

# PHILIPPINE NATIONAL STANDARD

PNS/BAFPS 115:2013  
ICS 67.080.10

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## Fresh fruits – Dragon fruit (Pitahayas) – Classification and grading



**BUREAU OF PRODUCT STANDARDS**

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Fresh fruits – Dragon fruit (Pitahayas) – Classification and grading  
PNS/BAFPS 115:2013

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**Foreword**

The development of the Philippine National Standard for Fresh fruits – Dragon fruit (Pitahayas) – Classification and grading, PNS/BAFPS 115:2013 was undertaken by the Bureau of Agriculture and Fisheries Product Standards (BAFPS) in order to reflect the recent technology developments in the industry, and the need for its harmonization with ASEAN standards and Codex requirements in Heavy Metals, Pesticide Residues and Hygiene.

A Technical Committee and Sub-Committee (SC) were organized by Bureau of Agriculture and Fisheries Product Standards (BAFPS) through Special Orders No. 289 series of 2012 to generate and update the data and formulate the PNS for Dragon Fruit. BAFPS, in collaboration with the TC conducted technical reviews and public consultations in the three major islands of the country prior to the finalization of the standard.

PNS/BAFPS 115:2013 aims to provide common understanding on the scope, definitions, minimum requirements, classification, size classification, tolerances, sampling, packaging, and marking and labeling of Dragon fruit.

## 1 Scope

This standard applies to commercial species and varieties of dragon fruits (pitahayas), genera *Selenicereus* and *Hylocereus*, of the Cactaceae family, to be supplied fresh to the consumer, after preparation and packaging. Dragon fruits for industrial processing are excluded.

## 2 References

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

## 3 Definitions

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

### 3.1

#### **clean**

practically free from dirt or other foreign matters

### 3.2

#### **damage**

any defects which materially affect the appearance of the edible and shipping quality of dragon fruits

### 3.3

#### **fresh**

succulent fruit with turgid wings/scales

### 3.4

#### **foreign matter**

shall include, but not limited to dust, dirt, plastic, and stone which are foreign to the dragon fruits

### 3.5

#### **ripe**

change in color from greenish to red, pink or yellow

### 3.6

#### **sound**

free from rotting and deterioration

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<sup>1</sup> The name of the fruit used by Codex Alimentarius Commission (CODEX STAN 237-2003, Amend. 2-2011 – Codex Standard for Pitahayas.

## 4 Provisions concerning quality

### 4.1 Minimum requirements

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

- whole;
- ripe;
- firm;
- sound;
- clean and free of any visible foreign matter;
- fresh in appearance;
- practically free of pests affecting the general appearance of the produce;
- practically free of damage caused by pests;
- free of abnormal external moisture, excluding condensation following removal from cold storage;
- free of any foreign smell and/or taste<sup>2</sup>;
- free of cracks in the skin;
- with a peduncle between 0.5 cm and 1.0 cm in length; and
- without peduncle and thorns.

**4.1.1** The dragon fruits must have reached an appropriate degree of development and ripeness<sup>3</sup> in accordance to the characteristics of the variety and/or type and the area in which they are grown.

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<sup>2</sup> This provision allows for smell caused by conservation agents used in compliance with corresponding regulations.

<sup>3</sup> The maturity of the yellow dragon fruits can be gauged visually from its external coloring and confirmed by examining flesh content and using the iodine test.

The development and condition of the dragon fruits must enable them:

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

## **4.2 Classification**

Dragon fruits are classified in three classes defined below:

### **4.2.1 Extra class**

Dragon fruits in this class must be of superior quality. They must be characteristic of the variety and/or type. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

### **4.2.2 Class I**

Dragon fruits in this class must be of good quality. They must be characteristics of the variety and/or type. The following slight defects, 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
- slight defects of the skin not exceeding 5 % of the total surface area of the fruit.

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

### **4.2.3 Class II**

This class includes dragon fruits which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in 4.1 above. The following defects, however may be allowed, provided the dragon fruits retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape; and
- defects of the skin not exceeding 10 % of the total surface area of the fruit.

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

## **5 Provisions concerning sizing**

Size is determined by the weight of the fruit, in accordance with table 1:

**Table 1 – Size classification in Dragon fruit**

<b>Size code</b>	<b>Size classification</b>	<b>Weight (g)</b>
1	Jumbo	> 700
2	Extra large (XL)	531 - 700
3	Large (L)	431 – 530
4	Medium (M)	331 – 430
5	Small (S)	230 - 330

The minimum weight of dragon fruit must not be less than 230 g.

## **6 Provisions concerning tolerances**

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

### **6.1 Quality tolerances**

#### **6.1.1 Extra class**

Five percent by number or weight of dragon fruits not satisfying the requirements of the class but meeting those of class I or, exceptionally coming within the tolerances of that class.

#### **6.1.2 Class I**

Ten percent by number or weight of dragon fruits not satisfying the requirements of the class, but meeting those of class II or, exceptionally, coming within the tolerances of that class.

#### **6.1.3 Class II**

Ten percent by number or weight of dragon fruits satisfying the minimum requirements of the class.

### **6.2 Size tolerances**

For all classes, 10 % by number or weight of dragon fruits corresponding to the size immediately above and/or below that indicated on the package.

## **7 Provisions concerning presentation**

### **7.1 Uniformity**

The contents of each package must be uniform and contain only dragon fruits of the same origin, variety and/or type, quality, color and size. The visible part of the dragon fruits in the package must be representative of the entire contents.

### **7.2 Packaging**

Dragon fruits must be packed in such a way as to protect the produce properly. The materials used inside the package must be new<sup>4</sup>, clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labeling has been done with non-toxic ink or glue.

Dragon fruits shall be packed in each container in compliance with the Recommended International Code of Practice for Packaging and Transport of Fresh Fruits and Vegetables (CAC/RCP 44-1995).

#### **7.2.1 Description of containers**

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the dragon fruits. Packages must be free of all foreign matter and smell.

## **8 Marking and labeling**

### **8.1 Consumer packages**

In addition to the requirements of the Codex General Standard for the Labeling of Prepackaged Foods (CODEX STAN 1-1985), each package shall be legibly labeled with the following information:

**8.1.1** Name of produce, variety and/or type;

**8.1.2** Class and size (size code);

**8.1.3** Number of units (optional);

**8.1.4** Net weight (optional);

**8.1.5** Name and address of producer, trader, exporter, packer and/or dispatcher. Identification code (optional)<sup>5</sup>;

<sup>4</sup> For the purposes of this standard, this includes recycled material of food grade quality.

<sup>5</sup> In the case where a code mark is used, the reference “packer and/or dispatcher (or equivalent abbreviations)” has to be indicated in close connection with the code mark.



**8.1.6** Place of origin and, optionally, province where grown or local place name;

**8.1.7** Date of harvest;

**8.1.8** Official inspection mark and/or product certification mark (optional); and

**8.1.9** Product of the Philippines.

## **8.2 Non-retail containers**

Each package must bear the abovementioned particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment. For produce transported in bulk, these particulars must appear on a document accompanying the goods.

## **9 Contaminants**

**9.1** The produce covered by this standard shall comply with the maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

**9.2** The produce covered by this standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

## **10 Hygiene**

**10.1** 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 Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1-1969), Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53-2003), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

**10.2** 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).

## Annex 1

## Types of Dragon fruits

Types of Dragon fruits	Description
1. <i>Hylocereus undatus</i> (red)	Red-skinned fruit with white flesh. This is the most commonly-seen dragon fruit.
2. <i>Hylocereus costaricensis</i> (Costa Rica often called <i>H. polyrhizus</i> )	Red-skinned fruit with red flesh
3. <i>Hylocereus megalanthus</i> (Selenicereus, yellow)	Yellow-skinned fruit with white flesh

## Annex 2

## Nutritional values of Dragon fruits

Nutritional content	Values
Fiber (g)	0.9
Fat (g)	0.61
Ash (g)	0.68
Water (g)	83.0
Carotene (g)	0.012
Phosphorus (mg)	36.1
Ascorbic acid (mg)	9.0
Protein (g)	0.229
Riboflavin (mg)	0.045
Calcium (mg)	8.8
Niacin (mg)	0.43
Iron (mg)	0.65



**Figure 1 – Dragon fruit**



**Figure 2 – Dragon fruits**



**Figure 3 – Red Dragon fruit**



**Figure 4 – Yellow Dragon fruit**



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Figure 5 – Dragon fruit varieties



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Figure 6 – *Hylocereus polyrhizus X undatus* – 'Delight' Dragon fruit



Figure 7 – Dragon Fruit plants



**Figure 8 – Defects of Dragon fruits**





**Figure 9 – Stalks - twisted versus cut**



**Figure 10 – Uneven ripening of Dragon fruits**



**Figure 11 - Defects of Red Dragon fruits**

## References

**PNS/BAFPS 115:2013**

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

Code of Hygienic Practice for Fresh Fruits and Vegetables. CAC/RCP 53-2003.

Codex General Standard for Contaminants and Toxins in Food and Feed. CODEX STAN 193-1995.

Codex General Standard for the Labeling of Prepackaged Foods. CODEX STAN 1-1985.

CODEX STAN 237-2003, Amend. 2 - 2011. Codex Standard for Pitahayas. Food and Agriculture Organization/World Health Organization Codex Alimentarius Commission. Rome, Italy.

Principles for the Establishment and Application of Microbiological Criteria for Foods. CAC/GL 21-1997.

Recommended International Code of Practice – General Principles of Food Hygiene CAC/RCP 1-1969.

Recommended International Code of Practice for Packaging and Transport of Fresh Fruits and Vegetables. CAC/RCP 44-1995.

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