

PHILIPPINE NATIONAL STANDARD

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ICS 67.080

Purple yam (ube) jam (halaya) – Specification



BUREAU OF PRODUCT STANDARDS

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Foreword

The Philippine National Standard for Purple yam (ube) jam (halaya) and the Recommended Code of Practice for the Processing and Handling of Purple yam (ube) jam (halaya) were drafted simultaneously under the project entitled "Development of Standards for Ethnic Foods", reviewed by the Commodity Working Group (CWG) and Food Standards Technical Committee (FSTC) and were endorsed for adoption as Philippine National Standard and Recommended Code of Practice by the Food and Drug Administration.

During the development survey on existing practices of the purple yam jam processors and analysis of their products were conducted to have baseline information. Public consultation workshop was held in the Department of Science and Technology compound where different stakeholders contributed their expertise in the finalization of the draft.

The Philippine National Standard and Recommended Code of Practice were developed to set the high standard of the product and to have guide for the assurance of its quality and safety to make the products more competitive in the world market.

Purple yam (ube) jam (halaya) – Specification**1 Scope**

This standard applies to thermally processed purple yam or *ube* (*Dioscorea alata*) jam (*halaya*) as defined in 3.1, intended for direct consumption and/or further processing.

2 References

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

3 Definition of terms

For the purpose of this standard, the following terms shall mean:

3.1**acidified food**

it is a low-acid food to which acid(s) or acid food(s) are added and which has a finished equilibrium pH of 4.6 or below and a water activity (a_w) greater than 0.85

3.2**commercial sterility of thermally processed food**

it is the condition achieved by application of heat, alone or in combination with other appropriate treatment, sufficient to render the food free from microorganisms capable of growing in food at ambient conditions at which the food is likely to be held during distribution and storage

3.3**container**

it means any form of packaging material, which completely or partially encloses the food (including wrappers). A container may enclose the food as a single item or several units or types of prepackaged food when such is presented for sale to the consumer

3.4**current good manufacturing practices (cGMP)**

it is a quality assurance system aimed at ensuring that products are consistently manufactured, packed, repacked or held to a quality appropriate for the intended use. It is thus concerned with both manufacturing and quality control procedures

3.5**food**

it is any substance, whether processed or semi-processed or raw which is intended for human consumption and including beverages, chewing gum and any substance, which has been used as an ingredient on the manufacture, preparation or treatment of food

3.6**food additive**

it refers to any substance the intended use of which results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food; and including any source of radiation intended for any such use), if such substance is generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown through scientific procedures to be safe under the conditions of the intended use

3.7**food standard**

it is a regulatory guideline that defines the identity of a given food product (i.e. its name and the ingredients used for its preparation) and specifies the minimum quality factors and, when necessary, the required fill of container. It may also include specific labeling requirements other than or in addition to the labeling requirements generally applicable to all prepackaged foods

3.8**halaya**

it is a local name for comminuted purple yam (*ube*) with added sugar and cooked to a suitable consistency with or without adding water, other food ingredients and, food additives

3.9**hermetically sealed container**

it is a container which is sealed air-tight to protect the contents against the entry of microorganisms during and after processing

3.10**humectant**

it is a food additive which prevents food from drying-out by counteracting the effect of a dry atmosphere

3.11**ingredient**

it is any substance including food additives, used as a component in the manufacture or preparation of a food and present in the final product in its original or modified form.

3.12**label**

it includes any tag, brand, mark, pictorial, or other descriptive matter, written printed, marked, embossed or impressed on, or attached to a container of food

3.13

labeling

it means any written, printed or graphic matter (1) upon any article or any of its container or wrappers or (2) accompanying the packaged food

3.14

lot

it is food produced during a period of time and under more or less the same manufacturing conditions as indicated by a specific code

3.15

low-acid food

it is any food, other than alcoholic beverages, with pH above 4.6 and a water activity (a_w) greater than 0.85

3.16

packaging

it is the process of packing that is part of the production cycle applied to a bulk product to obtain the finished product. Any material, including painted material, employed in the packaging of a product including any outer packaging used for transportation or shipment. Packaging materials are referred to as primary or secondary according whether or not they are intended to be in direct contact with the product

3.17

pasteurization

it is the heating of food at 100°C or below for a specified time which inactivates most of the vegetative forms of spoilage microorganisms

3.18

pH

it is the measure of the intensity or degree of acidity of a food material

3.19

prepackaged

it means packaged or made up in advance in a container, ready for sale to the consumer

3.20

processed food

it shall refer to food that has been subjected to some degree of processing (e.g. milling, drying, concentration and canning, etc.), which partially or completely change the physico-chemical and/or sensory characteristics of the raw material

3.21

sterilization temperature

it is the temperature maintained through the thermal process as specified in the scheduled process

3.22**sterilization time**

it is the time between the moment the sterilization temperature is achieved and the moment the cooling started

3.23**syneresis**

it is the separation or leakage of liquid caused by the release of moisture from the breakdown of the gel structure upon standing

3.24**water activity (a_w)**

it is equivalent to the measure of free moisture in a food equal to the ratio of water vapor pressure of a food to the vapor pressure of pure water at the same temperature. It describes the degree in which water is bound in the food material and its availability to act as a solvent and participate in chemical/biochemical reactions and growth of microorganisms

3.25**water activity (a_w) controlled products**

these are low-acid canned foods which rely on control of water activity, in conjunction with a thermal process, to prevent the growth of microorganisms of public health significance as well as microorganisms of non-health significance

3.26**yam**

it is a tuber of a perennial climbing plant of the edible species of the genus *Dioscorea*

4 Description**4.1 Product definition**

4.1.1 Purple yam jam is a comminuted product prepared from sound and clean purple yam tubers that are:

4.1.1.1 mixed with sugar and other carbohydrate sweetener/s or other sweetening agent, with or without additives;

4.1.1.2 cooked to a suitable consistency;

4.1.1.3 packed in hermetically sealed containers; and

4.1.1.4 heat processed to attain commercial sterility.

4.2 Product classification

4.2.1 Low-acid purple yam jam – The product with an equilibrium pH > 4.6 and water activity (a_w) \geq 0.90.

4.2.2 Acidified purple yam jam – The product with an equilibrium pH ≤ 4.6 and a water activity (a_w) > 0.85 . The product has a natural pH greater than 4.6 and acid/s is/are added to bring down the pH to ≤ 4.6 .

4.2.3 Water activity controlled purple yam jam – The product with an equilibrium water activity (a_w) of ≤ 0.85 regardless of pH value.

4.2.4 Water activity controlled low-acid purple yam jam – The product with an equilibrium pH of > 4.6 and water activity (a_w) range of 0.85 to 0.90.

4.3 Process description

4.3.1 Sterilization of low acid products at 115°C-121°C (240°F-250°F) for a specified length of time adequate to prevent the growth of pathogenic microorganisms, i.e., *Clostridium botulinum* and other heat resistant microorganisms capable of growing in food packed in hermetically sealed containers and stored and distributed under normal non-refrigerated conditions.

4.3.2 Pasteurization of acidified and water activity controlled products at 100°C (212°F) or lower for a specified length of time adequate to prevent the growth of pathogenic and spoilage microorganisms capable of growing in food packed in hermetically sealed containers and stored and distributed under normal non-refrigerated conditions.

5 Essential composition and quality factors

5.1 Ingredients

5.1.1 Basic ingredients

5.1.1.1 Purple yam shall be sound and clean tubers of edible purple yam varieties of *Dioscorea alata* (Annex A) in fresh, frozen or dried forms.

5.1.1.2 Sugar shall be one of carbohydrate sweeteners that can be added including invert sugar, glucose and fructose.

5.1.1.3 Water shall be fit for human consumption and meets the potability requirements prescribed in the Philippine National Standards for Drinking Water as per DOH Administrative Order No. 2007-0012 (Annex B).

5.1.2 Optional ingredients

All other ingredients used shall be of food grade quality and conform to all applicable standards, which may include, but not limited, to the following:

5.1.2.1 Fresh or processed liquid or powdered milk;

5.1.2.2 Fresh or processed coconut milk;

5.1.2.3 Butter or margarine; and

5.1.2.4 Honey or its products.

5.2 Quality criteria

5.2.1 Physico-chemical properties

pH and water activity (a_w) values shall be as follows:

Classification	pH	(a_w)
Low-acid purple yam jam	> 4.6	≥ 0.90
Acidified purple yam jam	≤ 4.6	>0.85
a_w controlled purple yam jam	None required	≤ 0.85
a_w controlled low-acid purple yam jam	>4.6	0.86 - 0.90
> = greater than; \geq - greater than or equal to; \leq - less than or equal to		

5.2.2 Sensory properties

5.2.2.1 The product shall have a purple color. The color may be adjusted by the addition of food grade colorant/s.

5.2.2.2 The product shall have the characteristic taste and odor of cooked yam and be free from any foreign flavor and odor.

5.2.2.3 The product shall have a thick and pasty consistency.

5.3 Microbiological requirement

The product shall pass the commercial sterility test.

6 Defects

The sample unit shall be considered defective when it exhibits any of the defects as defined and described below.

6.1 Types of defects

6.1.1 Foreign matters

The presence in the sample unit of any matter which: has not been derived from the components or constituents of ingredients used in the product and listed in subsection 5.1; and, does not pose a threat to human health and can be recognized without magnification or is present at a level determined by any method including magnification that indicates non-compliance with good manufacturing and sanitation practices.

6.1.2 Appearance

6.1.2.1 Presence of mold growth.

6.1.2.2 Presence of air spaces like air bubbles or cracks.

6.1.2.3 Discoloration characterized by fading, browning or darkening.

6.1.3 Odor and flavor

6.1.3.1 Distinct burnt and soil odors and flavors.

6.1.3.2 Presence of objectionable odors or flavors indicative of decomposition, like sour, rancid or stale odors and flavors.

6.1.4 Texture

Textural breakdown characterized by liquefaction, syneresis, lumping or coagulation and dehydration.

6.2 Classification of defectives

A container whose contents exhibit any of the defects described in subsections 6.1.1 to 6.1.3 and, in which the number of defects observed per unit lot exceeds the acceptance number prescribed in the appropriate sampling plan (Annex C) shall be considered as "defective".

7 Lot acceptance

A lot shall be considered acceptable when it complies with the applicable quality criteria as prescribed in sub-section 5.2 and the number of "defectives", as defined in sub-section 6.2, does not exceed the acceptance number prescribed in the appropriate sampling plan (Annex C).

8 Food additives

Food additives when used shall be in accordance with the regulations prescribed by the Bureau of Food and Drugs (BFAD) under Bureau Circular No. 016, s.2006: Updated List of Food Additives) and/or by the Codex Alimentarius Commission. The food additives listed but not limited to those in Table 1 may be used for the manufacture of purple yam jam.

Table 1 – Food additives for “Purple Yam Jam” as per BFAD B.C. No. 016, s. 2006. (Updated List of Food Additives)

Food additive	Maximum use level
a. Acidity regulator	
Citric acid	GMP
Lactic acid	GMP
Salts of gluconic acid (including glucono delta lactone or GDL)	GMP
b. Food coloring	
FD&C Blue no. 1 Brilliant blue FCF	300 mg/kg
FD&C Blue no. 2 Indigo carmine	300 mg/kg
FD&C Red no. 2 Amaranth	300 mg/kg
FD&C Red no. 3 Erythrosine	300 mg/kg
c. Humectants	
Glycerol or glycerin	GMP
Sorbitol and sorbitol syrup	GMP
Propylene glycol	50,000 mg/kg
d. Stabilizers and thickeners	
Carboxymethylcellulose (CMC)	500mg/kg
Modified starch	GMP
e. Artificial sweeteners	
Acesulfame potassium	350 mg/kg
Aspartame	1000 mg/kg
Saccharin	500 mg/kg
Sucralose	150 mg/kg
* Based on the Food Category System: 04.2.2.4 canned and bottled (pasteurized) or retort pouch vegetables.	

Others not included in the above list shall be allowed as carry-over, provided they are approved by the BFAD regulation and shall be in accordance to Section 5.2 of the “Principle Relating to the Carry-Over of Food Additives into Foods” (CAC/Volume 1 1991).

9 Weights and measures

9.1 Minimum fill

The container should be well filled with the product which should occupy not less than 90% of the water capacity of the container. The water capacity of the container is the maximum volume of distilled water at 20°C that the sealed container can hold when completely filled.

A container that fails to meet the requirement for the minimum fill (90% container capacity) shall be considered as defective.

9.2 Lot acceptance

A lot will be considered as meeting the requirements of sub-section 8.1.1 when the number of "defectives" does not exceed the acceptance number (c) of the appropriate sampling plan (Annex C).

10 Hygiene

10.1 The product covered by the provisions of this standard shall 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, Rev. 4-2003) and/or the A.O. No. 153 s. 2004 – Guidelines on the Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food and processed according to the Recommended Code of Practice for the Processing of Purple Yam (*Ube*) Jam (*Halaya*) (PNS/FDA 25:2010).

10.2 When tested by appropriate methods of sampling and examination, the product:

10.2.1 shall be free from filth that may pose a hazard to health;

10.2.2 shall be free from parasites which may represent a hazard to health;

10.2.3 shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health;

10.2.4 shall be free from spoilage or pathogenic microorganisms capable of survival and multiplication under normal conditions of storage; and

10.2.5 shall be free from container integrity defects which may compromise the hermetic seal.

11 Packaging and labeling

11.1 The product shall be packed in appropriate primary packaging material that will maintain its commercial sterility during storage and transport.

11.2 The net weight of any sample unit shall be in accordance with BFAD **Permissible Net Content Variation in Prepackaged Food (BFAD B.C. No. 6-A s. 1998)**.

11.3 Labeling of *retail* packages/container - Each retail container shall be labeled and marked with the information in accordance with current BFAD Labeling Regulations and shall contain the following information:

11.3.1 The name of the product. The name of the product shall be "Purple Yam (*Ube*) Jam (*Halaya*)" or "Purple Yam Jam", that may be preceded by "Sweet" or "Sweetened". The product may be called by other common names like: "*Ube* Jam", "*Ubi* Jam", *Ube Halaya*, "*Ubi Halaya*" or any other names provided that such name is accepted in the country of distribution.

11.3.2 The name and the address of the manufacturer, packer, distributor, importer, exporter or vendor of the food.

11.3.3 The complete list of ingredients and food additives used in the preparation of the product in descending order of proportion.

11.3.4 The net content by weight in the metric system. Other systems of measurement required by importing countries shall appear in parenthesis after the metric system unit.

11.3.5 The words "Best/Consume Before"/"Use by date" indicating end of period at which the product shall retain its optimum quality attributes at defined storage conditions.

11.3.6 Lot identification marked in code identifying product lot.

11.3.7 The words "Product of the Philippines" or the country of origin if imported.

11.3.8 Additional requirements

A pictorial representation of the product(s) on the label should not mislead the consumer with respect to the product so illustrated.

11.4 Labeling of non-retail, bulk containers

The name of the product, lot identification code and the name and address of the manufacturer or packer shall appear in the container. However, the name and address of the manufacturer may be replaced by identification marks provided that such mark is clearly identified with accompanying documents.

11.5 Nutrition labeling

Nutrition labeling shall conform to established regulations by the BFAD.

12 Method of sampling and analysis

12.1 Method of sampling

Sampling shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (CAC/RM 42-1969), Codex Alimentarius Volume 13, 1994 (Annex C).

12.2 Methods of analyses

12.2.1 Determination of pH

According to the method of AOAC 18th Edition (AOAC, 2005)

12.2.2 Determination of water activity (a_w)

According to the method of AOAC, 18th Edition (AOAC, 2005)

12.2.3 Commercial sterility test

According to the method of USFDA Bacteriological Analytical Manual (BAM) On-line Edition (USFDA, 2008)

Annex 1

Varieties of purple yam (*Dioscorea alata*) for the processing of purple yam (Ube) Jam (Halaya)

Variety	Local name	Tuber flesh color
1. VU-1	<i>Nay Engles</i>	White with purplish tinge
2. VU-2	None	Partially purple to purple
3. VU-3	None	White
4. PSB VU-4	<i>Binato Glan</i>	White
5. PSB VU-5	None	Off-white
6. NSIC VU-6	None	White
7. NSIC GY-7	None	Predominantly light purple
8. NSIC VU-8	None	Predominantly purple to entirely purple
9. PRA-5	<i>Farm Lisbon</i>	White
10. PRA-7	<i>Florido</i>	White
11. PRA-10	<i>Kabusah</i>	White
12. PRA-11	<i>Kinabayo</i>	White
13. PRA-35	<i>Kinampay</i>	Predominantly light purple to purple
Source: Philippine Rootcrop Research and Training Center (Philrootcrops), Visayas State University (VSU), Baybay, Leyte		

Annex 2
Standard parameters and values for drinking water

Table 1 – Standard values for bacteriological quality

Parameter	Value/Unit	Point of compliance
Total coliform	< 1.1 MPN/100 ml	Service reservoir Water treatment works Consumers' taps Refilling stations Water haulers Water vending machines
Fecal coliform	< 1.1 MPN/100 ml	Service reservoir Water treatment works Consumers' taps Refilling stations Water haulers Water vending machines Point sources - Level 1
Heterotropic plate count	< 500 CFU/ml	Service reservoir Water treatment works Consumers' taps nearest meter Refilling stations Water vending machines

Table 2 – Standard values for physical and chemical quality for acceptability aspects for drinking water

Constituents	Maximum level (mg/L) or Characteristic	Constituents	Maximum level (mg/L) or Characteristic
Taste	No objectionable taste	Hydrogen Sulfide	0.05
Odor	No objectionable odor	Iron	1.0
Color	Apparent = 10 color units True = 5 color units	Manganese	0.4
Turbidity	3 NTU	pH	6.5 – 8.5
Aluminum	0.2	Sodium	200
Chloride	250	Sulfate	250
Copper	1.0	Total Dissolved Solids	500
Hardness	300 as CaCO ₃	Zinc	5.0

Source: Philippine National Standards for Drinking Water 2007 (DOH AO 2007-0012)

Table 3 – Standard values for organic and inorganic chemical constituents of health significance in drinking water

Inorganic chemical	Constituents	Maximum level (mg/L)	Constituents	Maximum level (mg/L)
	Antimony	0.02	Fluoride	1.0
	Arsenic	0.05	Lead	1.01
	barium	0.7	Mercury (total)	0.001
	Boron	0.5	Nickel	0.02
	Cadmium	0.003	Nitrate	50
	Chromium (Total)	0.05	Nitrite	3.0
	Cyanide (Total)	0.07	Selenium	0.01
Organic chemical	Constituents	Maximum level (mg/L)	Constituents	Maximum level (mg/L)
	Benzene	0.01	Ethylbenzene	0.30
	Carbon tetrachloride	0.004	Nitilotriacetic acid (NTA)	0.20
	1,2-Dichlorobenzene	0.1	Polyaromatic hydrocarbons (PAHs)	0.20
	1,4-Dichlorobenzene	0.5	Polynuclear aromatic	0.0007
	1,2-Dichloroethane	0.003	Tetrachloroethene	0.02
	1,1-Dichloroethene	0.05	Styrene	0.04
	1,2-Dichloroethene	0.07	Tetrachloroethene	0.70
	Dichloromethane	1.0	Trichloroethene	0.07
	Di(2-ethylhexyl) phthalate	1.01	Vinyl chloride	0.0003
	Edetic Acid (ADTA)	0.001	Xylene	0.5
Organic pesticide	Constituents		Maximum level (ug/L)	Status in the Philippines
	Aldrin and Dieldrin (combined)		30.0	Banned
	Atrazine		0.03	Registered
	Carbofuran		2.0	Registered
	Chlordane		7.0	Banned
	DDT **		0.2	Banned
	1,2-Dibromo-3-chloropropane (DBCP)		1.0	Banned
	2,4-Dichlorophenoxyacetic acid (2,4-D)		1.0	Registered
	Endrin		30.	Banned
	1,2-Dibromomethane (Ethylene dibromide)		0.6	Banned
	Heptachlor and Heptachlor epoxide (combined)		0.03	Banned
	Lindane		2.0	Restricted
	MCPA (4-(2-methyl-4-chloro) phenoxy) acetic acid		2.0	Registered
	Pendimethalin		20.0	Registered
	Pentachlorophenol (PCP)		9.0	Banned

Annex 3

**Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL 6.5)
(CAC/RM 42-1969)**

Sampling plan no. 1 – Normal operations

Inspection level 1, AQL 6.5)

1. Net weight: ≤ 1 kg

Lot size (N)	Sample size	Acceptance number (C)
4,800 or less	6	1
4,801 – 24,000	13	2
24,001 – 48,000	21	3
48,001 – 84,000	29	4
94,001 – 144,000	48	6
144,001 – 240,000	84	9
More than 240,000	126	13

2. Net weight: >1 kg ≥ 4.5 kg

Lot size (N)	Sample size	Acceptance number (C)
2,400 or less	6	1
2,401 – 15,000	13	2
15,001 – 24,000	21	3
24,001 – 42,000	29	4
42,001 – 72,000	48	6
72,001 – 120,000	84	9
More than 120,000	126	12

3. Net weight > 4.5kg

Lot size (N)	Sample size	Acceptance number (C)
600 or less	1	1
601 – 2,000	13	2
2,001 – 7,200	21	3
7,201 – 15,000	29	4
15,001 – 24,000	48	6
24,001 – 42,000	84	9
More than 42,000	126	13

**Sampling plan 2 - In case of disputes
Inspection level 2, AQL 6.5)**

1. Net weight: ≥ 1 kg

Lot size (N)	Sample size	Acceptance number (C)
4,800 or less	13	2
4,801 – 24,000	21	3
24,001 – 48,000	29	4
48,001 – 84,000	48	6
94,001 – 144,000	84	9
144,001 – 240,000	126	13
More than 240,000	200	19

2. Net weight: >1 kg ≥ 4.5 kg

Lot size (N)	Sample size	Acceptance number (C)
2,400 or less	13	2
2,401 – 15,000	21	3
15,001 – 24,000	29	4
24,001 – 42,000	48	6
42,001 – 72,000	84	9
72,001 – 120,000	126	13
More than 120,000	200	19

3. Net weight > 4.5 kg

Lot size (N)	Sample size	Acceptance number (C)
600 or less	13	2
601 – 2,000	21	3
2,001 – 7,200	29	4
7,201 – 15,000	48	6
15,001 – 24,000	84	9
24,001 – 42,000	126	13
More than 42,000	200	19

Source: Codex Alimentarius Sampling Plans for Prepackaged Foods – CAC/RM 42-1969, Codex Alimentarius Volume 13.

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PNS/FDA 24:2010

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FORMULATING BODY
Development of Standards for Purple Yam (Ube) Jam (Halaya)

FDA Technical Working Group

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