PHILIPPINE NATIONAL STANDARD

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Recommended code of practice for the processing and handling of purple yam (ube) jam (halaya)

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.

Recommended code of practice for the processing and handling of purple yam (ube) jam (halaya)

1 Scope

This Code of Practice is a set of recommended procedures that shall be adopted by processors of purple yam jam to enable their products to conform to the **Philippine National Standard for Purple Yam (*Ube*) Jam (*Halaya*) (PNS/FDA 24:2010)**.

This code provides a guide in the production, storage and handling of purple yam jam necessary to maintain their safety and quality from the receipt of raw materials and ingredients up to distribution.

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 Code, the following definitions shall apply:

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
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

3.9
humectant
it is a food additive which prevents food from drying-out by counteracting the effect of a dry atmosphere

3.10
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

3.11
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

3.12
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

3.13
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

3.14
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

3.15
packaging i
it s 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 of 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

3.16
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

3.17
pH
it is the measure of the intensity or degree of acidity of a food material

3.18
prepackaged
it means packaged or made up in advance in a container, ready for sale to the consumer

3.19
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

3.20
refractometer
it is the instrument used to measure the percent soluble solids, referred to as degree Brix (°Bx), in concentration of sugars expressed in terms of number of grains of sucrose per 100g of liquid. One (1) grain is equal to 0.065 gram

3.21
soluble solids
it is the concentration of sugars expressed in terms of the number of grains of sucrose per 100 g of liquid measured by a refractometer and expressed in degree Brix (°Bx)

3.22
sterilization temperature
it is the temperature maintained through the thermal process as specified in the scheduled process

3.23
sterilization time
it is the time between the moment the sterilization temperature is achieved and the moment the cooling started

3.24
water activity (a_w)
it is 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 Ingredients and packaging material requirements

4.1 Ingredients

4.1.1 Basic ingredients

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

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

4.1.1.3 Water shall be water 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).

4.1.2 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:

4.1.2.1 Fresh or processed, liquid or powdered milk;

4.1.2.2 Fresh or processed coconut milk;

4.1.2.3 Butter or margarine; and

4.1.2.4 Honey or its products.

4.1.3 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 regulators	
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).

4.2 Packaging materials

The packaging materials should be appropriate for the product to be packed and for the expected conditions of handling during distribution and storage. These should provide adequate protection from contamination for the contents and should be sufficiently durable to withstand mechanical, chemical and thermal stresses encountered during processing and normal distribution. All packaging materials must be clean and free from any defects that may affect the product or package integrity. These shall be stored in a clean and sanitary manner.

Just before filling, rigid containers shall be cleaned and sanitized to prevent incorporation of foreign matter into the finished product. Closures, semi-rigid containers, preformed flexible pouches and flexible pouch roll stock packed in their original wrappings may not be cleaned before use, subject to the conditions of handling by the processors or suppliers.

4.2.1 Glass jars and metal closures (caps or lids)

Only heat resistant glass jars and metal closures should be used. The glass jars should be properly inspected for cracks, chips and other defects. These should be washed with clean water to eliminate dirt and foreign matter. Metal closures should be provided with heat resistant liners and should be free from scratches, dents and other defects. It must also be provided with a self-sealing compound that will produce a hermetic seal after thermal processing.

Glass jars may be reused provided these are sound, and properly washed and sanitized. All metal closures shall never be reused. Shrinkable plastic cap seals should fit the size of the closures and glass jars when used as tamper-evident security feature, and, protect potential contamination in between the metal closure and the glass finish.

4.2.2 Metal containers

Two or three piece tin or aluminum cans should be inspected for integrity of side seam and double seams, general cleanliness and of defects. Only suitable inside linings may be used as required by the product.

4.2.3 Semi - rigid and flexible containers

Preformed heat resistant and retortable containers made of suitable materials may be used. They should be free from pinholes, scratches, blisters and other defects. The pouch seal area must be free from product spills and wrinkles.

5 Hygiene

It is recommended that the product covered by the provisions of this code of practice 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 **BFAD A.O. No. 153 s. 2004 – Guidelines on the Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food**, covering the plant facilities and operations requirement including the construction and layout of processing plant, hygienic facilities, equipment, utensils and working surfaces.

6 Preparation and processing

The production of purple yam jam is described from the receipt of raw materials up to product storage. The production process should be supervised by personnel with adequate technical training and experience.

6.1 Preparation of ingredients

Raw material (purple yam) and ingredients must be safe for human consumption and free from spoilage and contamination. Whenever applicable, certificates of analyses (COA) from ingredient suppliers shall be secured to confirm their suitability for processing. No ingredients, which have indications of deterioration, decomposition or contamination to an extent which renders them unfit for human consumption, shall be used for processing. Stored stocks of ingredients should be used on a first in - first out (FIFO) or on the first to expire - first to use (FEFU) basis. Ingredients that do not conform to the requirements of Sub-section 4.1 (Ingredient) shall be rejected.

6.1.1 Receipt of basic ingredients

All basic ingredients must be carefully inspected before use and must meet the following requirements:

6.1.1.1 Purple yam tubers shall be accepted only if they conform to 4.1.1.1. They must be packaged in suitable bulk packaging material and free from any signs of quality deterioration, decomposition or contamination like excessive discoloration, mold growth, insect infestation and other damage.

6.1.1.2 Frozen purple yam puree and purple yam powder may be used, alone or in combination with unprocessed purple yam puree. All deliveries of these intermediate products should be accompanied by certificates of analysis (COA) attesting to their safety and quality. They should not contain any ingredients that are not necessary in the processing of purple yam jam.

6.1.1.3 Sugar shall conform to 4.1.1.2. It shall be pre-packaged, refined sugar in the form of coarse or fine white crystals without any dirt, sand or other foreign matters.

6.1.1.4 Water shall conform to 4.1.1.3. It shall be obtained only from reliable sources, with adequate supply at all times. It should be clear and, free from any objectionable color, odor or taste.

6.1.2 Receipt of optional ingredients

All optional ingredients shall be inspected before use. They must be properly packaged and free from any signs of visible deterioration and contamination.

6.2 Processing operations

The manufacture of purple yam jam shall use standardized formulation and process required to achieve the safety and quality criteria as prescribed in Section 5.2 of the Standards for Purple Yam (*Ube*) Jam (*Halaya*) (PNS/FDA 24:2010). Any modifications introduced must be tested and validated prior to adoption in commercial processing.

6.2.1 Receipt and storage of purple yam tubers

Purple yam tubers should be processed immediately upon receipt or may be stored at room temperature. It should be stored in a cool, dry place.

6.2.2 Washing

The tubers may be soaked in tap water prior to washing for a period enough to soften the adhering soil and other foreign matters. They are then thoroughly washed using a pressurized water washer or by brushing with plastic bristle brush. The washed tubers are stacked in clean trays or baskets to drain and kept in dry and well ventilated storage areas ready for the succeeding operations.

The washing operation should be done in an area outside the processing facility to effectively segregate peelings and minimize contamination of the peeled tubers.

6.2.3 Cooking and cooling

Before cooking, the washed tubers may also be soaked in chlorinated water containing 100 ppm chlorine for at least 1 minute then rinsed with tap water and drained.

The tubers are then cooked by steaming at 100°C using a steamer or any atmospheric cooker. Pressure cookers or steam retorts may be used for cooking at higher cooking temperatures of 115.6°C and 121°C. The cooking process should be sufficient to fully cook the tubers up to its core.

Tubers may be sorted and cooked according to sizes and weights for even cooking. Timing of the cooking process shall start when the cooking temperature is reached.

After cooking, the tubers are cooled to room temperature (28°C-30°C) for manual peeling. Blower fans may be used to assist in cooling the tubers provided that the fans are kept clean and dust free.

6.2.4 Peeling and cutting

After cooling, the tubers are peeled and cut into cubes using stainless steel knives. Any unsightly or damaged parts, like scab-like surface lesions and discolored meat should be removed. Peels and other discarded parts should be immediately disposed, collected in a trash bin and brought out of the processing area. Excessive build-up of trash in the processing area should be avoided to prevent contamination of the peeled tubers.

Cut or cubed tubers are kept in clean covered containers pending use.

6.2.5 Grinding and mixing

The pre-cut cooked tubers are passed through a grinder with an appropriate size of die until a pasty consistency is achieved. During the grinding process, sugar, water and the optional ingredients may be added. The grinding process may be repeated to evenly mix the ingredients. Sugar syrup may be added instead of using refined sugar and water.

6.2.6 Cooking

The purple yam mixture is then transferred in appropriate cooking vats or kettles and cooked with continuous agitation until the required consistency is achieved. The end-point of cooking is also indicated when the required sweetness is attained, and determined using a hand-held refractometer that measures the percentage total soluble solids (TSS) reading equivalent to the percentage sucrose in the product.

6.2.7 Filling/packing in containers

The cooked mixture is filled while hot either manually or mechanically in suitable containers leaving an appropriate headspace. Filling temperature should not be lower than 82°C or 180°F. After filling, the filled containers should be freed of trapped air bubbles before sealing.

Properly filled containers should exhibit a net weight equivalent to at least 90% of the water capacity of the container. Overfilling can lead to underprocessing and leakage.

6.2.8 Exhausting of filled containers

Vacuum in the containers may be produced by heat exhausting, hot filling, steam injection or the application of vacuum. The filled containers may be exhausted to create the necessary vacuum upon cooling. It also prevents/minimizes corrosion of closures and removes air that would cause discoloration, flavor changes and loss of nutrients.

During heat exhausting, the temperature of the contents should reach at least 80°C prior to full sealing. This would be sufficient to produce vacuum in the containers.

6.2.9 Closing or sealing of containers

For rigid packaging materials (cans and glass jars), seams and other closures should be air tight and secure to meet the requirements of processors. Self-sealing metal caps or lids should be tightened and secured to each filled jar before thermal processing.

No further tightening should be done during and after processing to avoid damaging the seal that could result to leakage.

To prevent leakage and contamination, the sealing surface should be free from defects and damage. After closing, the caps should be essentially level, not cocked or tilted, and seated well down the glass jar finish (neck). The diameter across the finish of the jar should be less than that of the diameter across the container. This will prevent damage caused by bumping with adjacent containers as they move along conveyors.

For flexible packaging materials, the seal area must be free of food material and wrinkles in order to form adequate heat seals. Sealing time and temperature, pressure should conform to the packaging material specifications.

6.2.10 Washing of sealed containers

Washing of filled and sealed containers should be done to remove product spills adhering firmly on the outside surface of the container.

6.2.11 Thermal processing of sealed containers

Thermal processing should immediately start after closing or sealing the containers to prevent reduction in product temperature. Processing schedules for specific formulations of purple yam jam should be established by competent personnel/ laboratories.

6.2.11.1 Establishment of thermal processes

Establishment of the required heat treatment for a product can be divided into two steps.

First, the required heat process to achieve commercial sterility is determined on the basis of factors such as the reference organism of public health significance and/or spoilage microorganisms, container size and type, pH of the product, product composition or formulation, levels and types of preservatives, water activity (a_w), and the expected storage conditions.

The second step is to carry out heat penetration tests on the basis of heat processing facilities available and the desired product quality. The temperature at the slowest heating point in the container contents should be monitored during the tests. An adequate number of heat penetration tests should be done to determine variations that should be considered in the scheduled process.

6.2.11.2 Thermal processing times and temperatures

a) **Sterilization at severe heating temperatures for low-acid purple yam jam.**

Low-acid purple yam jam has an equilibrium pH > 4.6 and water activity (a_W) > 0.90 that should be sterilized at 115.6°-121°C (240°-250°F), which is equivalent to a pressure of 10 psi-15 psi (50.3 inch-60.4 inch Hg or 170 kPa-205 kPa) at processing times specified in the scheduled processes. The scheduled processes should be adequate to destroy the spores of *Clostridium botulinum*, a food poisoning and heat resistant bacterium that survives in improperly processed low-acid foods. Appropriate sterilization equipment for low-acid foods packed in glass jars, cans and pouches should be used.

b) **Pasteurization at lower temperature of the purple yam jam of the following classifications:**

i) Acidified purple yam jam The product has an equilibrium pH ≤ 4.6 and a water activity (a_W) > 0.85. The raw material has a natural pH greater than 4.6 and acid/s or acid foods are added to bring down the pH to ≤ 4.6.

ii) Water activity (a_W) controlled purple yam jam. The product has an equilibrium water activity (a_W) of ≤ 0.85 regardless of the pH value

iii) Water activity controlled low-acid purple yam jam. The product has an equilibrium pH of > 4.6 and water activity (a_W) range of 0.86 to 0.90.

The above acidified and water activity (a_W) controlled products are thermally processed by pasteurization 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. It is necessary that the products' pH and water activity (a_W) are checked and monitored.

6.2.11.3 Thermal processing room operations

Scheduled processes and thermal processing procedures for each product and container size shall be posted in a conspicuous place near the processing equipment. Such information should be readily available to the retort or processing system operator and auditors/inspectors of the Bureau of Food and Drugs.

All retort baskets, trucks, cars or crates containing un-retorted food products shall be conspicuously marked with heat sensitive indicators or other effective identifying markers.

An accurate wall clock must be posted where it is clearly visible from the retort operator's station.

6.2.11.4 Cooling of processed products

Cooling of finished products is dependent on the thermal processing systems used. Low-acid products processed in water retorts with air overpressure are cooled in the same heating equipment. Precaution should be taken not to abruptly reduce pressure during cooling of glass jars and pouches to prevent breakage. Air cooling may be used for products packed in glass jars.

To avoid thermophilic spoilage and/or quality deterioration of the product, the containers should be cooled as rapidly as possible to an internal temperature of 40°C- 50°C (104° -122°F).

The cooling water must have low microbial content, which can be achieved by adequate chlorination. The minimum level of residual free chlorine for cooling water is 2 ppm. Chlorine levels in excess of this may accelerate corrosion of certain metallic containers. The residual chlorine in cooling water should be maintained and recorded.

6.2.11.5 Washing and drying

The finished products may be washed in warm water to remove adhering product particulates, and immediately dried. Pouches may be dried promptly using appropriate dryers.

To control post -process leakage contamination or leaker infection in glass jars and cans, processed containers should be dried as soon as possible after processing so that exposure to post-wet retorting, conveying and handling equipment is minimized.

6.3 Container handling after processing

Container abuse and mechanical shocks should be avoided to prevent leaker infection and breakage of glass jars.

Store products in cool, dry place.

7 Coding, inspection and labeling

7.1 Coding of sealed containers

Codes of processed containers should be marked in indelible ink with details of production date, batch code, product code, the manufacturing plant, the production line in which product was packed and other information necessary for product traceability. However, if the container does not permit the code to be embossed or inked, the label should be legibly perforated or otherwise marked, and securely affixed to the product container.

7.2 Inspection of the finished products

All finished products should be inspected before labeling and casing, and defective products should be segregated and rejected. The company should have an approved policy or procedure in handling defective or rejected products based on AO 153 series of 2004 (Revised Guidelines on the Current Good Manufacturing Practices in Manufacturing, Packaging, Repacking or Holding Food).

7.3 Labeling

Labeling should be done after the prescribed incubation period when the product has passed quality evaluation. All containers should be properly labeled. The label should conform to the labeling regulation as per BFAD A.O. No. 88-B s. 1984 (Rules and Regulation Governing the Labeling of Prepackaged Food Products Distributed in the Philippines).

7.4 Tamper -evident seals

Tamper -evident seals are highly recommended as added product security feature.

8 Quality assurance

8.1 Record keeping

Permanent, legible and dated records of time, temperature, code mark and other pertinent details should be kept for each load/batch. Such records are essential as a check on processing operations.

Record pertaining to time for time steam on, venting time and temperature, sterilization period, sterilization temperature reached and time steam off should be kept for every batch load.

Written records of all container closure examinations should specify the code lot, the time and date of container closure inspections, the measurements obtained, and all corrective actions taken.

Records identifying initial distribution of the finished product should be maintained to facilitate the segregation of specific food lots that may have been contaminated or otherwise unfit for intended use.

8.2 Deviations in processing

Whenever process monitoring records disclose that a product received a thermal or sterilization treatment less than that stipulated in the scheduled process, the processor should:

8.2.1 Identify, isolate and then reprocess the portion of the production lot involved. Complete reprocessing records should be retained.

8.2.2 Set aside that portion of the product lot involved for further evaluation for any potential public health hazard. Such evaluation shall be made by a competent processing authority and shall be in accordance with recognized procedures. A record shall be made of the evaluation made and results. After the determination that no significant potential for health hazard exists, that batch/lot of the product in a lot involved may be distributed. Otherwise, that portion of the product in a lot shall be properly disposed.

8.2.3 All process deviations involving failure to satisfy the minimum requirements of the scheduled process shall be recorded detailing the deviations and the actions taken to correct them.

9 Storage and transport of finished products

Processors should ensure that the storage and transport conditions of the finished product do not adversely affect the integrity of the product container and, the safety and quality of the product. Extreme fluctuations in temperature and humidity should be avoided during storage and transport of the product.

10 Laboratory control procedures

10.1 Each food -processing establishment should have access to laboratory control of both the processes used and the finished products.

10.2 All ingredients and food products declared unfit for human consumption by the laboratory should be rejected and properly discarded.

10.3 Representative samples for each lot or batch should be taken to assess the safety and quality of the product.

10.4 Microbiological laboratory for pathogenic organisms should be separated from the processing area, and no pathogenic organisms should be handled within the premises of the manufacturing plant.

10.5 Laboratory procedures for quality control of the processes and product should follow recognized or standard methods for easy interpretation of results.

10.6 Samples for each batch of production should be retained and stored for reference and observation

11 End product specifications

Appropriate methods should be used for sampling analysis and determinations to meet the following specifications:

11.1 To the extent possible in good manufacturing practice, the products should be free from any objectionable characteristics.

11.2 The product should not contain any pathogenic organisms or any toxic substances originating from microorganisms.

11.3 The product should be free from chemical pollutants in amounts, which may represent hazard to health.

11.4 The product should comply with the requirements set forth by the Bureau of Food and Drugs and the Codex Alimentarius Commission on Pesticide Residues and Food Additives.

11.5 Products with an equilibrium pH above 4.6, a water activity (a_w) above 0.85 should receive a processing treatment sufficient to destroy all spores of *Clostridium botulinum*, unless growth of surviving spores would be permanently prevented by product characteristics other than pH and water activity (a_w).

Annex A

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

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

Annex B

Standard parameters and values for drinking water

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

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 CaCO3	Zinc	5.0

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	Nitrilotriacetic 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-ethyhexyl) 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) phenoxyl acetic acid	2.0	Registered
	Pendimethalin	20.0	Registered
	Pentachlorophenol (PCP)	9.0	Banned

Annex C
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: ≥ 1kg**

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 > 4.5kg**

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.		

1. Apparatus

Weighing balance (sensitivity: 0.10 gram)

2. Procedure

2.1 Weigh the sample unit on its original sample packed container. This is the gross weight.

2.2 Open and transfer the contents of each individual package. Wash the empty package and blot dry.

2.3 Weigh out the washed empty package. This is the weight of the packaging material.

2.4 Subtract the weight of the empty package from the gross weight. The resulting figure is the net weight of the individual package (net weight = gross weight – weight of packaging).

2.5 Average the results from all package of a sample representing a lot. Report result as the average net weight of the product.

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.

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

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