PHILIPPINE NATIONAL STANDARD

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Raw nata de coco – Specification

DEPARTMENT OF TRADE & INDUSTRY PHILIPPINES

BUREAU OF PRODUCT STANDARDS

Foreword

The development of Philippine National Standard for Raw nata de coco was initially undertaken upon the request of the Philippine Coconut Authority (PCA). In close collaboration with the Regional Offices of PCA, the Bureau of Agriculture and Fisheries Product Standards (BAFPS) conducted a series of public consultative meetings to thresh out comments from all concerned stakeholders.

BAFPS deemed it necessary to adopt a standard providing common understanding on the scope, grading, tolerances, hygiene and methods of analysis and sampling.

Raw nata de coco – Specification

1 Scope

This standard applies to raw nata de coco produced by bacteria *Acetobacter pasteurianus (Acetobacter aceti* subsp. *xylinum)* during fermentation of coconut substrate like coconut water and/or coconut milk. Commercial forms of raw nata de coco are slabs, diced or cubes.

2 References

The titles of the standards publications referred to in this standard are listed on the inside back cover.

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1 General

3.1.1
raw nata de coco
thick, white, translucent and gel-like mass produced by the bacteria, *Acetobacter pasteurianus (Acetobacter aceti* subsp. *xylinum)* during fermentation of coconut substrate

3.1.2
drained weight
the mass of solid food in a container

3.1.3
filth and extraneous matter
any objectionable matter contributed by animals such as rodent, insect or bird or any visible matter not inherent to the product

4 General requirements

In all grades subject to the special provisions for each grade and tolerances allowed, raw nata de coco must meet the following requirements:

4.1 Raw nata de coco must not have objectionable foreign odor aside from the characteristic acetic acid-like odor.

4.2 Raw nata de coco must not have any discoloration not characteristic of the product.

4.3 Raw nata de coco must be cleaned without the presence of any cream adhering on the slabs.

5 Grades

Raw nata de coco shall be graded according to its general appearance, quality and condition specified in Table 1.

Table 1 – Grades of raw nata de coco

Parameters	Grade		
	A	B	C
Appearance	smooth	smooth	Smooth to slightly rough
Texture (penetrometer reading)	firm (7.0 mm - 9.4 mm)	slightly firm (> 9.4 mm - 10.0 mm)	slightly soft (> 10.0 mm)
pH	maximum of 4.5	maximum of 4.5	maximum of 4.5

6 Tolerances

6.1 Physical

For all grades, the following tolerances shall apply:

Table 2 – Maximum allowed tolerances for raw nata de coco

Type of visible filth and extraneous matters	Raw nata de coco slabs, tolerance in 4 kg sample	Raw nata de coco, diced/cubes	
		Tolerance in < 1kg sample	Tolerance in > 1kg to 4 kg sample
Hair, whole insects, recognizable insect parts, feather fragments	absent	absent	absent
Other extraneous materials > 0.5 mm (e.g. coconut husk fibers, wood particles)	Not more than 10 pieces	Not more than 5 pieces	Not more than 10 pieces
Black, brown or other extraneous particles $\leq$ 0.5 mm	Not more than 20 particles per slab (30 cm^2 x 30 cm^2) and/or Not more than 10 particles per 500 mL of packing medium	Not more than 10% of the drained nata de coco cubes and/or Not more than 10 particles per 500 mL of packing medium	Not more than 10% of the drained nata de coco cubes and/or Not more than 10 particles per 500 mL of packing medium
Textile fibers	Not more than 10 pieces	Not more than 5 pieces	Not more than 10 pieces

6.2 Chemical

Raw nata de coco shall have no trace amounts of additives like benzoate, sorbates, and sulfites, and should not contain unallowed addition of chemicals such as formalin in excess of existing Codex standards.

7 Hygiene

It is recommended that the product covered by the provisions of this standard shall be in accordance with the appropriate Sections of the General Principle of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1-1969, Rev.3-1997) and should conform with the Bureau of Food and Drugs (BFAD) Administrative Order (A.O.) # 153 series of 2004 on Good Manufacturing Practices (GMP).

8 Packaging

Raw nata de coco in water, citric acid solution and/or glacial acetic acid solution shall be packed in clean and suitable packaging material that can withstand handling and distribution conditions to prevent contamination.

9 Labelling

Each container shall be labeled and marked with the following information:

9.1 Name of the product: "Raw nata de coco";
9.2 Brand name or trade name;
9.3 Net content;
9.4 Lot identification number (LIN);
9.5 Name and address of producer, and/or packer, or distributor;
9.6 The phrase "Product of the Philippines";
9.7 Date manufactured; and
9.8 PCA registration number (mandatory).

10 Storage requirements

Raw nata de coco shall be stored in areas where the safety and quality of the product shall not be affected due to changes in temperature, humidity and environmental conditions.

11 Sampling

A lot shall consist of products manufactured in one production shift, under similar processing condition. Random sampling will be conducted in taking samples for analysis.

12 Method of Analysis and Sampling

12.1 Determination of Equilibrium pH (Annex A)
12.2 Determination of Benzoic Acid (Annex B)
12.3 Determination of Sorbic Acid (Annex C)
12.4 Determination of Sulfites (Annex D)

Annex A

Determination of equilibrium pH
AOAC 981.12,1990

A.1 Comminute nata de coco sample until homogenous.

A.2 Turn on pH meter and clean electrode tip by using distilled water and gently wiping with soft tissue paper.

A.3 Calibrate instrument as follows:

a) Immerse electrode in buffer solution of 7.0. Wait until reading is constant and adjust reading to 7.0 if necessary.
b) Wash electrode with distilled water.
c) Immerse electrode in buffer solution of 4.0 and wait until reading is constant and adjust reading to 4.0 if necessary.

A.4 After calibration, determine pH of samples by immersing the sensitive portion of electrode in the sample, agitating sample slightly and wait until reading is constant before taking pH.

NOTE Check temperature of sample and adjust temperature scale.

Annex B

Determination of benzoic acid (Spectrophotometric method) AOAC 960.38.1990

B.1 Preparation of standard curve

Prepare solution of benzoic acid in ether containing 50 mg/L. Determine absorbance (A) of this solution in tightly stoppered cell in Beckman DU or recording spectrophotometer between 265 nm and 280 nm in 1 nm interval. Plot A against wavelength and record wavelength of minimum at approximately 267.5 nm as point B, other minimum at approximately 267.5 nm as point D and highest maximum at approximately 272 nm as point C.

Prepare solutions of benzoic acid in ether measured in mg/L containing 20, 40, 60, 80, 100 and 120. Determine absorbance of these solutions in tightly stoppered cell in spectrophotometer at points B, C and D. For each concentration average A at B and D and subtract this value from A and C. Plot difference against concentration.

B.2 Preparation of sample

Blend nata de coco sample until homogenous. Transfer 20 g to separator and dilute to 200 mL with saturated NaCl solution. Make solution definitely acid to litmus with HCl and mix well.

B.3 Determination

Extract prepared solution with 70 mL, 50 mL, 40 mL and 30 mL portions ether, shaking well to ensure complete extraction. Break emulsions by standing, stirring, or centrifuging. Drain and discard aqueous phase. Wash combined ether extracts with 50 mL, 40 mL and 30 mL portions. HCl (1+100) and discard HCl washings. (If extracts requires no purification, proceed to next step.) Extract ether solution with 50 mL, 40 mL, 30 mL and 20 mL portions 0.1% NH_4OH and discard ether. Neutralize combined NH_4OH extracts with HCl and add 1mL excess. Extract acidified solution with 70 mL, 50 mL, 40 mL and 30 mL ether.

Dilute combined ether extracts to 200mL with ether and determine absorbance in tightly stoppered cell in spectrophotometer at wavelengths B, C and D diluting with ether if necessary to obtain optimum concentration of 20 120 mg/L. Average A at B and D and subtract this value from A at C. Determine concentration of benzoic acid from standard curve, correcting for dilutions. Benzoic acid x 1.18- Na benzoate.

Conduct determination similarly on benzoate free sample of product and determine absorbance in regions 265 nm and 280 nm at 1nm intervals. If curve is straight line in this region, method is applicable to this product.

Annex C

Determination of sorbic acid (Spectrophotometric method) AOAC 974.10.1990

C.1 Reagents and apparatus

a) Metaphosphoric acid solution – Dissolve 5 g HPO_3 in 250 mL H_2O and dilute with 1L with alcohol.
b) Mixed ethers – Petroleum ether-anhydrous ether (1+1).
c) Potassium permanganate – Dissolve 15 g $KMnO_4$ in H_2O, dilute to 100 Ml and filter through glass wool
d) Sorbic acid solution – (1) stock solution, 1.0 mg/Ml. Dissolve 200 mg sorbic acid in 200 Ml mixed ethers, (2) working solution, 0.05 mg/Ml. Dilute 10 Ml stock solution to 200 Ml with mixed ether
e) Reference solution – Shake 100 Ml mixed ethers with 10 Ml HPO_4 solution and dry supernate ether solution with 5 g cm cells, transparent to UV.

C.2 Preparation of standard curve

Add 1 mL, 2 mL, 4 mL and 6 mL working standard solution (d)(2) to separately 100 mL volume flasks and dilute to volume with mixed ethers. Determine absorbance of solutions at 250 nm against mixed ethers. Plot absorbance against mg sorbic acid/100 mL.

C.3 Determination

Blend sample until homogenous. Accurately weigh 20.0 g sample, add enough HPO_3 solution to yield total of 100 mL liquid in mixture. Blend for 1 min and immediately filter thru 18.5 cm Whatman No.3 paper. Transfer 10 mL of filtrate to 250 mL separator containing 100 mL mixed ether s and shake for 1min. Discard aqeous layer and dry ether extract with 5 g anhydrous Na_2SO_4. Determine absorbance at 250 nm against reference solution (e). Determine concentration of sorbic acid from standard curve.

$$\% \text{ sorbic acid} = (\text{mg sorbic acid/g sample}) \times (1/1000 \text{ mg}) \times 1000$$
$$= \text{mg sorbic acid}/20$$

Confirm presence of sorbic acid as follows: Add 2 mL $KMnO_4$ solution to remaining ether solution and shake for 1min. Filter thru Whatman No.3 paper, add 5 g anhydrous Na_2SO_4, shake, and scan spectrum between 300 nm and 200 nm. Absence of peak at 250 nm confirms presence of sorbic acid in sample.

Annex D

Determination of free and combined sulfites (SO_2) (Modified rankine method)

D.1 Weigh 10 mL of 0.3 % of hydrogen peroxide into the flask (A) of Figure 1. Add 3 drops of methyl red-methylene blue indicator, which should turn to purple. Adjust the color to olive-green with 0.01 N sodium hydroxide.

D.2 Weigh 10 mL of sample previously cooled to 0 °C, and 10 mL of ice-cold 25 % phosphoric acid into the flask (B) in Figure 1, then connect the two flasks to the apparatus.

D.3 Switch the air bubbler and inject air from (D) via (E) into the flask (B) at the flow rate of 11 minutes.

D.4 Continue bubbling for 30 min. at 0 °C, then rapidly replace flask (A) with flask (A).

D.5 Remove the ice-bath from under jack (B), wipe the outside of flask with dry cloth, then inject air 10 min. heating the flask (B) with flame 4 cm to 5 cm high from a microburner, without a wire gauze, so that the point of the flame is in contact with the flask (B). After 10mins turn off the air bubbler, wash the open end of the bubbler with a small quantity of freshly boiled and cooled water into the flask (A').

D.6 Titrate the contents of the flask (A) (free sulfite) and the flask (A') (combined sulfite) with 0.01 N sodium hydroxide to the initial olive-green color.

Calculate the free and combined sulphite contents
(1 mL of 0.01 N sodium hydroxide = 0.32 mg of SO_2)

Calculation:

$$\text{ppm } SO_2 = \frac{32.03 \times \text{volume NaOH} \times \text{N NaOH} \times 1000}{\text{weight of sample in grams}}$$

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ito, Yoshio. 1981. Analytical Methods of Food Additives for Various Foods In: Food Sanitation in Japan III.

Philippine National Standards 1219:1994. Agricultural and Other Food Products Nata de Coco in Syrup-Specification

SEAFDEC. 1987. Laboratory manual on analytical methods and procedures for fish and fish products. Hasegawa, Singapore (ed.)

Testing, Inspection and Accreditation Committee. DTI Task Force on Nata de Coco, 1994.

ITDI. Industry Standard for Raw Nata de Coco. Paper presented by Ma. Divina Alcasabas, Chief Rural Technology and Information Division, ITDI at the 23rd Annual Convention of the Philippine Society for Microbiologists held at the Century Park Sheraton, Manila, May 19-20, 1994.

B P S

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