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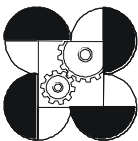
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NATA DE COCO PRODUCTION



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‘Our Business is Industry...’

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NATA DE COCO (COCONUT GEL) PRODUCTION

A. RAW MATERIALS AND INGREDIENTS

1. Coconut (*Cocos nucifera*)

Only mature coconut, 10-11 months old, not copra mature, is suitable for *nata de coco* production. The common mature coconut is approximately 1 kg, ovoid in shape and brown in color, although there are some varieties, which are naturally yellow in color. A thick brown layer, called the “testa” or coconut paring separates the coconut meat from the inner surface of the shell. In the grating of coconut meat for *nata de coco* production, utmost care is practiced to prevent the coconut paring from being collected.

The coconut meat should be white in color, clean and free from any discoloration.

2. Sugar

Sugar for the production of *nata de coco* must conform to at least the Refined Premium Grade Classification of the Philippine National Standard Specifications for White Sugar (PNS 1078:1993).

Refined sugar is a white, odorless and crystalline sucrose, free from dirt and other extraneous matter. It is packed in a properly labeled clean polypropylene bags lined with polyethylene film or in multi-layered paper bags or equivalent packaging or bulk containers. It should conform to specific requirements in Table 1.

Table 1. Qualitative and microbiological requirements of premium grade refined sugar*

Characteristic/Test	Requirement
<i>a. Qualitative requirements</i>	
Sucrose, % mass at 25°C, minimum	99.8
Moisture, % mass, maximum	0.04
Ash, conductometric, % mass, maximum	15
Reducing sugar, % mass, maximum	30
Sediment, mg/kg, maximum	10
<i>b. Microbiological limits</i>	
Mesophilic bacteria, cfu/10 g, maximum	200
Yeast and Mold, cfu/10 g, maximum	10
Thermophilic spores, cfu/10 g, maximum	150

*Philippine National Standard Specifications for White Sugar (PNS 1078:1993)

3. **Glacial Acetic Acid**

Glacial acetic acid is a colorless liquid having a characteristic pungent odor and vinegar-like acidic taste. In its food grade form it is used as an acidulant, flavoring agent. It should contain not less than 99% acetic acid (CH_3COOH or $\text{C}_2\text{H}_4\text{O}_2$) and highly soluble in water.

Other names for glacial acetic acid are acetic acid, ethanoic acid, ethylic acid; vinegar acid; vinegar; methane carboxylic acid. It has a Chemical Abstracts Services Number (CAS) of 64 -19-7.

Glacial acetic acid is highly corrosive liquid and its mist cause severe burns to the body tissues. Ingestion or swallowing can cause severe injury that may lead to death. Inhalation of concentrated vapors may cause serious damage to lining of the nose, throat and lungs. So that observations of safety precautions are highly recommended.

4. **Nata Starter or Mother Liquor**

Nata starter or mother liquor is a milky liquid culture medium consisting of active *nata* organism/ *Gluconobacter xylinum* (formerly *Acetobacter xylinum*) grown in coconut water and/or coconut milk substrate under favorable conditions.

Available at the:

Bureau of Plant Industry

692 San Andres St., Malate, Manila, Philippines

Tel. No. 525-78-57

5. **Water**

The water to be used in the preparation of the *nata de coco* medium should be clean and potable. It should conform to the Philippine National Standards for Drinking Water particularly for the treated water in the distribution system. Its microbiological, physical and chemical properties should conform to the requirements in Tables 2 and 3.

Table 2. Microbiological requirements for drinking water

Microorganism	Standard Value/ Permissible Limit
Total Plate Count (colony/mL)	10
Total Coliforms (No./100 mL)	0
Total <i>Escherichia coli</i> or thermotolerant (fecal) coliform bacteria (No./100 mL)	must not be detectable in any 100 mL sample. In any case of large quantities where sufficient samples are examined, it must not be present in 95% of samples taken throughout any 12 month period

Source: Section 2, *Philippine National Standards for Drinking Water*. Department of Health, Manila, Philippines. 1983

Table 3. Physical and chemical quality requirements for drinking water

Constituent	Permissible Limit (mg/L)
Taste	Unobjectionable
Odor	Unobjectionable
Color	5 TCU
Turbidity	5 NTU
Aluminum	0.2
Chloride	250
Copper	1
Hardness	300 (as CaCO ₃)
Hydrogen Sulfide	0.05
Iron	1
Manganese	0.5
pH	6.5 – 8.5
Sodium	200*
Sulfate	250
Total Dissolved Solids	500
Zinc	5

* Secondary Standards, Compliance with the Standard and Analysis are not obligatory.

Reference: WHO Guidelines for DWQ, 1984; Revision of WHO Guidelines for DWO, 1993.

B. PROCESSING OF *NATA DE COCO**

1. Preparation of *nata de coco* growing medium

The basic formulation in the processing of raw *nata de coco* is as follows:

- 1 kg grated coconut meat
- 2 kg refined sugar
- 5 liters *nata* starter or mother liquor
- 0.40 liter glacial acetic acid
- 28 liters tap water

The same formulation is used in the preparation of the *nata* starter medium or mother liquor.

- a. Preparation of coconut milk. Clean coconuts are split crosswise with a clean sharp knife then the coconut meat is washed with water to remove bits of husks and shells brought by the splitting process. The meat is then recovered from the shell with a manual or electric grater.

Extract the coconut milk by adding 2 liters of water to the grated coconut then mix and wrap in cheesecloth and squeeze manually or by using a screw press. The extraction may be repeated by adding another 2 liters of water. Combine the extracts and strain using a finely meshed strainer or cheesecloth.

- b. Preparation of *nata* medium. The remaining 24 liters of water left after the extraction of coconut milk are transferred to an appropriate container for mixing. With continuous mixing, the following ingredients are added in succession: refined sugar, coconut milk, mother liquor and glacial acetic acid. The mixture is thoroughly mixed then filtered into another container using a fine mesh strainer or cheesecloth.

2. **Distribution of *nata* mixture and fermentation.** The mixture is dispensed into previously sanitized fermenting containers like plastic tray-molds at volumes depending on the size of the container and the required thickness of the resulting *nata* slab.

* *Source:* Sanchez, Priscilla S. 1990. *Nata de Coco* in Coconut as Food (Part 4). Published by the Philippine Coconut Research and Development Foundation (PCRDF). Diliman, Quezon City; pp 185-199.

The filled containers are covered with sheets of paper and arranged in layers. In case of more containers, layers of containers may be piled up on top of the other. The mixture is left undisturbed from 7-10 days or longer to ferment at 30-32°C. The length of fermentation will depend on the thickness and quality of *nata* required by buyers.

The same *nata* mixture may also be used as *nata* starter or mother liquor. Fill the mixture to about two-thirds full in clean glass jars and with clean paper. Incubate as that of *nata* slabs, in single layer, without stacking for 3 to 4 days.

3. **Harvesting of *nata* slabs.** After the fermentation period, harvest the resulting *nata* slabs and transfer in plastic container, like 200-liter plastic drums, containing water.
4. **Cleaning and deacidification.** Clean the *nata* slabs by removing the adhering cream on the bottom surface, then soak in several changes of water to leach out or remove the acidic taste. The *nata* slabs may be sliced into desired size manually or by using a *nata* cutter.

5. **Soaking in water or acidified water.** If the *nata* is not to be processed immediately or intended to be stored, soak *nata* slabs or slices in plastic containers containing water with or without acetic acid added. The pH of the acidified *nata* should be at least 4.0. Adjust the pH of the soaking medium by adding more glacial acetic acid. Check the pH using pH meter or pH paper. *Nata* slabs or slices soaked in water should be disposed or processed immediately to prevent the development of off-odor.
6. **Bulk packaging.** Drain *nata* slabs or slices and transfer a specific weight in plastic drum containers or plastic sacks lined with polyethylene bags (PE) bags. Fill with plain water or acidified water leaving a sufficient headspace. Cover tightly and store in pallets in clean areas. Bulk packaged raw *nata* are delivered to processors or traders or collected (pick-up) by buyers from the growing facilities.

FLOW DIAGRAM IN NATA DE COCO PRODUCTION

