1 Scope

This standard applies to Tilapia species of the *Cichlidae* family prepared and marketed live, chilled or frozen, intended for human consumption. The product can be presented in the following forms:

(i) live
(ii) whole
(iii) whole, gutted
(iv) fillet

2 References

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

3 Definition of Terms

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

3.1 Chilling refers to the process of cooling fish and shellfish to a temperature of 0^0C-4^0C (*BAFS/PNS 138:2014 – Philippine National Standard for Fresh-chilled, Fresh-frozen and Treated Tuna)*

3.3 Contaminant refers to any biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability *(BAFS/PNS 138:2014)*

3.4 Eviscerated refers to having at least the gut and all the internal organs removed

3.5 Food additive refers to any substances other than the basic food stuff present in the food as a result of any aspect of production, processing, storage or packaging but not include chance contaminants

3.6 Freezer burn refers to the loss of moisture from frozen products though evaporation. This may occur if the products are not properly glazed, packaged or stored *(BAFS/PNS 138:2014)*

3.7 Freezing refers to a process that is carried out in appropriate equipment in which the initial temperature of the product is reduced to -18^0C or lower. The process shall not be regarded complete unless and until the product temperature has reached -18^0C or lower at the thermal center after thermal stabilization *(BAFS/PNS 138:2014)*

3.8 Glazing refers to the application of a protective layer of ice formed at the surface of a frozen product, done by spraying with or dipping it into clean seawater, potable water, or potable water with approved additives, as appropriate *(BAFS/PNS 138:2014)*

3.9 Potable water refers to water suitable (both health and acceptability considerations) for drinking and cooking purposes *(BAFS/PNS 138:2014)*

3.10 Veterinary Drugs refers to chemical substances used to alter the state or condition of the fish and/or the culture medium *(FAO 214)*

4 Description

4.1 Product Definition

4.1.1 Live Tilapia

Live tilapia is properly handled to keep the product fresh and free from any defects and harmful substances.

4.1.2 Whole Tilapia
Fresh whole tilapia with all internal organs are intact, and subjected to either chilling or freezing process.

4.1.3 Whole gutted tilapia

Fresh whole tilapia with the viscera and other organs completely removed, and subjected to either chilling or freezing process

4.1.4 Tilapia Fillet

Fresh tilapia fillet prepared with or without skin, subjected to either chilling or freezing process

4.2 Process definition

4.2.1 Live Tilapia

Live tilapia kept in appropriate holding containers with aerated cool and clean freshwater in accordance to Section 8 - Hygiene and handling.

4.2.2 Whole Tilapia

Fresh tilapia, uneviscerated, cleaned and washed with potable water and subjected to immediate chilling at 0-4^{0}C; or immediate freezing to a core temperature of -18^{0}C or lower, packed and stored at -18^{0}C or lower.

4.2.3 Whole gutted tilapia

Fresh tilapia eviscerated, cleaned and washed with potable water, handled in accordance with hygienic practices and subjected to either immediate chilling at 0-4^{0}C or immediate freezing to a core temperature of -18^{0}C or lower.

4.2.4 Tilapia Fillet

Fresh tilapia fillet, with or without skin, cleaned and washed with potable water and subjected to immediate chilling at 0-4^{0}C; or immediate freezing to a core temperature of -18^{0}C or lower, packed and stored at -18^{0}C or lower.

Immediate pre-chilling must be done after harvest with proper icing prior to freezing or further processing.

5 Essential composition and quality factors

5.1 Basic Ingredient

5.1.1 Raw Material

Live, chilled and frozen tilapia shall be prepared from fresh and wholesome fish fit for human consumption.

5.1.2 Water

Water for holding live tilapia, washing, cleaning, glazing, and cooling shall be potable as defined in section 3.10.

5.2 Final product

5.2.1 The final product shall meet the requirements of this standard when lots examined in accordance with Section 12-Lot Acceptance and comply with the provisions set out in Section 11-Definition of Defectives. Products shall be examined by the methods given in Section 10-Method of Sampling, examination and analysis.

5.2.2 The products shall not contain more than 200 mg/kg of histamine based on the average of the sample unit tested.

5.2.3 The final product shall possess the following size characteristics:

Table 1-Size classification of fresh whole tilapia

Size	Weight
Small	200-400
Medium	401-600
Large	>600

5.2.4 The final product shall conform to the following microbiological safety requirements in Table 2:

Table 2 – Microbiological safety requirements

Test/Microorganism	n	c	m	M
E. coli, MPN/g	5	2	11	500
Staphylococcus aureus (coagulase +), cfu/g	5	2	10^3	10^4
Vibrio parahaemolyticus, cfu/g	5	2	10^2	10^3
Salmonella/25 g	5	0	0	-
Aerobic Plate Count (APC)/Standard Plate Count (SPC), cfu/g	5	3	$5x10^5$	10^7

Legend: **n** -number of sample units selected from a lot of food to be examined
c -maximum allowable number of defective or marginally acceptable units
m -acceptable level of microorganism determined by a specified method; the values are generally based on levels that are achievable under GMP
M -level which when exceeded in one or more samples would cause the lot to be rejected as this indicates potential health hazard or imminent spoilage
cfu - colony forming unit
MPN -most probable number

Source: a. *PNS for Fresh-chilled, Fresh-frozen and Treated Tuna (BAFS/PNS 138:2014)*
b. DOH-FDA Circular No. 2013-010, Revised Guidelines for the Assessment of Microbiological Quality of Processed Foods, Table 11. Fish and Fish Products: Fresh Frozen Fish.

5.2.5 The final product shall meet the quality characteristics in Table 3.

Table 3 – Quality characteristics of Tilapia

Product Form	Quality characteristics	
	Appearance/Texture	**Odor**
Live	- no visible lesions - complete fins - scales intact - -no deformity - no sign of disease or illness - characteristic color of the species - firm texture -	- fresh seaweedy odor - absence of muddy or algae-like odor and flavor
Whole	- no visible lesions - complete fins - scales intact - no deformity - characteristic color of the species	- fresh seaweedy odor - absence of muddy or algae-like odor and flavor -

	- Firm texture - Red gills - No blood spot on gill cover	
Whole, gutted	- characteristic color of the species - scales and fins intact - flesh intact - firm texture - Slime-free - eyes clear not sunken	- fresh seaweedy flavor - absence of muddy or algae-like odor and flavor
Fillet	- characteristic color of the species - ;white to off-white meat - muscle block intact - absence of blood spots	- fresh seaweedy flavor - absence of muddy or algae-like odor and flavor

6 Food additives

Food additives shall not be allowed in this product.

7 Contaminants

The products shall comply with the acceptable level of contaminants as specified in Table 4.

Table 4 – Acceptable levels of heavy metals in fish

Heavy metal	**MRPL (mg/kg)**
Cadmium	0.5 [1]
Lead	0.3 [2, 3]
Total Mercury	0.5 [1,3]
Veterinary Drug	**MRPL (ppb)**
Oxytetracycline	200 μg/mg

Legend: ppm= parts per million
ppb= parts per billion
MRL= Maximum Residue Limit
MRPL= Maximum Reportable Performance Limit

Sources:
1 DA-BFAR Fisheries Office Order No. 313, s. 2006 (Amendments to the Supplemental Requirements on Quality Standards for the Exportation of Fresh, Chilled and Frozen Fish and Fishery/Aquatic Products

2 DA-BFAR Fisheries Administrative Order No. 210 s. 2001. Rules and Regulation on the exportations of fresh, chilled and frozen fish and fishery/aquatic products
3 CODEX STAN 193-1995 (Codex General Standard for Contaminants and Toxins in Food and Feed)

8 Hygiene and handling

The products shall be prepared and processed under hygienic conditions in accordance with the Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food (DOH AO No. 153 s. 2004) and its future amendments, and the following recommended codes of practice:

a) General Principles of Food Hygiene (CAC/RCP 1-1969); and

b) Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003).

9 Presentation, packaging and labeling

9.1 Presentation

9.1.1 The product shall be presented as live, and chilled or frozen whole, whole-gutted tilapia and chilled or frozen tilapia fillet with or without skin.

9.1.2 Individual retail or bulk container shall contain only one species of tilapia, which are relatively uniform in size.

9.2 Packaging

The product shall be packed in food grade packaging materials which are clean and free from any foreign matter or contaminant. Live tilapia shall be kept in appropriate holding containers.

9.3 Labeling

The product shall be labeled according to the provisions of the Codex General Standard for the Labeling of Prepackaged Foods (CODEX STAN 1-1985) and its future amendments.

9.3.1 Retail package/container

Each retail product package shall be labeled and marked with the following information:

a. The name of the product shall be “Live”, “Fresh-Chilled” or “Fresh-Frozen” followed by corresponding English or common/local name with its scientific name in parenthesis, e.g. “Chilled Tilapia” (*Oreochromis spp.).* The products may be called by other common/local names provided that such names are accepted in the place/ country of distribution;

b. The net content by weight in metric system and/or number of pieces per pack. The net weight based on other systems of measurement required by importing countries shall appear in parenthesis after the metric net weight;

c. The label shall state that the product must be stored under conditions to maintain the best quality during transport, storage and distribution (e.g. keep refrigerated/chilled/frozen. For live tilapia, the term "perishable" should be indicated.

d. The name and address of either of the following: manufacturer, packer, distributor, importer, exporter or vendor;

e. The lot identification code/number;

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

g. The pictorial presentation (optional). Pictorial presentation of the product on the label should not mislead the consumer with respect to the product so illustrated;

h. [The expiry date (DD/MM/YYYY) for Chilled and Frozen tilapia only.; and

i. Other information that may be required by the importing country

9.3.2 Non-retail container

Information on the above provisions (Section 9.3.1) shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer or packer as well as storage instructions, shall appear on the container.

However, the lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such mark is clearly identifiable with the accompanying documents.

10 Methods of Sampling, examination and analyses

10.1 Methods of sampling

Sampling of lots for examination of the final product shall be in accordance with the Codex General Guidelines on Sampling (CAC/GL 50-2004). A sample unit is the individually packed product or a 1 kg portion from bulk containers.

10.2 Methods of Analyses

10.2.1 Determination of Heavy Metals

According to the procedure published by AOAC, 2016, 20th edition or an equivalent analysis method.

10.2.2 Determination of Veterinary Drugs

According to the procedure published by AOAC, 2016, 20th edition or an equivalent analysis method.

10.2.3 Determination of histamine

According to the AOAC 977.13 or an equivalent method of analysis.

10.2.4 Determination of microorganisms

According to the procedure described by FDA Bacteriological Analytical Manual (BAM), published by AOAC, 2016, 20th edition) or an equivalent analysis method.

10.2.5 Determination of net weight

10.2.5.1 Determination of net weight of products not covered by glaze

The net weight (exclusive of packaging material) of each sample unit representing a lot shall be determined in the frozen state.

10.2.5.2 Determination of net weight of products covered by glaze

As soon as the package is removed from low temperature storage, open immediately and place the contents under a gentle spray of cold water. Agitate carefully so that the product is not broken. Spray until all ice-glaze that can be seen or felt is removed. Remove adhering water by the use of paper towel and weigh the product in a tared pan.

10.2.6 Procedure for the detection of parasites

The entire sample unit is examined non-destructively by placing appropriate portions of the thawed sample unit on a 5 mm thick acryl sheet with 45% translucency and candled with a light source giving 1500 lux 30 cm above the sheet.

11 Definition of defectives

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

11.1 Freezer burn

More than 10% of the declared weight of the frozen tilapia is affected by dehydration evident in more than 10% of the surface area.

11.2 Foreign matter

The presence in the sample unit of any matter which has not been derived from tilapia (excluding packing material), and is readily 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.

11.3 Odor and flavor

Presence of persistent and distinct objectionable odor and flavor.

11. 4 Flesh abnormalities

Flesh exhibiting freezer burn (white chalky appearance) and pasty consistency upon thawing and characterized by loosening of scales, bruises of fish skin and extreme mutilation and presence of undesirable parts or incidence of viscera.

11.5 Discoloration

Any alteration in flesh/meat in the sample unit of chilled or tilapia such as fading in color.

12 Lot acceptance

A lot shall be considered as meeting the requirements of this standard when:

(i) the total number of defective sample units as classified according to Section 11 does not exceed the acceptance number (c) of the appropriate sampling plan (AQL-6.5);

b) the average net weight of all sample units is not less than the declared weight, provided there is no unreasonable shortage in any individual container; and

the essential composition and quality factors, food additives, contaminants, hygiene and handling, and labeling requirements of Sections 5, 6,7,8 and 9, respectively, are met.

References

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.

BAFS/PNS 138:2014. Philippine National Standard for Fresh-chilled, Fresh-frozen and Treated Tuna. Bureau of Agriculture and Fisheries Standards. Department of Agriculture. Quezon City, Philippines

BAFS/PNS 176:2016. Philippine National Standard for Dried Anchovies. Bureau of Agriculture and Fisheries Standards. Department of Agriculture. Quezon City, Philippines

CAC/GL 50-2004. General Guidelines on Sampling. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization. Rome, Italy. (www.codexalimentarius.org)

CAC/RCP 52-2003, Rev. 6-2011, Amend.3-2016. Code of Practice for Fish and Fishery Products. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization. Rome, Italy. (www.codexalimentarius.org)

CODEX STAN 1-1985, Amend. 7-2010. General Standard for the Labeling of Prepackaged Foods. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization (FAO/WHO) Joint Programme. Rome, Italy. (www.codexalimentarius.org)

CODEX STAN 192-1995, Rev. 17-2016. General Standard for Food Additives Foods. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization (FAO/WHO) Joint Programme. Rome, Italy. (www.codexalimentarius.org)

CODEX STAN 193-1995, Rev.4-2009, Amend.6-2016. Codex General Standard for Contaminants and Toxins in Food and Feed. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization. Rome, Italy. (www.codexalimentarius.org)

CODEX STAN 234-1999, Rev.2-2007, Amend.5-2016. Codex Recommended Methods of Analysis and Sampling. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization. Rome, Italy. (www.codexalimentarius.org)

DA BFAR - Fisheries Administrative Order No. 210 s. 2001. Rules and Regulations on the Exportation of Fresh, Chilled and Frozen Fish and Fishery/Aquatic Products. Diliman, Quezon City. Department of Agriculture, Bureau of Fisheries and Aquatic Resources.

DOH-BFAD Administrative Order No. 153 s. 2004. Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food. Department of Health. Manila, Philippines.

DOH-BFAD Administrative Order No. 153, s. 2004. Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food. Department of Health. Muntinlupa City, Philippines.

Draft Philippine National Standard for Live, Chilled and Frozen Pompano. Bureau of Agriculture and Fisheries Standards. Department of Agriculture. Quezon City, Philippines.

ICMSF, 1986, 2nd Edition. Sampling for Microbiological Analysis: Principles and Specific Applications. International Commission on Microbiological Specifications for Food

Official Methods of Analysis, 2016, 20th Edition. AOAC International, Rockville, United States of America