
**Dried small sardine and sardine-type pelagic fish — Part 3: salted
Boiled dried anchovies**



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WD-ARS 1110-3-2022, Dried small sardine and sardine-type pelagic fish — Part 3: Boiled dried salted anchovies**1 Scope**

This standard shall apply to all commercial species of anchovies belonging to the family *Engraulidae* that have been boiled in brine, and dried. This product is intended for consumption after cooking and for further processing. This Standard shall not cover products that have undergone heat treatment prior to drying; It does not also cover products which have undergone an enzymatic maturation in brine

NOTE: The product shall be prepared from fresh or frozen split or whole fish of the family *Engraulidae* with some of the species listed, but not limited in Annex A

2 Normative 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.

AOAC Official Method 937.09, *Salt (chlorine as sodium chloride) in seafood*

AOAC Official Method 977.13, *Histamine in sea food — Fluorometric method*

AOAC Official Method 999.10, *Lead, cadmium, zinc, copper, and iron in foods — Atomic absorption spectrophotometry after microwave digestion*

AOAC Official Method 999.11, *Lead, cadmium, copper, iron and zinc in foods — Atomic absorption spectrophotometry after dry ashing*

AOAC Official Method 2015.01, *Heavy metals in food — Inductively coupled plasma–mass spectrometry*

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

ARS 471, *Iodized food grade salt — Specification*

CAC/RCP 52, *Code of practice for fish and fishery products*

CODEX STAN 192, *General standard for food additives*

ISO 4831, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of *Salmonella* spp.*

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ISO 6887-1, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 1: General rules for the preparation of the initial suspension and decimal dilutions*

ISO 6887-3, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 3: Specific rules for the preparation of fish and fishery products*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 7937, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of Clostridium perfringens — Colony-count technique*

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO 16654, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Escherichia coli O157*

ISO 18787, *Foodstuffs — Determination of water activity*

ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp.*

ISO/TS 21872-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 1: Detection of Vibrio parahaemolyticus and Vibrio cholerae*

ISO/TS 21872-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 2: Detection of species other than Vibrio parahaemolyticus and Vibrio cholerae*

3 Terms and definitions

For the purpose of this standard, the following terms and definitions apply.

3.1

breakage

refers to fish (excluding fins and scales) which is not intact

3.2

brine

refers to solution of salt in water

3.3

clean seawater

refers to seawater which meets the same microbiological standards as potable water and is free from objectionable substances

3.4

contaminant

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

3.4.1

microbiological contamination

refers to the presence, introduction, reintroduction, growth and/or survival of pathogens of public health concern

3.5

drying

refers to a process in which the moisture content in the fish is decreased to appropriate required characteristics under controlled hygienic conditions

3.5.1

artificial drying

refers to the process of removing moisture from fish in an enclosed chamber under controlled temperature, airflow and humidity

3.5.2

solar drying refers to drying fish using sun's energy to heat air, and then using the heated air to remove the moisture from the fish. The process involves the fish being placed in an enclosed drying chamber and allowed to dry

3.5.3

sun drying

refers to the exposure of fish to open air under the heat of the sun.

3.6

hazard

refers to a biological, chemical or physical agent in or condition of food with the potential to cause an adverse health effect

3.7

fresh fish

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

3.8

label

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

3.9

labelling

refers to any written, printed or graphic matter that is present on the label, accompanies the food, or is displayed near the food, including that for the purpose of promoting its sale or disposal

3.10

lot

refers to a definitive quantity of a commodity produced essentially under the same conditions

3.11

packaging

refers to the process of packing that is part of the production cycle applied to bulk product to obtain the finished product. Any material, including printed material, employed in the packaging of a product, including any outer packaging used for transportation of shipment. Packaging materials are referred to

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as primary or secondary according to whether or not they are intended to be in direct contact with the product.

3.12

potable water

refers to water suitable (both health and acceptability considerations) for drinking and cooking purposes

3.13

salting

refers to a process of treating fish with food grade quality salt to lower water activity in fish flesh and to enhance flavor by any appropriate salting technology (e.g. dry salting and brining)

3.13.1

brining

refers to the process of placing fish in brine for a period of sufficient length for the fish tissue to absorb a specific quantity of salt

3.14

shelf-life

refers to the period during which the product maintains its microbiological and chemical safety and sensory qualities at a specific storage temperature. It is based on identified hazards for the product, heat or other preservation treatments, packaging method and other hurdles or inhibiting factors that may be used

3.15

split dried anchovies

refer to dried anchovies prepared by cutting the fish from the base of the tail to the tip of the head with internal organs and gills removed, and with or without backbone or head prior to salting and drying

3.16

water activity (a_w)

refers to a measure of the free moisture in food which supports the growth of microorganisms. It is the quotient of the water vapor pressure of the substance divided by the vapor pressure of pure water at the same temperature

3.17

whole dried anchovies

refer to dried anchovies in their original form, which have not been cut, and may or may not have been eviscerated, and with all parts intact.

4 Description

4.1 Product description

The product shall be prepared from fresh and frozen fish of the family *Engraulidae* with some of the species listed, but not limited to in Annex A.

- a) whole dried anchovies; and
- b) split dried anchovies.

4.2 Process description

4.2.1 The product shall be prepared by washing fresh fish in brine or clean sea water and salting by boiling in brine or clean sea water and drying. The drying process shall mean sun-drying or artificial drying.

4.2.2 The product shall be packed in a suitable packaging material which is moisture proof and gas impermeable. It shall be processed and packaged so as to minimize oxidation.

4.3 Handling practice

Fresh anchovies that are not processed immediately after harvesting shall be handled under such hygienic conditions as will maintain the quality during transportation and storage up to and including the time of processing. It is recommended that the fish shall be properly chilled or iced to bring its temperature down to 0°C (32°F) as quickly as possible as specified in Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) and kept at an adequate temperature to prevent deterioration, histamine formation, spoilage and bacterial growth prior to processing. The drying process must be sufficiently short to preclude the formation of *Clostridium botulinum* toxin.

5 Essential composition and quality factors

5.1 Raw materials

5.1.1 Fish: The product shall be prepared from clean, sound fish which have characteristic fresh appearance, colour and odour.

5.1.2 Salt (for preparation of brine): Salt shall mean sodium chloride of suitable quality as specified in ARS 471.

5.2 Final product

5.2.1 The final product shall meet the requirements of this standard when lots examined in accordance with specified methods of test.

5.2.2 The product shall comply with the physico-chemical requirements prescribed in Table 1.

Table 1 – Physico-chemical requirements of boiled salted dried anchovies

Characteristics	Requirement	Method of test
Moisture, %, max.	(5 – 7) 12	ISO 6496 (AOAC 950.46.B)
Sodium chloride, max (dry basis)	15%	AOAC 937.09
Water activity at 25 °C (a_w), max	0.70	ISO 18787
Acid insoluble ash, % by weight max. (dry basis)	1.5 %	ISO 5985
Histamine, max ppm	100	AOAC 977.13

5.2.3 Product sizing

The product shall comply with the size classifications of dried anchovies prescribed in Table 2.

Table 2 – Size classification of dried anchovies

Size designation	Total length (cm)
Small	Less than 3.5
Medium	3.5 – 6.5
Large	greater than 6.5

5.2.4 Breakage

5.2.4.1 Breakage shall mean fish (excluding fins and scales) which is not intact. The percentage of breakage is determined by the number of broken fish over the total number of fish in the test sample.

5.2.4.2 The percent breakage defined in 5.2.4.1 shall not exceed the limits specified in 5.2.5.

5.2.5 Product grading

Each size of dried anchovies shall be classified into two grades as prescribed in Table 3. Those which are not included in Grade A and B will be considered reject.

Table 3 – Grades of dried anchovies

Characteristics	Grade	
	A	B
Individual breakage	Less than 5%	more than 5 % but less than 15%
Colour (comparison of colour must be among the same species of fish)	Whitish or bluish or yellowish (characteristic of species)	Off white or pale yellow
Odour	No foul or rancid smell	No foul or rancid smell

5.2.6 The products should comply with any microbiological requirement criteria specified in Table 4.

Table 4 – Microbiological criteria for dried anchovies

Test/ Microorganism	N	c	m	M	Method of test
Aerobic plate count (APC), cfu/g	5	2	10 ⁵	5x10 ⁵	ISO 4833
Yeast and mold count, cfu/g	5	2	10 ³	10 ⁴	ISO 21527-1
<i>Staphylococcus aureus</i> , cfu/g	5	2	10 ³	10 ³	ISO 6888
<i>E.coli</i> cfu/g	Absent	Absent	Absent	Absent	ISO 7251
Total coliform	5	2	10	100	ISO 4832
Legend: N number of sample units selected from a lot of food to be examined 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 c maximum allowable number of defective or marginally acceptable units					

5.2.7 Sensory and physical examination

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and in accordance with Annex B.

6 Hygiene and handling

6.1 The product covered by the provisions of this standard shall be prepared and handled in accordance with ARS 53, CAC/RCP 52 and the relevant public health regulations.

6.2 The dried fish shall contain not more than 10 microgram per kilogram aflatoxin of which not more than 5 microgram per kilogram may be aflatoxin B₁ when tested in accordance with ISO 16050.

6.3 No sample unit shall contain histamine that exceeds 20 mg/100g.

6.4 The product shall not contain any other substance in amounts which may present a hazard to health or in accordance with standards established by the Codex Alimentarius Commission.

7 Food additives

No food additives are permitted in these products.

8 Contaminant limits

The product shall not contain any other substance in amounts which may present a hazard to health. Dried anchovies shall comply with the contaminant limits given in Table 5.

Table 5 — Contaminant limits for dried anchovies

Type of contaminant		Maximum limit (mg/kg)	Method of test
(i)	Cadmium	0.5	AOAC 2015.01
(ii)	Lead	0.3	AOAC 2015.01
(iii)	Total mercury	0.5	AOAC 2015.01

9 Pesticide residues

Dried anchovies shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for similar commodities. (Codex pesticides residues in food)

10 Weight and measures

The fill and the weight of the product shall comply with weight and measures regulations of the importing country.

11 Packaging and labelling

11.1 Packaging

11.1.1 Any container for boiled dried salted anchovies shall be clean, dry and shall protect the organoleptic and other quality characteristics of the product during storage and transport.

11.1.2 The package shall not pass on to the product any foreign odour, flavour, and colour or other foreign matter.

11.1.3 The products shall be packed in retail and/or bulk packaging materials which shall contain only one species per pack.

11.2 Labelling

11.2.1 The containers shall be labelled in accordance with the requirements of ARS 56.

11.2.2 Retail package / container

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

- (a) The name of the product shall be “boiled dried salted anchovies”. The products may be called by other common/local names provided that such names are accepted in the place/country of distribution and in a manner not to mislead the consumer;

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- (b) The scientific names of the fish may appear on the label but shall be declared on trade documents;
- (c) The net content by weight in metric system. The net weight based on other systems of measurement required by importing countries shall appear in parenthesis after the metric net weight;
- (d) If the grade and size of fish is declared the table in 5.2.5 shall be applied.
- (e) Date of processing;
- (f) The lot identification code/number;
- (g) The words “Best before Date” followed by the date (DD/MM/YYYY) indicating end of the period at which the product shall retain its optimum quality attributes at a stated storage condition;
- (h) The label shall state that the product should be stored under suitable conditions to maintain the best quality during transport, storage and distribution (e.g. keep in cool dry place);
- (i) The name and address of either of the following: manufacturer, packer, distributor, importer, exporter or vendor;
- (j) Country of origin or 'Product of" and the exact geographical location of the harvest
- (k) The pictorial presentation (optional). Pictorial presentation of the product on the label should not mislead the consumer with respect to the product so illustrated.

11.2.3 Non-retail container

Information on the above provisions (11.2.2) 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.

12 Definition of defectives

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

12.1 Foreign matter

The presence in the sample unit of any matter, which has not been derived from the *Engraulidae* family, and does not pose 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.

12.2 Breakage

Extensive textural breakdown of the fish which is characterized by the body part being split or broken or torn into two or more pieces in more than 25% of the fish in the sample unit.

12.3 Odour and flavour

A sample unit affected by persistent and distinct objectionable odours and flavours indicative of decomposition (such as putrid) or rancidity.

12.4 Pink

Any visible evidence of red halophilic bacteria on the surface of the fish in more than 25% of the fish in the sample unit.

12.5 Mould growth

Fish with an aggregate area of pronounced mould growth in more than 25% the sample unit.



Fresh anchovies



Dried anchovies

Annex A
(informative)

Anchovies species

English/Common name	Local name	Scientific name
1. Shorthead anchovy		<i>Encrasicholina heteroloba</i>
2. Buccaneer anchovy		<i>Encrasicholina punctifer</i>
3. Japanese anchovy		<i>Engraulis japonicus</i>
4. Scaly hairfin anchovy		<i>Setipinna taty</i>
5. Common hairfin anchovy		<i>Setipinna tenuifilis</i>
6. Commerson's anchovy		<i>Stolephorus commersonii</i>
7. Indian anchovy		<i>Stolephorus indicus</i>
8. Spotty-face anchovy		<i>Stolephorus waitei</i>
9. Baelama anchovy		<i>Thryssa baelama</i>
10. False baelama anchovy		<i>Thryssa encrasicholoides</i>
11. Hamilton's thryssa		<i>Thryssa hamiltonii</i>
12. Longjaw thryssa		<i>Thryssa setirostris</i>
13. Ronquillo's anchovy		<i>Stolephorus ronquilloi</i>

Annex B
(informative)

Sensory and physical examination

The sample used for sensory evaluation should not be same as that used for other examination.

1. Examine every fish in the sample unit for foreign matter, breakage, pink condition and mould growth.
2. Assess the odour in uncooked sample in accordance with the Guidelines for the Sensory Evaluation of Fish and Shellfish In Laboratories (CAC/GL 31-1999).
3. Assess the flavour in cooked sample in accordance with the Guidelines for the Sensory Evaluation of Fish and Shellfish In Laboratories (CAC/GL 31-1999).

The sample shall be cooked prior to assessment according to the cooking instructions on the package. When such instructions are not given, the sample shall be deep fried in fresh cooking oil at 190 °C for 1-2 minutes as appropriate to the size.

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