy foods are. Thermophilic lactic acid bacteria are those that grow best at temperatures over 35°C, while mesophilic starters grow best at temps between 20 and 30°C.

Yoghurt is a fermented food formed through an anaerobic fermentation of lactose in milk by appropriate microorganisms most of which are categorized as pro-biotic. A cultured dairy product known as yoghurt is made by fermenting milk with or without additional ingredients. non-fat dry milk (NFDM) containing Streptococcus thermophilus and Lactobacillus bulgaricus. It typically has a soft, friable custard-like consistency, 12–14% total milk solids, and a clear, pronounced acid flavor. Yogurt is often made by pasteurizing the mixture and changing the milk proteins such that they will offer the right viscosity and gelation with the least amount of syneresis in the final product at 80 to 85°C for 30 minutes. Coconut (Cocos nucifera L.) is one of the oldest fruits in the world and is confined to seacoast in the humid tropics. It has been estimated that 25% of the world's output of coconut is consumed as coconut milk. Coconut milk is being used by confectionaries, bakeries, biscuits and ice cream Industries worldwide to enhance flavor and taste of various products. Coconut milk was found to be rich in calcium. The milk was reported to be high in minerals and vitamin content. According to popular belief, coconuts provide nutritious sources of meat, juice, milk and oil. It is classified as a "functional food" because it offers many health benefits in addition to its nutritional value due to its fiber and oil content. The oil is known to promote insulin secretion and blood sugar utilization; reduces symptoms associated with malabsorption syndrome and cystic fibrosis; helps relieve symptoms associated with Crohn's disease; ulcerative colitis and stomach ulcers; improves utilization of essential fatty acids and protects them from oxidation Current trends and the changing needs of consumers indicate an excellent opportunity for innovation and development of fermented milks Current trends and the changing needs of consumers indicate an excellent opportunity for innovation and development of fermented milks (Khurana and Kanawjia, 2007). Little is known about fiber fortification of cultured dairy products, but there is potential to use a variety of fibers such as psyllium, guar gum, gum arabic, oat fiber, and soy components (Staffolo et al.,). Therefore, consuming symbiotic foods containing prebiotics (fiber) and probiotics (lactic acid bacteria) would provide additional nutrients that can help improve overall health and well-being. Therefore, the aim of this research is to prepare yogurt enriched with coconut milk and find out the physico-chemical, microbiological, sensory properties and general acceptability of the product.

So now we must choose the lactose content in the coconut milk and normal cow milk for providing persons who have lactose intolerance.

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2. Materials and Methods

One of the earliest cultured milk products, yoghurt has its roots in the Middle East. Originally, it would have been produced by nomadic tribesmen using goat and sheep milk. Yogurt has a lot of good qualities, but it can still go bad quickly, especially at room temperature. In the Middle East, there has been a trend towards looking for easy ways to prolong the shelf life of food. The first process was drying the yoghurt in animal skins to create condensed or concentrated yoghurt. The product's total solid content was around 25%, and its lactic acid content was larger than 2% of its acidity. Benefits of fermenting milk the most significant benefits of fermented foods include: Preventing milk from spoiling by unfavourable bacteria as a result of the fermentation's production of lactic acid and other antimicrobial metabolites producing variety in foods by varying their body, texture, and flavour.

Improving the digestibility of fermented products, especially protein, which may be crucial for those with digestive disorders. A starter culture is a substance that contains a lot of the lactic acid bacteria that cause milk to become acidic. Starter cultures can also be cultivated and expanded in dairy environments, however they are typically produced in specialised starter culture laboratories. Most yoghurt manufacture uses a symbiotic combination of Streptococcus Although they are capable of autonomous growth, and when employed, they produce acid at a considerably greater rate. Together, the two organisms grow better than any of them did separately. S. thermophilus expands quicker and generates both carbon dioxide and acid. The carbon dioxide and format that were created encourages the growth of L. bulgaricus. On the other hand, L. bulgaricus's proteolytic activity generates peptides and amino acids that are stimulatory. The biological and physical reactions of milk lead to the production of yoghurt gel. Yogurt's starter uses lactose as fuel, producing lactic acid as well as other important components that are inescapable. Lactic acid gradually develops and destabilises the compound calcium caseinate phosphate. casein micelle aggregations or an individual. As the pH gets closer to the isoelectric point, micelles form and congregate. (pH 4.6 to 4.7) Coconut yoghurt, a probiotic-rich meal, can help your gut microbiota. Your microbiome is crucial because it affects a wide range of health factors, including your personality and more overt digestive system disorders like irritable bowel syndrome. Your immune system and central nervous system may be impacted by the microbiome in your stomach. A cranial nerve known as the vagus nerve actually connects your brain and digestive system directly. The vagus nerve has the ability to detect different types of microorganisms in the microbiome of your digestive system, which in turn affects your health.It is perfect for persons who are vegan because coconut yoghurt is typically considered as being comparable to yoghurt made with animal-produced skim milk. Food diversity is produced by varying the body, texture, and flavour of the food. Fermented foods, particularly proteins, are easier to digest, which may be crucial for persons with digestive problems.

In some cases, the fermentation process can lower the bulk and the initial material, which increases the goods' storage life. Examples include classic dried, transportable fermented milk-cereal mixtures that can be consumed anywhere.

Fermented milk products contain antibiotics made by microorganisms employed culture, which have a negative impact on and restrict the growth of dangerous germs found in the intestine. Certain items made from fermented milk can be used as dietary supplements to treat conditions like anaemia, kidney stones, gastritis, and dysentery. Exocellular polysaccharides are produced by a number of Gram-positive and Gram-negative bacteria, including lactic acid bacteria. Certain strains of S. thermophilus and L. bulgaricus, which may have varying chemical compositions, create mucous substances. Both species make polysaccharides, but only one of them has the capacity to thicken. Even under the same experimental conditions, the quantities of polymer produced by the ropy strains of both species varied significantly. A strong association between the amount of polysaccharide generated and the corresponding viscosity is challenging to find. This challenge might be brought on by modifications in the 3-dimensional structure of polymers and their interactions with specific milk components, primarily caseins that precipitate at low pH. The amount of days a product can be consumed after it is produced without compromising its safety, appeal, or ability to meet customer expectations is referred to as its shelf-life. In other words, it should continue to be organoleptically and microbiologically safe over the specified shelf-life.

Most yoghurts with limited shelf lives are "lives," meaning the culture's organisms are still alive. There is some activity even though their metabolic rate is rather low at 7°C. This can be assessed during the shelf-life by measuring the pH, determining the titrable acidity, and tasting the product.

The shelf-life of yoghurt is approximately one year, depending on the hygienic standards followed during production, the microbiological quality of the ingredients, and the packaging material. he general ideal is to prepare yoghurt by the addition of coconut milk in different proportion. Specific objects To fulfill the general objects the following specific objects will be done To study the effect of different situations of coconut milk on the set yoghurt and to estimate its sensitive parcels. To dissect the coconut milk yoghurt for its proximate composition. To study the shelf life of the yoghurt. Significance of the study Yoghurt is the lactic- acid fermented product and has a distinct acidic, sharp flavor. Yoghurt was first produced to save the milk. Yoghurt possesses the long shelf life than milk. Different yoghurt grounded products are being available in the world’s request similar as drinking yoghurt, insalubrious yoghurt, shrikhand etc.

Acidity:

On an appropriate plate or basin, weigh precisely 10 g of the yogurt sample that has been made Add 1 mL of phenolphthalein indicator and 30 mL of warm water. Give it a good shake and titrate it with a standard NaOH solution (0.1N).

In 20 seconds, finish the titration. Maintain a baseline by placing 10 g of prepared dahi/yogurt sample in a different plate and diluting it with 30 mL of water for comparison of color.

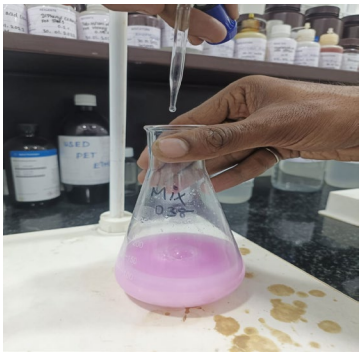

Fig. 1. Titration method

Total Solids:

Heat the moisture dish holding 20 g of prepared sand and glass stirring rod in the oven for 1 h; cool and weigh. Weigh the sample into the dish accurately—about 5 g. A few drops of water can be added to help disseminate the sample using the glass rod. Boil the dish in a water bath for 30 minutes or so.

Wipe the dish's bottom before placing it in the air oven. In an oven kept at 102 2 °C, dry for about 4 hours. Remove dish to effective desiccator, let cool, and weigh.

Put the dish back in the oven for an additional hour, move it to a desiccator, let it cool, then weigh it. Continue the heating.

Fig. 2. Water bath and hot air oven

pH:

pH metre calibration: Set the buffer solutions' temperature to 20 °C and perform the calibration process as directed by the pH meter's manufacturer. Notes Check the pH meter's calibration with one or more of the standard buffer solutions at least once every 30 minutes if a series of samples are being examined. development of a test solution. To make a 10% solution of the sample, dissolve 10 g of the sample in 100 mL of distilled water.2. Use a calibrated pH metre to determine pH. Record the result read to at least one decimal place (as the pH of the casein aqueous extract). Note the value (as the pH of the caseinate aqueous solution)

Moisture:

Place the coconut milk sample in a pot of boiling water, let it sit for 20 to 30 minutes, and then wipe the dish's bottom. After exposing the material in an oven kept at 1021°C for about 4 hours, transfer the dish containing the substance and the glass rod. Replace the lid after 4 hours, move the covered dish to the desiccator, let it cool to 253 °C, and then rapidly and accurately weigh it to the nearest 0.1 mg. Replace the lid, heat the dish and lid for a further hour at 1021°C, and then let them cool to room temperature (253 °C) in the desiccator before weighing them. Drying, cooling, and weighing are repeated until the final result

Fig. 3. pH meter

Protein:

Switch on the distillation system's condenser water. Pour 75 mL of a 50% (m/m) sodium hydroxide solution carefully down the Kjeldahl flask's slanted neck until a clear layer forms at the bottom of the bulb. Add this solution to the diluted digest. The interaction between the two solutions ought to be clear. 3. Attach the Kjeldahl flask to the distillation apparatus as soon as the sodium hydroxide solution has been added. The distillation apparatus' condenser outlet tube is connected to a 500 mL Erlenmeyer flask that has 50 mL of boric acid solution with indicator in it. Stir the Kjeldahl flask vigorously to properly combine its contents until there are no distinct layers of solution.

Table 1
Result

Parameters	Normal cow curd	Coconut yogurt
pH	4.75	4.78
Acidity	15%	17%
Moisture	35%	43%

3. Conclusion

Yogurt made from coconut milk was created in a lab for the comparison study. The coconut milk is combined with the preparation culture. The coconut milk was heated for a little more until it reached a temperature of about 80–82°C. The heated milk was then allowed to cool to about 43–44°C before the industrial culture was added to each formulation at a rate of 2%. The mixture is then put in disposable cups. After that, the yoghurt mixture was stored in an incubator that was held at a temperature of roughly 43°C for 3.5–4 hours till the coagulum was produced. To determine its acceptable level, coconut milk yoghurt with varying quantities of coconut milk underwent sensory testing and comparisons. The product containing 90% coconut milk and 10% cow milk by volume was rated as best in all attributes during the sensory evaluation of the product conducted on the attributes like aroma, colour, taste, texture, and overall acceptability. The coconut milk-infused yoghurt hence created was discovered to be less expensive and more

nutritious than the commercial yoghurt, according to the storage analysis the product under refrigerated condition had extended shelf-life. The addition of coconut milk to the yoghurt had no impact on the syneresis. You can make yoghurt by combining various amounts of sugar with MSNF. Yogurt made from coconut milk may undergo thermal treatment to lengthen its shelf life.

You may also make yoghurt with coconut milk if you enjoy dairy goods and are not sensitive to dairy milk. To do this, combine coconut milk and dairy milk in a ratio of 1.5, pasteurize the combined milk, and then proceed as instructed in the section on creating coconut yoghurt. The yoghurt made with dairy milk and coconut has a thicker consistency, less whey separation, and a tasteful coconut flavour. To prepare yoghurt safely, remember to maintain good personal hygiene, wash your hands with soap and warm water, bandage any injuries or burns before handling food, minimise cross-contamination, clean and disinfect your equipment and utensils, rinse them thoroughly, and let them air dry. Coconut yoghurt has all the advantages of ordinary yoghurt and is packed with probiotics. Coconut yoghurt can be used in place of dairy yoghurt for people who have a lactose intolerance or a milk allergy. Probiotics have been shown to improve the immune system, prevent gastrointestinal diseases, H. Pylori infection, osteoporosis, reduce constipation, improve nutritional absorption, and lower blood cholesterol, among other health advantages. Yogurt also has a number of probiotics, including Bifidobacteria, Lactobacillus acidophilus, and Lactobacillus casi. One tablespoon of fresh yoghurt can regularly provide the daily quantity of probiotics needed for health benefits.

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