

codex alimentarius commission



FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS



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CX 5/35

CL 2004/43-FFP
September 2004

TO: Codex Contact Points
Interested International Organizations

FROM: Secretary, Codex Alimentarius Commission
Joint FAO/WHO Food Standards Programme
FAO, 00100 Rome, Italy

SUBJECT: **Proposed Draft Standard for Ready-to-Eat Smoked Fish**
Request for comments at Step 3

DEADLINE: **30 November 2004**

COMMENTS:

To:	Secretary, Codex Alimentarius Commission Joint FAO/WHO Food Standards Programme – FAO Viale delle Terme di Caracalla - 00100 Rome, Italy Fax: +39 (06) 5705 4593 E-mail: codex@fao.org	Copy:	Codex Contact Point Norwegian Food Control Authority P.O. Box 8187 Dep. 0034 Oslo, Norway Fax: +47.23.21.70.01 E-mail: CCFFP@mattilsynet.no
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The 25th Session of the Committee on Fish and Fishery Products considered a first version of the Proposed Draft Standard for Smoked Fish and agreed to circulate the text for comments at Step 3, and agreed that the Delegation of Denmark, assisted by interested countries, would review the document for circulation and consideration at the next session (ALINORM 04/27/18, paras. 146-152).

A Working Group open to all interested members was held in Copenhagen, Denmark, from 26 to 27 February 2004 at the kind invitation of Denmark, for the purpose of elaborating further on Appendix XI of ALINORM 04/27/18, in the light of the comments received. The working group went through the whole text and reached consensus on a number of amendments. Some points were left in square brackets for further discussions in the next session of the Committee. The list of participants is presented in **Appendix II**.

The Proposed Draft Standard, as presented in **Appendix I**, is hereby circulated for comments at Step 3 and consideration by the 27th Session of the Committee on Fish and Fishery Products (Cape Town, South Africa, 28 February - 4 March 2005).

Governments and international organizations wishing to provide comments should do so in writing, preferably by email, to the above addresses **before 30 November 2004**.

PROPOSED DRAFT STANDARD FOR READY-TO-EAT SMOKED FISH

(At Step 3 of the Procedure)

1. SCOPE

This standard applies to chilled or frozen, ready-to-eat hot or cold smoked finfish (herein after referred to as “fish”). The standard applies to whole fish, fillets and sliced and similar products thereof. It does not apply to speciality products where hot or cold smoked fish constitutes only a part of the edible contents, nor to mince products based on hot or cold smoked fish.

2. DESCRIPTION**2.1 Product definition**

Smoked fish is prepared from fresh or frozen fish treated with smoke.

2.2 PROCESS DEFINITION

- Salting – The fish used for smoked fish may be salted before smoking. Salting may be done by dry salting, brining by immersion or brining by injection, or any combination thereof.
- Hot Smoking - Fish are treated with smoke generated from burning and or smouldering wood at a temperature which will raise the fish flesh above 65°C and cause its coagulation.
- Cold Smoking – Fish are treated with smoke generated from smouldering wood at a temperature which will not cause visible coagulation of the flesh.
- Liquid Smoking - Fish are treated with smoke, regenerated from smoke condensates.
- Packaging – Smoked fish may be packed aerobically or under reduced oxygen conditions, including under vacuum or in a modified atmosphere.
- Storage – Smoked fish may be stored refrigerated [(0°C to 5°C)], super-chilled [(-3°C to 0°C)] or frozen (<-18°C).

Microbial hazards should be controlled through an application of science-based options, as shown in Annex 1 addressing *Clostridium botulinum*, involving packaging type, storage temperature and the use of salt in the water phase.

2.3 PRESENTATION

Any presentation of the product shall be permitted provided that it meets all requirements of this standard, and it is adequately described on the label to avoid confusing or misleading the consumer.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS**3.1 THE RAW MATERIAL**

Smoked fish shall be prepared from sound and wholesome fish, which may be fresh or frozen, and of a quality to be sold for human consumption after appropriate preparation. Fish flesh shall not be obviously [visibly] infected by parasites.

3.2 INGREDIENTS

All ingredients used shall be of food grade quality and conform with all applicable Codex standards.

3.3 WOOD FOR GENERATION OF SMOKE

Wood for generation of smoke must not have been treated with any chemicals, paint or impregnating materials. Wood should also be free from any visible microbiological or fungal growth.

3.4 LIQUID SMOKE

Liquid smoke should be generated from wood of a quality according to Section 3.3, and should be approved for food use.

3.5 FINAL PRODUCT

Products shall meet the requirements of this standard when lots examined in accordance with section 9, comply with the provisions set out in section 8. Products shall be examined by the methods given in section 7.

[3.6 DECOMPOSITION]

[The product shall not contain more than 10 mg of histamine per 100g fish flesh based on the average of the sample unit tested. To be further elaborated.]

4. FOOD ADDITIVES

[All additives used shall be of food grade quality and conform with all applicable Codex standards. Food additives to be allowed in smoked fish to be elaborated.]

5. HYGIENE AND HANDLING

5.1 CODES OF PRACTICE

[It is recommended that the] products covered by the provisions of this standard [shall] be prepared and handled in accordance with the appropriate sections of the recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1-1985, rev. 3, 1997) and other relevant codex texts such as codes of practice and codes of hygienic practice, as follows;

- (i) the Recommended International Code of Practice for Fish and Fishery Products (CAC/RCPXX-2002)

5.2 MICROBIOLOGICAL CRITERIA

The products shall comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria in Foods (CAC/RCP 21-1997).

5.3 OTHER SUBSTANCES

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

5.4 PARASITES

Smoked fish products shall not contain living parasites (e.g. larvae of nematodes).

Viability of nematodes shall be examined according to Annex 2. If living nematodes are confirmed, products must not be placed on the market for human consumption before they are treated in conformity with the methods laid down in Annex 3.

5.5 LISTERIA MONOCYTOGENES

This section has to be elaborated.

[The issue of *L. monocytogenes* in foods is being addressed by Codex in a separate document titled “Proposed Draft Guidelines on the Application of General Principles of Food Hygiene to the [Management] of *Listeria monocytogenes* in foods” by the CCFH Drafting Group Listeria (CX/FH 04/7).]

5.6 CLOSTRIDIUM BOTULINUM

Toxins of *Clostridium botulinum* are not allowed in smoked fish products. The formation of *Clostridium botulinum* toxin can be controlled through an application of science-based options involving packaging type, storage temperature, and the use of salt in the water phase. The table shown in Annex 1 addresses these control options.

5.7 HISTAMINE

No sample unit shall contain histamine that exceeds 20 mg/100g fish muscle

5.8 FOREIGN MATERIAL

The final product shall be free from any foreign material that poses a threat to human health.

6. LABELLING

In addition to the provisions of the Codex General Standard for the Labelling of Pre-packed Foods CODEX STAN 1-85, Rev. 1-1991) the following specific provisions apply.

6.1 NAME OF THE FOOD

6.1.1 The name of the product as declared on the label shall contain the word "Smoked" in combination with the name of the fish appropriate to the species of the fish in accordance with the law, custom or practice in use in the country of distribution, and in a manner not to mislead the consumer.

[Where liquid smoke is used, it must be declared on the label.]

6.1.2 In addition to the specified labelling designations above, the usual or common trade names of the product may be added so long as it is not misleading to the consumer in the country in which the product will be distributed.

6.2 STORAGE INSTRUCTIONS

The label must contain storage instructions for the product.

6.3 LABELLING OF RETAIL PACKAGES

[It must be clearly stated on the labelling, if the final product has been kept in storage in frozen condition, but is then thawed prior to sale and sold as a refrigerated product.]

6.4 LABELLING OF NON-RETAIL CONTAINERS

Information on the above mentioned provisions should be given on the container as well as the lot identification and the identification of the manufacturer and the country of origin.

7. SAMPLING, EXAMINATION AND ANALYSIS

7.1 SAMPLING

Sampling of lots for examination of the product for quality shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepacked Foods (AQL-6.5) CODEX STAN 233-1969.

A sample unit is the primary container or for individually packed products at least a 1 kg portion of the sample unit.

The sampling of lots for microbial and parasitological analysis will be in accordance with the principles in the guidelines for sampling under development by CCMAS.

7.2 SENSORY AND PHYSICAL EXAMINATION

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and in accordance with procedures elaborated in Sections 7.3 through 7.5 and the "Code of Practice for the Sensory Evaluation of Fish and Shellfish."

7.3 DETERMINATION OF HISTAMINE

AOAC 977.13 (most recent edition) or other scientifically equivalent validated method.

7.4 DETERMINATION OF DEAD PARASITES

The entire sample unit is examined non-destructively by the naked eye for the presence of dead parasites and trace of their activity such as gelatinised parts of the flesh (See Annex 4).

7.5 DETERMINATION OF NET WEIGHT

The net weight is determined as the weight of the product, exclusive of packaging material, interleaving material, etc. The average net weight of all sample units is not less than the declared weight.

7.6 PROCEDURE FOR THAWING

Frozen smoked fish shall be thawed at < 5°C.

8. DEFINITION OF DEFECTIVES

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

8.1 MICROBIOLOGICAL DEFECTS

[The issue of *L. monocytogenes* in foods is being addressed by Codex in a separate document titled "Proposed Draft Guidelines on the Application of General Principles of Food Hygiene to the [Management] of *Listeria monocytogenes* in foods" by the CCFH Drafting Group Listeria (CX/FH 04/7).]

8.2 FOREIGN MATTER

The presence in the sample unit of any matter, which has not been derived from the fish or the smoke, does not pose a threat to human health, and is readily recognised without magnification or is present at a level determined by any method including magnification that indicates non-compliance with good manufacturing practice.

8.3 PARASITES

The presence of any live parasites in a sample of the edible portion (see Annex 2).

8.4 ODOUR AND FLAVOUR

Persistent and distinct objectionable odours or flavours characteristic for decomposition, rancidity, burning sensation or other sensory impressions not characteristic of the product.

9. LOT ACCEPTANCE

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

- (i) The total number of defectives as classified according to Section 8 does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Pre-Packed Foods (AQL-6.5) - (CODEX STAN 233-1969);
- (ii) The average net contents of all packages examined are not less than the declared weight, and no individual container is less than 95% of the declared weight; and
- (iii) The Food Additives, Hygiene and Handling and Labelling requirements of Sections 4, 5 and 6 are met.

ANNEX 1
Control and Prevention of *Clostridium botulinum* Toxin Formation.

Countries where the products are to be consumed can be expected to make their science-based risk management choices within this framework, i.e., select some options and exclude others, based on conditions within the country (e.g., nature and enforcement of refrigeration and shelf life controls; transportation times and conditions; variability in amount of salt in the water phase that could occur despite best efforts to achieve a required percentage, etc.), and the level of protection that the country chooses for itself for this particular risk.

Storage Temp	Packaging	Water Phase Salt*	Comments
[(0°C to 3°C)]	Any	No minimum water phase salt is needed.	Temperature monitoring required on each package
[(>3°C to 5°C)]	Aerobically Packaged	No minimum water phase salt is needed. Nonetheless, where there is a reasonable possibility of severe time/temperature abuse, the country where the product is being consumed might choose a water phase salt barrier of at least 3% to 3.5% as a precautionary measure.	Storage temperature is for the control of pathogens generally and for quality. In air-packaged products, aerobic spoilage organisms provide sensory signs of spoilage before the formation of toxin by <i>C. botulinum</i> . However, even in air packaging it is possible for anaerobic micro-environments to exist and toxin may form if the product is subject to severe time/temperature abuse. For that reason, the country where the product is consumed may still require water phase salt as a barrier to growth of non-proteolytic strains of <i>C. botulinum</i> if there are concerns about the ability of transporters, retailers or consumers to maintain time/temperature control.
Frozen (< or = -18°C)	Reduced Oxygen (including vacuum packaging and modified atmosphere Packaging**)	No minimum water phase salt is needed for safety.	<i>C. botulinum</i> toxin cannot form when product is frozen. Because toxin production can occur after thawing, labelling information about the need to keep frozen, to thaw under refrigeration, and to use the product immediately after thawing is important.
[(>3°C to 5°C)]	Reduced Oxygen (including vacuum packaging and modified atmosphere packaging)	Water phase salt at minimum level of between 3% & 3.5% may be selected by the country where the product is to be consumed.	Water phase salt at a minimum level of between 3 and 3.5% (water phase salt) in combination with chilling will significantly delay (or prevent) toxin formation.
[>5°C to 10°C]	Reduced Oxygen	5% Water Phase Salt	Non-proteolytics (<i>C. botulinum</i>) are controlled under these conditions.

*As an alternative to water phase salt, time/temperature controls alone may be used. *C botulinum* cannot grow and produce toxin at or below 3°C. Other time/temperature combinations exist that similarly control the formation of toxin (Skinner,G.E. and Larkin,J.W. (1998) Conservative prediction of time to *Clostridium botulinum* toxin formation for use with time-temperature indicators to ensure the safety of foods. *Journal of Food Protection* **61**, 1154-1160). Where enforcement of shelf life as well as consumer acceptance of shelf life are norms, the country may select a system that relies on the combination of existing storage temperature conditions (i.e. during transport, retail storage, and consumer storage) and shelf life limitations.

However, in countries where consumer acceptance and regulatory enforcement of shelf life are not norms, continuous monitoring, such as that provided by time/temperature integrators on consumer packages, may be selected as a control by the country where the product will be consumed. The necessity for time/temperature integrators exists because, unlike freezing, temperature control through refrigeration is not a visual condition and cannot be determined without an additional monitoring control.

**As new technologies are developed, e.g. modified atmosphere with high oxygen, new controls may be defined.

ANNEX 2

VIABILITY TEST FOR NEMATODES

Principle:

Nematodes are isolated from fish fillets by digestion, transferred into 0.5 % Pepsin digestion solution and inspected visually for viability. Digestion conditions correspond to conditions found in the digestive tracts of mammals and guarantee the survival of nematodes.

Equipment:

- Stacked sieves (diameter: 14 cm or larger, mesh size: 0.5 mm)
- Magnetic stirrer with thermostated heating plate
- normal laboratory equipment

Chemicals:

- Pepsin 2000 FIP-U / g
- Hydrochloric acid

Solution:

A: 0.5 % (w/v) Pepsin in 0.063 M HCl

Procedure:

Fillets of approximately 200 g are manually shredded and placed in a 2 l beaker containing 1 l Pepsin solution A. The mixture is heated on a magnet stirrer to 37 °C for 1- 2 h under continuous slow stirring. If the flesh is not dissolved, the solution is poured through a sieve, washed with water and the remaining flesh is quantitatively replaced in the beaker. 700 ml digestion solution A is added and the mixture stirred again under gentle heating (max. 37°C) until there are no large pieces of flesh left.

The digestion solution is decanted through a sieve and the content of the sieve rinsed with water.

Nematodes are carefully transferred by means of small forceps into Petri dishes containing fresh Pepsin solution A. The dishes are placed on a candling dish, and care has to be taken not to exceed 37 °C.

Viable nematodes show visible movements or spontaneous reactions when gently probed with dissecting needles. A single relaxation of coiled nematodes, which sometimes occurs, is not a clear sign of viability. Nematodes must show spontaneous movement.

Attention:

When checking for viable nematodes in salted or sugar salted products, reanimation time of nematodes can last up to two hours and more.

Remarks:

Several other methods exist for the determination of viability of nematodes (e.g. ref. 2, 3).

The described method has been chosen because it is easy to perform and combines isolation of nematodes and viability test within one step.

References:

1. Anon.: Vorläufiger Probenahmeplan, Untersuchungsgang und Beurteilungsvorschlag für die amtliche Überprüfung der Erfüllung der Vorschriften des § 2 Abs. 5 der Fisch-VO. Bundesgesundheitsblatt 12, 486-487 (1988).
2. Leinemann, M. and Karl, H.: Untersuchungen zur Differenzierung lebender und toter Nematodenlarven (*Anisakis* sp.) in Heringen und Heringserzeugnissen. Archiv Lebensmittelhygiene 39, 147 – 150 (1988).
3. Priebe, K., Jendrusch, H. and Haustedt, U.: Problematik und Experimentaluntersuchungen zum Erlöschen der Einbohrpotenz von *Anisakis* Larven des Herings bei der Herstellung von Kaltmarinaden. Archiv Lebensmittelhygiene 24, 217 – 222 (1973).

ANNEX 3

Procedures sufficient to kill nematodes

Where freezing is required as a Critical Control Point to kill parasites the fish must be frozen either before or after the cold smoking to sufficiently kill the living parasites. This process must be performed at a minimum of -20° C for 24 hours or a minimum of -35° C for 15 hours.

ANNEX 4

Determination of the presence of visible parasites

1. The presence of readily visible parasites in a sample unit that is broken into normal bite-size pieces 20 - 30 mm of flesh by the thickness of the fillet. Only the normal edible portion is considered even if other material is included with the fillet. Examination for evidence of parasites should be done in an adequately lighted room (where a newspaper may be read easily), without magnification.

Or

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

**Working Group 26-27 February 2004
List of Participants**

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