

PHILIPPINE NATIONAL STANDARD

PNS/BAFPS 67:2008
ICS 67.120.30

Frozen tilapia



BUREAU OF PRODUCT STANDARDS

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Foreword

The Philippine National Standards (PNS) for Frozen tilapia was prepared as part of the project of the Bureau of Agriculture and Fisheries Products Standards (BAFPS) with the Bureau of Agricultural Research (BAR) entitled "Quality Standardization on Selected Fishery Products". A technical working group (TWG) was created through Special Order Number 100 Series of 2006 identifying members and experts that shall be involved in the formulation the draft standards for fishery products.

In collaboration with the industry and the regional offices of the Bureau of Fisheries and Aquatic Resources (BFAR), the TWG presented the draft standards for public consultation in Aklan, General Santos and Quezon City.

The PNS for Frozen tilapia aims to provide common understanding on the scope of the standard, product description, classifications, essential composition and quality factors, hygiene and handling, packaging and labeling requirements, methods of sampling and analyses, and definition of defectives.

Frozen tilapia

1 Scope

This standard prescribes quality specifications and safety requirements and methods for determining these for frozen tilapia (*Oreochromis spp.*) prepared in the following forms:

- Whole, gutted
- 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 this standard, the following terms shall mean:

3.1 chilling

a process by which the temperature of the fish is lowered to a point near the freezing point of water (0 °C) but not below it by means of heat withdrawal

3.2 chilled fish

fresh fish, which has been subjected to a chilling treatment and stored at a temperature close to 0 °C but not above 4 °C

3.3 cleaning

means the removal of soil, food residues, dirt, grease or other objectionable matter from surfaces

3.4 dehydration

the loss of moisture from the frozen product due to prolonged cold storage

3.5 fish

includes generic term used to refer to aquatic animals such as fish, crustaceans (crabs, prawns, lobsters) and mollusks (clams, mussels, oysters, scallops, octopus, squids etc.)

3.6 fishery/aquatic products

includes all other products of aquatic living resources in any form

3.7

fresh fish

freshly caught fish, which has received no treatment other than chilling and exhibiting no deteriorative changes

3.8

freezing

a process which is carried out in appropriate equipment in which the initial temperature of the product is reduced to -18 °C or lower with most of the tissue water turning into ice. The process shall not be regarded as complete unless and until the product temperatures has reached -18 °C (0 °F) or lower at the thermal centre after thermal stabilization

3.8.1

quick freezing

a freezing rate at which no part of the fish takes more than two hours to cool from -1 °C to -5 °C, which further reduction of the temperature at the end of the freezing period to the recommended cold storage temperature

3.9

frozen fish

fresh fish, which have been subjected to a freezing process and stored at -18 °C or lower

3.10

food

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

3.11

food additive

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

3.12

glazing

a process in which a thin protective layer of ice is allowed to form on the surface of the frozen fish by spraying it with, or dipping it in potable water at 0 °C in order to prevent dehydration and oxidation of the frozen product

3.13

gutted fish

fish that has been eviscerated or had the entrails removed

3.14

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

3.15

potable water

water fit for human consumption and in which potability has been determined by health authorities cited in PNS for Drinking Water (PNS 991: 1993 Agricultural and other Food Products – Bottled Drinking Water Specifications)

4 Description

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

4.1 Product definition

4.1.1

frozen whole gutted tilapia

fresh whole tilapia with the viscera and other organs completely removed, and subjected to a quick freezing treatment

4.1.2

frozen tilapia tillet

fresh tilapia fillets prepared with or without skin, subjected to a quick freezing treatment

4.2 Process definition

4.2.1

frozen whole gutted tilapia

fresh chilled tilapia eviscerated, washed with potable water and quick frozen until the product temperature has reached -18 °C or lower

4.2.2

frozen tilapia fillet

tilapia fillets, with or without skin, are quick frozen until the product temperature has reached -18 °C or lower at the thermal center after thermal stabilization, packed and cold stored at -18 °C or lower

5 Essential composition and quality factors

5.1 Fish

Quick frozen tilapia shall be prepared from sound and wholesome fish and fit for human consumption.

5.2 Glazing

If glazed, the water used shall be of potable quality. Potability of water should meet the standard parameters and values for bacteriological, physico-chemical, and aesthetic quality of drinking water (PNS for drinking water, 1993).

5.3 Other Ingredients

All other ingredients shall be of food grade quality and shall conform to all applicable Codex standards.

5.3.1 Water

Water fit for human consumption and in which potability has been determined by health authorities cited in PNS for Drinking Water (PNS 991: 1993 Agricultural and other Food Products).

5.4 Final Product

5.4.1 The final product shall conform to the physico-chemical requirements in Table 1.

Table 1 – Chemical fish freshness indices of frozen tilapia

Chemical parameter	Limit
Total volatile bases- Nitrogen (TVB-N)	20 mg N/100 g – 30 mg N/100 g
Trimethylamine- Nitrogen (TMA-N)	5 mg N/100 g – 10 mg N/100 g
Peroxide value	10 meq/kg – 20 meq/kg
pH	6.2 – 6.9
Hypoxanthine	2 μ mole/g – 3 μ mole/g
K-value	\leq 20 %
Sources: BFAR-FAO No. 210 series of 2001 Laboratory Techniques in Food Analysis, Pearson 1972 edition Seafood: Resources Nutritional Composition and Preservation, Chapter 4.	

5.4.2 The final product shall conform to the microbial requirements in Table 2.

Table 2 – Microbiological criteria for frozen tilapia

Microbiological parameter	Limit
1. Aerobic plate count (APC)	500,000 /g
2. <i>Staphylococcus aureus</i>	1,000 /g
3. <i>Escherichia coli</i>	11/g
4. <i>Salmonella</i>	Absent in 25 g
5. <i>Shigella</i>	Absent in 25 g
Source: International Commission on Microbiological Specifications for Food (ICMSF), 1986	

5.4.3 The final product meets the quality characteristics in Table 3.

Table 3 – Quality characteristics of frozen tilapia

Product form	Quality characteristics	
	Appearance/Texture	Odor
Whole, gutted	<ul style="list-style-type: none"> • Bright silvery gray in color. • Head firmly attached to the body • Scales intact • Flesh intact/firm texture, • Eyes clear not sunken 	<ul style="list-style-type: none"> • Absence of muddy or algae-like odor • Absence of ammoniacal and putrid odor
Fillet	<ul style="list-style-type: none"> • Flesh translucent • Muscle blocks intact 	<ul style="list-style-type: none"> • Absence of muddy or algae-like odor • Absence of ammoniacal and putrid odor

6 Hygiene and handling

6.1 The final product shall be free from any foreign materials, which may represent a hazard to health.

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

6.2.1 Shall be free from microorganism in amounts which may represent a hazard to health; and

6.2.2 The final product shall conform to the sampling plans and to the microbiological requirements on ICMSF as described in Annex A.

7 Presentation, packaging and labelling

7.1 Presentation

7.1.1 The products shall be presented as frozen whole, gutted tilapia and frozen tilapia fillets with or without skin.

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

7.2 Packaging

The product shall be packed in containers made of suitable films or laminates that are clean and free from any foreign matter or contaminants.

7.3 Labeling

7.3.1 Labeling or retail packages/container

Each retail product package shall be labeled and marked with the following information in accordance with BFAD Administrative Order Series of 1984:

7.3.1.1 The name of the product. The word quick frozen shall be followed by the common names or usual name of the species, the label in the case of eviscerated fish, shall include the terms indicating that the fish has been eviscerated or deboned;

7.3.1.2 The label shall state that the product should be maintained under conditions that will maintain the quality during transport, storages, storage and distribution;

7.3.1.3 The words “best before” followed by the date, month and year indicating end of the period at which the product shall retain its optimum quality attributes at a stated storage condition;

7.3.1.4 The name “Product of the Philippines;”

7.3.1.5 The name and address of manufacturer/distributor (or area of production/harvest area);

7.3.1.6 Net weight; and

7.3.1.7 Lot number.

7.3.2 Labeling of Non-retail container

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

8 Methods of sampling and analysis

8.1 Method of sampling

Sampling of lots for physico-chemical examination of the product shall be in accordance with sampling plans provided in Annex C based on FAO/WHO Codex Alimentarius Commission Sampling Plans for Prepackaged Foods (AQL=6.5) (CAC/rm42-1969). A sample lot (N0 shall be the quantity of the product under similar conditions. A sample unit shall be the primary container where the product is in bulk; while the individual fish is the sample unit for retail packaged products.

For microbiological analyses, the ICMSF (1978) suggested Case 2, 3 Class Sampling Plan is recommended as defined in Annex B.

8.2 Methods of analyses

8.2.1 Determination of peroxide value

According to the Association of Official Analytical Chemists (AOAC), 2001, 12th Edition.

8.2.2 Determination of aerobic plate count

According to the procedure described by FDA Bacteriological Analytical Manual (BAM), published by AOAC, 2001, 12th Edition.

8.2.3 Determination of *Escherichia coli* organism

According to the procedure described by FDA Bacteriological Analytical Manual (BAM), published by AOAC, 2001, 12th Edition.

8.2.4 Determination of *Staphylococcus aureus*

According to the procedure described by FDA Bacteriological Analytical Manual (BAM), published by AOAC, 2001, 12th Edition.

9 Definitions of defectives

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

9.1 Freezer burn

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

8.2 Foreign matter

The presence in the sample unit of any matter which has not been derived from fish, (excluding packaging material), which poses a threat to human health 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.

8.3 Appearance, odor and flavor

Non-conformity with the characteristics specified in Table 3.

8.4 Flesh abnormalities

A sample unit affected by excessive gelatinous condition of the flesh together with greater than 86 % moisture found in any individual fillet or a pasty texture resulting from parasitic infestation affecting more than 5 % of fillet by weight.

8.5 Discoloration

Product showing abnormal discoloration of the flesh, such as green or black as associated with decomposition.

Annex A

Sampling plans and recommended microbiological unit for fresh, and fish frozen at sea, fish block, comminuted fish blocks

Analyses	Case	Plan class	n	c	Unit per g	
					m	M
APC (cfu/g)	1	3	5	3	10^6	10^7
Faecal Coliform (MPN/g)	4	3	5	3	4	400
<i>Staphylococcus aureus</i> (cfu/g)	4	3	5	3	10^3	2×10^3

where:

n is the number of sample to be analyzed per product lot;
 c is the number of sample that may exceed m but not M; and
 m is the maximum count beyond which product safety/quality maybe affected.

Annex B

Sampling plan for physico-chemical examinations

Sampling plan 1		
Normal operations		
(Inspection Level 1, AQL = 6.5)		
Net weight is equal to or less than 1 kg (2.2 lb)		
Lot size (N)	Sample size (n)	Acceptance number (c)
4,800 or less	6	1
4,901 – 24,000	13	2
24,001-48,000	21	3
48,001 – 84,000	29	4
84,001-144,000	48	6
144,001 –240,000	126	13
Net weight is greater than 1 kg (2.2 lb) But no more than 4.5kg (10 lb)		
Lot size (N)	Sample size (n)	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	13
Net weight is greater than 4.5 kg (10 lb)		
Lot size (N)	Sample size (n)	Acceptance number (c)
600 or less	6	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 1, AQL = 6.5)		
Net weight is equal to or less than 1 kg (2.2 lb)		
Lot size (N)	Sample size (n)	Acceptance number (c)
4,800 or less	6	1
4,901 – 24,000	13	2
24,001-48,000	21	3
48,001 – 84,000	29	4
84,001-144,000	48	6
144,001 –240,000	126	13
More than 240,000	200	19
Net weight is greater than 1 kg (2.2 lb) But no more than 4.5kg (10 lb)		
Lot size (N)	Sample size (n)	Acceptance number (c)
2,800 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
74,001 –120,000	126	13
More than 120,000	200	19
Net weight is greater than 4.5 kg (10 lb)		
Lot size (N)	Sample size (n)	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: FAO/WHO Codex Alimentarius Commission
Sampling plans for pre-packaged foods
CAC/RM42-1969**

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 referenced document (including any amendments) applies.

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**Department of Agriculture
Bureau of Agriculture and Fisheries Product Standards
Technical Working Group for the Development of
Philippine National Standard of Frozen Tilapia**

Chair

Director Gilberto F. Layese
Bureau of Agriculture and Fisheries
Product Standards (BAFPS)
Department of Agriculture (DA)

Co-chair

Ms. Lilia Pelayo
Bureau of Fisheries and Aquatic Resources (BFAR)
Department of Agriculture (DA)

Members

Ms. Norma C. Borja
Bureau of Fisheries and Aquatic Resources (BFAR)

Ms. Dolor L. Villaseñor
Industrial Technology Development Institute (ITDI)
Department of Science and Technology (DOST)

Ms. Teresita S. Palomares
Industrial Technology Development Institute (ITDI)
Department of Science and Technology (DOST)

Ms. Almueda David
Bureau of Food and Drugs (BFAD)
Department of Health (DOH)

Ms. Charina May Tandas
Bureau of Food and Drugs (BFAD)
Department of Health (DOH)

Experts Involved:

Mr. Basilio M. Rodriguez, Jr.
Philippine Tilapia Inc. (PTI)

Mr. Benson Dakay
Seaweed Industry Association of the
Philippines (SIAP)

Mr. Alvin Gimelo
Bangus Association of the Philippines (BAPI)

Technical Secretariat:

Ms. Lara G. Vivas
Bureau of Agriculture and Fisheries Product
Standards (BAFPS)

Ms. Mary Grace Mandigma
Bureau of Agriculture and Fisheries Product
Standards (BAFPS)

your partner in product quality and safety



BUREAU OF PRODUCT STANDARDS

3F Trade and Industry Building
361 Sen. Gil J. Puyat Avenue, Makati City 1200, Metro Manila, Philippines
T/ (632) 751.3125 / 751.3123 / 751.4735
F/ (632) 751.4706 / 751.4731
E-mail : bps@dti.gov.ph
www.dti.gov.ph