

# **PHILIPPINE NATIONAL STANDARD**

**PNS/BAFS 329: 2022  
ICS 67.080.01**

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## **Mature Coconut — Product Standard — Grading and Classification**



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## Foreword

In 2021, the Bureau of Agriculture and Fisheries Standards (BAFS) started the development of a PNS for Mature Coconut in response to the proposal from the Philippine Coconut Authority (PCA) to establish a maturity characterization for coconuts. The PNS aims to differentiate mature coconut from *buko* or young coconut and further strengthen the implementation of Executive Order No. 1016, series of 1985 (Withdrawing of the Inspection, Commodity, and Export Clearance Requirements on Philippine Exports), which prohibits the export of mature coconut. Furthermore, this PNS is aligned with the ASEAN Stan 56:2018 (ASEAN Standard on Mature Coconut), in compliance with the Philippines' commitment to harmonize national standards with the Association of Southeast Asian Nations (ASEAN) standards.

The Technical Working Group (TWG) tasked to develop the PNS was created through Special Order (SO) No. 817, series of 2021 (Addendum to the Special Order No. 81, series of 2021 entitled, "Creation of TWGs for the Development of PNS for Agriculture and Fishery Products, Machinery, and Equipment), SO No. 103, series of 2022 (Creation of TWGs for the Development of PNS for Agriculture and Fishery Products, Machinery, Tools, and Equipment), and SO No. 350 series of 2022 (Addendum to the Special Order No. 183, series of 2022 entitled "Creation of TWGs for the Development of PNS for Agriculture and Fishery Products, Machineries, and Infrastructures"). The TWG was composed of representatives from the relevant government agencies, academe, and private sector. The draft PNS underwent a series of TWG meetings and stakeholder consultations conducted physically and via online platforms before its endorsement to the DA Secretary for approval.

This PNS is drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

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## 1 Scope

This Standard applies to physiologically mature coconut from commercial varieties of *Cocos nucifera* L. of Arecaceae family to be supplied fresh to the consumer and may be intended for further processing. This standard does not apply to young coconut fruits and *makapuno*.

## 2 Normative References

The following documents are referred to in the text in such a way that some or all their contents constitute the requirements of this document. The latest edition of the referenced documents (including any amendments) applies.

Association of Southeast Asian Nations (ASEAN). (2018). ASEAN standard for mature coconut (ASEAN Stan 56:2018).

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### 3 Terms and Definitions

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

#### 3.1

##### **coconut**

refers exclusively to the palm, *Cocos nucifera* L. or its components, including its fruit or drupe, which contains a unique range of oils, proteins, carbohydrates, dietary fiber, minerals and water, and the aqueous effusion from the inflorescence (BAFPS-DA, 2007, *modified*)

#### 3.2

##### **coconut water**

the liquid which fills the cavity within the kernel (Menon & Pandalai, 1958, *modified*)

#### 3.3

##### **damage defect**

any abnormality or injury, which affects the appearance and shipping and eating qualities of the coconut (BAFPS-DA, 2008, *modified*)

**3.4****deterioration**

any disorder characterized by biological decomposition (BAFPS-DA, 2004)

**3.5****endocarp**

layer immediately below the fibrous covering which protects the kernel, usually referred to as shell. It has three ridges on the outside and three eyes located at the basal end or apex of the drupe where it is attached to the fruit stalk, two of which are quite hard, and the third, which is the germinating eye being bigger, generally less compact than other portions, and having softer fibers over it (Menon & Pandalai, 1958, *modified*)

**3.6****endosperm**

coconut meat

refers to the firm white flesh attached to the shell (Menon & Pandalai, 1958, *modified*). This is also known as coconut kernel

**3.7****exocarp**

outermost layer of the coconut (Menon & Pandalai, 1958)

**3.8****labeling**

any written, printed or graphic matter that is present on the label accompanying the food, including that for the purpose of promoting its sale or disposal (BAFS-DA, 2016)

**3.9****mature coconut**

coconut which exhibits color break, sloshing, and shell darkening or meat hardening at 10 to 12 months from pollination (BAFS-DA, 2018)

**3.10****maximum residue limit (MRL)**

maximum concentration of a pesticide residue (expressed as mg/kg) to be legally permitted in or on food commodities and animal feeds (BAFS-DA, 2021)

**3.11****rotting**

deterioration caused by microorganism resulting to softening of the coconut meat and foul odor (BAFPS-DA, 2013, *modified*)

**3.12****sound**

characterized by being free of rotting and deterioration (BAFPS-DA, 2013)

**3.13****whole**

unsplit coconut with husk (ASEAN, 2018, *modified*)

**4 Minimum Requirements**

**4.1** In all classes, subject to the special provisions for each class and the tolerances allowed, the mature coconut shall be:

- a) whole;
- b) partially or fully husked;
- c) free of germination or visible shoots;
- d) free of eye punctures or cracks on the shell;
- e) visually free of pests;
- f) sound; free of damage and deterioration caused by pests affecting the general appearance and the meat quality; and
- g) clean, practically free of any visible foreign matter and foul odor.

**4.2** Mature coconut shall reached an appropriate degree of development for harvesting depending on the variety, season, and area in which they are grown. The development and condition of the mature coconut shall be such as to enable them to:

- a) withstand transport and handling; and
- b) arrive in a satisfactory condition at the place of destination.

**4.3 Maturity criteria**

Physiologically mature coconut shall exhibit any of the following:

- a) Color break - exocarp or outer skin of one to two fruits in a bunch regardless of variety, turns greyish or brown
- b) Sloshing - sound produced when shaken due to the reduced volume of coconut water
- c) Shell darkening and toughening - color change observed when the endocarp protecting the coconut meat turns from off-white to dark brown
- d) Meat hardening – state where the endosperm becomes fully hardened from being jelly-like and thin with its oil content not lower than 63% (dry basis).

- 4.4 Sample illustrations of acceptable and damaged or defective coconuts are shown in Annexes A (Appearance of acceptable mature coconut based on age) and B (Damaged or defective mature coconut).

## 5 Classification

Mature coconut is classified into three classes defined below:

- 5.1 **Class I** – Mature coconut in this class must be of superior quality. It must be free of defects with the exception of very slight superficial defects provided these do not affect the general appearance of the produce, quality, keeping quality, and presentation in the package.
- 5.2 **Class II** – Mature coconut in this class must be of good quality. Slight physical defects/variations, however, may be allowed, provided these do not affect the general appearance of the produce, quality, keeping quality, and presentation in the package. The defects must not, in any case, affect the meat and water of the fruit.
- 5.3 **Class III** – This class includes mature coconut which does not qualify for inclusion in the higher classes, but satisfies the minimum requirements specified in Section 4 above.

## 6 Size Classification

- 6.1 The size of a mature coconut may be measured through its equatorial and polar diameters as illustrated in Annex C (Illustration of polar and equatorial diameters for whole, partially-, and fully-husked mature coconut).
- 6.2 The size code of whole mature coconut should be in accordance with Table 1:

**Table 1.** Classification of whole mature coconut based on weight and diameter

Size Code	Weight (kg)	Diameter <sup>2,3</sup> (cm)	
		Polar	Equatorial
1	>2.0 <sup>1</sup>	>25.0	>21.0
2	>1.5 - 2.0 <sup>1</sup>	>23.0 – 25.0	>18.0 – 21.0
3	1.0 - 1.5 <sup>1</sup>	21.0 – 23.0	15.0 – 18.0



Size Code	Weight (kg)	Diameter <sup>2,3</sup> (cm)	
		Polar	Equatorial
4	<1.0 <sup>2,3</sup>	<21.0	<15.0
<sup>1</sup> ASEAN.(2018). ASEAN standard for mature coconut (ASEAN Stan 56:2018). <a href="https://asean.org/storage/2012/05/ASEAN-Standard-for-Mature-Coconut.pdf">https://asean.org/storage/2012/05/ASEAN-Standard-for-Mature-Coconut.pdf</a> <sup>2</sup> Zamboanga Research Center (ZRC) - Philippine Coconut Authority (PCA) - Department of Agriculture (DA). (2022). [Unpublished raw data] <sup>3</sup> Visayas State University (VSU) - National Coconut Research Center (NCRC). (2022). [Unpublished raw data]			

**6.3** For husked mature coconut, the size code should be in accordance with Table 2:

**Table 2.** Classification of fully husked mature coconut based on weight and diameter

Size Code	Weight (kg)	Diameter <sup>2,3</sup> (cm)	
		Polar	Equatorial
1	>1.2 <sup>1</sup>	>13.5	>14.0
2	0.8 – 1.2 <sup>1</sup>	12.0 – 13.5	12.0 – 14.0
3	<0.8 <sup>2,3</sup>	<12.0	<12.0
<sup>1</sup> ASEAN.(2018). ASEAN standard for mature coconut (ASEAN Stan 56:2018). <a href="https://asean.org/storage/2012/05/ASEAN-Standard-for-Mature-Coconut.pdf">https://asean.org/storage/2012/05/ASEAN-Standard-for-Mature-Coconut.pdf</a> <sup>2</sup> ZRC - PCA - DA. (2022). [Unpublished raw data] <sup>3</sup> VSU - NCRC. (2022). [Unpublished raw data]			

## 7 Tolerances

Tolerances in respect of quality shall be allowed in each package (or in each lot for produce presented in bulk) for produce not satisfying the requirements of the class indicated.

### 7.1 Quality tolerances

**7.1.1 Class I** – Five percent (5%) by number or weight of mature coconut not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

**7.1.2 Class II** – Ten percent (10%) by number or weight of mature coconut not satisfying the requirements of the class, but meeting those of Class III or exceptionally, coming within tolerances of that class.

**7.1.3 Class III** – Ten percent (10%) by number or weight of mature coconut satisfying neither the requirements of the class, nor the minimum requirements with the exception of produce affected by rotting or any other deterioration rendering it unfit for consumption.

### 7.2 Size tolerances

For all classes, 10% by number or weight of mature coconut not satisfying the requirements as regards sizing, but falling within the size immediately above or below those indicated in Section 6.

## 8 Methods of Analysis and Sampling

Analytical and sampling methods to be used for ascertaining conformance to the requirements of this specification shall be in accordance with relevant text in PNS ISO 874:2011 (Fresh fruits and vegetables - Sampling) and CXS 234-1999 (Codex methods of analysis and sampling) or their latest issuances.

## 9 Provision Concerning Presentation

### 9.1 Uniformity

The contents of each package or lot presented in bulk shall contain only mature coconut uniform in quality and size. The visible part of the contents of the package or lot presented in bulk shall be representative of the entire contents.

## 9.2 Packaging

Mature coconut should be packaged in such a way as to protect the produce properly. The materials used inside the package shall be clean and of good quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly paper or stamps bearing trade specifications are allowed, provided the printing or labelling has been done with non-toxic ink or glue.

Packages (or lot for produce presented in bulk) shall be free from foreign matter and odor. If transported in bulk, the hauling vehicle should meet the quality, hygiene, ventilation, and resistance characteristics to ensure suitable handling, shipping, and preserving of the mature coconut.

## 10 Marking or Labeling

### 10.1 Consumer Packages

In addition to the requirements of the CXS 1-1985, rev. 1-2018 (Codex general standard for the labelling of prepackaged foods) or its latest issuance, each package should be labeled as to the name of the produce, variety and/or commercial type.

### 10.2 Non-Retail Containers

Each package shall bear the following particulars, letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or accordingly specified in the documents accompanying the shipment.

For produce transported in bulk these particulars shall appear on a document accompanying the goods.

#### 10.2.1 Identification

The product shall be identified by the name and address of the trader/seller, packer and/or dispatcher with an identification code (optional).

#### 10.2.2 Name of Produce

Name of produce if the contents are not visible from the outside. Name of variety and/or commercial type (optional).

### 10.2.3 Origin of Produce

District where the coconut is grown or national, regional, or local place name and optionally, country of origin.

### 10.2.4 Commercial Identification

- a) Produce name;
- b) Variety name (optional);
- c) Class;
- d) Size; and
- e) Number of units (e.g., pieces, crates, sacks) and/or their respective net weights

### 10.2.5 Official Inspection Mark (optional)

## 11 Contaminants

- 11.1 Mature coconut shall comply with the MRLs for pesticides established by the CAC, ASEAN Harmonized MRLs of Pesticides and/or by the competent authority for this commodity.
- 11.2 Mature coconut shall comply with the maximum levels of the PNS 194:2017 (GSCTFF) or its latest issuance.

## 12 Hygiene

- 12.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the ASEAN GAP, ASEAN General Principles for Food Hygiene, CXS 1-1969 (Recommended international code of practice – General principles of food hygiene), CXS 53-2003 (Code of Hygienic Practice [COHP] for fresh fruits and vegetables), PNS/BAFS 238:2018 (Code of GAP for Coconut) and other relevant Codex texts such as COHP and COP or their latest issuances.
- 12.2 The produce should comply with any microbiological criteria established in accordance with the PNS/BAFS 307:2020 (Establishment and application of microbiological criteria related to food) or its latest issuance.

**Annex A**  
(Informative)

**Appearance of acceptable mature coconut based on age**



**Figure A.1.** Ten (10) months (Franklin Baker Company of the Philippines, 2022)



**Figure A.2.** Eleven (11) months (Franklin Baker Company of the Philippines, 2022)



**Figure A.3.** Twelve (12) months (Franklin Baker Company of the Philippines, 2022)

**Annex B**  
(Informative)

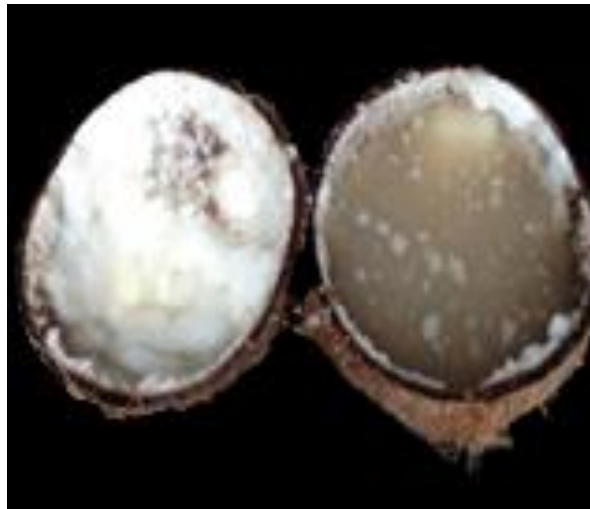
**Damaged or defective mature coconut**



**Figure B.4.** Cracked coconuts - cracked nuts without water, with yellowish color on cracked portion, moldy (Franklin Baker Company of the Philippines, 2022)



**Figure B.5.** Germinated coconut - any evidence of germination, big or small, haustorium, shoot with or without roots (Franklin Baker Company of the Philippines, 2022)



**Figure B.6.** *Kain-buwan* - irregular shape of eyes, half with meat/half without meat (Franklin Baker Company of the Philippines, 2022)



**Figure B.7.** *Puyaw* - dry meat, detached from shell (Franklin Baker Company of the Philippines, 2022)

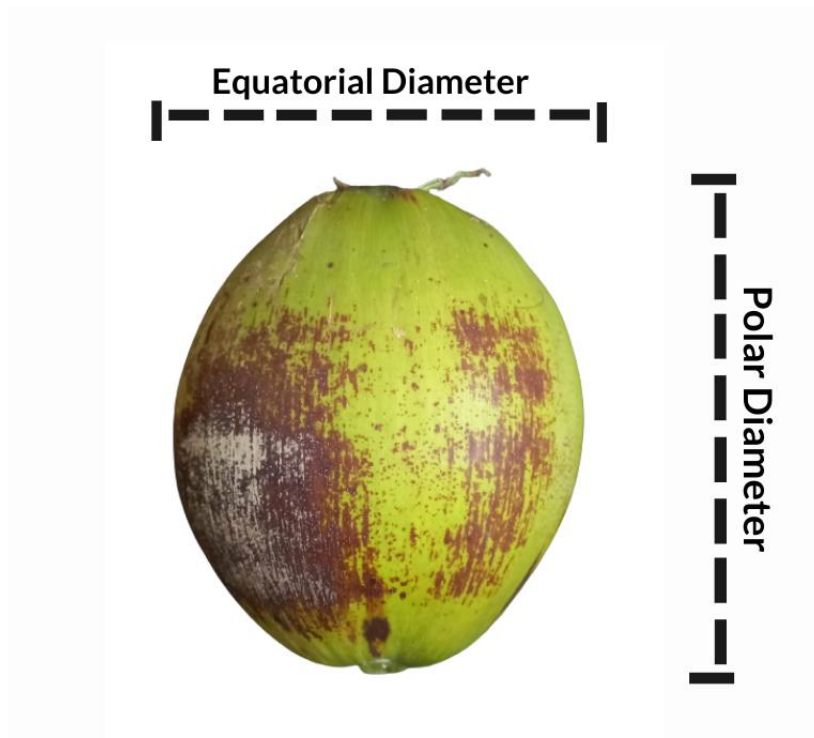




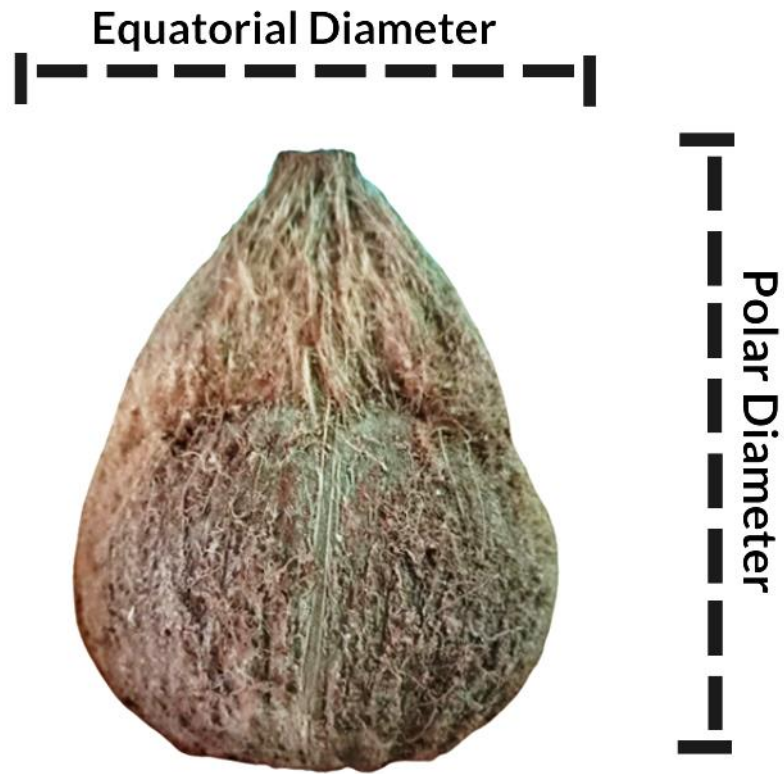
**Figure B.8.** Punctured eye (Franklin Baker Company of the Philippines, 2022)

**Annex C**  
(Informative)

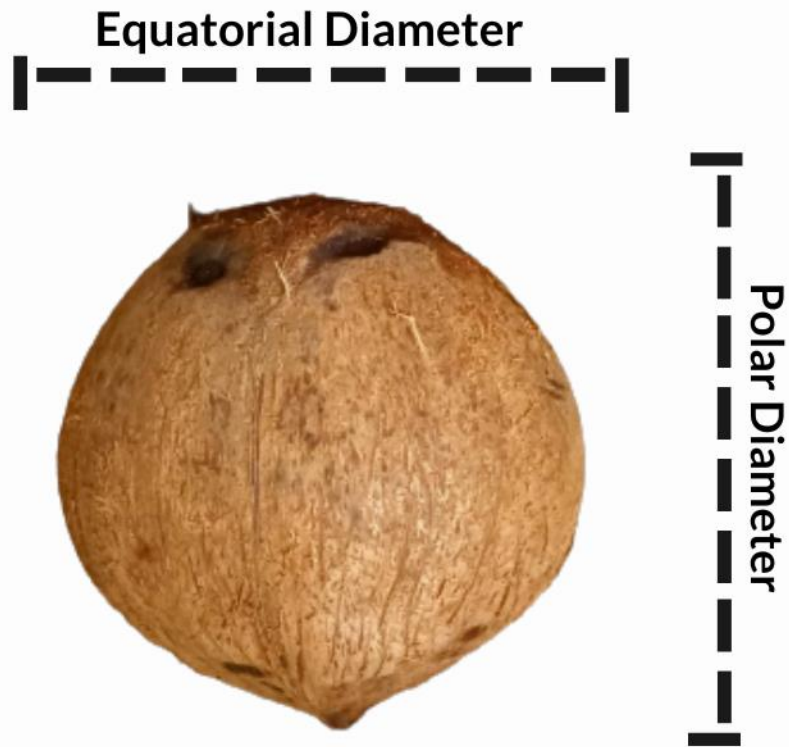
**Illustration of polar and equatorial diameters for whole, partially-, and fully-husked mature coconut**



**Figure C.1.** Whole mature coconut (PCA-CALABARZON Region, 2022)



**Figure C.2.** Partially-husked mature coconut (Greenlife Coconut Products, 2022)



**Figure C.3.** Fully-husked mature coconut (PCA-CALABARZON Region, 2022)

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**Department of Agriculture (DA)**  
**Bureau of Agriculture and Fisheries Standards (BAFS)**

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