

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of
the United Nations



World Health
Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - Fax: (+39) 06 5705 4593 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Item 8

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

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CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (OPTIONAL FINAL PRODUCT REQUIREMENTS FOR COMMODITIES / APPENDIX ON MAP)

Comments of Canada, Nigeria, Senegal, United States of America and African Union

CANADA

General Comments

Canada supports the Committee's decision to remove the appendices from the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003), with the exception of Appendix 1 on MAP. While the appendices contain some essential quality and composition factors, many are already addressed in the relevant standards. The remaining quality factors are of a commercial nature and are not related to health and safety.

Specific Comments

APPENDIX I - MODIFIED ATMOSPHERE PACKAGING

- Title

Revise:

MODIFIED ATMOSPHERE PACKAGING

~~GOOD PROCESS CONTROLS ARE ESSENTIAL WHEN PACKING FILLETS AND SIMILAR PRODUCTS~~

Reason: This sentence is better suited in the first paragraph as an introduction (see revision below).

- 1st paragraph

Revise:

~~Modified atmosphere packing (MAP) The atmosphere in a modified atmosphere packaged product (vacuum or gas) differs from the ambient atmosphere which~~ in which the composition of the atmosphere surrounding the fillet is different from the normal composition of air, can be an effective technique for delaying microbial spoilage and oxidative rancidity in fish. **However, when packing fish and seafood in modified atmosphere packaging to extend the shelf-life of refrigerated products, good process controls are essential.**

Reason : New first sentence: to be consistent with the definition adopted in the "CODE OF HYGIENIC PRACTICE FOR REFRIGERATED PACKAGED FOODS WITH EXTENDED SHELF LIFE" CAC/RCP 46- (1999) (CAC/RCP 46). Last sentence: new location of title phrase

- Insert new 2nd paragraph

The following guidance should be considered as supplemental to the guidance already outlined in section 8.2 of this code. Note that the guidance below does not apply to raw or cooked smoked products. For MAP of smoked fish and smoke flavoured fish, please refer to section 12.1.14 of this code.

- 2nd paragraph

Revise 1st sentence:

For ~~white~~ **lean** fish gas mixtures containing 35-45 CO₂, 25-35% O₂ and 25-35% N₂ are recommended.

Reason: White fish is not defined and the level of oxygen suggested can lead to lipid oxidation.

Revise 4th sentence

However, **for** retail packs of fillets or similar products, too high a proportion of **CO₂** in the gas mixture can induce pack collapse, excessive drip and may cause bleaching.

Revise 6th sentence

~~O₂ is preferentially excluded from oily fish in MA packs so as to inhibit oxidative rancidity.~~ **To inhibit oxidative rancidity of oily fish, oxygen gas may be excluded.**

Revise 7th / last sentence

A gas/product ratio of 3:1 is ~~commonly~~ recommended. Any reductions in this ratio can result in an impaired **impact** the **duration of the extended** shelf-life extension.

Reason: Editorial

- **3rd paragraph**

Revise 2nd sentence

Determination of the shelf life of a particular product should be by a suitably qualified person such as a food ~~technologies~~ **technologist** or microbiologist.

Reason: Editorial

Revise 6th sentence

It is very important to note that the inclusion of O₂ does not preclude the growth of *Clostridium botulinum* type E, ~~and~~ **Since this pathogen can grow and produce toxin at temperatures of 3.0 - 3.3 °C, strict temperature control is required** throughout the shelf life of the product ~~is very important.~~ ~~In many circumstances it is considered undesirable to use ice to cool these packs and therefore mechanical refrigeration methods are preferred~~ **should be used.**

Reason: To provide specific information about the pathogen as the basis for using adequate storage temperatures.

- **4th paragraph**

Revise 1st sentence

Seal integrity of MA packs is ~~a critical control point since it determines whether a MA pack is susceptible to external microbial contamination and air dilution of~~ **essential in maintaining the gas mixture and product quality for the duration of the shelf-life.**

Reason: The purpose of MAP is to extend the duration of a product's quality and not to prevent, eliminate or reduce a hazard. Seal integrity is therefore not a critical control point.

Revise 3rd sentence

To obtain and maintain a proper seal, great ~~Great~~ care should be taken to ensure that the seal area is ~~not contaminated with~~ **free of** product, product drip or moisture ~~since seal integrity may be reduced.~~

Reason: Editorial

Revise 4th sentence

In addition, ~~the quality of the film used is important, particularly with regard to gas permeability, and~~ **the specifications and quality of the film used for the MAP should be suitable for maintaining or achieving the modified atmosphere desired within the package.** ~~Only~~ film with a clearly defined ~~specifications~~ from reputable manufacturers should be used.

Reason: To clarify the intent.

Appendix III - FRESH, FROZEN AND MINCED FISH

1.1 Quick Frozen Finfish, Uneviscerated and Eviscerated.

Comment: The optional requirements are not considered to be essential safety or quality aspects and are therefore not suitable for inclusion in the COP or related standards.

1.2 Quick Frozen Fish Fillets and 1.3 Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh

Comment: The optional requirements on dehydration and bones are considered to be essential safety or quality aspects however they are already addressed in the *General Standard for Quick Frozen Fish Fillets and Standard for Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh*.

Appendix IV - FROZEN SURIMI

Comment: The optional requirements provide valuable information on the procedures and methods to measure quality attributes however the defect criteria for these attributes are not outlined and there is no Codex standard for surimi.

APPENDIX V - COATED IQF FISHERY PRODUCTS

Comment: The optional requirement on dehydration is considered to be an essential quality aspect that could be incorporated in the *Standard for Quick Frozen Fish Sticks (Fish Fingers), Fish Portions and Fish Fillets - Breaded or in Battered*.

APPENDIX VI - SALTED FISH

Comment: The optional requirements are not considered to be essential safety or quality aspects. Their inclusion in the COP or related standards is not warranted. The appendix should be deleted.

APPENDIX VIII - LOBSTERS AND CRABS

Comment: The optional requirements are not considered to be essential safety or quality aspects and therefore not suitable for inclusion in the COP or related standards.

APPENDIX IX - SHRIMPS AND PRAWNS

Comment: The optional requirement on dehydration and black spots are considered essential quality aspects but are already addressed in the *Standard for Quick Frozen Shrimps and Prawns*.

APPENDIX XI - CANNED FISH

1. Canned Finfish

2. Canned sardines and sardine-type products.

Comment: The optional requirements are not considered to be essential safety or quality aspects and therefore not suitable for inclusion in the COP or related standards. Furthermore, Canada does not support retaining the requirements on drained or washed weight and exuded water - which appear to be a fish content labelling standard that has not been discussed and approved by the Committee.

3. Canned Salmon and 4. Canned crab meat

Comment: The optional requirements are not considered to be essential safety or quality aspects and therefore not suitable for inclusion in the COP or related standards.

NIGERIA AND AFRICAN UNION

APPENDIX IV - Frozen Surimi

Summation: First grade surimi should meet the following requirements (see table below). According to the manufacturer's practice the quality of surimi is graded on the basis of the physical and visual conditions of raw surimi and its gel forming ability.

POSITION: The table is incomplete for colour analysis, it should include a* parameter

Comments: Colour analysis use the CIE colour system profile (CIE Lab).The colour values are expressed as: L* variable representing lightness (L* = 0 for black, L* = 100 for white), a* scale representing the red/green, + a* intensity in red and - a* intensity in green and b* scale representing the yellow/blue, + b* intensity in yellow, -b* intensity in blue (Hunter and Harold, 1987). The L*, a*, and b* values change during processing and storage period in confirmation to physico chemical changes. These changes are associated with myofibrillar protein degradation, lipid oxidation, and surface diffusion of nitrogen substances. This allows the formation of yellow pigment, redness and other changes. (Decleir and others, 1978; Nawar, 1996; Xiong, 2000; Thanonkaew and others, 2008, Pokorny and Kolakowska, 2008).

APPENDIX III - OPTIONAL FINAL PRODUCT REQUIREMENTS- FRESH, FROZEN AND MINCED FISH

1.1 Quick Frozen Finfish, Uneviscerated and Eviscerated.

Defect:

POSITION: Texture defects: The variation in temperature during freezing and or during storage of products (-18) allows the formation of demethylamine and formaldehyde which changes the texture, making it more hard for chewing. Hence temperature variation should be a determinate factor for texture defect.

SENEGAL

ANNEXE IV - Surimi congelé

Conclusions finales: Le surimi de première qualité devrait remplir les critères suivants (voir le tableau ci-dessous). Selon les pratiques usuelles des fabricants, la qualité du surimi est déterminée en fonction de l'état physique du surimi cru, **de son apparence** et de sa capacité gélifiante.

COMMENTAIRES : Le Sénégal estime que le tableau pour l'analyse de la couleur est incomplet, il devrait inclure le paramètre **a***

JUSTIFICATIONS: L'analyse des couleurs utilise le profil du système des couleurs CIE (CIE Lab). La valeur des couleurs est exprimée en variable comme: L* représentant la luminosité (L* = 0 pour le noir, L* = 100 pour le blanc), a* une échelle représentant les rouge/vert, + a* une intensité en rouge et - a* une intensité en vert et b* une échelle représentant les jaune/bleu, + b* une intensités en jaune, - b* une intensité en bleu (Hunter and Harold, 1987). Les valeurs L*, a* et b* changent au cours du traitement et pendant la période de stockage en confirmation des changements physico-chimiques. Ces changements sont associés à la dégradation des protéines myofibrillaires, à l'oxydation des lipides, et à la diffusion superficielle de substances azotées. Cela permet la formation de pigment jaune, des rougeurs et d'autres changements. (Decleir et autres, 1978; Nawar, 1996; Xiong, 2000; Thanonkaew et autres, 2008, Pokorny et Kolakowska, 2008).

ANNEXE III - PRESCRIPTIONS FACULTATIVES CONCERNANT LE PRODUIT FINI- POISSON FRAIS, CONGELÉ OU HACHÉ

1.1 Poisson surgelé, non éviscéré et éviscéré.

Défaut: Défauts de texture:

COMMENTAIRES : Nous estimons que la la variation de température devrait être un facteur déterminant dans le défaut de texture.

JUSTIFICATIONS : La variation de température lors de la congélation et ou pendant le stockage de produits congelé (-18°C) entraîne la formation de diméthylamine et de formaldéhyde qui changent la texture en rendant la chair dure entraînant ainsi difficile la mastication. C'est pourquoi

UNITED STATES OF AMERICA

Appendix 1, Modified Atmosphere Packaging

General Comments

The United States supports the inclusion of guidance on Modified Atmosphere Packaging (MAP) for raw fish, with revisions to cover the hazard of *Clostridium botulinum* growth and toxin formation.

In addition to the specific comments listed below, we suggest in the Code of Practice for Fish and Fishery Products CAC/RCP 52-2003 under section 8.2.2 (page 93) that *Clostridium botulinum* is added as a potential hazard for the vacuum or modified atmosphere packaging (Processing Step 11) since the hazard of *C. botulinum* growth and toxin formation is introduced at this step.

Specific Comments

Title

Comments: Revise Title as follows:

MODIFIED ATMOSPHERE PACKAGING OF RAW FRESH OR PREVIOUSLY FROZEN FILLETS AND MINCED RAW FISH

Rationale: Addition of "OF RAW FRESH OR PREVIOUSLY FROZEN FILLETS AND MINCED RAW FISH" because Appendix 1 is referred to from the Code of Practice for Fish and Fishery Products, Section 8 Processing of Fresh, Frozen and Minced Fish.

1st Paragraph

Comment: Revise as follows:

Modified atmosphere packing (MAP), in which the composition of the atmosphere surrounding the fillet is different from the normal composition of air, can be an effective technique for delaying microbial spoilage and oxidative rancidity in raw fish. **It also introduces the serious food safety hazard of *Clostridium botulinum* growth and toxin formation.**

Rationale: Addition of the word “raw” to ensure readers understand that this Appendix is for raw fish and does not include cooked fish. Appendix 1 does not apply to cooked fish because this appendix is referred to from the Code of Practice for Fish and Fishery Products, Section 8 Processing of Fresh, Frozen and Minced Fish and cooking the fish inhibits spoilage microorganisms and may affect *C. botulinum* growth and toxin formation.

The statement about *C. botulinum* is added at the beginning of this document because *C. botulinum* is such a serious hazard and MAP is not just about the addition of gases into the packaging.

2nd Paragraph, Last sentence

Comment: Edit follows:

A gas/product ratio of 3:1 is commonly recommended. Any reductions in this ratio can result in an impaired shelf-life extension.

Rationale: Editorial

3rd Paragraph, 2nd Sentence

Comment: Edit as follows:

Determination of the shelf life of a particular product should be by a suitably qualified person such as a food technologist~~ies~~ or microbiologist.

Rationale: Editorial

3rd Paragraph

Comment: Add two sentences between 3rd and 4th sentences as follows:

Since fish can be contaminated with *Clostridium botulinum* type E great care has to be exercised when determining the shelf life. **Type E does not break down protein and can grow at a minimum of 3°C. This allows toxin production before spoilage makes the product unacceptable to consumers.** Although it is generally accepted that *Clostridium botulinum* does not grow at temperatures below +3°C other factors, e.g. salt content or pH etc. can also have an inhibitory effect.

Rationale: Information about *C. botulinum* type E is provided to explain why it is so important that a qualified person conduct shelf life studies for modified atmosphere packs.

3rd Paragraph

Comment: Add new paragraph within current 3rd paragraph as follows:

Thus when determining the shelf life of MAP fresh fish it is advisable to do challenge tests on the product which accurately reflect the product conditions and storage and distribution environment.

If temperature is the sole control, processors need to store and distribute MA packs below 3°C with an appropriate time temperature indicator (TTI) on each individual package.¹ TTIs alert the end user or consumer when the package has been exposed to unsafe time-temperature exposures for toxin production. The TTI should be designed and validated for *Clostridium botulinum* toxin production using the Skinner-Larkin curve.²

Rationale: This information about *C. botulinum* is critical for the food safety of MA packs. Processors are to maintain MA packs below 3°C to control for the hazard of *C. botulinum*. Once the MA packs leave the control of processors, TTIs are critical to ensure time –temperature exposures at retail and by consumers do not lead to *C. botulinum* toxin production. Surveys of retail display cases and home refrigerators indicate that temperatures above 7°C are common. Appropriate TTIs will be able to determine if these types of temperatures along with the time exposures are safe. TTIs are to be specifically designed for *C. botulinum*. Most of the TTIs sold are not designed for determining time-temperature exposures that could lead to botulinum toxin production.

3rd Paragraph

Comment: Start new paragraph that includes the end of the 3rd paragraph as follows:

Reduced oxygen packaging (ROP) encompasses a large variety of packaging methods including MAP, vacuum packaging, hermetically sealed containers, heat sealed plastic or laminated packaging, and packing in oil. By reducing or preventing the exchange of air, a processor can create a reduced oxygen environment and introduce the hazard of Clostridium botulinum. MA packs can become ROP from spoilage organisms depleting the O₂. It is very important to note that the inclusion of O₂, **even at levels above air** does not preclude the growth of Clostridium botulinum type E and temperature control throughout the shelf life of the product is **critical** ~~very important~~. In many circumstances it is considered undesirable to use ice to cool these packs and therefore mechanical refrigeration methods are preferred.

Rationale: The term reduced oxygen packaging (ROP) is explained because MAP is considered a form of ROP. Information is also provided to clarify that all MA packs including those that have oxygen at levels above air are considered ROP because spoilage organisms will utilize the oxygen. “Very important” is changed to “critical” because “very important” is already used at the beginning of the sentence.

New Paragraph

Comment: Insert new paragraph after the new paragraph discussed directly above (and before the current 4th paragraph), as follows:

***Clostridium botulinum* can also be controlled through formulation and processing controls³ such as:**

- Freezing the finished packaged product and using labeling with instructions to keep the product frozen until used and to thaw under refrigeration immediately before use.
- Controlling the level of acidity or pH of the food to be 4.6 or below for shelf stability or to 5.0 or below with refrigeration at 4.4°C or below.
- Controlling the amount of moisture in the food to be 0.85 or below for shelf stability or to below 0.97 with refrigeration at 4.4°C or below.
- Controlling the amount of salt in the product to a minimum of 5% water phase salt with refrigeration at 4.4°C or below.
- Using a combination of salting, smoking and refrigeration. Controls for smoked fish can be found in Annex II of *Standard for smoked fish, smoke-flavoured fish and smoke-dried fish* (CODEX STAN 311-2013).

All ROP seafood products should have a hazard analysis critical control point (HACCP) plan that addresses *Clostridium botulinum* and all of the food safety hazards associated with the product.

Rationale: Additional controls for *C. botulinum* are provided in case processors do not want to use temperatures below 3°C and TTIs. Also a reminder is added for processors to create a HACCP plan that includes *C. botulinum* as a hazard for ROP fish.

References

Comment: Add a References section as follows:

References

1. **National Advisory Committee on Microbiological Criteria for Foods (March 20, 1992) Vacuum or Modified Packaging for Refrigerated Raw Fishery Products.**
2. **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.**
3. **USFDA (April 2011) Fish and Fishery Product Hazards and Controls Guidance, 4th edition, Chapter 13, Clostridium botulinum Toxin Formation.**

Rationale: References provided for additional information.