MAKING COCONUT YOGURT AT HOME

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Coconut Yogurt

Coconut yogurt is a non-dairy fermented product that is made of coconut milk and cultured with lactic acid bacteria. Coconut yogurt also provides the health benefits associated with coconuts and probiotics.

Fig. 1. Coconut yogurt

Benefits of Coconut Milk

Coconut milk is not only rich in vitamins, amino acids and minerals, but it is also a good source of lauric acid, a medium-chain fatty acid (MCFA) that our body quickly absorbs for energy. Lauric acid contains antibacterial and antiviral activity that possibly reduces the risk of stroke by decreasing serum low-density lipoproteins and increasing high-density lipoproteins. Also, the medium-chain triglycerides (MCT) in coconut milk can lower inflammation, provide energy and generate satiety to prevent people from over-eating (Dayrit, 2014).

Fig 2. Coconut milk

Health Benefits of Probiotics

Coconut yogurt is full of probiotics and provides all the benefits of regular yogurt. For those with lactose intolerance or milk allergies, coconut yogurt can be an alternative to dairy yogurt. The health benefits of probiotics include enhancing the immune system, preventing gastrointestinal disorders, *H. Pylori* infection, osteoporosis, reducing constipation, improving nutrient absorption and reducing blood cholesterol. Additionally, yogurt contains various probiotics, such as *Lactobacillus acidophilus, Lactobacillus casi* and Bifidobacteria. Regular consumption of one tablespoon of fresh yogurt can meet the recommended daily amount of probiotics for health benefits (Farnworth, 2008).

Why Make Yogurt at Home

Coconut is a popular tropical fruit on Guam and other Pacific islands. However, coconut yogurt is unavailable in local stores; regular yogurt is relatively expensive due to importation. Using local coconuts to make yogurt at home can reduce the family cost for regular yogurt consumption. The freshness of home-made yogurt provides attractive sensory quality and a high number of probiotics for health benefits. Consumers can also control the taste and flavor of coconut yogurt to meet their needs by adding favorable ingredients and controlling processing conditions.

Making Fresh Coconut Milk

Making fresh coconut milk requires mature coconuts, which provide a high yield of coconut meat. Mature nuts may contain coconut water with edible meat inside. It is recommended to use white coconut meat with no brown or black spots to make the milk. Please use the tools listed in Table 1 and the following procedures and instructions described in Table 2.

Grating Coconut Meat - Fresh grated coconut meat is ideal for extracting coconut milk. After opening the coconuts, use a manual or electronic grater to remove coconut meat from the shell. A coconut knife can also be used to scrape larger chunks of meat from the shell. A vegetable peeler can be used to remove the brown skin and cut the larger pieces into

small cubes for effectively extracting coconut milk. Please use clean and sanitized tools to grate coconut meat.

Table 1. Supplies for preparing coconut milk and making coconut yogurt.

Processing	Supplies
Preparing coconut milk	• Open coconut: meat cleaver, heavy knife or hammer. • Grate coconut: manual or electronic coconut grater; coconut knife and vegetable peeler (optional). • Extract coconut milk: blender, mesh strainer or cheesecloth; thermometer, timer; measuring cups.
Making coconut yogurt	• Pasteurization: stove, saucepan or pot, whisk, thermometer, timer. • Cooling: large container, ice or cold water. • Inoculation: commercial culture or fresh commercial or home-made yogurt; spoons, mixing bowl, strainer; yogurt jars or food containers with lids. • Incubation: yogurt maker or incubator. • Storage: refrigerator

Table 2. Procedures and instructions for making coconut milk.

Procedures	Instructions
Open coconuts	Use mature coconuts and remove coconut water and the edible nut inside.
Grate coconuts	Grate coconut meat from the shell or scape the meat from the shell, peel the brown skins and cut large chunks of meat into small cubes.
Extract coconut milk	Place the coconut meat in a blender and add hot drinking water at 90-95°C (194-203°F) at a ratio of 1:1.5 (meat:water). After 1 minute, blend the coconut meats for 5 minutes at a high speed setting.

Extracting Coconut Milk - It is recommended to use a ratio of coconut meat to water at 1:1.5 in weight to extract coconut milk. Place grated coconut meat in a blender and add hot water at 90-95°C (194-203 °F) over the meat and let sit for one minute, blend the mixture for 5 minutes while gradually increasing speed. During blending, scrape the sides of the blender occasionally to ensure all of the meat is well mixed. If the coconut meat is in chunks or cubes, soak the meat in boiling water for one minute to soften before adding to the blender. After blending, pour the mixture into a bowl lined with a strainer or cheesecloth. If a cheesecloth is used, squeeze the milk through the cloth into the container. The residues of coconut meat can be dehydrated for coconut flour and used as a fiber-rich food ingredient.

Fig 3. Home-made coconut milk

Making Coconut Yogurt

Fresh coconut milk will produce a unique coconut flavor and taste of the yogurt. If fresh coconut milk is not available, you can substitute it with canned coconut milk. The main procedures for coconut yogurt include pasteurization, cooling, inoculation, incubation and refrigeration (Table 3).

Table 3. Procedures and instructions for making plain coconut yogurt.

Procedures	Instructions
Pasteurization	Add coconut milk in a saucepan or pot, heat the milk to 85-90°C (185-194°F) for 15 minutes and stir milk constantly. Regularly check temperature with a thermometer.
Cooling	Place the saucepan in an ice or cold water bath to cool the pasteurized milk to 41-43°C (106-110°F) immediately. Check the temperature with a thermometer.
Inoculation	If commercial culture is used, first dissolve the culture with some milk then mix it well with the rest of the milk. If fresh yogurt is used, first dissolve yogurt (3-5% by weight) with some milk, pour the mixture into the remaining milk through a strainer and mix them well.
Incubation	Place the inoculated milk in cleaned and sanitized yogurt jars or food-grade containers and close them with lids. Ferment the coconut milk in a yogurt maker or an incubator at 43°C (110°F) for 10-16 hours.
Storage and consumption	Check the texture, taste and flavor of coconut yogurt. If the yogurt meets the quality criteria, place the yogurt in the refrigerator at 4°C (40°F) to stop incubation. Consume the yogurt within 2 weeks.

Pasteurization - The purpose of pasteurization is to kill pathogens and spoilage microorganisms (vegetative cells) for food safety and quality. The condition for pasteurizing coconut milk is heating the liquid to the temperature of 85-90°C (185-194 °F) for 15 minutes. The heat treatment can also change the structure of proteins in coconut

milk to improve the gelation of coconut yogurt. During pasteurization, stir the milk constantly to avoid scorching and use a thermometer to check the temperature. If a thickening agent is used to minimize the separation of the yogurt, add and dissolve the ingredient in the milk before pasteurization.

Cooling - The pasteurized coconut milk must be cooled to 41-43°C (106-110 °F) before inoculating the culture of lactic acid bacteria. Otherwise, the high temperatures will kill the starter cultures and probiotics, causing no fermentation during the incubation of the milk.

Inoculation - After cooling, starter culture must be added into the coconut milk for fermentation. The starter culture contains the strains of *Streptococcus thermophiles* and *Lactobacillus bulgaricus* with or without other probiotic organisms. Commercial freeze-dried cultures or fresh yogurt (commercial or self-made) can be used as starter cultures. For inoculation, first, dissolve the commercial culture powder or the yogurt culture (3-5% of milk) in a small amount of coconut milk and then add the culture through a strainer into the milk and stir it thoroughly.

Incubation - Before incubation, pour the inoculated milk in clean and sanitized jars or containers and cover with lids. Then place the jars or containers in a yogurt maker or an incubator to ferment the milk at 43°C (110 °F) for 12-16 hours. The fermentation time depends on the temperature of the incubator, the size of jars or containers and the activity of starter cultures. During fermentation, the starter cultures use sugars in coconut milk, produce acids and decrease the pH of milk below 4.6. The coconut milk will be thickened to form a yogurt-like texture. The cultures will also produce yogurt characteristic flavors and polysaccharides, which stabilize the texture of coconut yogurt.

Fig 4. Yogurt maker and jars

Storage - After incubation, check the quality of the coconut yogurt. If the texture, taste, and flavor meet the quality criteria, place the coconut yogurt in the refrigeration at 4 °C (40 °F) to stop the fermentation. The coconut yogurt stored in the refrigerator can be consumed within two weeks. During storage, if the yogurt has mold, undesirable color or flavor, or any signs of spoilage, please discard it immediately.

Desirably Sensory Properties

Coconut yogurt should have a smooth and glossy appearance with a semi-thick texture. Depending on the starter used and incubation time, coconut yogurt would have a mild tartness or very acidic taste mixed with the unique flavor of coconut. It would be normal to observe some separation of coconut yogurt and whey after fermentation. For quality defects, please check the troubleshooting tips in Table 4.

Fig. 5. Home-made coconut yogurt

Make Greek Coconut Yogurt

If you prefer thick Greek yogurt, a Greek yogurt strainer or cheesecloth can be used to separate the coconut yogurt from the whey. With the Greek yogurt strainer, strain the whey from the yogurt in the refrigerator for 2-4 hours. The longer the yogurt is strained, the thicker the coconut yogurt will be. If using cheesecloth, separate the whey from the yogurt for 20 minutes. The strained coconut yogurt has a texture of Greek-like yogurt; store it in the refrigerator for consumption.

Table 4. Troubleshooting of coconut yogurt.

Defects	Cause of defect
Fail to coagulate after incubation for 10-16 hours	The incubation temperature is too hot or too cold; use a thermometer to check and control the temperature at 43°C (110°F); the quality starter culture is poor; or the milk is too hot when adding the starter culture.
Undesirable taste and flavor	Starter culture may be contaminated; incubation of yogurt is too long; milk is scorched while heating; or jars or containers may not be clean.
Syneresis	Yogurt made of fresh coconut milk commonly shows some separation of whey due to lower protein content in the milk. Adding a thickening agent, such as gelatin and tapioca flour, will reduce the syneresis.

Fig. 6. Greek yogurt strainer

Coconut-Dairy-Milk Yogurt

If you are not allergic to dairy milk and prefer dairy products, you can also make coconut-dairy milk yogurt. To do this, mix the coconut milk with dairy milk at a ratio of 1:1, 1.5:1, or 2:1 (coconut milk to diary milk), pasteurize the mixed milk and follow the same procedures as described in the section of making coconut yogurt. The coconut-dairy-milk yogurt has a thicker texture and less whey separation with sensible coconut flavor.

Food Safety Practice for Making Yogurt

To make yogurt safely, please practice good personal hygiene, use soap and warm running water to wash your hands, bandage cuts and burns on hands before handling food, avoid cross-contamination, clean and sanitize equipment and utensils, rinse well and air dry. Ingredients added to yogurt should be of good quality and uncontaminated. Discard batches of yogurt that fail to set properly. Discard any yogurt with visible signs of microbial growth or any odors other than the acidity of fresh yogurt during storage.

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