

# FRESH FRUITS - BANANA

PNS/BAFS 64:2008

ILLUSTRATIVE GUIDE



# Illustrative Guide

Fresh Fruits - Banana (PNS/BAFPS 64:2008)

Bureau of Agriculture and Fisheries Standards (BAFS) Quezon City, 2022



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# **Introductory Note**

The Philippine National Standard for Fresh Fruits - Banana, PNS/BAFPS 64:2008 was developed by the Bureau to reflect the technology developments in the industry, and to harmonize with ASEAN standards and Codex requirements in heavy metals, pesticide residues and hygiene. The PNS aims to provide a common understanding on the grading and classifying banana grown from different varieties and produced in the Philippines to be supplied fresh to the consumers.

This year, the Bureau came up with the Illustrative Guide for PNS Fresh Fruits – Banana to further explain the PNS provisions through photographs or images. Through the IG, the Bureau aspires to enhance the understanding of the relevant stakeholders on quality matters leading to increase adoption of the Standard.

For more information, please visit our website http://www.bafs.da.gov.ph and Facebook page (https://www.facebook.com/da.bafs).

# Director's Message



Bananas, specifically cavendish bananas, have consistently registered as one of the top exports of the Philippines. In fact, according to the United Nations – Food and Agriculture Organization (FAO) in a 2021 report, the Philippines is the second largest banana exporter despite the 33.58% decline in shipments and tough competition with Latin American countries.

According to the same FAO report, even the neighboring ASEAN countries pose a threat to capturing major Asian

markets, specifically China. This is mainly because Filipino small banana producers need assistance in attaining the quality requirements of the Chinese market.

BAFS, as the standard–setting agency for agri-fishery sectors, aims to address this issue by promoting the adopted PNS for the grading and classification of bananas, particularly PNS/BAFS 64:2008 Fresh fruits – Banana.

The BAFS Technical Services Division together with the members of the Technical Working Group, drafted this Illustrative Guide as supplementary learning materials to achieve this goal. The IG contains photographs and illustrations to depict and explain the Standard's provisions.

Positively, this Guide will aid the Philippine banana industry, especially our farmers, in ensuring the quality of bananas intended not only for the domestic market but for export as well.

VIVENCIO R. MAMARIL, PhD

Bureau of Agriculture and Fisheries Standards

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# Scope

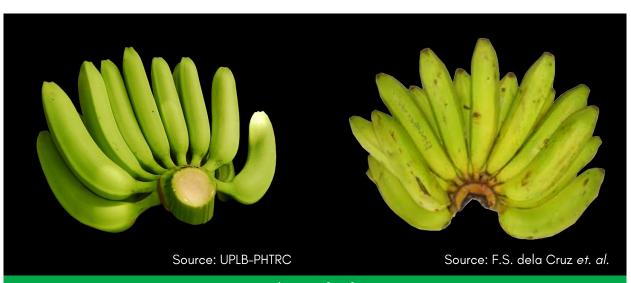
This standard establishes a system of classifying and grading banana (generally considered table banana) grown from *Musa* spp., of the Musaceae family, in the mature stage, to be supplied fresh to the consumer, after preparation and packaging. Banana intended for cooking only (plantains) or for industrial processing are excluded.

#### **Definitions**

#### Banana

edible fruit of tropical plant belonging to the genus *Musa* of the family Musaceae. Some varieties of bananas in the Philippines are Bungulan, Cavendish, Lakatan, Latundan, Pisangmas, Tindoc, Señorita, and Morado.

# Varieties of banana and their characteristics



# 'Bungulan'

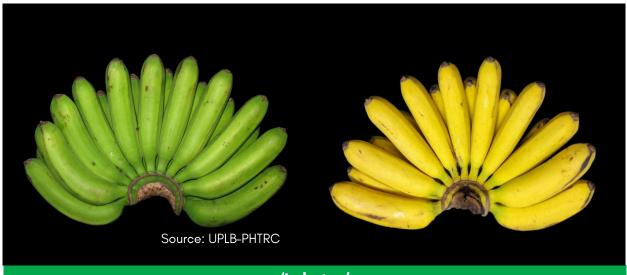
'Buluñgan', 'Balañgon', 'Buñguran', 'Balañgon'

The fruit is long, slightly curved and slightly angular. The peel is yellow-green when ripened at ambient temperature of 28 °C. The flesh is sweet, melting, aromatic with a creamy color when ripe.



# 'Cavendish'

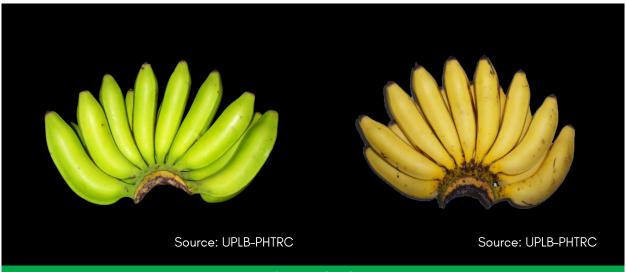
The fruit is long, slightly curved and slightly angular. The peel is yellow-green when ripened normally and has bright yellow color at ambient temperature of 28 °C. The flesh is sweet, melting, strongly aromatic and with a creamy color when ripe.



# **'Lakatan'**

# 'Mapang'

The fruit is long, slightly angular, with thick peel which turns orange-yellow when ripe. The flesh is sweet, aromatic, firm and is light orange yellow when ripe.



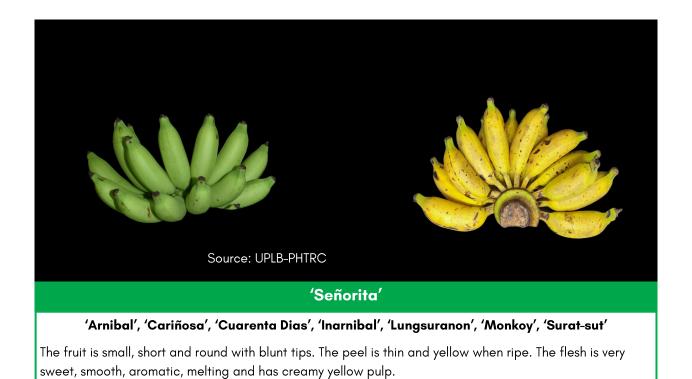
# 'Latundan'

# 'Tundan', 'Turdan', 'Suring'

The fruit is short and round. The peel is thin and yellow when ripe. The flesh is white, soft and slightly subacid.

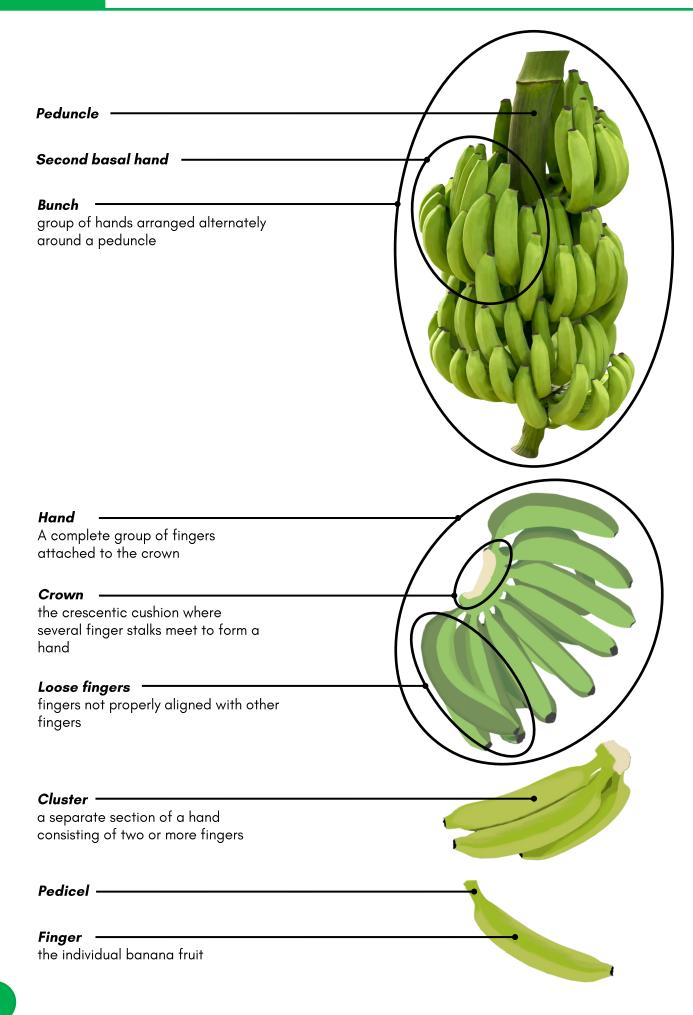


The fruit is medium size and slightly angular to round. The peel is thick and purplish-red when ripe. The flesh is smooth, melting, sweet, slightly aromatic and has cream-colored pulp.



# Other banana varieties





### Diameter

the diameter measured from side to side at the center of the middle finger of the second basal hand of the stem or bunch



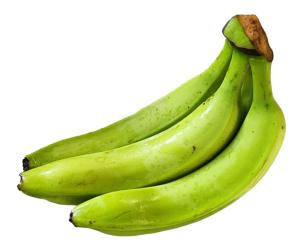
Image 1. Banana diameter measured using a dial reading caliper



Image 2. Banana length measured using a finger length tape

# Length

the dimensions of the fruit measured at its dorsal side from the base of the fruit pulp to its tip



### Clean

the fruit is generally free from dirt, latex, stains and other foreign materials

## Well-formed

regular, fairly compact and reasonable uniform size of the fingers of banana hand

# Clean, reasonably

the fruit exhibits unavoidable dirt, latex stains, and other foreign matters incidental to proper harvesting

# Well-formed, fairly

less regular, less compact and reasonable uniform size of the fingers of banana hand



### Mature

a stage of development that will ensure acceptability of the quality of the hand upon ripening

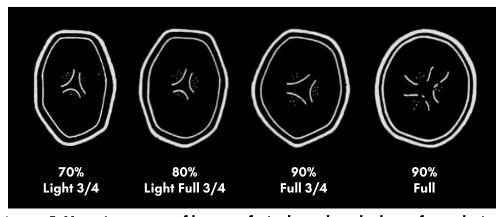


Image 3. Maturity stages of banana fruits based on the loss of angularity

# **PULP COLOR TEST CHART**

A. Normal fruit (no ripening signs)



B. Evidence of ripening bananas (initial stage)



C. Advanced ripening. Yellow areas extending further out of the center



Image 4. A pulp color test chart used for checking the ripeness of bananas (adapted from TADECO)

## Ripe

stage of development when the banana fruit is in its most desirable condition for eating



Image 5. Visual demonstration of an iodine test to check the ripeness of bananas

### **Calibration**

the term used by the banana export industry to indicate the diameter of banana finger expressed in calibration units with thirty-two calibration units equal to 25.4 mm

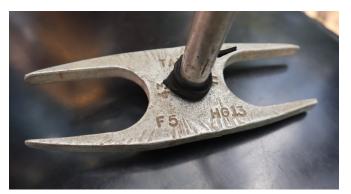
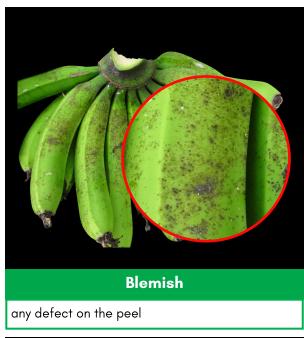
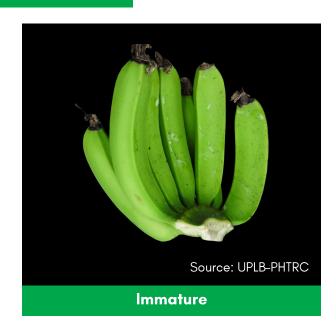


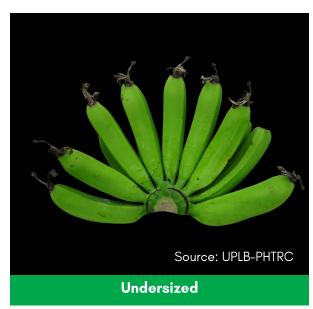
Image 6. Fixed caliper used to determine the diameter of banana finger for calibration

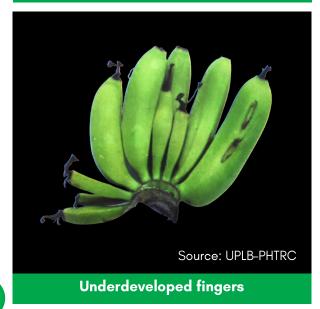
# **Preharvest defects**

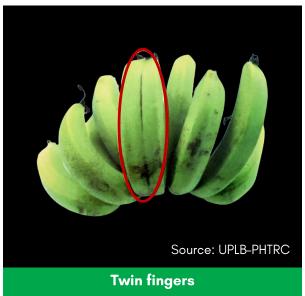












### Pest

include insects, disease-causing microorganisms and other biological entities causing damage to the plant parts

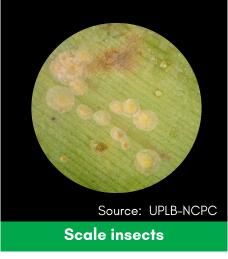
# **Insect pests**





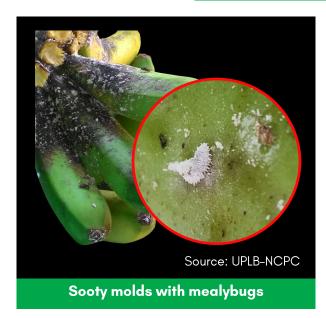








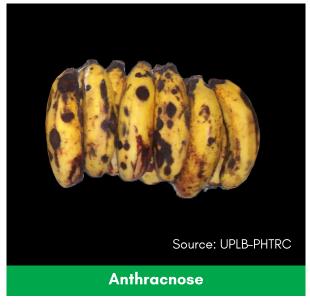
# Insect pest damages





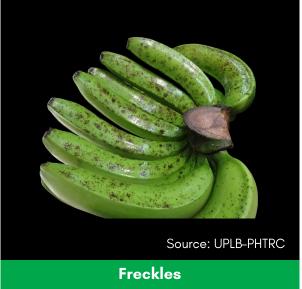


# Diseases observed in bananas









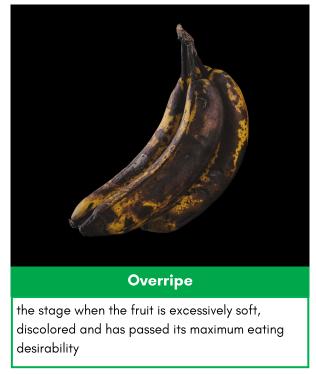
# Postharvest damages



any mechanical injury on the peel of the fruit that makes it unsightly

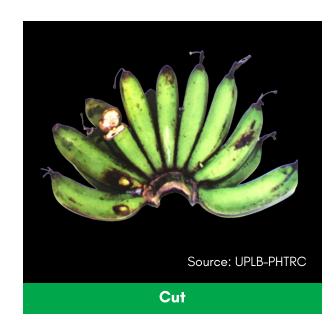




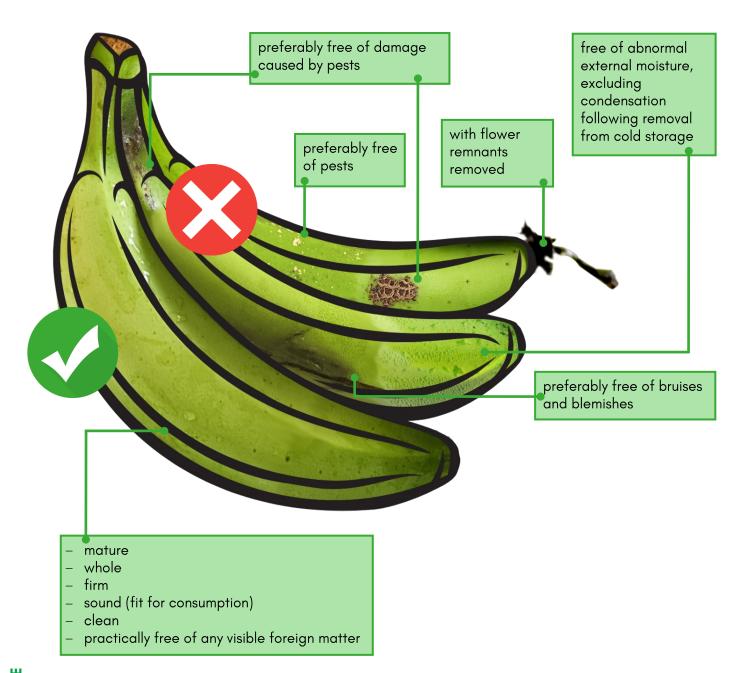








In all classes, subject to the special provisions for each class and the tolerances allowed, the banana must be:



In addition, hands and clusters must include a sufficient portion of the crown with or without peduncle fragments, sound and free of fungal contamination.

The banana must have been carefully picked and have reached an appropriate degree of development and maturity in accordance with criteria proper to the variety and to the area in which they are grown.

Bananas are classified in three classes as defined below:



# **Extra Class**

Banana in this class must be of superior quality. It must have all the typical characteristics and color of the variety and/or commercial type. It must be mature, clean, well-formed, welltrimmed and free of decay, split fingers, loose fingers, bruises, blemishes and discoloration caused by diseases, insects, molds, latex burn, and mechanical damage. Very slight superficial defects are allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.



### Class I

Banana in this class must be of good quality. It must have all the typical characteristics and color of the variety and/or commercial type. It must be mature, clean, well-formed, well -trimmed and free of decay, split fingers, loose fingers, bruises, blemishes and discoloration caused by diseases, insects, molds, latex burn, and mechanical damage. Slight defects of the fingers, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- slight defects in shape and color
- slight defects on the skin due to rubbing and other defects such sunburns and blemishes not exceeding 5 % of the total surface area.

The defects must not, in any case, affect the flesh of the fruit.



# Class II

This class includes banana which do not qualify for inclusion in higher classes but satisfy the minimum requirements specified in Section 2. The following defects, however, may be allowed, provided the banana retain their essential characteristics as regards the quality, the keeping quality and presentation in the package:

- defects in shape and color;
- defects on the skin due to rubbing and other defects such as sunburn and blemishes not exceeding 10 % of the total surface area.

The defects must not, in any case, affect the flesh of the fruit.

Size is determined either by length or diameter. The length is measured based on the middle in the outer row from the blossom end to the base of the pedicel where the edible flesh ends and maximum diameter of the equatorial section of the fruit, in accordance with the following table.

The reference fruit for measurement of the length and grade is:

- for hands, the median finger on the outer row of the hand;
- for clusters, the finger next to the cut section of the hand on the outer row of the cluster.

# Large-sized fruits

**Table 1.** Size classification for large-sized fruits

Size code	Length of finger (mm)	Diameter (mm)
L1	> 200	> 40
L2	181 – 200	36 - 40
L3	161 – 180	33 - 35
L4	141 – 160	29 - 32
L5	120 - 140	25 -28

## Medium-sized fruits

**Table 2.** Size classification for medium-sized fruits

Size code	Length of finger (mm)	Diameter (mm)
M1	> 130	> 36
M2	121 - 130	34 -36
M3	111 – 120	31 - 33
M4	101 – 110	28 - 30
M5	90 - 100	25 - 27

# Small-sized fruits

**Table 3.** Size classification for small-sized fruits

Size code	Length of finger (mm)	Diameter (mm)
S1	> 110	> 30
S2	91 – 110	28 -30
S3	71 – 90	25 - 27
S4	50 - 70	22 - 24

# 5.1 Quality tolerance

- **5.1.1 Extra class** Five (5) percent by number or weight of banana not satisfying the requirements of the class, but meeting those of Class I or exceptionally, coming within the tolerances of that class.
- **5.1.2** Class I Ten (10) percent by number or weight of banana not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.
- **5.1.3 Class II** Ten (10) percent by number or weight of banana 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.

### 5.2 Size tolerance

For all classes, ten (10) percent by number or weight of banana corresponding to the size immediately above or below that indicated on the package.

Banana must be packed in cartons or other similar containers that will protect from any external and internal damage to the produce. Each container shall be in compliance with the Recommended International Code of Practice for Packaging and Transport of Fresh Fruits and Vegetables (CAC/RCP 44 – 1995, Amd. 1 – 2004). The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling and transport of banana.

# Sample containers for harvesting





# Sample packaging for transport and retail





Each container shall be properly labeled with the following information:

- 1. Name of the product, variety and/or commercial type;
- 2. Class and size code;
- 3. Net content, weight (kg)/places/pack;
- 4. Name and address of grower, trader and/or exporter;
- 5. Province where grown;
- 6. Date of harvest;
- 7. Shelf-life of the produce (optional); and
- 8. Product of the Philippines

# Sample labels for banana packaging box





# 8.1 Heavy metals

Banana shall comply with the maximum levels for heavy metals established by the Codex Alimentarius Commission and/or authority for this commodity.

## 8.2 Pesticide residues

Banana shall comply with the maximum residue limits (MRL) established by the Codex Alimentarius Commission and/or authority for this commodity.

Table 4. MRL per active ingredient in banana (from PNS/BAFS 160:2021)

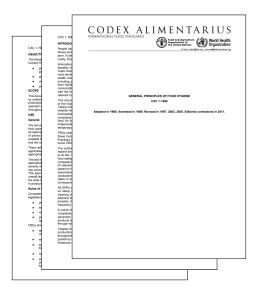
Active ingredient	MRL (mg/kg)
abamectin	0.01
acephate	1.00
acibenzolar-S-methyl	0.06
atrazine	0.02
azoxystrobin	0.50
benomyl	0.10
bifenthrin	0.10
bitertanol	0.50
boscalid	0.60
buprofezin	0.50
carbaryl	5.00
cadusafos	0.01
carbendazim	0.20
carbofuran	0.01
chlorfenapyr	0.01
chlorothalonil	2.00
chlorpyrifos	2.00
cypermethrin	0.03
diazinon	0.30
difenoconazole	0.10
dimethoate	1.00
diniconazole	0.01
diquat	0.02
dithiocarbamates (maneb, mancozeb, propineb, thiram,	2.00
dodine	0.20

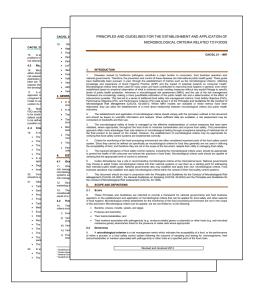
Active ingredient	MRL (mg/kg)
ethyl formate	3.00
epoxiconazole	0.50
ethephon	2.00
ethoprophos	0.02
etofenprox	2.00
fenamiphos	0.05
fenarimol	0.20
fenbuconazole	0.05
fenitrothion	0.20
fenpropimorph	2.00
fipronil	0.005
flonicamid	2.00
fluazifop-p-butyl	0.01
fluopyram	0.80
flusilazole	0.03
flutriafol	0.30
formetanate HCl	0.01
fosthiazate	0.05
glufosinate ammonium	0.20
glyphosate	0.20
haloxyfop1	0.02
imazalil	2.00
imidacloprid	0.05
iminoctadine tris (albesilate)	0.30
indaziflam	0.01

Active ingredient	MRL (mg/kg)
iprodione	10.00
soprothiolane	0.90
Isopyrazam	0.05
lambdacyhalothrin	0.50
methomyl	5.00
oxamyl	0.20
prochloraz	5.00
propiconazole	0.10
pyraclostrobin	0.01
pyrimethanil	0.10
saflufenacil	0.01
spinosad	0.01
spirotetramat	4.00
spiroxamine	4.00
tebuconazole	0.05
terbufos	0.05
thiabendazole	5.00
thiamethoxam	0.02
thiophanate methyl	0.20
triadimefon	1.00
triadimenol	0.20
tridemorph	0.07
trifloxystrobin	0.05
triflumizole	2.00
zoxamide	0.20

# 9.1 Hygiene

- 9.1.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with appropriate sections of the Recommended International Code of Practice General Principles of Food Hygiene (CAC/RCP 1 1969, Rev. 4 2003), Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53–2003), and other relevant Codex texts such as Code of Hygienic Practice and Code of Practice.
- 9.1.2 The produce should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21–1997).





## 9.2 Other consideration

Implement Good Agricultural Practices for the production and harvesting of banana.



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### Page 2 (Left to right; top to bottom)

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UPLB-PHTRC. (n.d.). Untitled edited image of ripe cavendish banana [Photograph].

UPLB-PHTRC. (n.d.). Untitled edited image of unripe lakatan banana [Photograph].

### Page 3 (Left to right; top to bottom)

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UPLB-PHTRC. (n.d.). Untitled edited image of unripe señorita banana [Photograph].

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UPLB - PHTRC. (n.d.). Untitled edited image of crown rot in banana [Photograph].

UPLB - PHTRC. (n.d.). Untitled edited image of finger rot in banana [Photograph].

UPLB - PHTRC. (n.d.). Untitled edited image of banana freckles [Photograph].

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UPLB - PHTRC. (n.d.). Untitled edited image of banana with box burn [Photograph].

UPLB - PHTRC. (n.d.). Untitled edited image of banana with cut [Photograph].

### Page 20 (Left to right)

UPLB - PHTRC. (n.d.). Untitled image of man carrying a bamboo basket with bananas [Photograph].

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# **Technical Working Group**

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Illustrative Guide (IG) serves as a supplementary Philippine National Standards (PNS) learning material to aid stakeholders to have uniform understanding and interpretation of the PNS for its efficient adoption and implementation.

The development of IG for PNS/BAFPS 64:2008 Fresh Fruits – Banana was initiated in 2022 to provide supplementary photographs or images pertaining to some provisions of the end-product quality standard for banana.









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