

PHILIPPINE NATIONAL STANDARD

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ICS 67.020

**Recommended code of practice for the processing and
handling of dried fish**

Foreword

The development of this Philippine National Standard for Recommended Code of Practice for the Processing and Handling of Dried Fish was initially prepared by the Institute of Technology and Development Institute.

In 2005, the Bureau of Food and Drugs (BFAD) created the PNS Committee to fastrack the development of the ethnic food products standards and part of the standards is the code of practice to guide the food manufactures/processors, repackers, traders, exporters/importers and distributors of these dried fish products.

Recommended code of practice for the processing and handling of dried fish

1 Scope

This Code prescribes the guidelines and the essential requirements for the handling and processing of dried fish products prepared with or without salt.

This Code is intended to prescribe guidelines to achieve compliance with the standards for dried fish.

2 Definition of terms

For the purpose of this Code, the following definition shall apply:

2.1**artificial drying**

drying by means of mechanically circulated air where the temperature and humidity may be controlled

2.2**brining**

the process of soaking fish in a solution of salt (sodium chloride) of particular concentration for a period sufficient for fish tissue to absorb a significant quantity of salt

2.3**chilled fish**

fresh fish, which has been stored at a temperature not exceeding 5°C

2.4**cleaning**

the removal of objectionable matter from the surface

2.5**container**

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

2.6**contaminants**

any biological or chemical agent, foreign matter, or other substances that are not intentionally added to food, which may compromise food safety or suitability

2.7

contamination

any direct or indirect transmission of objectionable substances to the fish

2.8

disinfection

the direct application of chemical or physical agents and processes to eliminate pathogenic or disease-causing microorganism

2.9

dried fish fillet

dried fish made from fresh cut parallel to the central bone of the fish wherein the fins, main bones and sometimes belly flaps are removed

2.10

dry salting or kench curing

the direct application of salt to fish with the resulting brine to drain

2.11

food

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

2.12

food additives

any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacturing, processing, preparation, treatment, packaging, transport or holding of such food results or maybe reasonably expected to result (directly or indirectly) in its or its by – product becoming a component of (or otherwise affecting the characteristic of) such food

2.13

food standard

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

2.14

fresh fish

freshly caught fish, which has received no treatment other than chilling

2.15

good manufacturing practice (GMP)

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

2.16

hazard analysis and critical control point (HACCP)

a preventive food quality management system, which identifies, evaluates and controls the hazards significant to food safety specific to a product

2.17

ingredient

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

2.18

iodized salt

a food grade quality salt that meets the purity requirements of standards for iodized salt per Republic Act (R.A.) No. 8172

2.19

label

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

2.20

labeling

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

2.21

lot

food produced during a period of time and under more or less the same manufacturing condition indicated by a specific code

2.22

natural drying

the drying of fish by exposure to open air

2.23

packaging

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

2.24

processed food

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

2.25

processing

the part of production cycle starting from weighing of raw materials to the obtaining of a bulk product

2.26

processing plant

the building or buildings, or portions thereof used for the manufacture and storage of dried fish for human consumption

2.27

split dried fish

dried fish prepared by cutting the fish along the dorsal side from the base of the tail to the tip of the head with the internal organs and gills removed prior to salting and drying

2.28

water activity (aw)

the ratio of water vapor pressure of the substance to the vapor pressure of pure water at the same temperature

2.29

whole dried fish

fish dried in its original form, which has not been cut and eviscerated, and with scales intact

3 Raw materials requirements

3.1 Fish

The fish shall be fresh, and wholesome, fit for human consumption.

3.2 Salt

It shall be of food grade quality and meets the purity requirements of standards for iodized salt as per R.A. No. 8172.

4 Plant facilities and operation requirements

4.1 Construction and layout of processing plant and hygienic facilities

This should conform to BFAD Administrative Order No. 153 series of 2004 (AO 153 s. 2004), the *“Revised Guidelines on the Current Good Manufacturing Practice (cGMP) in Manufacturing, Packing, Repacking or Holding Food.”*

4.2 Equipment, utensils and working surfaces

4.2.1 All food contact surfaces like fish containers, fish brining and salting vats should be resistant to corrosion, repeated cleaning and disinfection.

4.2.2 All equipment should permit thorough cleaning and disinfection.

4.2.3 Cutting boards should be made of impervious, easy to clean materials.

4.2.4 Fish drying yards should conform to have the following requirements:

4.2.4.1 It should be clean and dry with good drainage system to drain out the fish drippings.

4.2.4.2 Drying racks should be made of durable materials (e.g. bamboo poles, wood or concrete). The drying trays should be made of corrosion-resistant materials and should be placed at least one meter above the ground.

4.2.4.3 Portable shades or plastic film coverings should be readily available to protect fish from sudden rain.

5 Hygienic practices

5.1 The premises, soaking tanks and /or vats, utensils and other physical facilities must be kept clean and in good condition. All fish contact surfaces should be scrubbed with detergent then thoroughly rinsed with water. Final rinse with chlorinated water with calcium or sodium hypochlorite is recommended. A 200 ppm solution or about 2 tablespoons of laundry bleach per gallon (3.785 liters) of water may be used.

5.2 Cutting or splitting should be done as soon as possible to prevent fish deterioration.

5.3 Insecticides should not be used during operations. The use of adhesive insect traps or the “light insecticutor” lamps with attached collecting trays are recommended.

5.4 All offals should be collected into an appropriate container for proper disposal.

5.5 Personal hygiene should conform to the GMP requirements in BFAD AO 153 s. 2004.

6 Production requirements

6.1 Receiving of raw materials and ingredients

6.1.1 Fish

The freshness of fish is generally evaluated based on its appearance, odor and texture. Annex A provides the comparative characteristics of fresh and stale fish.

The fish should be processed immediately after receipt. Those fish that cannot be immediately processed into dried fish should be properly stored in ice or preferably refrigerated or chilled, pending processing.

6.1.2 Salt and other ingredients

The salt should be coarse or fine and of food grade quality, and meets the purity requirements as specified in Section 4.1 of the Implementing Rules and Regulations of the ASIN Law, Republic Act (RA) 8172, an *Act Promoting Salt Iodization Nationwide*.

Other food ingredients like spices (onions, garlic, pepper), seasoning and condiments (sugar, vinegar, soy sauce, monosodium glutamate or “vetsin”) may be added to enhance the flavor of the dried product. Potassium sorbate, a preservative to prevent mold growth, may be added in the brining process as long as the amount added does not exceed 200 mg per kg of the final product.

6.2 Sorting

All fish should be carefully inspected and sorted according to size and quality before processing.

6.3 Washing, splitting, evisceration or gutting and cleaning

6.3.1 The fish should be thoroughly washed before processing and immediately gutted, if necessary.

6.3.2 For split type dried fish, the fish should be split into butterfly fillet, by cutting longitudinally along the dorsal side from the base of the tail to the tip of the head. The fish should be split open and the gills and internal organs removed. The remaining traces of internal organs and blood in the peritoneal lining should be scraped and washed thoroughly. The cleaned fish should be allowed to drain.

6.3.3 For whole dried fish, no splitting or cutting is required. The fish should be washed and drained prior to salting and drying.

6.3.4 For filleted type dried fish, the fish is eviscerated and the loin meat portion of the fish is recovered by cutting the fish parallel to the central bones. The skins, bones, fins and belly flaps should be removed.

6.3.5 For unsalted fish, proceed to Drying (Step F) after washing.

6.4 Salting of fish

Fish should be uniformly salted either by brining or dry salting. Only uniform sized fish should be salted in the same batch.

6.4.1 Brining or soaking fish in salt solution

6.4.1.1 Fresh brine of required strength is prepared by dissolving the required amount of salt in a given amount of water.

6.4.1.2 Brine strength should be regularly checked with a hydrometer or salinometer and its strength maintained at the required concentrations through the addition of salt. The salinometer consists of a float with a stem attached, marked in degrees. In saturated brine, the stem will be almost entirely above the level of the salt solution and read 100° (corresponding to 26% salt by weight). In weaker brines more of the stem will be below the level of the salt solution. Salinometer readings should be taken at the standard temperature correction should be applied (see Annex B - *Preparation of Brine of Required Strength*)

6.4.1.3 The brine should be changed regularly to prevent the accumulation of fatty scum and decomposition of fish sludge made up of undissolved salt crystals, insoluble salt components, fish residues and other foreign matters. These impurities can contaminate the fish in subsequent brining and affect the quality of the final product.

6.4.1.4 The brine to fish ratio should be at least 1 part brine to 1 part fish when using saturated brine. A small amount of solid salt present at the bottom of the brining vat indicates saturation.

6.4.1.5 The fish should be completely covered by the brine to ensure even salt penetration. Weights made of plastic or stainless steel screens could be placed on top of the fish to keep the fish immersed in the brine.

6.4.1.6 During brining, the vat should be properly covered to prevent contamination.

6.4.2 Dry salting or Kench curing

6.4.2.1 Fish for dry salting should be properly arranged to ensure uniform conditions and proper drainage.

6.4.2.2 Fish piles should never be placed directly on the floor.

6.4.2.3 Amount of salt, time and temperature should be carefully controlled to obtain the desired product. The amount of salt to fish (by weight) ranges from 1 part of salt to 8 parts of fish for light salting or 1 part of salt to 3 parts of fish for heavy salting. The salting period depends on the saltiness required on the product.

6.4.2.4 Fish should be restacked periodically with the top of the pile going to the bottom of the new pile, and with the addition of fresh salt to ensure that sufficient salt will be present to complete the cure.

6.4.2.5 If the fish is restacked on pallets, the pallet should be clean.

6.4.2.6 Under certain conditions dry salting of small fatty fish, such as anchovy and small herring, may be used. For large fish, brining should be used in preference.

6.5 Washing the fish after salting

After the salting period, the fish should be removed from the salting vat, washed and drained. This prevents salt crystals from forming on the surface of the dried product.

6.6 Drying

The fish should be immediately laid on drying trays and dried by either the natural or the artificial drying method. The fish, laid on drying trays, is placed on drying racks and properly positioned in the sun drying area or pre-heated artificial dryer.

During sun drying, the fish should be inverted to allow even drying. It should be covered with nylon nets of suitable mesh during the entire drying period to protect the fish from insects. Fish not sufficiently dried during the day should be collected and stored indoors preferably in cold storage.

For artificial drying, the above steps may not be followed provided that the dryer is capable of maintaining the desired temperature during drying. For combination drying, the initial phase could be sun drying followed by the artificial drying to complete the drying operation.

6.7 Storage of dried fish

For longer shelf life, dried products should be stored at refrigerated conditions, at chilling temperature not exceeding 5°C or freezing temperature of at least -10°C. However, if refrigeration facilities are not available, dried fish can be stored at ambient conditions (28°C-30°C). The company should have an approved policy or procedure in handling defective or rejected products based on AO 153 series of 2004.

Annex A

Characteristics of fresh and spoiled fish

Criteria	Fresh fish	Spoiled fish
1. Body color	normal bright, glossy and shiny	pale, faded or dull
2. Rigidity of body	rigid or stiff	flabby or limp
3. Eyes	clear, bright (cornea clear black), bulging or protruding	cloudy or completely white, wrinkled, sunken
4. Scales	adhere strongly	Loose
5. Gills' odor, color	bright red, fresh seaweedy odor	yellowish, gray or brown color, off-odor (stale or sour)
6. Flesh	firm and elastic, springs back when pressed	very soft, finger impressions remain when pressed
7. Skin	no to little slime	slimy, sometimes coagulated or lumpy

Annex B

Preparation of brine of required strength

The amount of salt to be dissolved in water to obtain required brine strength: brine strength measured at 16°C or 61°F

Specific gravity	% Salt by weight	Baume' degrees U.S. Standard	Salinometer °S	Salt (kg) to be dissolved in 100 L water
1.007	1	1.0	3.8	1.0
1.014	2	2.0	7.6	2.0
1.022	3	3.1	11.4	3.1
1.029	4	4.1	15.2	4.3
1.037	5	5.2	19.0	5.3
1.044	6	6.1	22.7	6.4
1.051	7	7.0	26.5	7.5
1.058	8	7.9	30.3	8.7
1.066	9	8.9	34.1	9.9
1.073	10	9.8	37.9	11.1
1.081	11	10.9	41.7	12.4
1.089	12	11.9	45.5	13.6
1.096	13	12.7	49.3	14.9
1.104	14	13.7	53.1	16.3
1.112	15	14.6	56.8	17.6
1.119	16	15.4	60.6	19.0
1.127	17	16.3	64.6	20.5
1.135	18	17.2	72.0	22.0
1.143	19	18.1	75.8	23.5
1.151	20	19.0	79.6	25.0
1.159	21	19.9	83.4	26.6
1.168	22	20.9	87.2	28.2
1.176	23	21.7	91.0	29.9
1.184	24	22.5	94.8	31.6
1.192	25	23.4	98.5	33.3
1.201	26	24.3	100.0	35.1
1.204	26.4	24.6	-	35.9

References

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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 references document (including any amendments) applies.

Code of Practice in Manufacturing, Processing and Holding Human Food. Philippine National Standard. Product Standard Agency (PSN 96: 1985).

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Small Scale Processing of Fish. Technical Memorandum No. 3. Technology Series International Labor Office. Geneva. 1982.

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