codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

JOINT OFFICE: Viale delle Terme di Caracalla 00100 ROME Tel: 39 06 57051 www.codexalimentarius.net Email: codex@fao.org Facsimile: 39 06 5705 4593

ALINORM 03/18

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION
Twenty-fifth Session
Rome, 30 June – 5 July 2003

REPORT OF THE TWENTY-FIFTH SESSION OF THE CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS
Ålesund, Norway, 3 - 7 June 2002

Note: This document incorporates Circular Letter CL 2002/20-FFP

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CX 5/15 **CL 2002/20-FFP**
June 2002

TO: - Codex Contact Points
- Interested International Organizations

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

SUBJECT: **Distribution of the Report of the 25th Session of the Codex Committee on Fish and Fishery Products (ALINORM 03/18)**

A. MATTERS FOR ADOPTION BY THE 25th SESSION OF THE CODEX ALIMENTARIUS COMMISSION

Draft Standard and Code at Step 8 of the Procedure

1. Draft Standard for Draft Standard for Dried Salted Anchovies (para. 24, Appendix III)

2. Proposed Draft Code of Practice for Fish and Fishery Products (specific sections) (paras. 76 and 82, Appendix II)

Governments wishing to propose amendments or comments on the above documents should do so in writing in conformity with the Guide to the Consideration of Standards at Step 8 (see Procedural Manual of the Codex Alimentarius Commission) to the Secretary, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy **before 10 March 2003**.

Proposed Draft Standard and Related Text at Step 5 of the Procedure

3. Proposed Draft Model Certificate for Fish and Fishery Products (sanitary certificate) (para. 101, Appendix V)

4. Proposed Draft Amendment to the Standard for Quick Frozen Lobsters (para. 115, Appendix VI)

Governments wishing to submit comments on the implications which the Draft Amendment may have for their economic interests should do so in writing in conformity with the Procedure for the Elaboration of World-wide Standards at Step 5 to the Secretary, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy **before 10 March 2003**.

B. REQUEST FOR COMMENTS AND INFORMATION

Draft Standards at Step 6 of the Procedure

5. Draft Standard for Salted Atlantic Herring and Salted Sprats (para. 41, Appendix IV)

Comments are invited in particular on Section 8.1.2 Parasites and Annex II on the processes used to kill nematodes (other than time/salt concentration).

Governments wishing to submit comments should do so in writing to the Secretary, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy, **before 15 March 2003.**

Proposed Draft Standards and Related Texts at Step 3 of the Procedure

6. Proposed Draft Standard for Live and Processed Bivalve Molluscs (para. 94, Appendix VII)

7. Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat (para. 124, Appendix VIII)

8. Proposed Draft Model Certificate for Fish and Fishery Products (other certificates) (para. 101, Appendix X)

9. Proposed Draft Amendment to the Standard for Salted Fish and Dried Salted Fish of the *Gadidae* Family (para. 150, Appendix IX) (subject to the approval of the Commission as new work)

Governments wishing to submit comments should do so in writing to the Secretary, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy, **before 15 March 2003.**

NOTE: The Proposed Draft Sections of the Code of Practice for Fish and Fishery Products will be sent separately for comments at Step 3.

SUMMARY AND CONCLUSIONS

The summary and conclusions of the 25th Session of the Codex Committee on Fish and Fishery Products are as follows:

Matters for adoption by the Commission:

The Committee:

- advanced to Step 8 the Draft Standard for Dried Salted Anchovies (para. 24, Appendix III);
- advanced the Draft sections in the Code of Practice for Fish and Fishery Products (general aspects; fresh/frozen/minced fish; and canned fish) to Step 8; advanced the section on frozen surimi to Steps 5/8; and returned the Proposed Draft Sections (other sections) to Step 3 for further comments (para. 76 and 82, Appendix II);
- advanced to Step 5 the Proposed Draft Model Certificate for Fish and Fishery Products (sanitary certificate) (para. 101, Appendix V);
- advanced to Step 5 the Proposed Draft Amendment to the Standard for Quick Frozen Lobsters (para. 115, Appendix VI);
- agreed to initiate new work on a 1) a Proposed Draft Amendment to the Standard for Salted Fish and Dried Salted Fish of the *Gadidae* Family (para. 150, Appendix IX); and 2) on the elaboration of a Standard for Sturgeon Caviar (para. 140)

Other matters of interest to the Commission:

The Committee:

- agreed to return to Step 6 the Draft Standard for Salted Atlantic Herring and Salted Sprats (para. 41, Appendix IV);
- agreed to return to Step 3 the Proposed Draft Standard for Live and Processed Bivalve Molluscs (para. 94, Appendix VII);
- agreed to return to Step 3 the Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat (para. 124, Appendix VIII);
- agreed to return to Step 3 the Proposed Draft Model Certificates for Fish and Fishery Products (other certificates) (para. 101, Appendix X);
- agreed to consider the Proposed Draft Standard for Smoked Fish at its next session (para. 85);
- agreed to consider further at its next session discussion papers on the following subjects: 1) the review of the procedure for the inclusion of additional species (para. 136); and 2) fish content in fish sticks (in conjunction with the Draft Amendment to the Standard for Quick Frozen Fish Sticks at Step 7) (para. 147).

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LIST OF APPENDICES

INTRODUCTION

1) The Codex Committee on Fish and Fishery Products held its 25th Session in Ålesund, Norway, from 3 to 7 June 2002, at the courtesy of the Government on Norway. The Session was chaired by Dr Bjørn Røthe Knudsen, Regional Director of Norwegian Directorate of Fish and Fisheries and Aquaculture, Trondheim. The Session was attended by 131 Delegates and Observers representing 41 Member States and 2 Observer Organizations. The complete list of participants is attached to this report.

OPENING OF THE SESSION

2) The Session was opened by Mr Peter Gullestad, Director-General of Fisheries who welcomed the delegates and emphasized the importance of the work of the Codex Alimentarius Commission which in recent years reached new increased importance in view of the globalization of trade and because of its status as a reference under the agreements of the World Trade Organization. He pointed out that the primary goals of the CAC were to protect the health of consumers while ensuring fair trade practices with a view to facilitating international trade. Mr Gullestad drew the attention of the Delegates to an in-depth evaluation of the work of the CAC carried out by an independent Evaluation Team and an Expert Panel in order to ensure that it answered the needs of member countries, that the standards were based on independent and unbiased scientific advice and that there were opportunities especially for developing countries to participate in the Codex standard-setting process. Noting the importance of the work of the Committee in preparing the comprehensive Code of Practice for Fish and Fishery Products, he wished all success to the delegates.

3) The Session was also welcomed by the Mayor of Ålesund Mr Mike Arve Tonning.

ADOPTION OF THE AGENDA (Agenda Item 1)[1]

4) The Committee agreed to discuss Agenda Item 10 (Proposed Draft Standard for Scallops) after Agenda Item 7 (Proposed Draft Standard for Live, Quick Frozen and Canned Bivalve Molluscs) and to consider the proposal of Norway on Making Amendments in the Standard for Salted Fish and Dried Fish of the Gadidae Family of Fishes under Agenda Item 14 "Other Business and Future Work". With these amendments it adopted the Provisional Agenda contained in CX/FFP 02/1 as the Agenda for the Session.

MATTERS REFERRED BY THE CODEX ALIMENTARIUS COMMISSION AND OTHER COMMITTEES (Agenda Item 2)[2]

5) The Committee noted that a number of matters arising from the 24th Session of the Codex Alimentarius Commission, the 49th Session of the Executive Committee, the 34th Session of the Committee on Food Additives and Contaminants (CCFAC), the 34th Session of the Committee on Food Hygiene (CCFH), the *Ad Hoc* Intergovernmental Task Force on Foods Derived from Biotechnology and the Committee on Methods of Analysis and Sampling (CCMAS) were for information purposes only or would be discussed in more detail under the relevant Agenda Items. In addition the Committee noted the matters of interest to the Committee as follows:

Lead Level in Fish and Bivalve Molluscs

6) The Committee noted that the Committee on Food Additives and Contaminants had decided to continue its work on lead in fish and to discontinue the work on the elaboration of maximum levels for lead in bivalve molluscs and crustaceans as the lead exposure from these commodities did not contribute significantly to the total dietary lead exposure (ALINORM 03/12, paras 130-132).

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1 CX/FFP 02/1; CRD (Discussion paper on Making Amendments in the Standard for Salted Fish and Dried Fish of the Gadidae Family of Fishes, proposed by Norway).

2 CX/FFP 02/2; CX/FFP 02/Add.1; CRD 6 (comments of Brazil).

Genetically Modified Foods – Call for Experts

7) The Committee noted that FAO and WHO intended to organize an Expert Consultation on genetically modified animals and that one of the issues to be discussed there would be on genetically modified fish, therefore encouraged Member States to identify experts in this area and to inform FAO and WHO accordingly.

Microbiological Risk Assessments

8) The Representative of WHO informed the Committee of recent developments in the work of FAO and WHO in the microbiological risk assessment area and drew the attention of the Committee to the fact that an FAO/WHO Expert Consultation had completed the risk assessment of *Listeria monocytogenes* in ready to eat foods including smoked salmon and had been developing a risk assessment on *Vibrio parahaemolyticus* and *Vibrio vulnificus* in oysters and *Vibrio cholera* in shrimps for export and that these risk assessments would be available to the next Session of the Committee on Food Hygiene for review.

Proposed Draft Code of Practice for the Processing and Handling of Quick Frozen Foods

9) The Committee noted the decisions of the 49th Session of the Executive Committee on the above Code and the work in this area carried out in other Codex Committees. The Committee was of the view that the provisions of the above code were well applicable to the Proposed Draft Code of Practice for Fish and Fishery Products from the general point of view and decided to reference it in the relevant sections of the Proposed Draft Code for Fish and Fishery Products. The Committee also noted that the Proposed Draft Code for the Processing and Handling of Quick Frozen Foods referred to "traceability" and that the use of this term might need further consideration to ensure consistency with other Codex texts. The Committee agreed that the Proposed Draft Code of Practice for the Processing and Handling of Quick Frozen Foods could be recommended for adoption at Step 5 and encouraged Member States to submit their specific comments directly to the Committee on Food Hygiene.

DRAFT STANDARD FOR DRIED SALTED ANCHOVIES (Agenda Item 3)[3]

10) The Committee recalled that its last session had returned the Draft Standard to Step 6 for further comments, especially on the Decomposition Section and the Sections that had not been discussed in detail. The Committee noted that the Delegation of Malaysia had proposed additional text for the sections to be developed (7, 8 and 9) and agreed to use these proposals as a basis for discussion. The Committee discussed the text section by section as follows.

Title

11) The Committee agreed to amend the title to reflect that anchovies were boiled (in addition to dried and salted), as this was an important step to control product safety and quality.

Section 1. Scope

12) The Delegation of Spain, supported by other delegations, proposed to identify the species covered by the Standard, especially as some *Engraulidae* species were also included in other standards and as the common name should be related to the characteristics of the species, not to the type of processing. The Committee noted that this question would be discussed from a general point of view under Agenda Item 11. The Delegation of Spain also expressed the view that the management of fishery resources should be taken into account when establishing sizing provisions in Codex standards.

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[3] ALINORM 0/18, Appendix V, CX/FFP 02/3 (comments of Malaysia, Spain), CX/FFP 02/3 –Add.1 (comments of Thailand), CRD 6 (comments of Brazil)

Section 2. Description

13) The Committee amended section 2.2 Process Definition as proposed by the Delegations of France and Thailand, in order to clarify the process used, and especially salting. In section 2.3 Handling Practice, the Committee agreed that adequate temperature control was also necessary to prevent the formation of histamine and the section was amended accordingly.

14) The Delegation of Brazil proposed to specify that fish of a size superior to 6.5 cm should be eviscerated, in order to avoid risks to human health, but the Committee retained the current text.

Section 3. Essential Composition and Quality Factors

15) In section 3.4 Decomposition, the Delegation of Thailand indicated that it would have no objection to the inclusion of a level of histamine of 10mg/100g as the products concerned could meet this requirement and the current text was retained.

Section 4. Food Additives

16) The Committee included a section on additives, in conformity with the format of Codex Standards, and agreed that no additives should be allowed in the products covered by these standards.

Section 5. Hygiene

17) The Committee agreed that the title of the Section should be "Hygiene and Handling" for consistency with other standards for fish and fishery products, and to add a reference to the Code of Practice for Salted Fish.

Section 6. Labelling

18) The Name of the Food in Section 6.1 was amended to "Boiled Dried Salted Anchovies", following the earlier amendment to the title. The Committee also agreed that the common name of the product "shall be declared in accordance with the law and custom of the country in which the product is sold, in a manner not to mislead the consumer".

19) In section 6.2, the Committee agreed that labelling according to size and grade should be optional since sizing and grading were optional, and amended the text accordingly.

20) In section 6.3, some delegations proposed to include a reference to the scientific name of the species in addition to the common name as it was an important element of consumer information, especially as the Standard covered all species of *Engraulidae* and the species used as raw material would influence the quality of the final product. Other delegations pointed out that the declaration of the scientific name was not common practice in Codex standards and that it would not provide useful information to consumers.

21) After an extensive discussion, the Committee agreed with the compromise proposed by the Delegation of the United Kingdom to indicate the scientific name of the species in the accompanying commercial documents.

Section 7. Sampling, Examination and Analysis

22) The Committee added a reference to the method for the determination of histamine (Section 7.5) and a new Section 7.6 Sensory and Physical Examination with a description of the relevant procedure in Annex C.

Section 8. Definition of Defectives

23) The Committee agreed with the proposals of the Delegation of Malaysia for this section with the following amendments. The title of Section 8.2 was amended to "Breakage" and in Section 8.3, the last part of the sentence on contamination by foreign substances was deleted. As proposed by the Delegation of Canada, it was agreed to include a new paragraph on contamination by foreign substances in the Hygiene section, as this was consistent with the approach taken in other standards for fish and fishery products.

Status of the Draft Standard for Boiled Dried Salted Anchovies

24) The Committee, recognizing that all pending issues had been satisfactorily resolved, agreed to advance the Draft Standard to Step 8 for adoption by the 25th Session of the Codex Alimentarius Commission (see Appendix III)

DRAFT STANDARD FOR SALTED ATLANTIC HERRING AND SALTED SPRATS (Agenda Item 4)[4]

25) The Committee recalled that the above draft Standard had been extensively considered by its 24th Session of and that the 49th Session of the Executive Committee had adopted it at Step 5[5] .

26) The Committee decided to consider the Draft Standard Section by Section and made the following amendments:

Section 2.2 Process definition

27) In order to provide additional protection from *Clostridium botulinum* hazard, the Committee amended the second sentence of Section 2.2 by inserting provisions regarding temperature control in the salting process and adding as an alternative evisceration prior to brining. The Delegations of Norway and Germany expressed the view that this product had a long history of safe use and that no further health protection measures were required.

28) The Committee however was of the view that the matter of protection of public health from *Clostridium botulinum* hazard needed to be addressed in more detail and therefore agreed that the Delegation of Norway with assistance from the Netherlands, the United States and the representatives of FAO and WHO would prepare a risk profile on this matter for consideration by the next session. This would assist the Committee in deciding whether a full risk assessment for this hazard in salted Atlantic herring and sprats was needed.

29) The Committee amended the definitions of very lightly (Section 2.2.2.1) and lightly (Section 2.2.2.2) salted fish for clarification purposes as suggested by the Delegation of Canada.

Section 3.4 Decomposition

30) The Committee amended the sentence related to decomposition by clarifying that not more than 10 mg of histamine should be contained in 100g of fish flesh.

Section 4. Food Additives

31) The Delegation of Israel, supported by other delegations, expressed its concern with the use of Fast Green FCF. The Committee agreed that in general, colours were not used in salted Atlantic herring and salted sprats and that they should not be included in the standard.

32) The Committee noted that Fast Green FCF was already included in the General Standard for Food Additives (GSFA) in food category 9.2.5 “Smoked, dried, fermented, and/or salted fish and fish products, including molluscs, crustaceans, and echinoderms” but agreed to delete this additive from the present Draft Standard as it was not used in salted Atlantic herring and salted sprats.

33) The Committee agreed to include the following additives in the section, as proposed by the Delegation of Iceland:

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4 ALINORM 01/18, Appendix VI; CL 2002/2-FFP; CX/FFP 02/4 (comments of Canada, Israel, United States); CRD 2 (comments of Norway); CRD 6 (comments of Brazil).

5 ALINORM 03/3, para. 6, Appendix II.

- ❖ 300 Ascorbic acid: GMP (adopted in Table 3 of the GSFA)
- ❖ 330 Citric acid : GMP (adopted in Table 3 of the GSFA)
- ❖ Benzoates: 200mg/kg
- ❖ Sorbates: 200 mg/kg

34) In reply to a question on propyl gallate, the Committee recalled that it had been endorsed by the Committee on Food Additives and Contaminants and adopted in the GSFA with a level of 100 mg/kg.

Section 5. Hygiene and Handling

35) In order to be consistent with the decision taken earlier on this section in the standard for boiled salted anchovies (see para. 23), the Committee inserted additional wording related to foreign material that posed a threat to consumers.

36) The Committee noted that there was some inconsistency in addressing viable/visible parasites and therefore decided to delete Section 5.3.1 regarding fish infested with parasites with the understanding that the issue of visible parasites would be clarified in Section 8.1.2. The Committee agreed that no living nematodes could be allowed in herring and sprats and inserted the relevant provision in the Section on Hygiene and Handling in this regard.

Section 6. Labelling

37) The Committee noted that labelling provisions did not cover bulk products and therefore decided to insert additional wording in this regard. The Committee also inserted "salted" before herring and sprats in Section 6.1.1 in order to be consistent with the title of the Standard.

Section 8.1.2 Parasites

38) The Committee had a lengthy debate regarding the clarification of provisions regarding the expression and detection of visible parasites as quality provision in this standard and the tolerances that might be applied. Some delegations were of the opinion that provisions for dead parasites should apply only for unopened fish while some other delegations were of the view that it should apply to opened fish and that it was an important quality factor for consumers. There were also delegations that indicated that the above provision should be applied to the edible part only. The Committee concluded that this matter required further clarification, therefore as a compromise decided to use the following wording for this section "The presence of readily visible parasites in a sample of the edible portion of the sample unit detected by normal visual inspection of the fish flesh" and agreed to put this sentence in square brackets and to ask additional comments for further consideration.

Annex I

39) The Committee agreed to insert the determination of the viability of nematodes as proposed by the Delegation of Germany in Annex II of Circular Letter 2002/2-FFP.

Annex II

40) The Committee accepted the kind offer of the Delegation of Germany to elaborate treatment procedures to kill living nematodes (time/salt concentration) and invited Member States to submit their comments/proposals on the other processes, which could have equivalent effect to these procedures.

Status of the Draft Standard for Salted Atlantic Herring and Salted Sprats

41) The Committee was of the view that despite the progress made by this session on the development of the Draft Standard, some sections required further elaboration and discussion, therefore agreed to return the above Draft Standard to Step 6 for further comments and consideration by the next session of the Committee (see Appendix IV).

CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS: DRAFT SECTIONS (1,2.1, 2.2, 2.9, 3 TO 6 AND 13) AND PROPOSED DRAFT SECTIONS (OTHER SECTIONS) (Agenda Item 5)[6]

42) The Committee recalled that its last session had advanced to Step 5 several sections of the Code and returned other sections to Step 3 for redrafting by the responsible countries under the general coordination of the United Kingdom, Canada and France. The 49th (Extraordinary) Session of the Executive Committee had adopted at Step 5 the general requirements and the sections on fresh, frozen, minced and canned fish, subsequently circulated for comments at Step 6. The Committee noted the comments submitted to the Executive Committee and to the Committee on Food Hygiene, as well as the comments related to the endorsement of hygiene provisions.

43) The Delegation of the United Kingdom informed the Committee that in cooperation with Canada and France, they had incorporated the remaining sections prepared by the coordinating countries into the Code, and had proposed additional amendments to the structure of the code and to the Draft Sections.

44) The Committee agreed with the proposal of the Chairman to discuss the general issues concerning the title, scope and definitions, in the light of the comments received, before proceeding with a discussion section by section.

General Issues: Title, Scope and General Definitions

45) The Committee recalled that the Committee on Food Hygiene had noted that the use of the terms fish and shellfish should be further clarified. Some delegations expressed the view that a change in the title and scope of the Code was therefore required and the Committee discussed some proposals to this effect. After an extensive debate, the Committee agreed to retain the current title and to provide additional clarification in the Scope, indicating that the Code applied to "fish, shellfish and other aquatic invertebrates and products thereof". The Committee agreed that this covered all relevant products and would allow for the extension of the Code to additional species that were not currently covered. The Committee then discussed the definitions of "fish" and "shellfish" in order to clarify them in relation with the Scope.

46) The Committee agreed that "fish" should cover only cold-blooded (ectothermic) aquatic vertebrates and exclude amphibians and reptiles and the definition was amended accordingly.

47) The Delegation of France proposed to delete the definition of "shellfish" as it was likely to cause difficulties in translation and the categories covered were defined more precisely in the relevant sections. Other delegations expressed the view that this general term should be retained, provided it was clearly defined, rather that including additional definitions in each section.

48) After some discussion, the Committee agreed that shellfish "means those species of aquatic molluscs and crustaceans that are commonly used for food", deleting the reference to cephalopods as they were covered in a specific section.

49) The Committee also agreed to reorganize and re-number the Code in order to follow more closely the food chain, as follows: general sections, pre-harvest and primary production; processing; transport; and retail.

Other Definitions

50) The Committee considered the other definitions applicable to the sections under consideration at Step 7. The definition of "Biotoxins" was amended to take into account poisonous substances that are naturally present in some species. "Processing Facility" was replaced by "Facility". The definition of "Raw Material" was amended to include both fish and shellfish.

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[6] CL 2001/50-FFP, CX/FFP 02/5-Part I and II, CX/FFP 02/5-Add.1 (comments of Cuba, France, Norway, Spain, Thailand, United States), CX/FFP 02/5-Add.2 (comments submitted to CCEXEC and CCFH), CX/FFP 02/5-Add.3 (comments of Canada), CRD 3 (comments of the United Kingdom), CRD 6 (comments of Brazil), CRD 8 (comments of the Philippines)

51) The Committee generally agreed to delete definitions that were not used in the text, and in particular "Chilled Water" in section 2.1. The Committee agreed with the proposal of the Delegation of South Africa to add a definition of "Frozen Storage Facilities" since several sections included references to frozen storage.

DRAFT SECTIONS

52) The Committee considered the Draft Sections of the Code and made the following amendments.

Introduction

53) The Committee agreed to indicate that Defect Action Point (DAP) analysis was optional, as proposed by the Delegation of Malaysia.

Section 3. Pre-Requisite Programme

54) It was agreed that the title of section 3.1.3 should refer to "fish and shellfish" as it was of general application, while section 3.1.4 applied specifically to "Aquaculture Products and Molluscan Shellfish".

55) In section 3.1.4 the Committee agreed to delete the provisions concerning fish that was not harvested alive, in view of the health hazards for such products; and to add requirements for the holding or the transport of live fish. It was also specified that equipment should be easily cleanable and free from contamination, as proposed by the Delegation of India.

56) In section 3.4.1, it was agreed to use the same wording as in the definition of "cleaning" as it covered the removal of all objectionable matter.

3.6 Transport

57) The Committee agreed to clarify that the second paragraph on chilling did not apply to live fish and shellfish and that brine frozen fish intended for canning should be maintained at a temperature of -9°C or colder. Additional requirements were included for the transport of live fish and shellfish under a temperature tolerant to the species at the end of the section.

3.7 Traceability and Recall

58) The Delegation of the United States recalled that "traceability" was not defined in Codex and that discussions on this question were ongoing in several Committees; however the Intergovernmental *Ad hoc* Task Force on Foods Derived from Biotechnology had agreed on provisions for product tracing to address risks to human health. The Delegation therefore proposed to apply a similar approach to the Code. The Chairman recalled that this section had been initially developed to ensure that products that were found to present a hazard to health could be traced back and recalled. The Committee agreed to replace "traceability" with "product tracing" as this term was adequate for the purpose of the Code and to made some editorial amendments to the section.

Section 4. General Considerations

4.1 Potential Hazards Associated with Fish and Shellfish

59) In section 4.1.1.2 Bacteria, the Committee agreed to include a reference to the hazards related to *Staphylococcus aureus* and *Vibrio parahaemolyticus*, as proposed by the Delegation of France; and to clarify the processes that could be used to control hazards, as proposed by the Delegation of Canada.

60) The Committee agreed to reorder the section on phycotoxins PSP/DSP/ASP/NSP, as proposed by the Delegation of the United States. The Observer from the EC proposed to add specific references to Yessotoxin, Pectenotoxins and Azaspiracids. Other delegations indicated that there was no need to mention all types of toxins as the section provided only examples. The Committee agreed that a reference to "DSP complex" would ensure that all toxins were covered by the text.

61) The Committee agreed that Scombrotoxin should be considered under a new separate section (4.1.1.5) and made some amendments to the section for clarification purposes. The Committee made other editorial amendments in sections 4.1.1 (Title), 4.1.1.1 Parasites (Cestodes); 4.1.1.4 Biotoxins and 4.1.1.5 Scombrotoxin.

62) The Committee agreed that section 4.1 Potential Hazards Associated with Fish and Shellfish should be transferred from Section 4 to an Annex to Section 5 on HACCP and DAP Analysis, as it was directly related to hazard analysis.

4.2 Time and Temperature Control

63) The Committee added provisions for the transport of live fish and shellfish in section 4.2.2, as agreed earlier in Section 3.6 (see para.57) above).

Section 5. HACCP and Defect Action Point (DAP) Analysis

64) The Committee agreed on editorial amendments to the HACCP diagram in Figure 5.1 in order to ensure consistency with the General Principles of Food Hygiene, and in Tables 5.2 and 5.5 presenting examples of hazards at different steps of the process.

65) In section 5.3.3.1.2 Defects, the Delegation of Brazil stated that provisions on defects could be applied by governments for the purposes of regulation in order to protect consumers from misleading practices and that this should be taken into account in the text. After some discussion, the Committee agreed that the last sentence would read "These requirements are intended for voluntary application by commercial partners and not necessarily for application by governments".

Section 8. (previously 6) Processing of Fresh Fish, Frozen and Minced Fish

66) The Committee agreed to add references to scombrotoxin as a potential hazard in sections 8.1.Finfish Preparation and 8.4 Processing of Minced Fish. The reference to biotoxins was deleted from section 8.3.2 Glazing and 8.5.Packaging, Labels and Ingredients as it was not a potential hazard at those steps of the process. Microbiological contamination was included as a potential hazard in section 8.4.4 Wrapping and Packing.

67) The Committee agreed that section 8.2 should also cover Vacuum Packed Fish, as proposed by the Delegation of South Africa and amended the title and “technical guidance” accordingly.

Section 16. Canned Fish and Shellfish (previously Section 13. Canned Fish)

68) The Committee noted that the section covered fish and shellfish, cephalopods and in the future might apply to other aquatic invertebrates that were not currently covered. After an exchange of views, the Committee agreed that the title should refer to “fish and shellfish” and that the section applied also to cephalopods and other aquatic invertebrates.

69) In the flow chart 16.1, the reference to section 8.1 Fish preparation was deleted to avoid any confusion as the steps could apply to shellfish or other products. It was also recalled that the flow chart was for illustrative purposes only.

16.2.1 Hazards

70) The Committee agreed that histamine should be included under a new section A 2 Scombrotoxin rather than under A 3 Microbiological Toxins. It was also agreed to replace histamine with scombrotoxin where applicable. Section B. Chemical Hazards was amended as proposed by the Delegation of Brazil to address the contamination by chemical products.

71) As proposed by the Delegation of Canada, the Committee agreed to include additional explanations concerning the following risks: botulism in the paragraph on *Clostridium botulinum*; and post-processing contamination in the paragraph on *Staphylococcus aureus*. The Committee also agreed that Staphylococcus contamination was not generally caused by highly contaminated raw material and amended the text as proposed by the Representative of FAO.

72) The Committee noted that there was no definition of "container" and agreed to add a reference to "covers" when containers were mentioned in section 16.3.1 Raw Materials Reception and throughout the text for clarification purposes

73) In section 16.4.7.1 Filling, the Committee agreed to retain "microbiological growth (waiting period)" without square brackets; to include a reference to "microbiological survival"; and "foreign matter" was included as a potential hazard.

74) In section 16.4.9.1 Sterilisation Schedule, the second paragraph was clarified to reflect that proper heat penetration and temperature distribution tests should be carried out. In section 16.4.9.3 Monitoring of Heat Processing Operation, the fourth paragraph was amended to clarify the requirements for thermometer reading.

75) In section 16.4.10 Cooling, the Committee agreed to clarify that in the case of recycling, potable water should always be either chlorinated or treated by other adequate methods.

Status of the Draft Sections in the Code of Practice for Fish and Fishery Products

76) The Committee agreed to advance the above Sections to Step 8 for adoption by the 25th Session of the Codex Alimentarius Commission (see Appendix II).

77) The Committee decided to consider the section on Frozen Surimi because its provisions were related to the sections on fresh, frozen and minced fish that had been considered above and finalized.

PROPOSED DRAFT CODE (OTHER SECTIONS)

Section 2. 5 Definitions

78) The Committee agreed with the proposed Definitions applicable to Frozen Surimi.

Section 9. Processing of Frozen Surimi

79) In section 9.2.1 Raw Fresh and Frozen Fish Reception, the Committee deleted the two paragraphs concerning toxins as these hazards were already covered in the section on Fresh, Frozen and Minced Fish. The Committee had an exchange of views on the health risk associated with storage of fish for 14 days at 4° C and agreed to refer to a temperature as close as possible to 0° C, for consistency with section 4.2 (now 4.1) Temperature Control. The 7th paragraph concerning pH was amended to make it more general, retaining the reference to Alaska Pollock as an example.

80) In section 9.7, the Committee agreed that the use of protein plasma should be appropriately labelled, as proposed by the Delegation of Malaysia. The Delegation of Canada proposed to mention improper labelling of allergens as a potential hazard. The Committee however noted that the question of allergens labelling was generally addressed in the General Standard for the Labelling of Prepackaged Foods and retained the current text.

81) The Committee agreed that the section on additives should be consistent with the corresponding provisions for Fresh Frozen and Minced Fish (Section 8.4.3), with a reference to the General Standard for Food Additives. The reference to cross-contamination in section 9.8 Packaging and Weighing was deleted as it was not a potential hazard at that step.

Status of the Proposed Draft Section on Processing Frozen Surimi

82) The Committee agreed to advance the Proposed Draft Section to Step 5 with the recommendation that the Commission omit Steps 6 and 7 and adopt it at Step 8. The Section is presented in Appendix II with the sections at Step 8.

Other Sections

83) The Committee could not consider the other sections of the Code due to time constraints and agreed to return them to Step 3 for further comments, including the amended section on Molluscan Shellfish revised by a

Working Group convened during the session (see para. 88). The Committee also agreed that the United Kingdom, France and Canada would consider the sections at Step 3 and the comments received in order to prepare a revised text for consideration by the next session, if required.

84) The Committee agreed that a Working Group open to all interested countries would be held prior to the next session in order to discuss the remaining sections of the Code, especially Aquaculture and Molluscan Shellfish, as well as the food safety issues in the Proposed Draft Standard for Live and Processed Bivalve Molluscs. The Committee expressed its appreciation to the host country for this proposal that would facilitate the discussion of several complex issues that remained to be addressed.

PROPOSED DRAFT STANDARD FOR SMOKED FISH (Agenda Item 6)

85) The Committee noted that the document on this Agenda Item had not been made available to this session and therefore decided to consider this matter at it next session. The following countries expressed their willingness to cooperate with Denmark in the development of the document: Germany, France, New Zealand, Norway, South Africa, and the United States of America.

PROPOSED DRAFT STANDARD FOR LIVE, QUICK FROZEN AND CANNED BIVALVE MOLLUSCS (Agenda Item 7)[7]

86) The Committee recalled that the development of the proposed draft Standard for molluscan shellfish, especially on bivalve molluscs had been considered by its 22nd, 23rd Sessions, and that at the 24th Session the Delegation of the Netherlands had presented the proposed text which was subsequently circulated for comments at Step 3.

87) The Committee noted that in view of the comments received several important issues such as the expansion of the Scope, post harvest treatment, the methodology for dealing with targeted pathogens or the use of additives needed to be solved, therefore accepted the proposal of the Chairperson to convene an *ad hoc* Working Group[8] which would work during the current session to review the comments received and prepare a revised version for consideration by the Committee.

88) The Chairman of the *ad hoc* Working Group informed the Committee that a revised version of the proposed draft standard had been prepared in the light of comments received It was pointed out that a number of comments had been accommodated in different sections of the proposed draft Standard, that the Scope had been extended to include processed molluscs and scallops with gonads and that the title of the Standard had been amended to refer to "live and processed bivalve molluscs". The Committee was informed that different views were expressed on how to deal with targeted pathogens, product tracing and the levels and determination of biotoxins, therefore additional guidance in these areas was necessary.

89) The Delegation of the United States informed the Committee that post-harvest treated molluscs represented a rapidly growing market and that a programme based on post-harvest treatment as a key element of the control strategy had been recently developed in order to reduce illnesses from *Vibrio vulnificus* and *Vibrio parahaemolyticus.* The Delegation of the Netherlands informed the Committee that this problem may be solved by using classification of the growing waters for targeted pathogens.

90) The Observer from the EC drew the attention of the Committee to the levels for biotoxins applied in the EC in order to protect consumers' health. The Delegation of Israel and the Observer from the EC were of the view that the proposed levels for *E. coli* for live molluscs were too high and questioned the basis for their establishment.

91) The Committee noted the information provided by the Representative of WHO that FAO and WHO were developing a risk assessment on some *Vibrio* spp. in seafood, therefore agreed to put forward the following risk

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7 CX/FFP 02/7; CX/FFP 02/7-Add.1(comments of Malaysia, New Zealand, Spain and United States); CX/FFP 02/7-Add. 2 (comments of Cuba, Thailand); CRD 4 (comments of the European Community).

8 Canada, France, Germany, Ireland, Netherlands, New Zealand, Norway, Thailand and the United States.

management questions to the joint FAO/WHO Expert Consultation on Microbiological risk assessment in August 2002.

- Whether the following pre-harvest control measures (testing/monitoring the following parameters and consequential closure of the harvesting area) are effective in the control of *Vibrio parahaemolyticus* and *Vibrio vulnificus* in bivalve molluscs:
    - Testing of Bivalve mollusc meat for *Vibrio parahaemolyticus* and *Vibrio vulnificus*
    - Temperature monitoring of the growing water
    - Water testing for *Vibrio parahaemolyticus* and *Vibrio vulnificus*
    - Salinity monitoring
- Whether the following post harvest treatment technologies, alone or in combination, are effective in the reduction or elimination of *Vibrio parahaemolyticus* and *Vibrio vulnificus* in bivalve molluscs:
    - hydrostatic pressure
    - rapid cooling
    - irradiation
    - mild heat treatment (pasteurisation)
    - freezing and thawing
    - depuration

For *Vibrio parahaemolyticus*

- Whether food borne illnesses are caused by the heat resistant toxin produced by the pathogen or by the pathogen itself
- Availability of a method of analysis for *Vibrio parahaemolyticus* toxin gene (TDH)

92) In order to protect consumer health and properly elaborate the hygiene and handling section of the proposed draft Standard, the Committee agreed to ask FAO and WHO to provide scientific advice on biotoxins, especially as it related to their levels in bivalve molluscs.

93) The Committee noted that due to time constraints and substantial changes proposed to the text it was not possible to examine the proposed draft Standard in more detail and that in depth technical consideration on the unresolved issues was needed.

Status of the Proposed Draft Standard for Live and Processed Bivalve Molluscs

94) The Committee agreed to return the Proposed Draft Standard as revised at the current Session to Step 3 for further comments and consideration by the next session of the Committee (see Appendix VII).

PROPOSED DRAFT MODEL CERTIFICATE FOR FISH AND FISHERY PRODUCTS (Agenda Item 8)[9]

95) The Committee recalled that its 22nd, 23rd and 24th sessions had discussed the general aspects of model certificates and that the 24th Session had agreed to circulate for comments at Step 3 the proposed Draft Model Certificate prepared by the Delegations of Canada and Norway.

96) The Delegation of Canada presented the revised document prepared in cooperation with Norway in the light of the comments received. A few editorial changes had been made to the certificates themselves, and the main change was the addition of an Introduction, Scope and Definitions intended to clarify the purpose of the certificates, taking into account the *Guidelines for Generic Official Certificates Formats and the Production and Issuance of Certificates* (CAC/GL 38-2001) and other relevant texts on inspection and certification.

97) Several delegations stressed the difficulties of exporting countries in view of the multiplication of certificates required by importing countries and especially when lot by lot certification was required, as it created significant trade difficulties. These delegations therefore supported further work on the certificates.

98) The Committee agreed to concentrate on the introductory text and on the sanitary certificate at this stage as it reflects a systems approach while the other certificates reflect a lot-by-lot approach. The Committee agreed to discuss further the other types of certificates at the next session.

99) The Observer from the EC expressed the view that only the reference to the competent authority should be retained and that the reference to "inspection body" should be deleted, as it should be clear that sanitary certificates could be issued only by official competent authorities. Other delegations pointed out that while the competent authority exercised an overall responsibility, inspection and certification might be carried out by another recognized body, according to the procedures applied at the national level. It was also noted that the Attestation referred to the signature of the "official inspector".

100) The Committee noted that "inspection body" was not defined in Codex and that it would require further consideration if included in the text. After an exchange of views, the Committee agreed with the proposal of the Delegation of Canada to use the term "certifying body", as already defined in Codex.

Status of the Proposed Draft Model Certificate for Fish and Fishery Products

101) The Committee agreed to advance the Proposed Draft introductory section and sanitary certificate to Step 5 for adoption by the 25th Session of the Codex Alimentarius Commission (see Appendix V) and to return the other Proposed Draft Model Certificates to Step 3 for further comments and consideration at the next session (see Appendix X)

PROPOSED DRAFT AMENDMENTS TO THE STANDARD FOR QUICK FROZEN LOBSTERS (Agenda Item 9)[10]

102) The Committee recalled that the 24th Session of the Committee had considered a document prepared by the Delegation of Chile containing the background information on the commercial importance in international trade and taxonomical characteristics of the species *Pleuroncodes monodon* and *Cervimundia johni* for the purpose of elaborating a specific standard for Chilean langostinos. At that session the Committee had agreed that the Standard for Quick Frozen Lobsters should be amended to include the above species. It had also been agreed that the Delegation of Chile would provide a proposed draft amendment including the amendments to be made to the title and relevant sections, including labelling, for further consideration by the Committee.

103) The 49th Session of the Executive Committee had approved the elaboration of the proposed draft Amendment to the Standard for Quick Frozen Lobsters as new work and, as prepared by Chile, the proposed draft amendment had been circulated for comments at Step 3.

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9 ALINORM 0/18, Appendix VIII, CL 2000/20-FFP, CX/FFP 02/8

10 CX/FFP 02/9; CX/FFP 02/9-Add.1(Comments from Cuba, France and United States); CX/FFP 02/9-Add. 2 (Comments from Canada); CRD 8 (Comments from the Philippines).

104) The Committee accepted the proposal of the Delegation of Canada that there was no need to reexamine and amend the entire Standard for Quick Frozen Lobsters and that the sections which required revision were: Scope, Product Description, Labelling (name of the product) and Sampling, Examination and Analysis.

105) The Observer from the EC indicated that the proposed draft amendments were not acceptable due to linguistic problems especially as "langostinos" in Spanish covered a wide range of species which were already included in the standard for shrimps and prawns, and did not agree that it could be traded under the name of “langostinos”. The Observer suggested that the inclusion of new species in the standards be held until the Committee had developed a new procedure for inclusion to be considered under Agenda Item 11.

106) The Chairperson of the Committee clarified that Agenda Item 11 dealt with much broader aspects of the inclusion of new species and that until a new procedure was elaborated, the Committee would use the procedure that existed currently.

107) The Delegation of Chile drew the attention of the Committee to the fact that the term "langostinos" had been used for many years for marketing several species including *Pleuroncodes monodon* and *Cervimundia johni* and that its use for other species was not excluded. In response to a question from the Delegation of the United Kingdom, the Chairperson clarified that species other than the two species mentioned in the standard could also be named "squat lobsters" in accordance with the national law and custom.

108) The Delegation of Spain pointed out that the family *Galatheidae* included a broad range of species and that the denomination of *Pleuroncodes monodon* and *Cervimundia johni* species as langostinos confused consumers and created trade problems as this term was used for many other types of products traded in Spain and other countries.

109) The Committee noted that the confusion related mainly to the use of the term "langostinos" when marketed in some Spanish speaking countries and that the term “squat lobster” did not appear be a problem for the English name of the above species. The Delegation of France suggested that in order to avoid confusion for French-speaking consumers, the name for the above species should be translated into French as “galathée” but not “langoustine” or “homard” and the Committee accepted this proposal.

110) After extensive debate, the Committee was of the view that some differences were required between the English, French and Spanish versions for clarification purposes. It therefore agreed that in the Scope in the English version the term “squat lobster” was applicable while in the French and Spanish versions the scientific names would be given.

111) The Committee recalled that it had agreed to include in the standard only the species *Pleuroncodes monodon* and *Cervimundia johni* but not the entire genus of the above species, therefore amended Section 2.1 Description accordingly. For the term “squat lobster” in the French and Spanish versions it decided to use the same wording as in the Scope (see para 110) above).

112) The Committee agreed that the wording for the English version of Section 6.1 v) would be “squat lobster if derived from the species of *Cervimundia johni* and *Pleuroncodes monodon*”.

113) The French and Spanish versions would read as follows in Section 6.1 v) “if derived from the species *Pleuroncodes monodon* and *Cervimundia johni* the name should be in accordance with the law and custom of the country in which the product is sold, in a manner not to mislead the consumer”.

114) The Committee also agreed that in the French and Spanish versions of Section 7.1 Sampling the scientific names for “squat lobster” should be given.

Status of the Proposed Draft Amendment to the Standard for Quick Frozen Lobsters

115) The Committee agreed to forward the Proposed Draft Amendment to the Commission for adoption at Step 5 (see Appendix VI).

PROPOSED DRAFT STANDARD FOR SCALLOPS (Agenda Item 10)[11]

116) The Committee recalled that at the 24th Session the Delegation of Canada had presented a discussion paper on the need to elaborate a standard for scallops with a view to decide whether one or two standards for the above products should be developed. Following approval by the Executive Committee as new work, the Delegation prepared the proposed draft Standard which was circulated for comments at Step 3.

117) In view of time constraints and the summary document prepared by Canada on the drafting countries comments (Annex II of CX/FFP 02/10) which highlighted the essential elements for consideration, the Committee decided to concentrate its discussion on the issues that were presented in square brackets and needed further consideration by the Session.

118) The Committee clarified that the standard was not applicable to scallop meat bound by fibrinogen by deleting the square brackets from the first paragraph of the Scope. The Committee also deleted the square brackets from the second paragraph of the Scope and amended it to make it clear that the Standard for live and processed bivalve molluscs covered live scallops and other scallop products.

119) The Committee amended sections 2.3 "Presentation" and 3.1 "Scallop meat" for clarification purposes and decided to delete the square brackets regarding the 5% of broken pieces of scallop in relation to sample weight.

120) The Committee agreed to retain square brackets in section 3.3.2 related to the provisions on moisture content, as there was disagreement among the delegations regarding the expression of moisture; some delegations were in favour of its direct expression while others preferred to use the moisture content expressed in relation to protein content. It was also noted that the moisture content would depend on the outcome of the consideration of polyphosphates.

121) The Committee has extensive debate on the section on additives. The Delegation of the United States proposed to allow the use of sodium tripolyphosphate, pointing out that it was safely used in that country and there were some benefits from its use especially to prevent loss of moisture. This view was supported by the Delegation of Japan. Several other delegations pointed out that this standard covered natural and high value products and that there was no need to use any additives in this type of products. In view of this, the Committee agreed to retain the square brackets on this section.

122) The Committee was of the view that consideration of provisions on additives and especially on moisture required in-depth technical background and discussion, therefore agreed that Canada with the cooperation of France, Japan, Thailand and the United States should prepare a paper in this regard for consideration by the next session.

123) The Committee agreed to retain the square brackets on Section 5.2 related to biotoxins and accepted the kind offer of the Delegation of the United States to elaborate a text with provisions on parasites in Section 8.4 for further discussion by the Committee.

Status of the Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat

124) The Committee agreed to return the proposed draft Standard as revised at the current Session to Step 3 for further comments and consideration by the next session of the Committee (see Appendix VIII).

DISCUSSION PAPER ON THE INCLUSION OF ADDITIONAL SPECIES AND ON THE LABELLING REQUIREMENTS RELATED TO THE NAME OF THE SPECIES IN CODEX STANDARDS (Agenda Item 11)[12]

125) The Committee recalled that following the discussion on the inclusion of *Clupea bentincki* in the Standard for Canned Sardine and Sardine-Type products, the last session had decided to consider the inclusion

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[11] CX/FFP 02/10; CX/FFP 02/10-Add.1 (comments of Canada, Cuba, France and United States); CRD 4 (comments of EC); CRD 8 (comments of the Philippines).

[12] CX/FFP 02/11, CRD 8 (comments of the Philippines)

of species and labelling issues from a general point of view. It had been agreed that the Delegation of France would prepare a discussion paper on these questions, in cooperation with other interested countries.

126) The Delegation of France introduced the document that identified the main issues related to the inclusion and declaration of species and proposed some options for further work in this area, as follows. The Delegation pointed out that the current approach to labelling of the name of the food resulted in consumer confusion and unfair trade practices, especially as the same species could be covered by several standards under different common names (such as sardine and herring). In order to avoid such confusion, the Delegation of France first proposed that the labelling provisions of all standards should require the declaration of a common name in conformity with the law or custom of the country in which the product is sold. The comparison of all current standards for canned fish and fishery products showed that with the exception of the provisions concerning species, few substantial difference existed; these standards could therefore be merged into a single standard for canned fish and the adequate information on the nature of the product would be addressed through labelling. In addition to the common name, the scientific name and the origin of the product should be declared to provide adequate consumer information.

127) The Delegation also pointed out that the criteria applied in the current procedure were not selective enough, and in practice might allow the inclusion of additional species that were not really related to the main species described in the standards. It was therefore proposed to revise the procedure in order to take into account the "risk of confusion" likely to occur with new species, and to strengthen its scientific basis, especially through the use of protein electrophoretic profiles or DNA sequences to ensure the authentication of species.

128) The Committee expressed its appreciation to the Delegation of France for this comprehensive paper that provided a clear basis for the discussion of important issues.

129) The Delegation of Morocco supported the conclusions of the discussion paper and stressed the importance of ensuring fair trade practices and clear consumer information as the species was an essential quality factor; its identification should not be affected by the type of processing, but should be based on scientific criteria and on labelling provisions. This view was supported by several delegations.

130) Several delegations expressed their concerns with the proposals to indicate the scientific names in the label as it would not necessarily provide better information for the consumer and might create additional trade barriers. Some delegations expressed their concerns with the declaration of country of origin. However there was general consensus that the inclusion procedure should be reviewed in order to ensure that it was consistent with current scientific knowledge and methodology to establish the authenticity of species.

131) As regards the possible merging of standards, several delegations pointed out that current standards covered products with considerable differences in essential organoleptic characteristics and presentation (e.g. salmon and tuna). Their inclusion in separate standards was entirely justified and reflected current trade practices, whereas the merging of these standards might create confusion. It was also noted that the question of optional requirements to be included as appendices to the code would need to be taken into account in further discussion.

132) The Representative of FAO indicated that FAO was in the process of compiling a list of common names and scientific names used in all member countries, and also offered to provide information on current work on the authentication of fish species with techniques such as electrophoresis and DNA sequencing.

133) The Committee agreed that the establishment of such a list would be very useful for its further work on the identification of species and in general to facilitate the standardization of fish and fishery products, and encouraged FAO to proceed with its work. The Committee also recognized the importance of such work to facilitate trade and especially exports from developing countries.

134) The Observer from the EC also indicated that a list of scientific and common names used in the countries of the European Union had been prepared by EC Member states and that the Committee would be kept informed of further progress in this area. The Observer pointed out that if FAO was working on the establishment of such a list at the global level, this would only be useful if the list referred to the common names used in each member country and not only to the common name in each language.

135) The Delegation of France noted that no comments had been made on its first proposal intended to indicate in the labelling the common name used in the country where the product is sold, and expressed the view that there was no disagreement on this point. As regards the proposal to refer to the common name used in the country where the product is sold, the Delegation of Germany pointed out that this wording was already used in several standards. The Committee noted that this had been considered on a case-by-case basis, as it appeared from the discussions on specific standards at the present session.

136) The Committee recognized that there was no consensus on the inclusion of the scientific name and origin as general labelling requirements and on the need to merge current standards, but that further consideration should be given to a possible revision of the procedure for the inclusion of species. The Committee therefore agreed that the Delegation of France would revise the discussion paper to consider how the procedure for the inclusion of species might be revised[13] especially to take into account new scientific data and methodology. The Delegations of Brazil, Germany, Japan, Morocco, Mauritania, Senegal, Spain expressed their willingness to participate in the revision of the document.

DISCUSSION PAPER ON THE DEVELOPMENT OF A STANDARD FOR STURGEON CAVIAR (Agenda Item 12)[14]

137) The Committee recalled that its 23rd session had agreed that a discussion paper would be prepared to consider the possibility to develop a standard for sturgeon caviar. The Delegation of the Russian Federation recalled the economic importance of sturgeon caviar and the long tradition of Russia as a producer and exporter of this high quality traditional product. The discussion paper included trade statistics, scientific information and the framework of a standard containing safety, quality and labelling provisions. The Delegation also noted that the countries of the Caspian Sea were carrying out a conservation programme and that sturgeon aquaculture was under development; in view of the diversification of the market, an international standard was necessary to ensure fair trade practices for a product of high commercial value originating from an endangered species.

138) The Representative of FAO stressed the importance of responsible fishing and informed the Committee that FAO was working with CITES on the review of the criteria for the classification of endangered species, especially in order to ensure their applicability to aquatic species.

139) Several delegations pointed out that standardization work in this area was not well developed and therefore supported the development of an international standard in order to ensure food safety, fair trade and the conservation of an endangered species.

140) The Committee expressed its appreciation to the Russian Federation for the comprehensive information provided in the document and agreed to undertake new work on the development of a Proposed Draft Standard for Sturgeon Caviar. Subject to approval by the 25th Session of the Commission, the Russian Federation would prepare a Proposed Draft Standard for Sturgeon Caviar for comments and consideration at the next session. The Delegations of the United Kingdom, Germany, Iceland and Switzerland also offered to assist Russia in the development of the standard.

DISCUSSION PAPER ON THE DECLARATION OF FISH CONTENT IN FISH STICKS – DEFINITION AND METHOD OF ANALYSIS (Agenda Item 13)[15]

141) The Committee recalled that the 29th Session of the Committee of Food Labelling (2000) had agreed in principle on a declaration of fish content in fish sticks (Draft Amendment to the Standard for Quick Frozen Fish Sticks). Following this decision, the Committee had agreed that the Delegation of the United Kingdom would prepare a discussion paper proposing a definition and a method of determination for “fish content”.

142) The Delegation of the United Kingdom presented the document that reasserted the necessity of adequate consumer information; proposed a definition of fish content; and discussed the use of chemical methods in view

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13 CL 1995/30-FFP (reproducing the text of the procedure adopted by the Commission at its 13th Session in 1979)

14 CX/FFP 02/12

15 CX/FFP 02/13

of the variations in nitrogen content in fish species, including the use of conversion factors for difference species. The document also stressed the importance of good manufacturing practice in the processing of fish sticks.

143) The Committee expressed its appreciation to the Delegation of the United Kingdom, South Africa and the other countries involved for this comprehensive discussion paper that identified the issues to be addressed

144) The Delegation of the United States expressed the view that the resources involved to ensure compliance with requirements concerning fish content did not appear to be justified in terms of consumer protection and fair trade practices. The practical difficulties involved should be given further consideration in order to determine whether the declaration of fish content was preferable to the declaration of "fish core", currently used in national regulations and well understood by consumers.

145) The Delegation of South Africa, supported by the Delegation of New Zealand, pointed out the practical difficulties related to the proposed methodology, in particular the establishment of a database on nitrogen content that would cover all species concerned, including those of the Southern Hemisphere.

146) The Delegation of the United Kingdom indicated that the species presented in the document were the main species used in fish sticks, that analytical tolerances of the ISO method for nitrogen determination were less than the natural variability of nitrogen in fish and therefore should not affect the results. The Delegation also indicated that this methodology was applied in practice at the national level for the purposes of inspection, in conjunction with in-factory inspection.

147) The Committee agreed that the Delegation of the United Kingdom would prepare a revised discussion paper on the definition and the method for fish content for the next session and invited countries that had carried out studies in this area to provide relevant information.

OTHER BUSINESS, FUTURE WORK AND DATE AND PLACE OF THE NEXT SESSION (Agenda Item 14)

148) The delegation of Spain expressed its general reservation as the complete Spanish version of the report was not available to delegates.

Amendments in the Standard for salted Fish and Dried Salted Fish[16]

149) The Delegation on Norway drew the attention of the Committee to the fact that in the trade of salted and dried salted fish, the water content in the fish was normally defined in subjective terms in the trade contracts. These subjective terms were based on the appearance/presentation of the fish and when trade disputes about the water content occurred there was a need for an official method to determine the water content in these products.

150) The Committee agreed that there was a need to include a specific method to determine the water content in the whole fish for salted and dried salted fish of the Gadidae family, and a new procedure for the preparation of the sample in the current method for the determination of salt content. It therefore decided to initiate new work on the elaboration of the method, subject to approval by the next session of the Commission. The Committee requested the delegation of Norway to conduct a collaborative trial of the method amendments and agreed to attach CRD 1 to the report for comments and further consideration (see Appendix IX).

Future work

151) The Committee noted that, as a result of the discussions at the current session, the next session would consider the following items:

- Code of Practice for Fish and Fishery Products (Proposed Draft Sections)
- Draft Standard for Salted Atlantic Herring and Salted Sprats

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[16] CRD 1 (Discussion Paper on Making Amendments in the Standard for Salted Fish and Dried salted Fish of the *Gadidae* Family of Fishes, prepared by Norway).

- Draft Amendment to the Standard for Quick Frozen Lobsters
- Proposed/Draft Model Certificate for Fish and Fishery Products
- Proposed Draft Standard for Live and Processed Bivalve Molluscs
- Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat
- Proposed Draft Standard for Smoked Fish
- Proposed Draft Standard for Sturgeon Caviar
- Proposed Draft Amendments to the Standard for Salted Fish and Dried Salted Fish of the *Gadidae* Family of Fishes
- Discussion paper on the procedure for the inclusion of additional species in standards for fish and fishery products
- Discussion paper on fish content in fish sticks

Date and Place of the Next Session

152) The Committee noted that the next Session was tentatively scheduled to be held in Norway in October 2003, the exact arrangements to be finalized by the host country and the Codex Secretariat.

SUMMARY STATUS OF WORK

Subject Matter	Step	Action by	Document Reference in ALINORM 01/18
Draft Standard for Dried Salted Anchovies	8	Governments 25th CAC	para. 24 Appendix III
Draft Code of Practice for Fish and Fishery Products (general sections, fresh, frozen, minced, canned fish and frozen surimi)	8	Governments 25th CAC	paras. 76 and 82 Appendix II
Draft Standard for Salted Atlantic Herring and Salted Sprats	6	Governments 26th CCFFP	para. 41 Appendix IV
Proposed Draft Model Certificate for Fish and Fishery Products (sanitary certificate)	5	Governments 25th CAC	para. 101 Appendix V
Proposed Draft Amendment to the Standard for Quick Frozen Lobsters	5	Governments 25th CAC	para. 115 Appendix VI
Proposed Draft Code of Practice for Fish and Fishery Products (other sections)	3	Governments 26th CCFFP	para. 83
Proposed Draft Standard for Live and Processed Bivalve Molluscs	3	Governments 25th CAC	para. 94 Appendix VII
Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat	3	Governments 26th CCFFP	para. 124 Appendix VIII
Proposed Draft Model Certificate for Fish and Fishery Products (other certificates)	3	Governments 26th CCFFP	para. 101 Appendix X
Proposed Draft Standard for Smoked Fish	2/3	Denmark Governments 26th CCFFP	para. 85
Proposed Draft Standard for Sturgeon Caviar	1/2/3	25th CAC Russia/Governments 26th CCFFP	para. 140
Proposed Draft Amendment to the Standard for Salted Fish and Dried Salted Fish	1/2/3	25th CAC Governments 26th CCFFP	para. 149 Appendix IX
Other questions			
Revision of the Procedure for the Inclusion of Species		France/Governments 26th CCFFP	para. 136
Fish Content in Fish Sticks[17]		UK/Governments 26th CCFFP	para. 147

[17] In conjunction with the Draft Amendment to the Standard for Quick Frozen Fish Sticks at Step 7

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ALINORM 03/18
APPENDIX II

DRAFT CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS
(At Step 8 of the Procedure)

TABLE OF CONTENTS

INTRODUCTION

This Code of Practice for Fish and Fishery Products has been developed by the Codex Committee on Fish and Fishery Products from the merging of the individual codes listed in Appendix XII* plus a section on aquaculture and a section on frozen surimi. These codes were primarily of a technological nature offering general advice on the production, storage and handling of fish fishery products on board fishing vessels and on shore. It also deals with the distribution and retail display of fish and fishery products.

This combined Code of practice has been further modified to incorporate the Hazard Analysis Critical Control Point (HACCP) approach described in the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969, Rev.3 1997), Annex: *HACCP System and Guidelines for its Application* (Supplement to Codex Volume 1B). A pre-requisite programme is described in the Code covering technological guidelines and the essential requirements of hygiene in the production of fish, shellfish and their products, which are safe for human consumption, and otherwise meets the requirements of the appropriate Codex product standards. The Code also contains guidance on the use of HACCP, which is recommended to ensure the hygienic production of fish and fishery products to meet health and safety requirements.

Within this Code a similar systematic approach has been applied to essential quality, composition and labelling provisions of the appropriate Codex product standards. Throughout the code this is referred to as "Defect Action Point (DAP) Analysis". However DAP analysis is optional.

The Codex Committee on Fish and Fishery Products recommended at its Twentieth Session that defects of a commercial nature, i.e. workmanship defects, which had been removed from Codex fish product standards, be transferred to the appropriate Codex Code of practice for optional use between buyers and sellers during commercial transactions. The Committee further recommended that this detail should be described in a section on Final Product Specifications, which now appear as Appendices II - XI* of this document. A similar approach to HACCP has been incorporated into the Code as guidelines for the control of defects (DAP Analysis).

This Code will assist all those who are engaged in the handling and production of fish and fishery products, or are concerned with their storage, distribution, export, import and sale in attaining safe and wholesome products which can be sold on national or international markets and meet the requirements of the Codex Standards (see Appendix XII*).

HOW TO USE THIS CODE

The aim of this Code is to provide a user-friendly document as background information and guidance for the elaboration of fish and shellfish process management systems which would incorporate Good Management Practice (GMP) as well as the application of HACCP in countries where these, as yet, have not been developed. In addition, it could be used for training of fishermen and employees of the fish and shellfish processing industries.

The practical application of this *international* Code, with regard to *national* fisheries, would therefore require some modifications and amendments, taking into account local conditions and specific consumer requirements. This Code, therefore, is not intended to replace the advice or guidance of trained and experienced technologists regarding the complex technological and hygienic problems which might be unique to a specific geographical area or specific fishery and, in fact, is intended to be used as a supplement in such instances.

This Code is divided into separate, though interrelated, Sections. It is intended that in order to set up a HACCP or DAP programme these should be consulted as appropriate:

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* Under development

(a) *Section 2 - Definitions* – Being acquainted with the definitions is important and will aid the overall understanding of the Code.

(b) *Section 3 - Pre-requisite Programme* - Before HACCP or a similar approach can properly be applied to a process it is important that a solid foundation of good hygienic practice exists. This Section covers the groundwork which should be regarded as the minimum requirements for a facility prior to the application of hazard and defect analyses.

(c) *Section 4 – General Considerations for the Handling of Fresh Fish, Shellfish and Other Aquatic Invertebrates* – This Section provides an overall view of the potential hazards and defects which may have to be considered when building up a HACCP or DAP plan. This is not intended to be an exhaustive list but is designed to help a HACCP or DAP team to think about what hazards or defects should be considered in the fresh fish, shellfish and other aquatic invertebrates, and then it is up to the team to determine the significance of the hazard or defect in relation to the process.

(d) *Section 5 – Hazard Analysis Critical Control Point (HACCP) and Defect Action Point (DAP) Analysis* - Only when the groundwork in Section 3 has been satisfactorily achieved should the application of the principles outlined in *Section 5* be considered. This Section uses an example of the processing of a canned tuna product to help illustrate how the principles of HACCP should be applied to a process.

(e) *Sections 6 and 7 – Aquaculture Production* and *Molluscan Shellfish production* deal with pre-harvest and primary production of fish, crustaceans and molluscan shellfish not caught in the wild*.

Although potential hazards and potential defects are listed for most steps in Sections 6 to 18, it should be noted that this is only for guidance and the consideration of other hazards and/or defects may be appropriate. Also, the format in these Sections has been designed for maximum 'ease of use' and therefore the **'potential hazards'** or **'potential defects'** are listed only where they may be introduced into a product or where they are controlled, rather than repeating them at all the intervening processing steps.

Additionally, it must be stressed that hazards and defects, and their subsequent control or action points, are product and line specific and therefore a full critical analysis based on *Section* 5 must be completed for each individual operation.

(f) *Section 8 - Processing of Fresh, Frozen and Minced Fish* – This Section forms the foundation for most of the subsequent processing Sections. It deals with the major process steps in the handling of raw fish through to cold storage and gives guidance and examples on the sort of hazards and defects to expect at the various steps. This Section should be used as the basis for all the other processing operations (Sections 9-16) which give additional guidance specific to the appropriate product sector*.

(g) *Sections 9 to 16 – Processing of Specific Fish and Shellfish Products* – Processors operating in particular sectors will need to consult the appropriate Section to find additional information specific to that sector*.

(h) *Sections 17 to 18 - Transportation and Retail* cover general transportation and retail issues. Transportation and retail apply to most if not all sections for processing of specific products. They should be considered with the same care as the other processing steps*.

(i) Additional information will be found in the *Appendices**.

SECTION 1 - SCOPE

This Code of practice applies to the growing, harvesting, handling, production, processing, storage transportation and retail of fish, shellfish and aquatic invertebrates and products thereof from marine and freshwater sources, which are intended for human consumption.

* Under development.

SECTION 2 - DEFINITIONS
For the purpose of this Code:

2.1 GENERAL DEFINITIONS

Biotoxins	means poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin producing algae, or in water containing toxins produced by such organisms;
Chilling	is the process of cooling fish and shellfish to a temperature approaching that of melting ice;
Clean Water	means water from any source where harmful microbiological contamination, substances and/or toxic plankton are not present in such quantities as may affect the health quality of fish, shellfish and their products;
Cleaning	means the removal of soil, food residues, dirt, grease or other objectionable matter;
Contaminant	means any biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability;
Contamination	the introduction or occurrence of a contaminant in fish, shellfish and their products;
Control Measure	means any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level. For the purposes of this Code a control measure is also applied to a defect.
Corrective Action	means any action to be taken when the results of monitoring at the CCP indicate a loss of control. For the purposes of this Code this also applies to a DAP.
Critical Control Point (CCP)	a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.
Critical Limit	is a criterion, which separates acceptability from unacceptability. For the purpose of this Code this also applies to a DAP;
Decision Tree	a sequence of questions applied to each process step with an identified hazard to identify which process steps are CCPs. For the purpose of this Code this also applies to a DAP;
Decomposition	is the deterioration of fish, shellfish and their products including texture breakdown and causing a persistent and distinct objectionable odour or flavour;
Defect	means a condition found in a product which fails to meet essential quality, composition and/or labelling provisions of the appropriate Codex product standards;
Defect Action Point (DAP)	a step at which control can be applied and a quality (non-safety) defect can be prevented, eliminated or reduced to acceptable level, or a fraud risk eliminated;
Disinfection	means the reduction, by means of chemical agents and/or physical methods, the number of micro-organisms in the environment, to a level that does not compromise food safety or suitability;
Dressed	means that portion of fish remaining after heading and gutting;
Facility	means any premises where fish and fishery products are prepared, processed, chilled, frozen, packaged or stored. For the purposes of this Code, premises also includes vessels;
Fish	means any of the cold-blooded (ectothermic) aquatic vertebrates. Amphibians and aquatic reptiles are not included;
Hazard	a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect;
Hazard Analysis	the process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP plan;

Hazard Analysis Critical Control Point (HACCP)	a system which identifies, evaluates, and controls hazards which are significant for food safety;
Monitor	the act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control. For the purpose of this Code this also applies to a DAP;
Potable Water	is fresh water fit for human consumption. Standards of potability should not be lower than those contained in the latest edition of the "International Standards for Drinking Water", World Health Organisation;
Pre-Requisite Programme	is a programme that is required prior to the application of the HACCP system to ensure that a fish and shellfish processing facility is operating according to the Codex Principles of Food Hygiene, the appropriate Code of Practice and appropriate food safety legislation;
Raw Material	are fresh and frozen fish, shellfish and/or their parts which may be utilised to produce fish and shellfish products intended for human consumption;
Refrigerated Water	is clean water cooled by a suitable refrigeration system;
Shelf-Life	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;
Shellfish	means those species of aquatic molluscs and crustaceans that are commonly used for food;
Step	is a point, procedure, operation or stage in the food chain including raw materials, from primary production to final consumption;
Validation	means obtaining evidence that the elements of the HACCP plan are effective;
Verification	the application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan. For the purposes of this Code this also applies to a DAP;
Whole Fish (or Round Fish)	are fish as captured, ungutted.

2.4 FRESH, FROZEN AND MINCED FISH

Candling	is passing fillets of fish over a translucent table illuminated from below to detect parasites and other defects
Dehydration	is the loss of moisture from frozen products through evaporation. This may occur if the products are not properly glazed, packaged or stored. Deep dehydration adversely affects the appearance and surface texture of the product and is commonly known as "freezer burn";
Fillet	is a slice of fish of irregular size and shape removed from the carcase by cuts made parallel to the backbone;
Freezer	is equipment designed for freezing fish and other food products, by quickly lowering the temperature so that after thermal stabilisation the temperature in the thermal centre of the product is the same as the storage temperature;
Freezing Process	is a process which is carried out in appropriate equipment in such a way that the range of temperature of maximum crystallisation is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C (0°F) or lower at the thermal centre after thermal stabilisation;
Frozen Storage Facility	a facility that is capable of maintaining the temperature of fish at - 18ºC

Fresh Fish	are fish or fishery products which have received no preserving treatment other than chilling;
Frozen Fish	are fish which have been subjected to a freezing process sufficient to reduce the temperature of the whole product to a level low enough to preserve the inherent quality of the fish and which have been maintained at this low temperature, as specified in the Standard for Quick Frozen Finfish, Eviscerated and Uneviscerated during transportation, storage and distribution up to and including the time of final sale. For the purpose of this Code the terms "frozen", "deep frozen", "quick frozen", unless otherwise stated, shall be regarded as synonymous;
Glazing	The application of a protective layer of ice formed at the surface of a frozen product by spraying it with, or dipping it into, clean sea water, potable water, or potable water with approved additives, as appropriate;
Minced Fish	is comminuted flesh produced by separation from skin and bones;
Modified Atmosphere Packaging (MAP)	means packaging in which the atmosphere surrounding the fish is different from the normal composition of air;
Separation	is a mechanical process for producing minced fish whereby the skin and bone is substantially removed from the flesh;
Separator	is a mechanical device used for separation;
Steak	is a section of fish, removed by cutting approximately at right angle to the backbone.

2.5 FROZEN SURIMI

De-Watering	means removal of excessive wash water from the minced fish flesh;
Frozen Surimi	means the fish protein product for further processing, which has been processed by heading, gutting, cleaning fresh fish, and mechanically separating the edible muscle from the skin and bone. The minced fish muscle is then washed, refined, de-watered, mixed with cryoprotective food ingredients and frozen;
Gel Forming Ability	means the ability of surimi to form an elastic gel when fish meat is comminuted with the addition of salt and then formed and heated. This elasticity is a function possessed by myosin as the primary component of myofibrillar protein;
Myofibrillar Protein	is a generic term of skeletal muscle proteins such as myosin and actin;
Refining	means a process of removing from washed meat by used of a strainer small bones, sinews, scales and bloody flesh of such sizes as may not be mixed in a final product, thereby concentrating myofibrillar protein;
Surimi-Based Products	means a variety of products produced from surimi with addition of ingredients and flavour such as “surimi gel” and shellfish analogues;
Water-Soluble Components	means any water-soluble proteins, organic substances and inorganic salts contained in fish meat;
Washing	means a process of washing away blood and water soluble components from minced fish with cold water by the use of a rotary filter, thus increasing the level of myofibrillar proteins thereof;
Washed meat	means fish meat that is washed and then drained of water.

2.12 CANNED FISH AND SHELLFISH

For the purpose of this Code, only the definitions of the main terms related to canning industry and used in section 13 are given. For an overall set of definitions; please refer to the Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Food (CAC/PRC 23-1979, Rev. 2 (1993)).

Canned Food	means commercially sterile food in hermetically sealed containers.
Commercial sterility of thermally processed food	means the condition achieved by application of heat, sufficient, alone or in combination with other appropriate treatments, to render the food free from micro-organisms capable of growing in the food at normal non-refrigerated conditions at which the food is likely to be held during distribution and storage.
Hermetically Sealed Containers	are containers which are sealed to protect the content against the entry of micro-organisms during and after heat processing.
Retort	means a pressure vessel designed for thermal processing of food packed in hermetically sealed containers.
Scheduled Process (or Sterilisation schedule)	means the thermal process chosen by the processor for a given product and container size to achieve at least commercial sterility.
Sterilisation Temperature	means the temperature maintained throughout the thermal process as specified in the scheduled process.
Sterilisation time	means the time between the moment sterilisation temperature is achieved and the moment cooling started.
Thermal Process	means the heat treatment to achieve commercial sterility and is quantified in terms of time and temperature.
Venting	means thorough removal of the air from steam retorts by steam prior to a scheduled process.

SECTION 3 - PRE-REQUISITE PROGRAMME

Prior to the application of HACCP to any segment of the product processing chain, that segment must be supported by pre-requisite programmes based on good hygienic practice or as required by the competent authority.

The establishment of pre-requisite programmes will allow the HACCP team to focus on the HACCP application to food safety hazards which are directly applicable to the product and the process selected, without undue consideration and repetition of hazards from the surrounding environment. The pre-requisite programmes would be specific within an individual establishment or for an individual vessel and will require monitoring and evaluation to ensure their continued effectiveness.

Reference should be made to the *International Recommended Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969, Rev.3 1997), Annex: *HACCP System and Guidelines for its Application* for further information to assist with the design of the pre-requisite programmes for a processing facility or vessel.

It should be noted that some of the issues listed below, e.g. those related to damage, are designed to maintain quality rather than food safety and are not always essential to a pre-requisite programme for a food safety oriented HACCP system.

HACCP principles can also be applied to defect action points.

3.1 FISHING AND HARVESTING VESSEL DESIGN AND CONSTRUCTION

There are many different types of fishing vessel used throughout the world which have evolved in particular regions to take account of the prevailing economics, environment and types of fish and shellfish caught or

harvested. This Section attempts to highlight the basic requirements for cleanability, minimising damage, contamination and decomposition to which all vessels should have regard to the extent possible in order to ensure hygienic, high quality handling of fresh fish and shellfish intended for further processing and freezing.

The design and construction of a fishing vessel and vessels used to harvest farmed fish and shellfish should take into consideration the following:

3.1.1 For Ease of Cleaning and Disinfection

- vessels should be designed and constructed to minimise sharp inside corners and projections to avoid dirt traps;
- construction should facilitate ample drainage;
- a good supply of clean water or potable water[1] at adequate pressure.

3.1.2 To Minimise Contamination

- all surfaces in handling areas should be non-toxic, smooth impervious and in sound condition, to minimise the build-up of fish slime, blood, scales and guts and to reduce the risk of physical and microbial contamination;
- where appropriate, adequate facilities should be provided for the handling and washing of fish and shellfish and should have an adequate supply of cold potable water or clean water for that purpose;
- adequate facilities should be provided for washing and disinfecting equipment, where appropriate;
- the intake for clean water should be located to avoid contamination;
- all plumbing and waste lines should be capable of coping with peak demand;
- non-potable water lines should be clearly identified and separated from potable water to avoid contamination;
- objectionable substances, which could include bilge water, smoke, fuel oil, grease, drainage and other solid or semi-solid wastes should not contaminate the fish and shellfish;
- where appropriate, containers for offal and waste material should be clearly identified, suitably constructed with a fitted lid and made of impervious material;
- separate and adequate facilities should be provided to prevent the contamination of fish and shellfish and dry materials, such as packaging, by:
  - poisonous or harmful substances;
  - dry storage of materials, packaging etc.;
  - offal and waste materials;
- adequate hand washing and toilet facilities, isolated from the fish and shellfish handling areas, should be available where appropriate;
- prevent the entry of birds, insects, or other pests, animals and vermin, where appropriate.

3.1.3 To Minimise Damage to the Fish, Shellfish and Other Aquatic Invertebrates

- in handling areas, surfaces should have a minimum of sharp corners and projections;
- in boxing and shelving storage areas, the design should preclude excessive pressure being exerted on the fish and shellfish;
- chutes and conveyors should be designed to prevent physical damage caused by long drops or crushing;
- the fishing gear and its usage should minimise damage and deterioration to the fish and shellfish.

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[1] WHO Guidelines for Drinking Water Quality , 2nd edition, Geneva, 1993

3.1.4 To Minimise Damage during Harvesting of Aquacultured and Molluscan Shellfish

When aquacultured products and molluscan shellfish are harvested using seines or nets or other means and are transported live to facilities:

- seines, nets and traps should be carefully selected to ensure minimum damage during harvesting;
- harvesting areas and all equipment for harvesting, catching, sorting, grading, conveying and transporting of live products should be designed for their rapid and efficient handling without causing mechanical damage; These should be easy cleanable and free from contamination;
- conveying equipment for live and slaughtered products should be constructed of suitable corrosion-resistant material which does not transmit toxic substances and should not cause mechanical injuries to them;
- where fish is transported live, care should be taken to avoid overcrowding and to minimise bruising;
- where fish are held or transported live, care should be taken to maintain factors that affect fish health (e.g.CO_2, O_2, temperature, nitrogenous wastes, etc).

3.2 FACILITY DESIGN AND CONSTRUCTION

The facility should include a product flow-through pattern that is designed to prevent potential sources of contamination, minimise process delays which could result in further reduction in essential quality, and prevent cross-contamination of finished product from raw materials. Fish, shellfish and other aquatic invertebrates are highly perishable foods and should be handled carefully and chilled without undue delay. The facility, therefore, should be designed to facilitate rapid processing and subsequent storage.

The design and construction of a facility should take into consideration the following:

3.2.1 For Ease of Cleaning and Disinfection

- the surfaces of walls, partitions and floors should be made of impervious, non-toxic materials;
- all surfaces with which fish, shellfish and their products might come in contact should be of corrosion resistant, impervious material which is light-coloured, smooth and easily cleanable;
- walls and partitions should have a smooth surface up to a height appropriate to the operation;
- floors should be constructed to allow adequate drainage;
- ceilings and overhead fixtures should be constructed and finished to minimise the build-up of dirt and condensation, and the shedding of particles;
- windows should be constructed to minimise the build-up of dirt and, where necessary, be fitted with removable and cleanable insect-proof screens. Where necessary, windows should be fixed;
- doors should have smooth, non-absorbent surfaces;
- joints between floors and walls should be constructed for ease of cleaning (round joints).

3.2.2 To Minimise Contamination

- facility layout should be designed to minimise cross-contamination and may be accomplished by physical or time separation;
- all surfaces in handling areas should be non-toxic, smooth impervious and in sound condition, to minimise the build-up of fish slime, blood, scales and guts and to reduce the risk of physical contamination;
- working surfaces that come into direct contact with fish, shellfish and their products should be in sound condition, durable and easy to maintain. They should be made of smooth, non-absorbent and non-toxic materials, and inert to fish, shellfish and their products, detergents and disinfectants under normal operating conditions;
- adequate facilities should be provided for the handling and washing of products and should have an adequate supply of cold potable water for that purpose;

- suitable and adequate facilities should be provided for storage and/or production of ice;
- ceiling lights should be covered or otherwise suitably protected to prevent contamination by glass or other materials;
- ventilation should be sufficient to remove excess steam, smoke and objectionable odours and cross contamination through aerosols should be avoided;
- adequate facilities should be provided for washing and disinfecting equipment, where appropriate;
- non-potable water lines should be clearly identified and separated from potable water to avoid contamination;
- all plumbing and waste lines should be capable of coping with peak demands;
- accumulation of solid, semi-solid or liquid wastes should be minimised to prevent contamination;
- where appropriate, containers for offal and waste material should be clearly identified, suitably constructed with a fitted lid and made of impervious material;
- separate and adequate facilities should be provided to prevent the contamination by:
  - poisonous or harmful substances;
  - dry storage of materials, packaging etc.;
  - offal and waste materials;
- adequate hand washing and toilet facilities, isolated from handling area, should be available;
- prevent the entry of birds, insects, or other pests and animals;
- water supply lines should be fitted with back flow devices, where appropriate.

3.2.3 To Provide Adequate Lighting

- to all work surfaces.

3.3 DESIGN AND CONSTRUCTION OF EQUIPMENT AND UTENSILS

The equipment and utensils used for the handling of fishery products on a vessel or in a facility will vary greatly depending on the nature and type of operation involved. During use, they are constantly in contact with fish, shellfish and their products. The condition of the equipment and utensils should be such that it minimises the build-up of residues and prevents them becoming a source of contamination.

The design and construction equipment and utensils should take into consideration the following:

3.3.1 For Ease of Cleaning and Disinfection

- equipment should be durable and movable and/or capable of being disassembled to allow for maintenance, cleaning, disinfection and monitoring;
- equipment, containers and utensils coming into contact with fish, shellfish and their products should be designed to provide for adequate drainage and constructed to ensure that they can be adequately cleaned, disinfected and maintained to avoid contamination;
- equipment and utensils should be designed and constructed to minimise sharp inside corners and projections and tiny crevices or gaps to avoid dirt traps;
- a suitable and adequate supply of cleaning utensils and cleaning agents, approved by the official agency having jurisdiction, should be provided.

3.3.2 To Minimise Contamination

- all surfaces of equipment in handling areas should be non-toxic, smooth, impervious and in sound condition, to minimise the build-up of fish slime, blood, scales and guts and to reduce the risk of physical contamination;
- accumulation of solid, semi-solid or liquid wastes should be minimised to prevent contamination of fish;
- adequate drainage should be provided in storage containers and equipment;

- drainage should not be permitted to contaminate products.

3.3.3 To Minimise Damage

- surfaces should have a minimum of sharp corners and projections;
- chutes and conveyors should be designed to prevent physical damage caused by long drops or crushing;
- storage equipment should be fit for the purpose and not lead to crushing of the product.

3.4 HYGIENE CONTROL PROGRAMME

The potential effects of harvesting and handling of products, on-board vessel handling or in-plant production activities on the safety and suitability of fish, shellfish and their products should be considered at all times. In particular this includes all points where contamination may exist and taking specific measures to ensure the production of a safe and wholesome product. The type of control and supervision needed will depend on the size of the operation and the nature of its activities.

Schedules should be implemented to:

- prevent the build up of waste and debris;
- protect the fish, shellfish and their products from contamination;
- dispose of any rejected material in a hygienic manner;
- monitor personal hygiene and health standards;
- monitor the pest control programme;
- monitor cleaning and disinfecting programmes;
- monitor the quality and safety of water and ice supplies.

The hygiene control programme should take into consideration the following:

3.4.1 A Permanent Cleaning and Disinfection Schedule

A permanent cleaning and disinfection schedule should be drawn up to ensure that all parts of the vessel, processing facility and equipment therein are cleaned appropriately and regularly. The schedule should be reassessed whenever changes occur to the vessel, processing facility and/or equipment. Part of this schedule should include a ‘clean as you go’ policy.

A typical cleaning and disinfecting process may involve as many as seven separate steps:

Pre-cleaning	Preparation of area and equipment for cleaning. Involves steps such as removal of all fish, shellfish and their products from area, protection of sensitive components and packaging materials from water, removal by hand or squeegee of fish scraps, etc.
Pre-rinse	A rinsing with water to remove remaining large pieces of loose soil.
Cleaning	means the removal of soil, food residues, dirt, grease or other objectionable matter.
Rinse	A rinsing with potable water or clean water, as appropriate, to remove all soil and detergent residues.
Disinfection	Application of chemicals, approved by the official agency having jurisdiction and/or heat to destroy most microorganisms on surface
Post-rinse	As appropriate a final rinse with potable water or clean water to remove all disinfectant residues
Storage	Cleaned and disinfected equipment, container and utensils should be stored in a fashion which would prevent its contamination
Check of the efficiency of the cleaning	The efficiency of the cleaning should be controlled as appropriate

Handlers or cleaning personnel as appropriate should be well trained in the use of special cleaning tools and chemicals, methods of dismantling equipment for cleaning and should be knowledgeable in the significance of contamination and the hazards involved.

3.4.2 Designation of Personnel for Cleaning

- In each processing plant or vessel a trained individual should be designated to be responsible for the sanitation of the processing facility or vessel and the equipment within.

3.4.3 Maintenance of Premises, Equipment and Utensils

- buildings, materials, utensils and all equipment in the establishment - including drainage systems - should be maintained in a good state and order;
- equipment, utensils and other physical facilities of the plant or vessel should be kept clean and in good repair;
- procedures for the maintenance, repair, adjustment and calibration, as appropriate, of apparatus should be established. These procedures should specify for each equipment, the methods used, the persons in charge of their application, and their frequency.

3.4.4 Pest Control Systems

- good hygienic practices should be employed to avoid creating an environment conducive to pests;
- pest control programmes could include preventing access, eliminating harbourage and infestations, and establishing monitoring detection and eradication systems;
- physical, chemical and biological agents should be properly applied by appropriately qualified personnel.

3.4.5 Supply of Water, Ice and Steam

3.4.5.1 Water

- an ample supply of cold and hot potable water[2] and/or clean water under adequate pressure should be provided where appropriate;
- potable water[2] should be used wherever necessary to avoid contamination.

3.4.5.2 Ice

- ice should be manufactured using potable water[2] or clean water;
- ice should be protected from contamination.

3.4.5.3 Steam

- for operations which require steam, an adequate supply at sufficient pressure should be maintained;
- steam used in direct contact with fish or shellfish or food contact surfaces should not constitute a threat to the safety or suitability of the food.

3.4.6 Waste Management

- offal and other waste materials should be removed from the premises of a processing facility or vessel on a regular basis;
- facilities for the containment of offal and waste material should be properly maintained;
- vessel waste discharge should not contaminate vessel water intake system or incoming product.

3.5 PERSONAL HYGIENE AND HEALTH

Personal hygiene and facilities should be such to ensure that an appropriate degree of personal hygiene can be maintained to avoid contamination.

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[2] WHO Guidelines for Drinking Water Quality, 2nd edition, Geneva, 1993

3.5.1 Facilities and Equipment:

Facilities and equipment should include:

- adequate means of hygienically washing and drying hands;
- adequate toilet and changing facilities for personnel should be suitably located and designated.

3.5.2 Personnel Hygiene

- no person who is known to be suffering from, or who is a carrier of any communicable disease or has an infected wound or open lesion should be engaged in the preparation, handling or transportation;
- where necessary, adequate and appropriate protective clothing, headcovering and footwear should be worn;
- all persons working in a facility should maintain a high degree of personal cleanliness and should take all necessary precautions to prevent the contamination;
- hand-washing should be carried out by all personnel working in a processing area:
  - at the start of fish or shellfish handling activities and upon re-entering a processing area;
  - immediately after using the toilet;
- the following should not be permitted in handling and processing areas:
  - smoking
  - spitting
  - chewing or eating
  - sneezing or coughing over unprotected food
  - the adornment of personal effects such as jewellery, watches, pins or other items that, if dislodged, may pose a threat to the safety and suitability of the products.

3.6 TRANSPORTATION

Vehicles should be designed and constructed:

- such that walls, floors and ceilings, where appropriate, are made of a suitable corrosion-resistant material with smooth non-absorbent surfaces. Floors should be adequately drained;
- where appropriate with chilling equipment to maintain chilled fish or shellfish during transport to a temperature as close as possible to 0°C or, for frozen fish, shellfish and their products, to maintain a temperature of -18°C or colder (except for brine frozen fish intended for canning which may be transported at –9°C or colder);
- live fish and shellfish are to be transported at temperature tolerant to species.
- to provide the fish or shellfish with protection against contamination, exposure to extreme temperatures and the drying effects of the sun or wind;
- to permit the free flow of chilled air around the load when fitted with mechanical refrigeration means

3.7 PRODUCT TRACING AND RECALL PROCEDURES

Experience has demonstrated that a system for recall of product is a necessary component of a pre-requisite programme because no process is fail-safe. Product tracing, which includes lot identification, is essential to an effective recall procedure.

- managers should ensure effective procedures are in place to effect the complete product tracing and rapid recall of any lot of fishery product from the market;
- appropriate records of processing, production and distribution should be kept and retained for a period that exceeds the shelf-life of the product;
- each container of fish, shellfish and their products intended for the final consumer or for further processing should be clearly marked to ensure the identification of the producer and of the lot;

- where there is an health hazard, products produced under similar conditions, and likely to present a similar hazard to public health, may be withdrawn. The need for public warnings should be considered;
- recalled products should be held under supervision until they are destroyed, used for purposes other than human consumption, or reprocessed in a manner to ensure their safety.

3.8 TRAINING

Fish or shellfish hygiene training is fundamentally important. All personnel should be aware of their role and responsibility in protecting fish or shellfish from contamination and deterioration. Handlers should have the necessary knowledge and skill to enable them to handle fish or shellfish hygienically. Those who handle strong cleaning chemicals or other potentially hazardous chemicals should be instructed in safe handling techniques.

Each fish and shellfish facility should ensure that individuals have received adequate and appropriate training in the design and proper application of a HACCP system and process control. Training of personnel in the use of HACCP is fundamental to the successful implementation and delivery of the programme in fish or shellfish processing establishments. The practical application of such systems will be enhanced when the individual responsible for HACCP has successfully completed a course. Managers should also arrange for adequate and periodic training of relevant employee in the facility so that they understand the principles involved in HACCP.

SECTION 4 - GENERAL CONSIDERATIONS FOR THE HANDLING OF FRESH FISH, SHELLFISH AND OTHER AQUATIC INVERTEBRATES

Unless they can be reduced to an acceptable level by normal sorting and/or processing, no fish, shellfish and other aquatic invertebrates should be accepted if it is known to contain parasites, undesirable microorganisms, pesticides, veterinary drugs or toxic, decomposed or extraneous substances known to be harmful to human health. When fish and shellfish determined as unfit for human consumption are found they should be removed and stored separately from the catch and either reworked and/or disposed of in a proper manner. All fish and shellfish deemed fit for human consumption should be handled properly with particular attention being paid to time and temperature control.

4.1 TIME AND TEMPERATURE CONTROL

Temperature is the single most important factor affecting the rate of fish and shellfish deterioration and multiplication of micro-organisms. For species prone to scombrotoxin production, time and temperature control may be the most effective method in controlling food safety. It is therefore essential that fresh fish, fillets, shellfish and their products which are to be chilled should be held at a temperature as close as possible to 0ºC.

4.1.1 Minimise the Deterioration - Time

To minimise the deterioration, it is important that:

- chilling should commence as soon as possible;
- fresh fish, shellfish and other aquatic invertebrates should be kept chilled, processed and distributed with care and minimum delay.

4.1.2 Minimise the Deterioration - Temperature Control

Where temperature control is concerned:

- sufficient and adequate icing, or chilled or refrigerated water systems where appropriate, should be employed to ensure that fish, shellfish and other aquatic invertebrates are kept chilled at a temperature as close as possible to 0ºC;
- fish, shellfish and other aquatic invertebrates should be stored in shallow layers and surrounded by finely divided melting ice;
- live fish and shellfish are to be transported at temperature tolerant to species.

- chilled or refrigerated water systems and/or cold storage systems should be designed and maintained to provide adequate cooling and/or freezing capacities during peak loads;
- fish should not be stored in refrigerated water systems to a density which impairs its working efficiency;
- monitoring and controlling the time and temperature and homogeneity of chilling should be performed regularly

4.2 MINIMISE THE DETERIORATION - HANDLING

Poor handling practices can lead to damage of fresh fish, shellfish and other aquatic invertebrates which can accelerate the rate of decomposition and increase unnecessary post-harvest losses. Handling damage can be minimised by:

- fish and shellfish should be handled and conveyed with care particularly during transfer and sorting in order to avoid physical damage such as puncture, mutilation, etc.;
- where fish and shellfish are held or transported live, care should be taken to maintain factors that can influence fish health (e.g. CO_2, O_2, temperature, nitrogenous wastes, etc.);
- fish and shellfish should not be trampled or stood upon;
- where boxes are used for storage of fish and shellfish they should not be overfilled or stacked too deeply;
- while fish and shellfish are on deck, exposure to the adverse effects of the elements should be kept to a minimum in order to prevent unnecessary dehydration;
- finely divided ice should be used where possible, which can help minimise damage to fish and shellfish and maximise cooling capacity;
- in refrigerated water storage areas, the density of the fish should be controlled to prevent damage.

SECTION 5 - HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP) AND DEFECT ACTION POINT (DAP) ANALYSIS

The Hazard Analysis Critical Control Point (HACCP) is a science-based system which is aimed to prevent food safety problems from occurring rather than reacting to non-compliance of the finished product. The HACCP system accomplishes this by the identification of specific hazards and the implementation of control measures. An effective HACCP system should reduce the reliance on traditional end-product testing. Section 5 explains the principles of HACCP as it applies aquaculture and molluscan shellfish production and to the handling and processing, but the Code can only provide guidance on how to use these principles and offer suggestions as to the type of hazards which may occur in the various fishery products. The HACCP plan, which should be incorporated into the food management plan should be well documented and be as simple as possible. This section will demonstrate one format, which may be considered in the development of the HACCP plan.

Section 5 also explains how a similar approach involving many of the principles can apply to the broader application covering the essential quality, composition and labelling provisions of Codex standards or other non-safety requirements which in this case are referred to as **Defect Action Point Analysis**. This approach for defect analysis is optional and other techniques, which achieve the same objective, may be considered.

Figure 5.1 summarises how to develop a HACCP and Defect Analysis system.

5.1 HACCP PRINCIPLES

The HACCP System consists of seven principles[3], which are

PRINCIPLE 1 - Conduct a hazard analysis.

PRINCIPLE 2 - Determine the Critical Control Points (CCPs).

PRINCIPLE 3 - Establish critical limit(s).

PRINCIPLE 4 - Establish a system to monitor control of the CCP.

PRINCIPLE 5 - Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.

PRINCIPLE 6 - Establish procedures for verification to confirm that the HACCP system is working effectively.

PRINCIPLE 7 - Establish documentation concerning all procedures and records appropriate to these principles and their application.

[3] *International Recommended Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969, Rev.3 - 1997), Annex: *HACCP System and Guidelines for its Application*

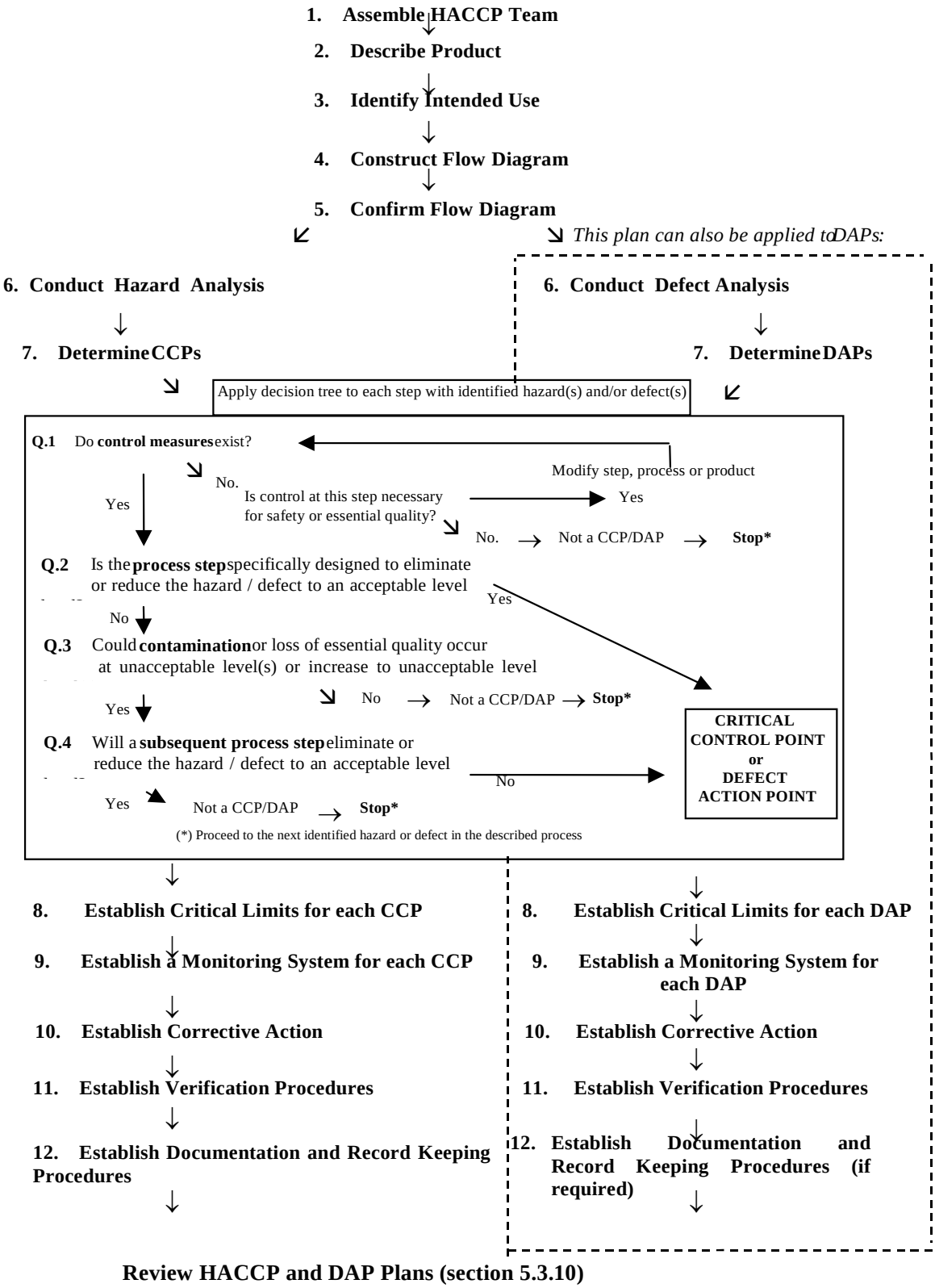

Figure 5.1 Summary of how to implement a HACCP and Defect Analysis

These principles have to be followed in any consideration of HACCP.

HACCP is an important management tool, which can be used by operators for ensuring safe, efficient processing. It must also be recognised that personnel training is essential in order that HACCP will be effective. In following HACCP principles, users are requested to list all of the hazards that may be reasonably expected to occur for each product type at each step or procedure in the process from point of harvest, during unloading, transport, storage or during processing, as appropriate to the process defined. It is important that HACCP principles be considered on a specific basis to reflect the risks of the operation.

5.2 DEFECT ACTION POINT ANALYSIS

Since the Code is intended to cover not only those hazards associated with safety but to include other aspects of production including the essential product quality, composition and labelling provisions as described in product standards developed by the Codex Alimentarius Commission, not only are critical control points (CCP) described but also defect action points (DAP) are included in the Code. The HACCP principles may be applied to the determination of a DAP, with quality instead of safety parameters being considered at the various steps.

5.3 APPLICATION

Each aquaculture, molluscan shellfish, shellfish and fish facility should ensure that the provisions of the appropriate Codex standards are met. To accomplish this, each facility should implement a food safety management system based on HACCP principles and should at least consider a similar approach to defects, both of which are described in this code. Prior to the application of HACCP to any segment of the growing, handling and processing chain, that segment must be supported by a pre-requisite programme based on good hygienic practice (see Section 3). It should be noted that parts of the pre-requisite programme may be classified as a CCP or DAP within a particular process.

The food management system developed should indicate responsibility, authority and the interrelationships of all personnel who manage, perform and verify work affecting the performance of such systems. It is important that the collection, collation and evaluation of scientific and technical data should be carried out by a multi-disciplinary team. Ideally, a team should consist of people with the appropriate level of expertise together with those having a detailed knowledge of the process and product under review. Examples of the type of personnel to include on the team are the processing facility manager, a microbiologist, a quality assurance/quality control specialist, and others such as buyers, operators, etc., as necessary. For small-scale operations, it may not be possible to establish such a team and therefore external advice should be sought.

The scope of the HACCP plan should be identified and should describe which segments of the food chain is involved and the general classes of hazards to be addressed.

The design of this programme should identify critical control points in the operation where the processing facility or product will be controlled, the specification or standard to be met, the monitoring frequency and sampling plan used at the critical control point, the monitoring system used to record the results of these inspections and any corrective action when required. A record for each critical control point that demonstrates that the monitoring procedures and corrective actions are being followed should be provided. The records should be maintained as verification and evidence of the plant's quality assurance programme. Similar records and procedures may be applied to DAPs with the necessary degree of record keeping. A method to identify, describe, and locate the records associated with HACCP programmes should be established as part of the HACCP programme.

Verification activities include the application of methods; procedures (review/audit) and tests in addition to those used in monitoring to determine:

- the effectiveness of the HACCP or DAP plan in delivering expected outcomes i.e. validation;
- compliance with the HACCP or DAP plan, e.g. audit/review;
- whether the HACCP or DAP plan or its method of application need modification or revalidation."

Table 5.1 A product description for Canned Tuna in Salted Water

	Objective	Example
Product name(s)	Identify the species and method of processing.	Canned tuna in salted water
Source of raw material	Describe the origin of the fish	Yellowfin tuna caught by purse seine in the Gulf of Guinea Whole brine frozen
Important final product characteristics	List characteristics that affect product safety and essential quality, especially those that influence microbial flora.	Compliance with Codex Standard Canned Tuna and Bonito; 'low-acid' food; can seal integrity.
Ingredients	List every substance added during processing. Only ingredients approved by the official agency having jurisdiction may be used.	water, salt
Packaging	List all packaging materials. Only materials approved by the official agency having jurisdiction may be used.	Container in coated chromium steel, capacity : 212 ml, total net weight : 185 g, fish weight : 150 g Traditional opening
How the end product is to be used	State how the final product is to be prepared for serving, especially whether it is ready to eat.	Ready to eat
Shelf life (if applicable)	State the date when the product can be expected to begin to deteriorate if stored according to instructions.	3 years
Where the product will be sold	Indicate the intended market. This information will facilitate compliance with target market regulations and standards.	Domestic retail market.
Special labelling instructions	List all instructions for safe storage and preparation	"Best before the date shown on label."
Special distribution control	List all instructions for safe product distribution.	None

The implementation of HACCP principles is better identified in the Logic Sequence for implementation of HACCP (Figure 5.1).

This flow chart is for illustrative purposes only. For in-factory HACCP implementation a complete and comprehensive flow chart has to be drawn up for each process

References correspond to relevant Sections of the Code.

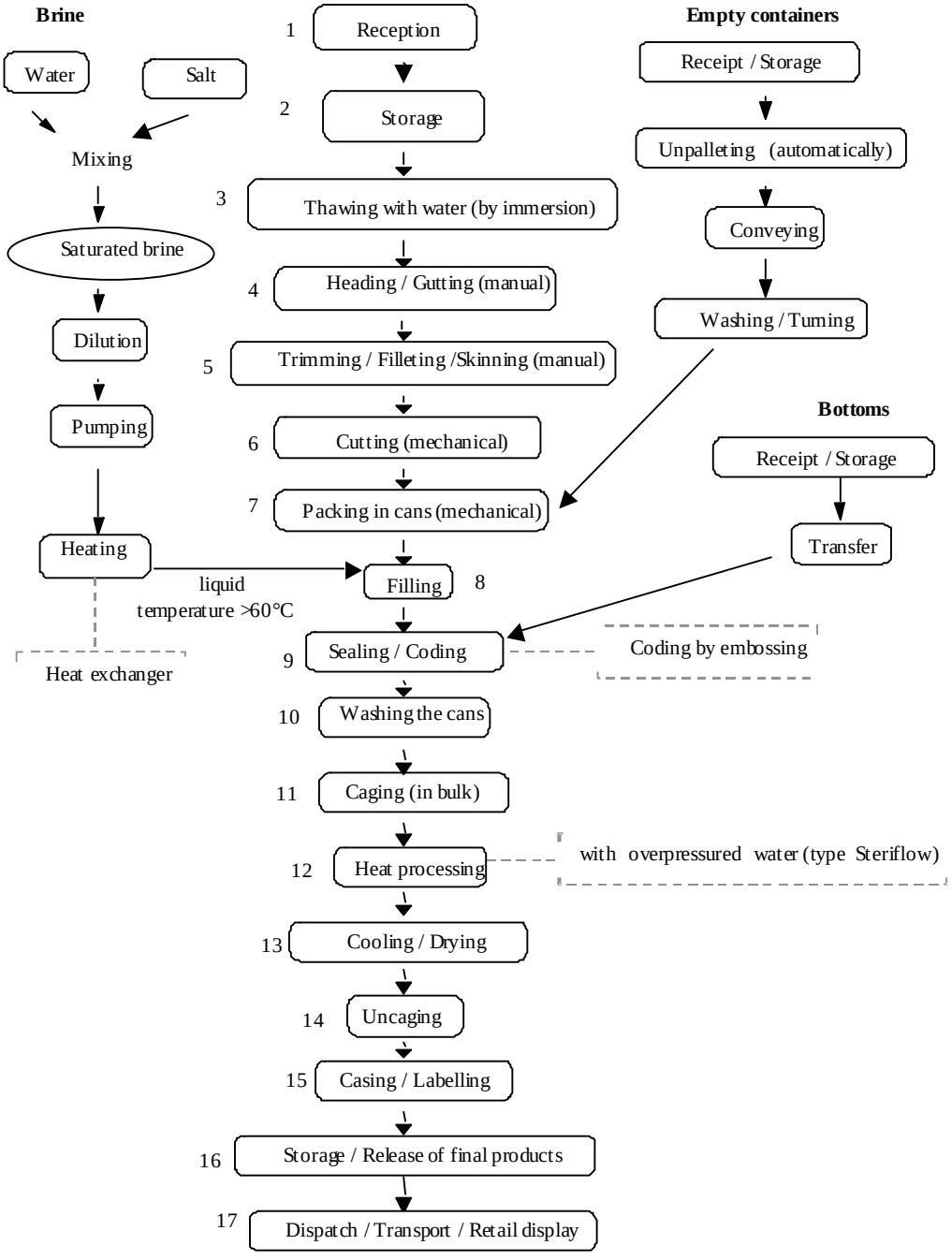

Figure 5.2 Example of a flow diagram for a processing line of canned tuna fish in brine

5.3.1 Describe Product

In order to gain a greater understanding and knowledge of the product under review, a thorough product description evaluation should be carried out. This exercise will facilitate in the identification of potential hazards or defects. An example of the type of information used in describing a product is given in Table 5.1.

5.3.2 Flow Diagram

For Hazard and Defect Analysis, it is necessary to carefully examine both the product and the process and produce a flow diagram(s). Any flow diagram should be as simple as possible. Each step in the process, including process delays from the selection of raw materials through to the processing, distribution, sale and customer handling, should be clearly outlined in sequence with sufficient technical data to avoid ambiguity. If a process is too complex to be easily represented by a single flow diagram, then it can be sub-divided into constituent parts, provided the relationship between each of the parts is clearly defined. It is helpful to number and label each processing step for ease of reference. An accurate and properly constructed flow diagram will provide the multi-disciplinary team with a clear vision of the process sequence. Once CCPs and DAPs have been identified they can be incorporated into the flow diagram specific for each processing facility. Figure 5.2 represents an example of a flow diagram for a canned tuna fish processing line. For examples of different processes see Figures 8.1 to 10.1 in the individual processing sections of the code.

5.3.3 Conduct Hazard and Defect Analysis

The purposes of hazard analysis are to identify all such food safety hazards at each Step, to determine their significance and to assess whether control measures for those hazards are available at each Step. Defect analysis serves the same purpose for potential quality defects.

5.3.3.1 Identification of Hazards and Defects

It cannot be stressed enough that where practical and feasible each individual facility should gather sound scientific and technical data relevant to the businesses for each step, from primary production, processing, manufacture, storage and distribution until the point of consumption. The assembly and nature of this information should be such to ensure that the multi-disciplinary team is able to identify and list, at each step of the process, all of the hazards that may reasonably likely to occur and defects that, in the absence of control measure(s), may likely result in the production of an unacceptable food. Potential hazards, which have been known to be associated with fresh fish and shellfish, are described in Annex 1. Table 5.2 summarises possible pre-harvest and harvest safety hazards in incoming fish and shellfish and Table 5.3 summarises possible safety hazards introduced in the post harvest and further processing of fish and shellfish.

It is important to identify potential hazards and defects in the operation from the point of view of plant construction, equipment used in the plant and hygienic practices, including those which may be associated with the use of ice and water. This is covered by the pre-requisite programme and is used to denote hazards that are common to almost any point in the process.

Table 5.2 Examples of Pre-harvest and Harvest Hazards in Incoming Fish & Shellfish

Biological		Chemical		Physical	
Parasites:	Parasites of public health significance: Trematodes, Nematodes, Cestodes	**Chemicals:**	Pesticides, herbicides, algicides, fungicides, anti-oxidants (added in feeds);	**Foreign Matter**	fish hooks
Pathogenic bacteria:	Salmonella, Shigella, E. coli, Vibrio cholerae, Vibrio parahaemolyticus, Vibrio vulnificus,	**Veterinary drug residues:**	Antibiotics, growth promoters (hormones), other veterinary drugs and feed additives		
Enteric Viruses:	Norwalk virus	**Heavy metals:**	Metals leached from marine sediments and soil, from industrial wastes, from sewage or animal manures		
Biotoxins:	Biotoxins, Scombrotoxin				
		Miscellaneous:	Petroleum		

Table 5.3 Examples of Hazards Introduced in the Post Harvest and Further Processing of Fish & Shellfish*.

Biological		Chemical		Physical	
Pathogenic bacteria:	Listeria monocytogenes, Clostridium botulinum, Staphylococcus aureus	**Chemicals:**	Disinfectants, Sanitizers or Lubricants (Misapplication)	**Foreign Matter**	Metal fragments; hard or sharp objects
Enteric Viruses:	Hepatitis A, Rotovirus		Disinfectants, Sanitizers or Lubricants (non-approved)		
Biotoxins:	Scombrotoxin, Staph. Enterotoxin, botulinum toxin				
		Ingredients and Additives:	Misapplication and non-approved		

Note: For biological hazards, environmental factors (for example: temperature, oxygen availability, pH and A_w) play a major role in their activity and growth, therefore the type of processing the fish or shellfish will undergo, and its subsequent storage, will determine their risk to human health and inclusion in a food

safety management plan. In addition, some hazards may show a certain degree of overlap between the two levels of operation through their existence and manifestation into the water supply.

* For hazards relating to specific products see the relevant processing section.

For the example on canned tuna developed in this section, the following essential potential hazards can be identified:

Table 5.4: An example of potential hazards for canned tuna

	In raw materials (frozen tuna)	During processing or storage or transportation
Biological	Presence of *Cl. botulinum*, Presence of scombrotoxin	Contamination by *Cl. Botulinum*, Growth of *Cl. Botulinum*, Survival of spores of *Cl. Botulinum*, Contamination and growth of *Staphylococcus aureus* Microbial recontamination after heat processing Production of scombrotoxin during processing, Production of staphylotoxin
Chemical	Presence of heavy metals	Recontamination by metals coming from the cans Recontamination by cleaning agents, by the brine, by mechanical grease, …
Physical	Presence of foreign material	Recontamination during processing (pieces of knives, by the cans, …)

For the example on canned tuna developed in this section, the following potential defects can be identified:

Table 5.5 An example of potential defects of canned tuna

	In raw materials (frozen tuna)	During processing or storage or transportation
Biological	Decomposition	Decomposition, survival of micro-organisms responsible of decomposition, …
Chemical		oxidation during storage, …
Physical		Objectionable matters (viscera, scales, skin, …), formation of struvite crystals, container defects (panelled container, …)
Others	species substitution	abnormal flavours, incorrect weight, incorrect coding, incorrect labelling

5.3.3.1.1 Hazards

It is equally important to consider, naturally occurring food safety hazards in the environment from which fish or shellfish are harvested. In general, risks to consumer health from seafood captured in unpolluted marine environments are low, provided these products are handled in line with principles of Good Manufacturing Practice. However, as with all foods, there are some health risks associated with the consumption of certain products, which may be increased when the catch is mishandled after harvest. Fish from some marine environments, such as tropical reef fish, can pose a consumer risk from natural marine toxins, such as ciguatera. The risk of adverse health effects from certain hazards might be increased under certain circumstances in products from aquaculture when compared with fish and crustacean from the marine environment. The risks of foodborne disease associated with products from aquaculture are related to inland and coastal ecosystems, where the potential of environmental contamination is greater when compared to capture fisheries. In some parts of the world, where fish or shellfish are consumed either raw or partially cooked, there is an increased risk of foodborne parasitic or bacterial disease. In order to perform a hazard analysis as part of the process of developing a HACCP plan, processors must have scientific information on potential hazards associated with raw material and products for further processing.

5.3.3.1.2 Defects

Potential defects are outlined in the essential quality, labelling and composition requirements described in the Codex Standards listed in Appendix XII*. Where no Codex Standard exists regard should be made to national regulations and/or commercial specifications.

End product specifications outlined in Appendices II – XI*, describe optional requirements which are intended to assist buyers and sellers in describing those provisions which are often used in commercial transactions or in designing specifications for final products. These requirements are intended for voluntary application by commercial partners and not necessarily for application by governments.

5.3.3.2 Significance of Hazards and Defects

One of the most important activities, which must be performed in a processing facility as part of the food safety management system is to determine if an identified hazard or defect is significant. The two primary factors that determine whether a hazard or defect is significant for HACCP purposes are probability of occurrence of an adverse health effect and the severity of the effect. A hazard that has a high severity of effect, such as death from *Clostridium botulinum* toxin, may impose a socially unacceptable risk at very low probability of occurrence, and thus warrant the application of HACCP controls (i.e., be a significant hazard for purposes of HACCP). Thus, in the processed canned tuna, *Clostridium botulinum* should be considered a significant hazard to be controlled through the application of a validated thermal process schedule. On the other hand, a hazard with a relatively low severity, such as mild gastroenteritis, might not warrant the HACCP controls at the same very low probability of occurrence, and thus not be significant for purposes of HACCP.

Information gathered during the product description exercise (refer to Section 5.3.1 – Describe Product) could also help facilitate the determination of significance since the likelihood of occurrence of hazard or defect can be affected by factors such as how the consumer will likely use the product (e.g., to consumed or cooked raw); the types of consumers who will likely consume it (e.g., immuno-compromised, elderly, children, etc.) and the method of storage and distribution (e.g., refrigerated or frozen).

Once significant hazard and defects have been identified, consideration needs to be given to assess their potential to be introduced or controlled at each step of the process. The use of a flow diagram (refer to Section 5.3.2 – Flaw Diagram) is beneficial for this purpose. Control measures must be considered for significant hazard(s) or defect(s) associated with each step with the aim of eliminating its possible occurrence or to reduce it to an acceptable level. A hazard or defect may be controlled by more that one control measure. For illustrative purposes, tables 5.6 and 5.7 demonstrate an approach to listing significant hazards and defects and the related control measures for the processing step, ”Heat Processing”.

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* Under elaboration.

Table 5.6 An example of the significant hazard survival of *Cl. Botulinum* at the step of heat processing for canned tuna

Processing step	Potential hazard	Is the potential hazard significant?	Justification	Control measures
12. Heat processing	*Cl. botulinum* viable spores	Yes	An insufficient heat processing may result in survival of *C. botulinum* spores and therefore, possibility of toxin production. A product must be commercially sterile	Ensure adequate heat applied for proper time at retort

Table 5.7: An example of the significant defect rancidity during the storage of frozen tuna for canned tuna

Processing step	Potential defect	Is the potential defect significant?	Justification	Control measures
2. Storage of frozen tuna	Persistent and distinct objectionable odours or flavours indicative of rancidity	Yes	Product does not meet quality or customer requirements	Controlled temperature in the storage premises Stock management procedure Maintenance procedure of the refrigeration system Personnel training and qualification

Table 5.8 A schematic example of a hazard analysis with corresponding control measures and the application of the Codex decision tree for the determination of a critical control point at processing step 12 of the example process as set out in Figure 5.2.

Processing Step N° 12 Heat processing		**Application of Codex Decision Tree**			
Potential Hazards	Control Measures				
Cl. botulinum viable spores	Ensure adequate heat applied for proper time at retort	**Q1**: Do control measures exist? **If yes** – go to Q2. **If no** – consider whether control measures are available or necessary within the process. Proceed to next identified hazard.	**Q2**: Is the step specifically designed to eliminate or reduce the likely occurrence of *Cl. botulinum* to an acceptable level? **If yes** – this step is a CCP. **If no** – go to Q3.	**Q3**: Could contamination occur in excess of acceptable levels or could these increase to unacceptable levels? **If yes** – go to Q4. **If no** – not a CCP.	**Q4**: Will a subsequent step eliminate or reduce the hazard to an acceptable level? **If yes** – not a CCP. **If no** – CCP. *What about consideration of a previous step?*
		A: Yes: a heat processing procedure (schedule, method) is clearly defined.	**A**: Yes, this step was specifically designed to eliminate spores.		
		Decision: Processing step N°12 « Heat processing » is a **Critical Control Point**			

5.3.4 Determine Critical Control Points and Defect Action Points

A thorough and concise determination of Critical Control Points and Defect Action Points in a process is important in ensuring food safety and compliance with elements related to essential quality, composition and labelling provisions of the appropriate Codex standard. The Codex decision tree (Figure 5.1, step 7) is a tool , which can be applied, to the determination of CCPs and a similar approach may be used for DAPs. Using this decision tree, a significant hazard or defect at a step can be assessed through a logical sequence of questions. Where CCPs and DAPs have been identified at a step, that point in the process must be controlled to prevent, reduce or eliminate the likely occurrence of the hazard or defect to an acceptable level. For illustrative purposes, an example of the application of the Codex decision tree to a hazard and defect using the canned tuna fish processing line, are shown in Tables 5.8 & 5.9, respectively.

Table 5.9 A schematic example of a defect analysis with corresponding control measures and the application of the Codex decision tree for the determination of a defect action point at processing step 2 of the example process as set out in Figure 5.2.

Processing Steps N°2 Storage of frozen tuna		**Application of Codex Decision Tree**			
Potential Defects	Control Measures				
Persistent and distinct objectionable odours or flavours indicative of rancidity	Controlled temperature in storage premises. Stock management procedure.	**Q1**: Do control measures exist? **If yes** – go to Q2. **If no** – consider whether control measures are available or necessary within the process. Proceed to next identified hazard.	**Q2**: Is the step specifically designed to eliminate or reduce the likely occurrence of rancidity to an acceptable level? **If yes** – this step is a DAP. **If no** – go to Q3.	**Q3**: Could rancidity occur in excess of acceptable levels or could it increase to unacceptable levels? **If yes** – go to Q4. **If no** – not a DAP.	**Q4**: Will a subsequent step eliminate rancidity or reduce its likely occurrence to acceptable level? **If yes** – not a DAP. **If no** – DAP. *What about consideration of a previous step?*
		A: Yes, the storage temperature is controlled, procedures exist	**A**: No	**A** : Yes, if the storage time is too long and/or the storage temperature is too high	**A** : No
		Decision: Processing Step N°2 « Storage of frozen tuna » is a **Defect Action Point**			

5.3.5 Establish Critical Limits

For each CCP and DAP, critical limits for the control of the hazard or defect must be specified. For any given hazard or defect, it may be necessary to have more than one critical limit designated for each control measure. The establishment of critical limits should be based on scientific evidence and validated by appropriate technical experts to ensure its effectiveness in controlling the hazard or defect to the determined level. Table 5.10 illustrates critical limits for a CCP and a DAP using a canned tuna fish processing line as an example.

5.3.6 Establish Monitoring Procedures

Any monitoring system developed by the multi-disciplinary team should be designed to detect loss of control at a CCP or DAP relative to its critical limit. The monitoring activity of a CCP or DAP should be documented in a concise fashion providing details regarding the individual responsible for the observation or measurement, the methodology used, the parameter(s) being monitored and the frequency of the inspections. The complexity of the monitoring procedure should also be carefully considered.

Considerations include optimising the number of individuals performing the measurement and selection of appropriate methods, which will produce rapid results (for example: time, temperature, pH). For CCPs, records of monitoring should be acknowledged and dated by a responsible person for verification.

Because each process is unique for each product, it is possible only to present, for illustrative purposes, an example of a monitoring approach for a CCP and DAP using the canned tuna fish processing line. This example is shown in Table 5.10.

5.3.7 Establish Corrective Action

An effective HACCP or DAP plan is anticipatory by nature and it is recognised that corrective action may be necessary from time to time. A documented corrective action programme should be established to deal with instances where the critical limit has been exceeded and loss of control has occurred at a CCP or DAP. The goal of this plan is to ensure that comprehensive and specific controls are in place and can be implemented to prevent the affected lot(s) from reaching the consumer. For example, fish and shellfish should be held and rejected if they are known to contain harmful substances and/or defects which would not be eliminated or reduced to an acceptable level by normal procedures of sorting or preparation. Of equal importance, is an assessment by plant management and other appropriate personnel to determine the underlying reason(s) why control was lost. For the latter, a modification to HACCP and DAP plans may be necessary. A record of investigation results and actions taken should be documented by a responsible person for each instance where loss of control occurred at a CCP or DAP. The record should demonstrate that control of the process has been re-established, that appropriate product disposition has occurred and that preventative action has been initiated. An example of a corrective action approach for a CCP and DAP using a canned tuna fish processing line is illustrated in Table 5.10.

5.3.8 Establish Verification Procedures

A processing facility should establish a verification procedure carried out by qualified individuals, to periodically assess if the HACCP and DAP plans are adequate, implemented and working properly. This step will help determine if CCPs and DAPs are under control. Examples of verification activities include: validation of all components of the HACCP plan including: a paper review of HACCP system, its procedures and records; review of corrective actions and product disposition actions when critical limits are not met and validation of established critical limits. The latter is particularly important when an unexplained system failure has occurred, when a significant change to the process, product or packaging is planned or when new hazards or defects have been identified. Observation, measurement and inspection activities within the processing facility should also be incorporated as a part of the verification procedure, where applicable. Verification activities should be carried out by qualified competent individuals. The verification frequency of the HACCP and DAP plans should be sufficient to provide assurance that their design and implementation will prevent food safety problems as well as issues associated with essential quality, composition and labelling provisions of the appropriate Codex standard to enable problems to be detected and dealt with in a timely manner. For illustration purposes, an example of a verification procedure approach for a CCP and DAP using the canned tuna fish processing line is shown in Table 5.10.

5.3.9 Establish Documentation and Record Keeping Procedures

Documentation may include Hazard Analysis, CCP determination, critical limit determination, and procedures for monitoring, corrective action and verification.

A current, accurate and concise record keeping system will greatly enhance the effectiveness of a HACCP programme and facilitate in the verification process. Examples of the elements of a HACCP plan that should be documented have been provided in this section for illustrative purposes. Inspection and corrective action records should be practical and collect all the appropriate data necessary to demonstrate “real-time” control or deviation control of a CCP. Records are recommended but not required for a DAP except where a loss of control occurred. For illustration purposes, an example of a record keeping approach for a CCP and DAP using the canned tuna fish processing line is shown in Table 5.10.

5.3.10 Review of HACCP and DAP Plans

Upon completion of all the steps for the development of HACCP and DAP plans as outlined in Figure 1 a full review of all components should be conducted. The purpose of these reviews is to verify that the plans are capable of meeting their objectives.

Table 5.10 An example of the results of the application of HACCP principles to the two specific steps in the canned tuna process (Tables 5.8 & 5.9), for a CCP & a DAP, respectively.

CCP				
Processing Step No. 12 : Heat Processing Hazard: *Clostridium botulinum* viable spores				
Critical Limit	Monitoring Procedure	Corrective Action	Records	Verification
Those specific parameters associated with heat processing.	**Who**: Qualified person assigned to heat processing **What**: All parameters **Frequency**: every batch **How**: Checks of sterilisation schedule and other factors	Who: qualified personnel What: Personnel retraining New heat processing or batch destruction Corrective maintenance of equipment Hold product until safety can be evaluated. Who: Appropriate trained personnel	Monitoring records, corrective action records, product evaluation records, calibration records, validation records, audit records, HACCP plan review record	Validation, finished product evaluation, internal audit, review of records, calibration of machinery (may be a prerequisite), review of HACCP plan, external audit

DAP				
Processing Step No. 2 : Storage of frozen tuna Defect: Persistent and distinct objectionable odours or flavours indicative of rancidity				
Critical Limit:	Monitoring Procedure	Corrective Action	Records	Verification
Number of rancid sample units cannot exceed acceptance number of established sampling plan. Storage temperature and time.	**Who**: Appropriate trained personnel **How** : Organoleptic examination Chemical tests Checking of the storage premise temperature Checking of stock forms **What**: fish quality and acceptability based on product Codex standard. **Frequency**: as required	What: Application of an intensified monitoring According to the results of this intensified inspection, immediate processing, sorting or reject of frozen tuna exceeding the critical limits. Adjust storage temperature. Personnel retraining Who: Appropriate trained personnel	Analysis results Stock forms Temperature records	On-site audit Review of monitoring and corrective action reports

5.4 Conclusion

Section 5 has demonstrated the principles of HACCP and how they should be applied to a process to ensure safe product. The same principles can be used to determine the points in a process where it is necessary to control defects. Since every facility and each processing line is different it is possible within this Code only to demonstrate the types of potential hazards and defects that must be considered. Furthermore, because of the nature of the significance of hazards and defects it is not possible to categorically determine which steps in a process will be CCPs and/or DAPs without actually assessing the process, the objectives of the process, its environment and expected outcomes. The example of the canned tuna processing line is intended to illustrate how to apply the principles, given the outcome of a commercially sterile product, and why a HACCP and DAP plan will be unique to each operation.

The remaining Sections in the Code concentrate on aquaculture and molluscan shellfish production and to the handling and processing of fish, shellfish and their products and attempt to illustrate the potential hazards and defects at the various stages in a wide range of processes. In developing a HACCP or DAP plan it will be necessary to consult Sections 3 & 5 before turning to the appropriate processing section for specific advice. It should also be noted that Section 8 refers to processing of fresh, frozen and minced fish and will provide useful guidance for most of the other processing operations.

SECTION 8 - PROCESSING OF FRESH, FROZEN AND MINCED FISH

In the context of recognising controls at individual processing steps, this section provides examples of potential hazards and defects and describes technological guidelines, which can be used to develop control measures and corrective action. At a particular step only the hazards and defects, which are likely to be introduced or controlled at that step, are listed. It should be recognised that in preparing a HACCP and/or DAP plan it is essential to consult Section 5 which provides guidance for the application of the principles of HACCP and DAP analysis. However, within the scope of this Code of Practice it is not possible to give details of critical limits, monitoring, record keeping and verification for each of the steps since these are specific to particular hazards and defects.

In general, the processing of fresh, frozen fish and minced fish, will range in sophistication. In its simplest form, the processing of fresh and frozen fish may be presented in a raw state such as dressed, fillets, and minced to be distributed in markets and institutions or used in processing facilities. For the latter, the processing of fresh, frozen and minced fish is often an intermediate step to the production of value added products (for example, smoked fish as described in section 12, canned fish as described in section 16, frozen breaded or battered fish as described in section 15). Traditional methods often prevail in the design of a process. However, modern scientific food technology is having an increasingly important role in enhancing the preservation and shelf-stability of a product. Regardless of the complexity of a particular process, the fabrication of the desired product relies on the consecutive execution of individual steps. As stressed by this Code, the application of appropriate elements of the pre-requisite programme (Section 3) and HACCP principles (Section 5) at these steps will provide the processor with reasonable assurance that the essential quality, composition and labelling provisions of the appropriate Codex standard will be maintained and food safety issues controlled.

The example of the flow diagram (Figure 8.1) will provide guidance to some of the common steps involved in a fish fillet preparation line, and three examples of final product types: modified atmosphere packaging (MAP), minced and frozen fish. As in the further processing of fresh fish in a MAP product, or minced or frozen fish, the section labelled “Fish Preparation” is used as the basis for all the other fish processing operations (Sections 9-16)[4], where appropriate.

[4] Sections 10-15 under elaboration

This flow chart is for illustrative purposes only. For in-factory HACCP implementation a complete and comprehensive flow chart has to be drawn up for each process.

References correspond to relevant Sections of the Code.

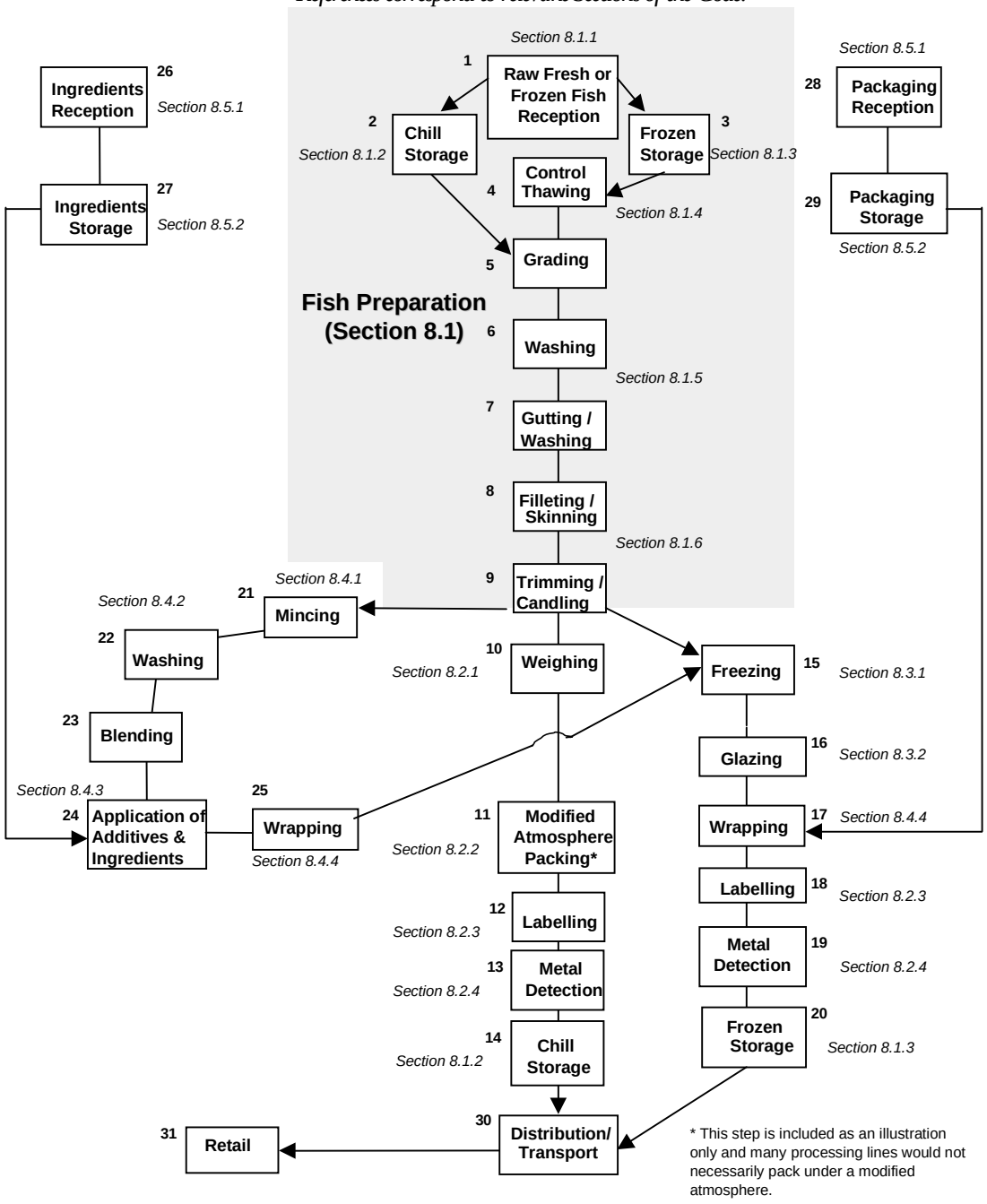

Figure 8.1 Example of a flow chart of a fish fillet preparation line, including MAP, mincing and freezing operations

8.1 FINFISH PREPARATION

The hygienic conditions and technical manner in which fish are prepared is similar and is not influenced greatly by its intended purpose (for direct distribution or for further processing). However, variations will exist in the form in which the fresh fish flesh is to be utilised. The forms may include, but not limited to, dressed, fillets or steaks.

8.1.1 Raw, Fresh or Frozen Fish Reception (Processing Steps 1)

Potential Hazards: *Microbiological pathogens, viable parasites, biotoxins, scombrotoxin, chemicals (including veterinary drug residues) and physical contamination.*

Potential Defects: *Decomposition, parasites, physical contamination*

Technical Guidance:

- for raw fish material, product specifications could include the following characteristics:
  - organoleptic characteristics such as appearance, odour, texture, etc;
  - chemical indicators of decomposition and/or contamination, for example, TVBN, histamine, heavy metals, pesticide residues, nitrates etc;
  - microbiological criteria, in particular for intermediate raw materials, to prevent the processing of raw material containing microbial toxins;
  - foreign matter;
  - physical characteristics such as size of fish;
  - species homogeneity.
- training in species identification and communication in product specification should be provided to fish handlers and appropriate personnel to ensure a safe source of incoming fish where written protocols exist. Of special consideration, are the reception and sorting of fish species that poses a risk of biotoxins such as ciguatoxin in large carnivorous tropical and sub-tropical reef fish or scombrotoxin in scombroid species or parasites;
- skills should be acquired by fish handlers and appropriate personnel in sensory evaluation techniques to ensure raw fish meet essential quality provisions of the appropriate Codex standard;
- fish requiring gutting on arrival at the processing facility should be gutted efficiently, without undue delay and with care to avoid contamination (see Section 8.1.5 - Washing & Gutting);
- fish should be rejected if it is known to contain harmful, decomposed or extraneous substances, which will not be reduced or eliminated to an acceptable level by normal procedures of sorting or preparation;
- information about the harvesting area.

8.1.1.1 Sensory Evaluation of Fish

The best method of assessing the freshness or spoilage of fish is by sensory evaluation techniques[5]. It is recommended that appropriate sensory evaluation criteria be used to evaluate the acceptability of fish and to eliminate fish showing loss of essential quality provisions of the appropriate Codex standards. As an example, fresh white fish species are considered unacceptable when showing the following characteristics:

Skin / Slime	dull, gritty colours with yellow brown dotting slime
Eyes	Concave, opaque, sunken discoloured
Gills	grey – brown or bleached, slime opaque yellow, thick or clotting
Odour	flesh odour amines, ammonia, milky lactic, sulphide, faecal, putrid, rancid

[5] *Guidelines for Sensory Evaluation of Fish and Shellfish in Laboratories* (CAC/GL 31-1999)

8.1.2 Chilled Storage (Processing Steps 2 & 14)

Potential Hazards: *Microbiological pathogens, biotoxin, and scombrotoxin.*

Potential Defects: *Decomposition, physical damage.*

Technical Guidance:

- fish should be moved to the chill storage facility without undue delay;
- the facility should be capable of maintaining the temperature of the fish between 0ºC - +4ºC;
- the chill room should be equipped with a calibrated indicating thermometer. Fitting of a recording thermometer is strongly recommended;
- stock rotation plans should ensure proper utilisation of the fish;
- the fish should be stored in shallow layers and surrounded by sufficient finely divided ice or with a mixture of ice and of water before processing;
- fish should be stored such that damage will be prevented from over-stacking or over-filling of boxes;
- where appropriate replenish ice supply on the fish or alter temperature of the room.

8.1.3 Frozen Storage (Processing Steps 3 & 20)

Potential Hazards: *Microbiological pathogens, toxins, viable parasites*

Potential Defects: *Dehydration, rancidity, loss of nutritional quality*

Technical Guidance:

- the facility should be capable of maintaining the temperature of the fish at or colder than -18ºC, and with minimal temperature fluctuations;
- the store should be equipped with a calibrated indicating thermometer. Fitting of a recording thermometer is strongly recommended;
- a systematic stock rotation plan should be developed and maintained;
- product should be glazed and/or wrapped to protect it from dehydration;
- fish should be rejected if known to contain defects, which subsequently cannot be reduced or eliminated to an acceptable level by re-working. An appropriate assessment should be carried out to determine the reason(s) for loss of control and the DAP plan modified where necessary
- for killing of parasites harmful to human health, the freezing temperature and monitoring of duration of freezing should be combined with good inventory control to ensure sufficient cold treatment.

8.1.4 Control Thawing (Processing Step 4)

Potential Hazards: *Microbiological pathogens, biotoxins and scombrotoxin*

Potential Defects: *Decomposition*

Technical Guidance:

- the thawing method should be clearly defined and should address the time and temperature of thawing, temperature measuring instrument used and placement of device for measurement. The thawing schedule (time and temperature parameters) should be carefully monitored. Selection of the thawing method should take into account in particular the thickness and uniformity of size of the products to be thawed;
- thawing time and temperature and fish temperature critical limits should be selected so as to control the development of micro-organisms, histamine, where high risk species are concerned or persistent and distinctive objectionable odours or flavours indicative of decomposition or rancidity;
- where water is used as the thawing medium, it should be of potable quality;
- where recycling of water is used, care should be taken to avoid the build up of microorganisms;
- where water is used, circulation should be sufficient to produce even thawing;

- during thawing, according to the method used, products should not be exposed to excessively high temperatures;
- particular attention should be paid to controlling condensation and drip from the fish. An effective drainage should be made;
- after thawing, fish should be immediately processed or refrigerated and kept at the adequate temperature (temperature of melting ice);
- the thawing schedule should be reviewed as appropriate and amended where necessary.

8.1.5 Washing and Gutting (Processing Steps 6 & 7)

Potential Hazards: *Microbiological pathogens, biotoxins and scombrotoxin*

Potential Defects: *Presence of viscera, bruising, off-flavours, cutting faults.*

Technical Guidance:

- gutting is considered complete when the intestinal tract and internal organs have been removed;
- an adequate supply of clean sea water or potable water should be available for washing of:
  - whole fish to remove foreign debris and reduce bacterial load prior to gutting;
  - gutted fish to remove blood and viscera from the belly cavity;
  - surface of fish to remove any loose scales;
  - gutting equipment and utensils to minimise build-up of slime and blood and offal;
- depending on the vessel or processing facility product flow pattern and where a prescribed critical limit for staging time and temperature regime has been established for the control of histamine or a defect, the gutted fish should be drained and well iced or appropriately chilled in clean containers and stored in specially designated and appropriate areas within the processing facility;
- separate and adequate storage facilities should be provided for the fish roe, milt and livers, if these are saved for later utilisation.

8.1.6 Filleting, Skinning, Trimming and Candling (Processing Steps 8 & 9)

Potential Hazards: *Viable parasites, microbiological pathogens, biotoxins and scombrotoxin, presence of bones.*

Potential Defects: *Parasites, presence of bones, objectionable matter (e.g. skin, scales, etc.), decomposition.*

Technical Guidance:

- to minimise time delays, the design of the filleting line and candling line, where applicable, should be continuous and sequential to permit the uniform flow without stoppages or slow-downs and removal of waste;
- an adequate supply of clean sea water or potable water should be available for washing of:
  - fish prior to filleting or cutting especially fish that have been scaled;
  - fillets after filleting or skinning or trimming to remove any signs of blood, scales or viscera;
  - filleting equipment and utensils to minimise build-up of slime and blood and offal;
  - for fillets to be marketed and designated as boneless, fish handlers should employ appropriate inspection techniques and use the necessary tools to remove bones not meeting Codex standards[6,7] or commercial specifications;
- The candling of skinless fillets by skilled personnel, in a suitable location which optimises the illuminating effect, is an effective technique in controlling parasites (in fresh fish) and should be employed when implicated fish species are being used;

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6 Codex Standard for Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh (Codex Stan. 165-1989, Rev.1-1995)

7 Codex Standard for Quick Frozen Fish Fillets (Codex Stan. 190-1995)

- the candling table should be frequently cleaned during operation in order to minimise the microbial activity of contact surfaces and the drying of fish residue due to heat generated from the lamp;
- where a prescribed critical limit for staging time and temperature regime has been established for the control of histamine or a defect, the fish fillets should be well iced or appropriately chilled in clean containers, protected from dehydration and stored in appropriate areas within the processing facility.

8.2 PROCESSING OF VACUUM OR MODIFIED ATMOSPHERE PACKED FISH

This section is designed to augment the processing of fresh fish section with additional operation steps pertaining specifically to the modified atmosphere packing of fish (see also Appendix I).

8.2.1 Weighing (Processing Step 10)

Potential Hazards: *Unlikely*

Potential Defects: *Incorrect net weight*

Technical Guidance:

- weigh scales should be periodically calibrated with a standardised mass to ensure accuracy.

8.2.2 Vacuum or Modified Atmosphere Packaging (Processing Step 11)

Potential Hazards: *Subsequent microbiological pathogens and biotoxins, physical contamination (metal).*

Potential Defects: *Subsequent decomposition*

Technical Guidance:

The extent to which the shelf-life of the product can be extended by vacuum or MAP will depend on the species, fat content, initial bacterial load, gas mixture, type of packaging material and, especially important, the temperature of storage. Refer to Appendix I for process control issues in modified atmosphere packaging.

- modified atmosphere packaging should be strictly controlled by:
  - monitoring the gas to product ratio;
  - types and ratio of gas mixtures used;
  - type of film used;
  - type and integrity of the seal;
  - temperature control of product during storage;
- occurrence of adequate vacuum and package;
- fish flesh should be clear of the seam area;
- packaging material should be inspected prior to use to ensure that it is not damaged or contaminated;
- packaging integrity of the finished product should be inspected at regular intervals by an appropriately trained personnel to verify the effectiveness of the seal and the proper operation of the packaging machine;
- following sealing, MAP or vacuumed products should be transferred carefully and without undue delay to chilled storage;
- Ensure that adequate vacuum is attained, and the package seals are intact.

8.2.3 Labelling (Processing Steps 12 & 18)

Potential Hazards: *Unlikely*

Potential Defects: *Incorrect labelling*

Technical Guidance:

- prior to their application, labels should be verified to ensure that all information declared meet, where applicable, the Codex General Standard for the Labelling of Pre-packaged Foods[8], labelling provisions of the appropriate Codex Standard for products and/or other relevant national legislative requirements;
- in many cases it will be possible to re-label incorrectly labelled products. An appropriate assessment should be carried out to determine the reason(s) for incorrect labelling and the DAP plan should be modified where necessary;

8.2.4 Metal Detection (Processing Steps 13 & 19)

Potential Hazards: *Metal contamination*

Potential Defects: *Unlikely*

Technical Guidance:

- it is important that line speeds are adjusted to allow for the proper functioning of a metal detector;
- routine procedures should be initiated to ensure product rejected by the detector is investigated as to the cause of the rejection;
- metal detectors, if used, should be periodically calibrated with a known standard to ensure proper operation;

8.3 PROCESSING OF FROZEN FISH

This section is designed to augment the processing of fresh fish section with additional operation steps pertaining specifically to the processing of frozen fish.

8.3.1 Freezing Process (Processing Step 15)

Potential Hazards: *Viable parasites.*

Potential Defects: *Texture deterioration, development of rancid odours, freezer burn*

Technical Guidance:

The fish product should be subjected to a freezing process as quickly as possible since unnecessary delays before freezing will cause temperature of the fish products to rise, increasing the rate of quality deterioration and reducing shelf-life due to the action of micro-organisms and undesirable chemical reactions.

- a time and temperature regime for freezing should be established and should take into consideration the freezing equipment and capacity; the nature of the fish product including thermal conductivity, thickness, shape and temperature and the volume of production, to ensure that the range of temperature of maximum crystallisation is passed through as quickly as possible;
- the thickness, shape and temperature of fish product entering the freezing process should be as uniform as possible;
- processing facility production should be geared to the capacity of freezers;
- frozen product should be moved to the cold storage facility as quickly as possible;

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[8] Codex General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985, Rev. 2-1991)

- the core temperature of the frozen fish should be monitored regularly for completeness of the freezing process;
- frequent checks should be made to ensure correct operation of freezing;
- accurate records of all freezing operations should be kept
- for killing of parasites harmful to human health, the freezing temperature and monitoring of duration of freezing should be combined with good inventory control to ensure sufficient cold treatment.

8.3.2 Glazing (Processing Step 16)

Potential Hazards: *Microbiological pathogens*

Potential Defects: *Subsequent dehydration, incorrect net weight*

Technical Guidance:

- glazing is considered complete when the entire surface of the frozen fish product is covered with a suitable protective coating of ice and should be free of exposed areas where dehydration (freezer-burn) can occur;
- if additives are used in the water for glazing, care should be taken to ensure its proper proportion and application with product specifications;
- where the labelling of a product is concerned, information on the amount or proportion of glaze applied to a product or a production run should be kept and used in the determination of the net weight which is exclusive of the glaze;
- where appropriate monitoring should ensure that spray nozzles do not become blocked;
- where dips are used for glazing it is important to replace the glazing solution periodically to minimise the bacterial load and build-up of fish protein, which can hamper freezing performance;

8.4 PROCESSING OF MINCED FISH

This section is designed to augment the processing of fresh fish section (prior to mincing) and processing of frozen fish section (after mincing) with additional operation steps pertaining specifically to the processing of minced fish.

8.4.1 Mincing Fish Using Mechanical Separation Process (Processing Step 21)

Potential Hazards: *Microbiological pathogens, biotoxins and scombrotoxin, physical contamination (metal, bones, rubber from separator belt, etc).*

Potential Defects: *Incorrect separation (i.e. objectionable matter), decomposition, presence of defect bones, parasites.*

Technical Guidance:

- the separator should be fed continuously but not excessively;
- candling is recommended for fish suspected of high infestation with parasites;
- split fish or fillets should be fed to the separator so that the cut surface contacts the perforated surface;
- fish should be fed to the separator in a size that it is able to handle;
- in order to avoid time-consuming adjustments of the machinery and variations in quality of the finished product, raw materials of different species and types should be segregated and processing of separate batches should be carefully planned;
- the perforation sizes of the separator surface as well as the pressure on the raw material should be adjusted to the characteristics desired in the final product;
- the separated residual material should be carefully removed on a continuous or near-continuous basis to the next processing stage;
- temperature monitoring should ensure undue temperature rises of the product are avoided.

8.4.2 Washing of Minced Fish (Processing Step 22)

Potential Hazards: *Microbiological pathogens and scombrotoxin.*

Potential Defects: *Poor colour, poor texture, excess of water*

Technical Guidance:

- if necessary the mince should be washed and should be adequate for the type of product desired;
- stirring during washing should be carried out with care, but it should be kept as gentle as possible in order to avoid excessive disintegration of the minced flesh which will reduce the yield due to the formation of fines;
- the washed minced fish flesh may be partially de-watered by rotary sieves or centrifugal equipment and the process completed by pressing to appropriate moisture content;
- if necessary, and depending on eventual end-use, the de-watered mince should be either strained or emulsified;
- special attention should be taken to ensure mince being strained is kept cool;
- the resulting waste water should be disposed of in a suitable manner.

8.4.3 Blending and Application of Additives and Ingredients to Minced Fish (Processing Steps 23 & 24)

Potential Hazards: *Physical contamination, non-approved additives and/or ingredients.*

Potential Defects: *Physical contamination, incorrect addition of additives.*

Technical Guidance:

- if fish, ingredients and /or additives are to be added, they should be blended in the proper proportions to achieve the desired sensory quality;
- additives should comply with the requirements of the Codex General Standard for Food Additives;
- the minced fish product should be packaged and frozen immediately after preparation; if it is not frozen or used immediately after preparation it should be chilled.

8.4.4 Wrapping and Packing (Processing Steps 17 & 25)

Potential Hazards: *Microbiological pathogens*

Potential Defects: *Subsequent dehydration, decomposition*

Technical Guidance:

- packaging material should be clean, sound, durable, sufficient for its intended use and of food grade material;
- the packaging operation should be conducted to minimise the risk of contamination and decomposition;
- products should meet appropriate standards for labelling and weights.

8.5 PACKAGING, LABELS & INGREDIENTS

8.5.1 Reception – Packaging, Labels & Ingredients (Processing Steps 26 & 28)

Potential Hazards: *Microbiological pathogens, chemical and physical contamination*

Potential Defects: *Misdescription*

Technical Guidance:

- only ingredients, packaging material and labels complying with the processors' specification should be accepted into the processing facility;
- labels which are to be used in direct contact with the fish should be fabricated of a non-absorbent material and the ink or dye used on that label should be approved by the official agency having jurisdiction;

- ingredients and packaging material not approved by the official agency having jurisdiction should be investigated and refused at reception;

8.5.2 Storage - Packaging, Labels & Ingredients (Processing Steps 27 & 29)

Potential Hazards: *Microbiological pathogens, chemical and physical contamination.*

Potential Defects: *Loss of quality characteristics of packaging materials or ingredients.*

Technical Guidance:

- ingredients and packaging should be stored appropriately in terms of temperature and humidity;
- a systematic stock rotation plan should be developed and maintained to avoid out of date materials;
- ingredients and packaging should be properly protected and segregated to prevent cross-contamination;
- defective ingredients and packaging should not be used.

SECTION 9 - PROCESSING OF FROZEN SURIMI

(Proposed Draft Section at Steps 5/8 of the Procedure)

In the context of recognising controls at individual processing steps, this section provides examples of potential hazards and defects and describes technological guidelines, which can be used to develop control measures and corrective action. At a particular step only the hazards and defects, which are likely to be introduced or controlled at that step, are listed. It should be recognised that in preparing a HACCP and/or DAP plan it is essential to consult Section 5 which provides guidance for the application of the principles of HACCP and DAP analysis. However, within the scope of this Code of Practice it is not possible to give details of critical limits, monitoring, record keeping and verification for each of the steps since these are specific to particular hazards and defects.

Frozen surimi is an intermediate food ingredient made from myofibrillar fish protein isolated from other constituent fish protein by repeated washing and de-watering of minced fish. Cryoprotectants are added so that the mince can be frozen and will retain the capacity to form gel when heat-treated after thawing. Frozen surimi is usually blended with other components and further processed into surimi-based products such as kamaboko or crab analogs (imitation crab) that utilise its gel forming ability.

Frozen surimi is manufactured using various methods, but this flow chart shows the most typical procedure.

This flow chart is for illustrative purpose only. For in-factory HACCP implementation a complete and comprehensive flow chart has to be draw up for each process.

References correspond to relevant Sections of the Code.

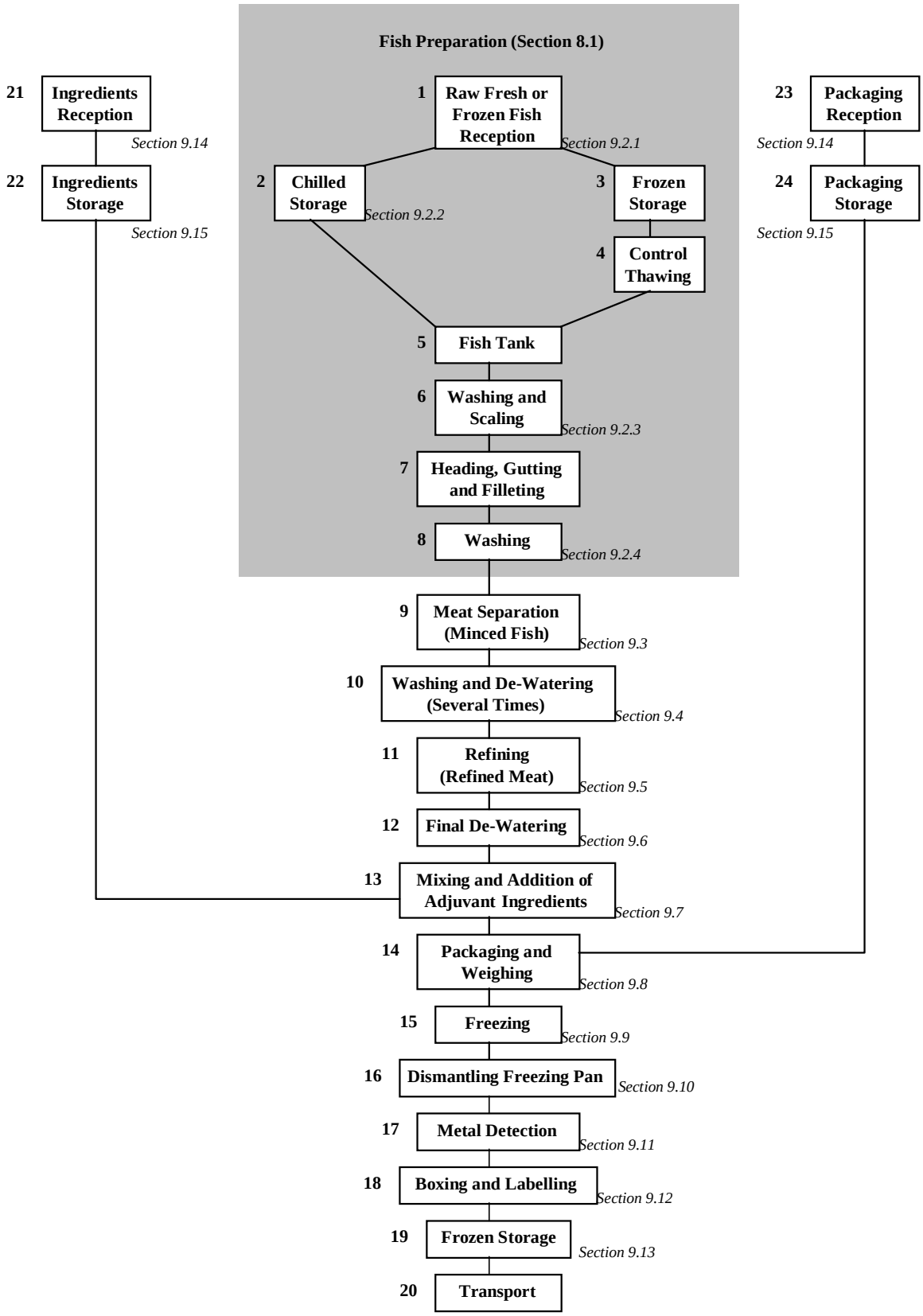

Figure 9.1 Example of a flow chart of a frozen surimi production process.

The main emphasis of this section of the code is to give guidance to the manufacture of frozen surimi

processed from marine groundfish such as Alaska Pollock and Pacific Whiting by mechanised operations that are common in Japan, the United States and some other country in which there are processors under mechanised operation.

The vast majority of frozen surimi is processed from marine groundfish such as Alaska Pollock and Pacific Whiting. However, technological advances and the change of main raw fish species for frozen surimi production will necessitate periodic revision of this section of the Code of Practice.

9.1 GENERAL CONSIDERATIONS OF HAZARDS AND DEFECTS FOR FROZEN SURIMI PRODUCTION

9.1.1 Hazards

Frozen surimi is an intermediate ingredient that will be further processed into surimi-based products such as kamaboko and crab analogs. Many of the potential food safety hazards will be controlled during subsequent processing. For example, pathogenic bacteria such as Listeria monocytogenes and toxin formers such as *Clostridium botulinum* (that becomes a hazard due to modified atmosphere packaging of the end product) should be controlled during the cooking or pasteurising steps of final processing. Possible *Staphylococcus aureus* contamination that produces heat-stable enterotoxins should be adequately controlled by the pre-requisite programme. Parasites will not be a hazard since the final product will be cooked or pasteurised.

If scombrotoxin-forming fish such as tuna or mackerel or tropical reef fish that may accumulate ciguatera toxin are utilised for surimi, appropriate controls for these hazards should be developed. Likewise, due to the highly mechanised nature of surimi processing, appropriate controls should be instituted to assure that metal fragments (e.g., bearings, bolts, washers, and nuts) are excluded or eliminated in the end product.

In countries that produce frozen surimi by traditional non-mechanised methods from locally available fish species for local consumption, extensive consideration should be given to pre-requisite programmes described in section 3.

9.1.2 Defects

Certain quality attributes of frozen surimi is important for the successful manufacture of surimi-based products such as kamaboko and crab analogs that meet consumer expectations of quality. Some of these important factors are colour, moisture content, pH or gel strength. These and others are described in more detail in Appendix X of the code entitled Optional Final Product Requirements for Frozen Surimi[9].

Myxosporidia is a parasite that is common in marine groundfish such as Pacific Whiting. This organism contains protease enzymes that chemically separates proteins that can ultimately affect the gel strength of surimi even at very low incidence. If species are used that are known to contain this parasite, a protease inhibitors such as beef plasma protein or egg whites may be needed as additives to attain the necessary gel strength capabilities for kamaboko or crab analogs production.

Decomposed fish should not be used as raw material for frozen surimi production. The sensory qualities will not be sufficient to produce acceptable kamaboko or crab analog end products. It also necessary to note that decomposed fish should not be used as raw material for production of frozen surimi, because proliferation of spoilage bacteria that cause decomposition of the end product will cause negative effect on the gel forming ability of frozen surimi by denaturing salt soluble protein.

The washing and de-watering cycle should be sufficient to achieve separation of the water-soluble protein from the myofibrillar proteins. If water-soluble proteins remain in the product it will negatively affect the gel forming ability and the long term frozen storage shelf life.

Objectionable matter such as small bones, scales and black belly lining should be minimised as it negatively affects the usability of frozen surimi for processing into end products.

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9 Under elaboration

Due to the comminuted nature of raw surimi, the use of food additive may be necessary to achieve the level of quality that is desired. These additives should be introduced to surimi in accordance to appropriate regulations and manufacturer's recommendation in order to avoid quality problems and regulatory actions.

Consideration should be given to the thermal stability of fish proteins. At normal room temperatures most fish proteins will undergo denaturing that will inhibit the gel forming ability of the product. Alaska Pollock and other cold water marine fish should not be subjected to temperatures above 10°C during processing. Warm water fishes may denature at a slower rate and may not be as temperature sensitive.

In countries that produce frozen surimi by traditional non-mechanised methods from locally available fish species for local consumption, special consideration should be given to several defects. Since the growth of spoilage bacteria that cause decomposition and protein denaturation increases with temperature, the conditions that the raw and processed product is subjected to should be carefully monitored.

9.2 FISH PREPARATION (Processing Steps 1 to 8)

Refer to Section 8.1 steps 1 through 8 for information regarding preparation of fish for processing. For frozen surimi processing, consideration should be given to the following for each step:

9.2.1 Raw Fresh and Frozen Fish Reception (Processing Step 1)

Potential Hazards: *unlikely when using marine ground fish as the raw material*

Potential Defects: *decomposition, protein denaturation*

Technical Guidance:

- harvested fish intended for frozen surimi processing should preferably be kept at 4°C or below;
- consideration should be given to the age and condition of fish used for surimi processing as the factors will affect the final gel strength capability. Especially, care should be taken to raw fish received many hours after harvest. For example acceptable period after harvest should be as follows, but processing as fast as possible after harvest will better retain adequate quality of frozen surimi:
  - round; within 14 days of harvest, when stored at 4° C or below;
  - dressed; within 24 hours after dressing, when stored at 4° C or below.
- date, time of harvesting, origin and harvester or vendor of products received should be properly recorded and identified;
- presence of decomposition in raw product should not be allowed, as it will negatively affect the gel strength capability of the end product. Harvested fish in poor condition may not result in specified colour characteristics;
- Fish that is used for frozen surimi processing should have a flesh for adequate gel strength capability. For example an aggregate flesh for Alaska Pollock (*Theragra chalcogramma*) should have pH of 7.0 ± 0.5
- fish that is crushed and suffocated due to abnormally big tow size and duration during harvesting should be deleted from the line in order to avoid negative effect to gel forming ability.

9.2.2 Chilled Storage (Processing Step 2)

Potential Hazards: *unlikely*

Potential Defects: *protein denaturation*

Technical Guidance:

- chilled storage at the processing facility should be minimised with prompt processing in order to minimise protein denaturation and loss of gel strength capability;
- raw fish should be preferably stored at 4°C or below and the dates of harvesting and the time of receipt of the fish should identify the lot of fish used for processing.

9.2.3 Washing and Scaling (Processing Step 6)

Potential Hazards: *unlikely*

Potential Defects: *protein denaturation, colour, objectionable matter*

Technical Guidance:

- the epidermis (slime layer), scales and loose pigment should be removed before heading and gutting. This will lessen the level of impurities and extraneous material that can negatively affect the gel strength capability and colour of the end product.

9.2.4 Washing (Processing Step 8)

Potential Hazards: *unlikely*

Potential Defects: *impurities, extraneous materials*

Technical Guidance:

- headed and gutted fish should be re-washed. This will lessen the level of impurities and extraneous material that can negatively affect the gel strength capability and colour of the end product.

9.3 MEAT SEPARATION PROCESS (Processing Step 9)

Potential Hazards: *metal fragments*

Potential Defects: *impurities*

Technical Guidance:

- fish flesh is minced using mechanical separation process, therefore metal detection equipment that is capable of sensing product that has become contaminated with metal fragments of the size likely to cause human injury should be installed at the most appropriate place in the process to eliminate the hazard;
- procedures should be established to assure that chemical contamination of the product is not likely;
- separated minced meat should be immediately spread into water and transferred to the washing and de-watering step to prevent blood from congealing and causing loss of gel strength capability.

9.4 WASHING AND DE-WATERING PROCESS (Processing Step 10)

Potential Hazards: *pathogenic microbial growth*

Potential Defects: *decomposition, protein denaturation, residual water-soluble protein*

Technical Guidance:

- temperature of the water and minced fish flesh in the rotating sieve or wash water should be adequately controlled to prevent the growth of pathogenic microbes;
- wash water should be 10°C or below for adequate separation of water-soluble proteins. Wash water for Pacific Whiting should be lower than 5°C since this species will usually have a high protease activity. Some warm water species may be processed at temperatures up to 15°C;
- product should be processed promptly to minimise possible pathogenic microbial growth;
- minced fish should be spread uniformly in the water to assure dilution of the water- soluble components and effect proper separation from the myofibrillar protein;
- consideration should be given to the specific design of the washing and de-watering step in regards to the desired yield, quality and fish species;
- a sufficient amount of potable water should be available for washing;
- the pH of wash water should be near 7.0. Wash water should preferably have a total hardness of 100ppm or below in terms of converted CaCO3;
- salt or other de-watering aids can be added (less than 0.3% salt) in the final stage of washing to enhance dehydration efficiency;
- food additives should be added in accordance with national regulations and manufacturer's instructions, if use in this process;
- wastewater should be disposed of in a suitable manner;
- wash water should not be recycled unless there are appropriate controls on its microbial quality.

9.5 REFINING PROCESS (Processing Step 11)

Potential Hazards: *pathogenic microbial growth, metal fragments*

Potential Defects: *objectionable matter, protein denaturation*

Technical Guidance:

- temperature of the minced fish flesh in the refining process should be adequately controlled to prevent the growth of pathogenic bacteria;
- for preventing protein denaturation, temperature of minced fish flesh should not exceed 10°C in the refining process;
- product should be processed promptly to minimise possible pathogenic microbial growth;
- metal detection equipment that is capable of sensing product that has become contaminated with metal fragments of the size likely to cause human injury should be installed at the most appropriate place in the process to eliminate the hazard;
- objectionable matter such as small bones, black membranes, scales, bloody flesh and connective tissue should be removed from washed flesh with appropriate refining equipment before final de-watering;
- equipment should be properly adjusted to effect efficient product throughput;
- refined product should not be allowed to accumulate on sieve screens for long periods of time.

9.6 FINAL DE-WATERING PROCESS (Processing Step 12)

Potential Hazards: *pathogenic microbial growth*

Potential Defects: *decomposition, protein denaturation*

Technical Guidance:

- temperature of the refined fish flesh in the final de-watering process should be adequately controlled to prevent the growth of pathogenic bacteria;
- temperature of refined fish flesh should not exceed 10°C for cold water fish species, such as Alaska Pollock. For Pacific Whiting the temperature should not be exceed 5°C, since this species usually will have a high protease activity. Some warm water species may be processed at temperatures up to 15°C;
- product should be processed promptly to minimise possible pathogenic microbial growth;
- the moisture level of refined product should be controlled to specified levels with appropriate de-watering equipment (e.g., centrifuge, hydraulic press, screw press);
- consideration should be given to variations in moisture levels due to the age, condition or mode of capture of the raw fish. In some cases dehydration should be performed before refining.

9.7 MIXING AND ADDITION OF ADJUVANT INGREDIENTS PROCESS (Processing Step 13)

Potential Hazards: *pathogenic microbial growth, metal fragments*

Potential Defects: *improper use of food additives, protein denaturation*

Technical Guidance:

- temperature of the product in the mixing process should be adequately controlled to avoid the growth of pathogenic bacteria;
- temperature of dehydrated fish flesh during mixing should not exceed 10°C for cold water fish species such as Alaska Pollock. For Pacific Whiting the temperature should not exceed 5°C since this species usually will have a high protease activity. Some warm water species may be processed at temperatures up to 15°C;
- product should be processed promptly to minimise possible pathogenic microbial growth;
- metal detection equipment that is capable of sensing product that has become contaminated with metal fragments of the size likely to cause human injury should be installed at the most appropriate place in the process to eliminate the hazard;
- food additives should be the same and comply with Codex General Standard for Food additives;
- food additives should be mixed homogeneously;

- Cryoprotectants should be used in frozen surimi. Sugars and/or polyhydric alcohols are commonly used to prevent protein denaturation in the frozen state;
- food grade enzyme inhibitors (e.g. egg white, beef protein plasma) should be used for species that exhibit high levels of proteolytic enzyme activity such as Pacific Whiting that reduce the gel forming ability of surimi during kamaboko or crab analogs processing. The use of protein plasma should be appropriately labelled.

9.8 PACKAGING AND WEIGHING (Processing Step 14)

Potential hazards: *pathogenic microbial growth*

Potential defects: *foreign matter (packaging), incorrect net weight, incomplete packaging, denaturation of protein*

Technical Guidance:

- temperature of the product should be adequately controlled during packaging to avoid the growth of pathogenic bacteria;
- product should be packaged promptly to minimise possible pathogenic microbial growth;
- the packaging operation should have procedures established that make possible cross contamination unlikely;
- product should be stuffed into clean plastic bags or packaged into clean containers that have been properly stored;
- product should be appropriately shaped;
- packaging should be conducted rapidly to minimise the risk of contamination or decomposition;
- packaged products should not contain voids;
- the product should meet appropriate standards for net weight.

See also Section 8.2.1 "Weighing" and Section 8.4.4 "Wrapping and Packing".

9.9 FREEZING OPERATION (Processing Step 15)

Refer to Section 8.3.1 for general considerations for freezing fish and fishery products.

Potential Hazards: *unlikely*

Potential Defects: *protein denaturation, decomposition*

Technical Guidance:

- after packaging and weighing the product should be promptly frozen to maintain the quality of the product;
- procedures should be established that specifies maximum time limits from packaging to freezing.

9.10 DISMANTLING FREEZING PAN (Processing Step 16)

Potential Hazards: *unlikely*

Potential Defects: *damage to plastic bag and product*

Technical Guidance:

- care should be taken to avoid breakage of plastic bag and the product itself in order to refrain from deep dehydration during long-term cold storage.

9.11 METAL DETECTION (Processing Step 17)

Refer to Section 8.2.4 "Metal Detection" for general information.

Potential Hazards: *metal fragments*

Potential Defects: *unlikely*

Technical Guidance:

- Metal detection equipment that is capable of sensing product that has become contaminated with metal fragments of the size likely to cause human injury should be installed at the most appropriate place in the process to eliminate the hazard.

9.12 BOXING AND LABELLING (Processing Step 18)

Refer to Section 8.2.3 "Labelling" and Section 8.4.4 "Wrapping and Packing".

Potential Hazards: *unlikely*

Potential Defects: *incorrect label, damage to packaging*

Technical Guidance:

- boxing should be clean, durable and suitable for the intended use;
- the boxing operation should be conducted to avoid the damage of packaging materials;
- product in damaged boxing should be re-boxed so that it is properly protected.

9.13 FROZEN STORAGE (Processing Step 19)

Refer to Section 8.1.3 "Frozen Storage" for general information concerning fish and fishery products.

Potential Hazards: *unlikely*

Potential Defects: *decomposition, protein denaturation*

Technical Guidance:

- frozen surimi should be stored at -20°C or colder to prevent protein denaturation from taking place. Quality and shelf life will be maintained more adequately if the product is stored at -25°C or colder;
- stored frozen product should have adequate air circulation to assure that it remains properly frozen. This includes preventing product from being stored directly on the floor of the freezer.

9.14 RAW MATERIAL RECEPTION - PACKAGING AND INGREDIENTS (Processing Steps 21 and 22)

Refer to Section 8.5.1 ”Raw Material Reception - Packaging, Labels and Ingredients".

9.15 RAW MATERIAL STORAGE - PACKAGING AND INGREDIENTS (Processing Steps 23 and 24)

Refer to Section 8.5.2 "Raw Material Storage - Packaging, Labels and Ingredients".

SECTION 16 - PROCESSING OF CANNED FISH, SHELLFISH AND OTHER AQUATIC INVERTEBRATES

This section applies to fish, shellfish, cephalopods and other aquatic invertebrates.

In the context of recognising controls at individual processing steps, this section provides examples of potential hazards and defects and describes technological guidelines, which can be used to develop control measures and corrective action. At a particular step only the hazards and defects, which are likely to be introduced or controlled at that step, are listed. It should be recognised that in preparing a HACCP and/or DAP plan it is essential to consult Section 5 (Hazard Analysis Critical Control Point (HACCP) and Defect Action Point (DAP) Analysis) which provides guidance for the application of the principles of HACCP and DAP analysis. However, within the scope of this Code of Practice it is not possible to give details of critical limits, monitoring, record keeping and verification for each of the steps since these are specific to particular hazards and defects.

This section concerns the processing of heat processed sterilised canned fish and shellfish products which have been packed in hermetically sealed containers[10] and intended for human consumption.

[10] Aseptic filling is not covered by this Code. Reference of the relevant code is made in Appendix XII.

As stressed by this Code, the application of appropriate elements of the pre-requisite programme (Section 3) and HACCP principles (Section 5) at these steps will provide the processor with reasonable assurance that the essential quality, composition and labelling provisions of the appropriate Codex standard will be maintained and food safety issues controlled. The example of the flow diagram (Figure 16.1) will provide guidance to some of the common steps involved in a canned fish or shellfish preparation line.

This flow chart is for illustrative purpose only. For in-factory implementation of HACCP principles, a complete and comprehensive flow chart has to be drawn up for each product.

References correspond to relevant Sections of the Code.

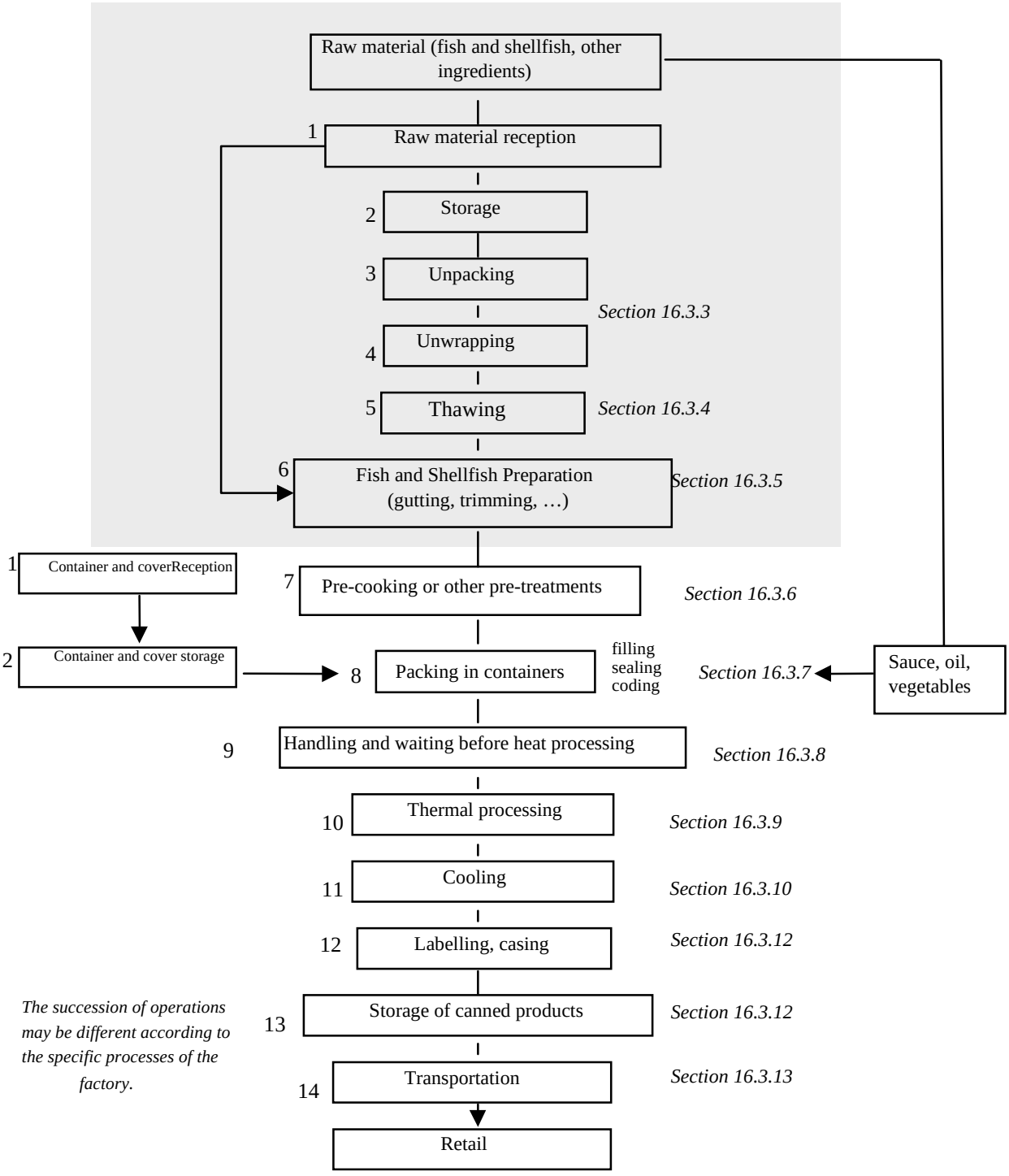

Figure 16.1 Example of a flow chart for the processing of canned fish and shellfish

16.1 GENERAL - ADDITION TO PRE-REQUISITE PROGRAMME

Section 3 (Pre-requisite programme) gives the minimum requirements for good hygienic practices for a processing facility prior to the application of hazard and defect analyses.

For fish and shellfish canneries, additional requirements to the guidelines described in Section 3 are necessary due to the specific technology involved. Some of them are listed below, but reference should also be made to the Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Food (CAC/PRC 23-1979, Rev. 2 (1993)) for further information.

- design, working and maintenance of baskets and handling and loading devices aimed at retorting should be appropriate for the kind of containers and materials used. These devices should prevent any excessive abuse to the containers.
- an adequate number of efficient sealing machines should be available to avoid undue delay in processing;
- retorts should have a suitable supply of energy, vapour, water and/or air so as to maintain in it sufficient pressure during the heat treatment of sterilisation ; their dimensions should be adapted to the production to avoid undue delays;
- every retort should be equipped with an indicating thermometer, a pressure gauge and a time and temperature recorder,
- an accurate clearly visible clock should be installed in the retorting room;
- canneries using steam retorts should consider installing automatic steam controller valves;
- Instruments used to control and to monitor in particular the thermal process should be kept in good condition and should be regularly verified or calibrated. Calibration of instruments used to measure temperature should be made in comparison with a reference thermometer. This thermometer should be regularly calibrated. Records concerning the calibration of instruments should be established and kept.

16.2 IDENTIFICATION OF HAZARDS AND DEFECTS

Refer also to Section 4.1 (Potential Hazards Associated with Fresh Fish and Shellfish)

This section describes the main potential hazards and defects specific to canned fish and shellfish.

16.2.1 Hazards

A Biological Hazards

A1 Naturally occurring marine toxins

Biotoxins such as tetrodotoxines or ciguatoxines are known to be generally heat-stable, so the knowledge of the identity of the species and/or the origin of fish intended for processing is important.

Phycotoxins such as DSP, PSP or ASP are also heat stable, so it important to know the origin and the status of the area of origin of molluscan shellfish or other affected species intended for processing.

A2 Scombrotoxins

Histamine

Histamine is heat-stable, and so its toxicity remains practically intact in containers. Good practices for the conservation and handling from capture to heat processing are essential to prevent the histamine production. The Codex Commission adopted in its standards for some fish species maximum levels tolerated for histamine.

A3 Microbiological toxins

Clostridium botulinum

The botulism risk usually appears after an inadequate heat processing and inadequate container integrity. The toxin is heat-sensitive, on the other hand, the destruction of *Clostridium botulinum* spores, in particular from proteolytic strains, requires high sterilisation values. The heat processing effectiveness depends on the contamination level at the time of the treatment. Therefore, it is advisable to limit proliferation and the contamination risks during processing. A higher risk of botulinum could result from any of the following: inadequate heat processing, inadequate container integrity, unsanitary post process cooling water and unsanitary wet conveying equipment.

Staphylococcus aureus

Toxins from *Staphylococcus aureus* can be present in a highly contaminated raw material or can be produced by bacterial proliferation during processing. After canning, there is also the potential risk of post process contamination with *Staphylococcus aureus* if the warm wet containers are handled in an unsanitary manner. These toxins are heat-resistant, so they have to be taken into account in the hazard analysis.

B Chemical Hazards

Care should be taken to avoid contamination of the product from components of the containers (e.g. lead) and chemical products (lubricants, sanitizers, detergents).

C Physical Hazards

Containers prior to filling may contain materials such as metal or glass fragments.

16.2.2 Defects

Potential defects are outlined in the essential quality, labelling and composition requirements described in the relevant Codex Standards listed in Appendix XII. Where no Codex Standard exists regard should be made to national regulations and/or commercial specifications.

End product specifications outlined in Appendix IX describe optional requirements specific to canned products.

16.3 PROCESSING OPERATIONS

Processors can also refer to the Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods (CAC/RCP 23-1979, Rev. 2 (1993)) in order to obtain detailed advice on canning operations.

16.3.1 Reception of raw material, containers, covers and packaging material and other ingredients

16.3.1.1 Fish and shellfish (Processing step 1)

Potential Hazards: *Chemical and biochemical contamination (DSP, PSP, scombrotoxine, heavy metals...)*

Potential Defects: *Species substitution, decomposition, parasites*

Technical Guidance:

Refer to section 8.1.1 (Raw Fresh or Frozen Fish Reception) and to other relevant sections; and also:

- When live shellfish (crustaceans) are received for canning processing, inspection should be carried out in order to discard dead or badly damaged animals.

16.3.1.2 Container, cover and packaging materials (Processing step 1)

Potential Hazards: *Subsequent microbiological contamination*

Potential Defects: *Tainting of the product*

Technical Guidance:

Refer to section 8.5.1 (Raw Material Reception – Packaging, Labels & Ingredients); and also:

- Containers, cover and packaging materials should be suitable for the type of product, the conditions provided for storage, the filling, sealing and packaging equipment and the transportation conditions;
- the containers in which fish and shellfish products are canned should be made from suitable material and constructed so that they can be easily closed and sealed to prevent the entry of any contaminating substance;
- containers and cover for canned fish and shellfish should meet the following requirements:
  - they should protect the contents from contamination by micro-organisms or any other substance;
  - their inner surfaces should not react with the contents in any way that would adversely affect the product or the containers ;
  - their outer surfaces should be resistant to corrosion under any likely conditions of storage;
  - they should be sufficiently durable to withstand the mechanical and thermal stresses encountered during the canning process and to resist physical damage during distribution;

16.3.1.3 Other ingredients (Processing step 1)

Refer to section 8.5.1 (Raw Material Reception – Packaging, Labels & Ingredients).

16.3.2 Storage of raw material, containers, covers and packaging materials

16.3.2.1 Fish and shellfish (Processing step 2)

Refer to sections 8.1.2 (Chilled storage), 8.1.3 (Frozen storage and 7.6.2 Conditioning and storage of molluscan shellfish in sea water tanks, basins, etc.)

16.3.2.2 Containers and packaging (Processing step 2)

Potential Hazards: *Unlikely*

Potential Defects: *Foreign matters*

Technical Guidance:

Refer to section 8.5.2 (Raw Material Storage - Packaging, Labels & Ingredients); and also:

- all materials for containers or packages should be stored in satisfactory clean and hygienic conditions;
- during storage, empty containers and covers should be protected from dirt, moisture and temperature fluctuations, in order to avoid condensations on containers and in the case of tin cans, the development of corrosion;
- during loading, stowing, transportation and unloading of empty containers, any shock should be avoided. Containers shouldn't be stepped on. These precautions become more imperative when containers are put in bags or on pallets. Shocks can deform the containers (can body or flange), that can compromise tightness (shocks on the seam, deformed flange) or be prejudicial to appearance.

16.3.2.3 Other ingredients (Processing step 2)

Refer to section 8.5.2 (Raw Material Storage - Packaging, Labels & Ingredients).

16.3.3 Unwrapping, unpacking (Processing steps 3 and 4)

Potential Hazards: *Unlikely*

Potential Defects: *Foreign matter*

Technical Guidance:

- During unwrapping and unpacking operations, precautions should be taken in order to limit product contamination and foreign matters introduction into the product. To avoid microbial proliferation, waiting periods before further processing should be minimised.

16.3.4 Thawing (Processing step 5)

Refer to section 8.1.4 (Control Thawing)

16.3.5 Fish and shellfish preparatory processes (Processing step 6)

16.3.5.1 Fish preparation (gutting, trimming...)

Potential Hazards: *Microbiological contamination biochemical development (histamine)*

Potential Defects: *Objectionable matters (viscera, skin, scales, ... in certain products), off flavours, presence of bones, parasites...*

Technical Guidance:

Refer to sections 8.1.5 (Washing and Gutting) and 8.1.6 (Filleting, Skinning, Trimming and Candling); and also:

- when skinning of fish is operated by soaking in soda solution, a particular care should be taken to carry out an appropriate neutralisation.

16.3.5.2 Preparation of molluscs and crustaceans

Potential Hazards: *Microbiological contamination, hard shell fragments*

Potential Defects: *Objectionable matters*

Technical Guidance:

Refer to sections 7.7 (Heat Treatment/Heat Shocking of Molluscan Shellfish in Establishment; and also:

- when live shellfish are used, inspection should be carried out in order to discard dead or badly damaged animals;
- particular care should be taken to ensure that shell fragments are removed from shellfish meat.

16.4 PRE-COOKING AND OTHER TREATMENTS

16.4.1 Pre-Cooking

Potential hazards : *chemical contamination (polar components of oxidised oils), microbiological or biochemical (scombrotoxin) growth.*

Potential defects : *water release in the final product (for products canned in oil), abnormal flavours.*

Technical guidance:

16.4.1.1 General Considerations

- methods used to pre-cook fish or shellfish for canning should be designed to bring about the desired effect with a minimum delay and a minimum amount of handling; the choice of method is usually strongly influenced by the nature of the treated material. For products canned in oil such as sardines or tunas, pre-cooking should be sufficient in order to avoid excessive release of water during heat processing;
- means should be found to reduce the amount of handling subsequent to pre-cooking, wherever practical;
- if eviscerated fish is used, then the fish should be arranged in the belly down position for pre-cooking to allow for the drainage of fish oils and juices which may accumulate and affect product quality during the heating process;
- where appropriate, molluscan shellfish, lobsters and crabs, shrimps and prawns and cephalopods should be pre- cooked according to technical guidance laid down in sections 7 (Processing of Molluscan Shellfish), 13 (Processing of Lobsters and Crabs), 14 (Processing of Shrimps and Prawns) and 15 (Processing of Cephalopods);
- care should be taken to prevent temperature abuse of scombrotoxic species before pre-cooking.

16.4.1.1.2 Pre-cooking Schedule

- the pre-cooking method, in particular, in terms of time and temperature, should be clearly defined. The pre-cooking schedule should be checked;
- fish pre-cooked together in batches should be very similar in size. It also follows that they should all be at the same temperature when they enter the cooker.

16.4.1.1.3 Control of Quality of Pre-cooking Oils and Other Fluids

- only good quality vegetable oils should be used in pre-cooking fish or shellfish for canning [refer to relevant Codex Standard for vegetable oils];
- cooking oils should be changed frequently in order to avoid the formation of polar compounds. Water used for pre-cooking should also be changed frequently in order to avoid contaminants;
- care must be taken that the oil or the other fluids used such as vapour or water do not impart an undesirable flavour to the product.

16.4.1.1.4 Cooling

- except for products, which are packed when still hot, cooling of pre-cooked fish or shellfish should be done as quickly as possible to bring the product temperatures in a range limiting proliferation or toxin production, and under conditions where contamination of the product can be avoided;
- where water is used to cool crustacea for immediate shucking, it should be potable water or clean seawater. The same water should not be used for cooling more than one batch.

16.4.1.2 Smoking

- refer to section 12 (Processing of smoked fish)

16.4.1.3 Use of Brine and Other Dips

Potential hazards : *microbiological and chemical contamination by the dip solution*

Potential defects : *adulteration (additives), abnormal flavours.*

Technical guidance:

- Where fish or shellfish are dipped or soaked in brine or in solutions of other conditioning or flavouring agents or additives in preparation for canning, solution strength and time of immersion should both be carefully controlled to bring about the optimum effect;

- dip solutions should be replaced and dip tanks and other dipping apparatus should be thoroughly cleaned at frequent intervals;
- care should be taken to ascertain whether or not the ingredients or additives used in dips would be permitted in canned fish and shellfish by the related Codex Standards and in the countries where the product will be marketed.

16.4.2 Packing in Containers (Filling, Sealing and Coding) (Processing Step 8)

16.4.2.1 Filling

Potential hazards : *microbiological growth (waiting period), microbiological survival growth and recontamination after heat processing due to incorrect filling or faulty containers, foreign material.*

Potential defects : *incorrect weight, foreign matter.*

Technical guidance

- a representative number of containers and covers should be inspected immediately before delivery to the filling machines or packing tables to ensure that they are clean, undamaged and without visible flaws;
- if necessary, empty containers should be cleaned. It is also a wise precaution to have all containers turned upside down to make certain that they do not contain any foreign material before they are used;
- care should also be taken to remove faulty containers, because they can jam a filling or sealing machine, or cause trouble during heat processing (bad sterilisation, leaks);
- empty containers should not be left on the packing tables or in conveyor systems during clean up of premises to avoid contamination or splashes;
- where appropriate, to prevent microbial proliferation, containers should be filled with hot fish and shellfish (> 63°C, for example for fish soups) or should be filled quickly (the shortest possible waiting period) after the end of the pre-treatments;
- if the fish and shellfish must be held for a long time before packing into containers, they should be chilled;
- containers of canned fish and shellfish should be filled as directed in the scheduled process;
- mechanical or manual filling of containers should be checked in order to comply with the filling rate and the headspace specified in the adopted sterilisation schedule. A regular filling is important not only for economical reasons, but also because the heat penetration and the container integrity can be affected by excessive filling changes;
- the necessary amount of headspace will depend partly on the nature of the contents. The filling should also take into account the heat processing method. Headspace should be allowed as specified by the container manufacturer;
- furthermore, containers should be filled such as the end product meets the regulatory provisions or the accepted standards concerning weight of contents;
- where canned fish and shellfish is packed by hand, there should be a steady supply of fish, shellfish and eventually other ingredients. Build-up of fish and shellfish, as well as filled containers at the packing table should be avoided;
- the operation, maintenance, regular inspection, calibration and adjustment of filling machines should received particular care. The machine manufacturers' instructions should be carefully followed;
- the quality and the amount of other ingredients such as oil, sauce, vinegar...should be carefully controlled to bring about the optimum desired effect;
- if fish has been brine-frozen or stored in refrigerated brine, the amount of salt absorbed should be taken into consideration when salt is added to the product for flavouring;
- filled containers should be inspected:

  - to ensure that they have been properly filled and will meet accepted standards for weight of contents
  - and to verify product quality and workmanship just before they are closed;
- manual filled products such as small pelagic fish should be carefully checked by the operators to verify that container flanges or closure surface have not any product residues, which could impede the formation of a hermetic seal. For automatic filled products, a sampling plan should be implemented.

16.4.2.2 Sealing

Sealing the container and covers are one of the most essential processes in canning.

Potential hazards : *subsequent contamination due to a bad seam*

Potential defects : *unlikely*

Technical guidance

- the operation, maintenance, regular inspection and adjustment of sealing machines should received particular care. The sealing machines should be adapted and adjusted for each type of container and each closing method which are used. Whatever the type of sealing equipment, the manufacturers or equipment supplier's instructions should be followed meticulously;
- seams and other closures should be well formed with dimensions within the accepted tolerances for the particular container;
- qualified personnel should conduct this operation;
- if vacuum is used during packing, it should be sufficient to prevent the containers from bulging under any condition (high temperature or low atmospheric pressure) likely to be encountered during the distribution of the product. This is useful for deep containers or glass containers. It is difficult and hardly necessary to create a vacuum in shallow containers that have relatively large flexible covers;
- excessive vacuum may cause the container to panel, particularly if the headspace is large, and may also cause contaminants to be sucked into the container if there is a slight imperfection in the seam;
- to find the best methods to create vacuum, competent technologists should be consulted;
- regular inspections should be made during production to detect potential external defects on containers. At intervals sufficiently close to each other in order to guarantee a closure in accordance with specifications, the operator, the supervisor of the closure or any other competent person should examine the seams or the closure system for the other types of containers, which are used. Inspections should consider for example vacuum measurements and seam teardown. A sampling plan should be used for the checks;
- in particular, at each start of the production line and at each change in container dimensions, after a jamming, a new adjustment or a restarting after a prolonged stop of the sealing machine, a check should be carried out;
- all appropriate observations should be recorded.

16.4.2.3 Coding

Potential hazards: *subsequent contamination due to damaged containers*

Potential defects: *loss of traceability due to an incorrect coding.*

Technical guidance

- each container of canned fish and shellfish should bear indelible code markings from which all-important details concerning its manufacture (type of product, cannery where the canned fish or shellfish was produced, production date, etc.) can be determined
- coding equipment must be carefully adjusted so that the containers are not damaged and the code remains legible;
- coding may sometimes be carried out after the cooling step.

16.4.8 Handling of Containers After Closure - Staging Before Heat Processing (Processing Step 9)

Potential hazards: *microbiological growth (waiting period), subsequent contamination due to damaged containers.*

Potential defects: *Unlikely*

Technical guidance

- containers after closure should always be handled carefully in such a way as to prevent every damage capable to cause defects and microbiological recontamination;
- if necessary, filled and sealed metal containers should be thoroughly washed before heat processing to remove grease, dirt and fish or shellfish stains on their outside walls;
- to avoid microbial proliferation, the waiting period should be as short as possible;
- if the filled and sealed containers must be held for a long time before heat processing, the product should be held at temperature conditions which minimise microbial growth;
- every cannery should develop a system, which will prevent non heat-processed canned fish and shellfish from being accidentally taken past the retorts into the storage area.

16.4.9 Thermal Processing (Processing Step 10)

Heat processing is one of the most essential operations in canning.

Canners can refer to the Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods (CAC/RCP 23-1979, rev. 2 in 1993) in order to obtain detailed advice on heat processing. In this Section, only some essential elements are pointed out.

Potential hazards: *survival of spores of Clostridium botulinum.*

Potential defects: *survival of micro-organisms responsible of decomposition*

Technical guidance

16.4.9.1 Sterilisation Schedule

- to determine the sterilisation schedule, at first, the heat process required to obtain the commercial sterility should be established taking into account some factors (microbial flora, dimensions and nature of the container, product formulation, etc.). A sterilisation schedule is established for a certain product in a container of a given size;
- Proper heat generation and temperature distribution should be carried out. Standard heat processing procedures and experimentally established sterilisation schedules should be checked and validated by an expert to confirm that the values are appropriate for each product and retort;
- before any changes in operations (initial temperature of filling, product composition, size of containers, fullness of the retort, etc.) are made, competent technologists should be consulted as to the need for re-evaluation of the process.

16.4.9.2 Heat Processing Operation

- only qualified and properly trained personnel should operate retorts. Therefore it is necessary that retort operators control the processing operations and ensure the sterilisation schedule is closely followed, including meticulous care in timing, monitoring temperatures and pressures, and in maintaining records;
- it is essential to comply with the initial temperature described in the schedule process to avoid under-processing. If the filled containers were held at refrigerated temperatures because of a too long waiting period before heat processing, the sterilisation schedule should take into account these temperatures;

- in order that the heat processing is effective and process temperature is controlled, air must be evacuated from the retort through a venting procedure that is deemed efficient by a competent technologist. Container size and type, retort installation and loading equipment and procedures should be considered;
- the timing of the heat processing should not commence until the specified heat processing temperature has been reached, and the conditions to maintain uniform temperature throughout the retort achieved, in particular, until the minimum safe venting time has elapsed;
- for other types of retorts (water, steam/air, flame, etc.) refer to the Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods (CAC/RCP 23-1979, rev. 2 in 1993);
- if canned fish and shellfish in different size containers are processed together in the same retort load care must be taken to ensure the process schedule used is sufficient to provide commercial sterility for all container sizes processed;
- when processing fish and shellfish in glass containers, care must be taken to ensure that the initial temperature of the water in the retort is slightly lower than that of the product being loaded. The air pressure should be applied before the water temperature is raised.

16.4.9.3 Monitoring of Heat Processing Operation

- during the application of heat processing, it is important to ensure that the sterilisation process and factors such as container filling, minimal internal depression at closing, retort loading, initial product temperature, etc. are in accordance with the sterilisation schedule;
- retort temperatures should always be determined from the indicating thermometer, never from the temperature recorder;
- permanent records of the time, temperature and other pertinent details should be kept concerning each retort load;
- the thermometers should be tested regularly to ensure that they are accurate. Calibration records should be maintained; the recording thermometer readings should never exceed the indicating thermometer reading;
- inspections should be made periodically to ensure that retorts are equipped and operated in a manner that will provide thorough and efficient heat processing, that each retort is properly equipped, filled and used, so that the whole load is brought up to processing temperature quickly and can be maintained at that temperature throughout the whole of the processing period;
- the inspections should be made under the guidance of a competent technologist.

16.4.10 Cooling (Processing Step 11)

Potential hazards : *recontamination due to a bad seam and contaminated water*

Potential defects : *formation of struvite crystals, buckled containers, scorch.*

Technical guidance:

- after heat processing, canned fish and shellfish should, wherever practical, be water cooled under pressure to prevent deformations, which could result in a loss of tightness. In case of recycling, potable water should always be chlorinated (or other appropriate treatments used) for this purpose. The residual chlorine level in cooling water and the contact time during cooling should be checked in order to minimise the risk of post-processing contamination. The efficiency of the treatment other than chlorination should be monitored and verified;
- in order to avoid organoleptic defects of the canned fish and shellfish, such as scorch or overcooking, the internal temperature of containers should be lowered as quickly as possible;
- for glass containers, the temperature of the coolant in the retort should be, at the beginning, lowered slowly in order to reduce the risks of breaking due to thermal shock;
- where canned fish and shellfish products are not cooled in water after heat processing, they should be stacked in such a way that they will cool rapidly in air.

- heat processed canned fish and shellfish should not be touched by hand or articles of clothing unnecessarily before they are cooled and thoroughly dry. They should never be handled roughly or in such a way that their surfaces, and in particular their seams, are exposed to contamination;
- rapid cooling of canned fish and shellfish avoids the formation of struvite crystals ;
- every cannery should develop a system to prevent unprocessed containers being mixed with processed containers.

16.4.10.1 Monitoring After Heat Processing and Cooling

- canned fish and shellfish should be inspected for faults and for quality assessment soon after it is produced and before labelling;
- representative samples from each code lot should be examined to ensure that the containers do not exhibit external defects and the product meets the standards for weight of contents, vacuum, workmanship and wholesomeness. Texture, colour, odour, flavour and condition of the packing medium should be assessed;
- if desired, stability tests could be made in order to verify in particular the heat processing;
- this examination should be made as soon as practical after the canned fish and shellfish have been produced, so that if there are any faults due to failings on the part of cannery workers or canning equipment, these failings can be corrected without delay. Segregating and properly disposing of all defective units or lots that are unfit for human consumption should be ensured.

16.4.11 Labelling, Casing and Storage of Finished Products (Processing steps 12 and 13)

Refer to Section 8.2.3 “Labelling”

Potential hazards : *subsequent recontamination due to the damage of containers or to an exposition to extreme conditions*

Potential defects : *incorrect labelling*

Technical guidance

- the materials used for labelling and casing canned fish and shellfish should not be conducive to corrosion of the container. Cases should have an adequate size in order that the containers fit them and are not damaged by any move inside. Cases and boxes should be the correct size and strong enough to protect the canned fish and shellfish during distribution;
- code marks appearing on containers of canned fish and shellfish should also be shown on the cases in which they are packed;
- storage of canned fish and shellfish should be made in order not to damage the containers. In particular, pallets of finished products should not be stacked excessively high and the forklift trucks used for the storage should be used in a proper manner;
- canned fish and shellfish should be so stored that they will be kept dry and not exposed to extremes of temperature.

16.4.12 Transportation of Finished Products (Processing step 14)

Potential hazards : *subsequent recontamination due to the damage of containers or to an exposition to extreme conditions*

Potential defects : *Unlikely*

Technical guidance

Refer to section 17 (Transportation); and also:

- transportation of canned fish and shellfish should be made in order not to damage the containers. In particular, the forklift trucks used during the loading and unloading should be used in a proper manner;
- cases and boxes should be completely dry. In fact, moisture has effects on the mechanical characteristics of boxes and the protection of containers against damages during transportation couldn't be sufficient;
- metal containers should be kept dry during transportation in order to avoid corroding and/or rust.

ANNEX I

POTENTIAL HAZARDS ASSOCIATED WITH FRESH FISH, SHELLFISH AND OTHER AQUATIC INVERTEBRATES

1 Examples of Possible Biological Hazards

1.1.1 Parasites

The parasites known to cause disease in humans and transmitted by fish or crustaceans are broadly classified as helminths or parasitic worms. These are commonly referred to as Nematodes, Cestodes and Trematodes. Fish can be parasitised by protozoans, but there are no records of fish protozoan disease being transmitted to man. Parasites have complex life cycles, involving one or more intermediate hosts and are generally passed to man through the consumption of raw, minimally processed or inadequately cooked products that contain the parasite infectious stage, causing foodborne disease. Freezing at -20°C or below for 7 days or -35°C for about 20 hours for fish intended for raw consumption will kill parasites. Processes such as brining or pickling may reduce the parasite hazard if the products are kept in the brine for a sufficient time but may not eliminate it. Candling, trimming belly flaps and physically removing the parasite cysts will also reduce the hazards but may not eliminate it.

Nematodes

Many species of nematodes are known to occur worldwide and some species of marine fish act as secondary hosts. Among the nematodes of most concern are *Anisakis* spp., *Capillaria* spp., *Gnathostoma* spp., and *Pseudoteranova* spp., which can be found in the liver, belly cavity and flesh of marine fish. An example of a nematode causing disease in man is *Anisakis simplex;* as the infective stage of the parasite is killed by heating (60°C for 1 minute) and by freezing (-20°C for 24 hours) in the fish core.

Cestodes

Cestodes are tapeworms and the species of most concern associated with the consumption of fish is *Dibothriocephalus latus*. This parasite occurs worldwide and both fresh and marine fish are intermediate hosts. Similar to other parasitic infections, the foodborne disease occurs through the consumption of raw or under-processed fish. Similar freezing and cooking temperatures as applied to nematodes will inactivate the infective stages of this parasite.

Trematodes

Fish-borne trematode (flatworm) infections are major public health problems that occur endemically in about 20 countries around the world. The most important species with respect to the numbers of people infected belong to the genera *Clonorchis* and *Ophisthorchis* (liver flukes), *Paragonimus* (lung flukes), and to a lesser extent *Heterophyes* and *Echinochasmus* (intestinal flukes). The most important definitive host of these trematodes is man or other mammals. Freshwater fish are the second intermediate host in the life cycles of *Clonorchis* and *Ophistorchis*, and freshwater crustaceans in the case of *Paragonimius*. Foodborne infections take place through the consumption of raw, undercooked or otherwise under-processed products containing the infective stages of these parasites. Freezing fish at -20°C for 7 days or at -35°C for 24 hours will kill the infective stages of these parasites.

1.1.2 Bacteria

The level of contamination of fish at the time of capture will depend on the environment and the bacteriological quality of the water in which fish are harvested. Many factors will influence the microflora of finfish, the more important being water temperature, salt content, proximity of harvesting areas to human habitations, quantity and origin of food consumed by fish, and method of harvesting. The edible muscle tissue of finfish is normally sterile at the time of capture and bacteria are usually present on the skin, gills and in the intestinal tract.

There are two broad groups of bacteria of public health importance that may contaminate products at the time of capture - those that are normally or incidentally present in the aquatic environment, referred to as the indigenous microflora, and those introduced through environmental contamination by domestic and /or industrial wastes. Examples of indigenous bacteria, which may pose a health hazard, are *Aeromonas hydrophyla*, *Clostridium botulinum*, *Vibrio parahaemolyticus*, *Vibrio cholerae*, *Vibrio vulnificus*, and *Listeria monocytogenes*. Non-indigenous bacteria of public health significance include members of the Enterobacteriaceae, such as *Salmonella* spp., *Shigella* spp., and *Escherichia coli*. Other species that cause foodborne illness and which have been isolated occasionally from fish are *Edwardsiella tarda*, *Pleisomonas shigeloides* and *Yersinia enterocolitica*. *Staphyloccocus aureus* may also appear.

Indigenous pathogenic bacteria, when present on fresh fish, are usually found in fairly low numbers, and where products are adequately cooked prior to consumption, food safety hazards are insignificant. During storage, indigenous spoilage bacteria will outgrow indigenous pathogenic bacteria, thus fish will spoil before becoming toxic and will be rejected by consumers. Hazards from these pathogens can be controlled by heating seafood sufficiently to kill the bacteria, holding fish at chilled temperatures and avoiding post-process cross-contamination.

Vibrio species are common in coastal and estuarine environments and populations can depend on water depth and tidal levels. They are particularly prevalent in warm tropical waters and can be found in temperate zones during summer months. *Vibrio* species are also natural contaminants of brackish water tropical environments and will be present on farmed fish from these zones. Hazards from *Vibrio* spp. associated with finfish can be controlled by thorough cooking and preventing cross-contamination of cooked products. Health risks can also be reduced by rapidly chilling products after harvest, thus reducing the possibility of proliferation of these organisms. Certain strains of *Vibrio parahaemolyticus* can be pathogenic and produce heat resistant toxins.

1.1.3 Viral Contamination

Molluscan shellfish harvested from inshore waters that are contaminated by human or animal faeces may harbour viruses that are pathogenic to man. Enteric viruses that have been implicated in seafood-associated illness are the hepatitis A virus, caliciviruses, astroviruses and the Norwalk virus. The latter three are often referred to as small round structured viruses. All of the seafood-borne viruses causing illness are transmitted by the faecal-oral cycle and most viral gastro-enteritis outbreaks have been associated with eating contaminated shellfish, particularly raw oysters.

Generally viruses are species specific and will not grow or multiply in foods or anywhere outside the host cell. There is no reliable marker for indicating presence of the virus in shellfish harvesting waters. Seafood-borne viruses are difficult to detect, requiring relatively sophisticated molecular methods to identify the virus.

Occurrence of viral gastro-enteritis can be minimized by controlling sewage contamination of shellfish farming areas and pre-harvest monitoring of shellfish and growing waters as well as controlling other sources of contamination during processing. Depuration or relaying are alternative strategies but longer periods are required for shellfish to purge themselves clean of viral contamination than for bacteria. Thermal processing (85-90°C for 1.5 min.) will destroy viruses in shellfish.

1.1.4 Biotoxins

There are a number of important biotoxins to consider. Around 400 poisonous fish species exist and, by definition, the substances responsible for the toxicity of these species are biotoxins. The poison is usually limited to some organs, or is restricted to some periods during the year.

For some fish, the toxins are present in the blood; these are ichtyohaemotoxin. The involved species are eels from the Adriatic, the moray eels, and the lampreys. In other species, the toxins are spread all over the tissues (flesh, viscera, skin); these are ichtyosarcotoxins. The tetrodotoxic species responsible for several poisonings, often lethal, are in this category.

In general these toxins are known to be heat-stable and the only possible control measure is to check the identity of the used species.

Phycotoxins

Ciguatoxin

And the other important toxin to consider is ciguatoxin, which can be found in a wide variety of mainly carnivorous fish inhabiting shallow waters in or near tropical and subtropical coral reefs. The source of this toxin is dinoflagellates and over 400 species of tropical fish have been implicated in intoxication. The toxin is known to be heat stable. There is still much to be learnt about this toxin and the only control measure that can reasonably be taken is to avoid marketing fish that have a known consistent record of toxicity.

PSP/DSP/NSP/ASP

Paralytic Shellfish Poison (PSP), Diarrhetic Shellfish Poison (DSP), Neurotoxic Shellfish Poison (NSP), and Amnestic Shellfish Poison complex (ASP) are produced by phytoplankton. They concentrate in bivalve molluscan shellfish which filter the phytoplankton from the water, and also may concentrate in some fish and crustacea.

Generally, the toxins remain toxic through thermal processing so the knowledge of the species identity and/or origin of fish or shellfish intended for processing is important.

Tetrodotoxin

Fish mainly belonging to the family Tetradontidea (" puffer fishes") may accumulate this toxin which is responsible for several poisonings, often lethal. The toxin is generally found in the fish liver, roe and guts, and less frequent in the flesh. Differently from most other fish biotoxins that accumulate in the live fish or shellfish, algae do not produce this toxin. The mechanism of toxin production is still not clear, however, apparently there are often indications of the involvement of symbiotic bacteria.

1.1.5 Scombrotoxin

Scombroid intoxication, sometimes referred to as histamine poisoning, results from eating fish that have been incorrectly chilled after harvesting. Scombrotoxin is attributed mainly to *Enterobacteriaceae* which can produce high levels of histamine and other biogenic amines in the fish muscle when products are not immediately chilled after catching. The main susceptible fish are the scombroids such as tuna, mackerel, and bonito, although it can be found in other fish families such as *Clupeidae*. The intoxication is rarely fatal and symptoms are usually mild. Rapid refrigeration after catching and a high standard of handling during processing should prevent the development of the toxin. The toxin is not inactivated by normal heat processing. In addition, fish may contain toxic levels of histamine without exhibiting any of the usual sensory parameters characteristic of spoilage.

1.2 Chemical hazards

Fish may be harvested from coastal zones and inland habitats that are exposed to varying amounts of environmental contaminants. Of greatest concern are fish harvested from coastal and estuarine areas rather than fish harvested from the open seas. Chemicals, organochloric compounds and heavy metals may accumulate in products that can cause public health problems. Veterinary drug residues can occur in aquaculture products when correct withdrawal times are not followed or when the sale and use of these compounds are not controlled. Fish can also be contaminated with chemicals such as diesel oil, when incorrectly handled and detergents or disinfectants when not properly rinsed out.

1.3 Physical Hazards

These can include material such as metal or glass fragments, shell, bones, etc.

DRAFT STANDARD FOR BOILED DRIED SALTED ANCHOVIES

(At Step 8 of the Procedure)

1. SCOPE

This standard shall apply to all commercial species of fish belonging to the family *Engraulidae* that have been salted, boiled and dried. This product is intended for cooking before consumption. This Standard does not cover products which have undergone an enzymatic maturation in brine.

2. DESCRIPTION

2.1 PRODUCT DEFINITION

The product shall be prepared from fresh fish of the family *Engraulidae* obtained from the raw material described in Section 3.1.

2.2 PROCESS DEFINITION

2.2.1 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 sundrying or artificial drying.

2.2.2 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.

2.3 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 the "Recommended International Code of Practice for Fresh Fish" (CAC/RCP 9-1976) 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.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 RAW MATERIAL

3.1.1 Fish

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

3.1.2 Salt

Salt shall mean sodium chloride of suitable quality as specified in sub-section 5.4.2 of the "Recommended International Code of Practice for Salted Fish" (CAC/CRP 26-1979).

3.2 FINAL PRODUCT

3.2.1 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.

3.2.2 The product shall comply with the requirements prescribed in Table 1.

Table 1: Requirements for Dried Salted Anchovies

Characteristics	Requirement
Sodium chloride, percent by weight, max (d.b.)	15
Water activity (a_w), max	0.75
Acid insoluble ash, percent by weight, max. (d.b.)	1.5

3.3 BREAKAGE

3.3.1 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.

3.3.2 The percent breakage defined in section 3.3.1 shall not exceed the limits specified in section 3.5.

3.4 DECOMPOSITION

The products shall not contain more than 10 mg/100g of histamine based on the average of the sample unit tested.

3.5 SIZE CLASSIFICATION

According to Annex A

4. FOOD ADDITIVES

No food additives are permitted in these products.

5. HYGIENE AND HANDLING

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 2-1997), and the Recommended International Code of Practice for Fresh Fish (CAC/RCP 9 - 1976) and Salted Fish Code (CAC/RCP 26-1979).

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

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

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

6. LABELLING

In addition to the provisions of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 1-1991), the following specific provisions apply:

6.1 THE NAME OF THE FOOD

The name of the product shall be "Boiled Dried Salted Anchovies" in addition the common name of the fish shall be declared in accordance with the law and custom of the country in which the product is sold, in a manner not mislead the consumer.

6.2 GRADE AND SIZE OF PRODUCT

If the grade and size of fish is declared the table of Annex A should be applied.

6.3 SCIENTIFIC NAMES

The scientific names of the fish shall be declared on trade documents.

6.4 ADDITIONAL REQUIREMENTS

The package shall bear clear directions for keeping the product from the time they are purchased from the retailer to the time of their use and directions for cooking.

7. SAMPLING, EXAMINATION AND ANALYSIS

7.1 SAMPLING

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

7.2 DETERMINATION OF SODIUM CHLORIDE

According to AOAC 937.09 (volumetric method).

7.3 DETERMINATION OF WATER ACTIVITY

According to AOAC 978.18.

7.4 DETERMINATION OF ACID INSOLUBLE ASH

According to method set out in Annex B.

7.5 HISTAMINE

According to AOAC 977.13.

7.6 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 C.

8. DEFINITION OF DEFECTIVES

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

8.1 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.

8.2 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.

8.3 ODOUR AND FLAVOUR

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

8.4 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.

8.5 MOULD GROWTH

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

9. LOT ACCEPTANCE

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

1. the total number of defectives as classified according to Section 8 does not exceed the acceptable number of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (1969) (AQL-6.5) (CODEX STAN 233-1969).

2. the average net weight of all sample units is not less than the declared weight, provided no individual container is less than 95% of the declared weight; and

3. the Hygiene, Packing and Labelling requirements of Section 4, 5 and 6 are met.

ANNEX A

1. SIZING

Size shall be determined by the length of the product (whole fish).

Size Designation	Length
Small	less than 3.5 cm
Medium	3.5 - 6.5 cm
Big	greater than 6.5 cm

2. GRADING

Each size of dried salted anchovies shall be classified into two grades as defined below:

Characteristics	Grade	
	A	B
Breakage	Less than 5%	Less than 15%
Colour (comparison of colour must be among the same species of fish)	Whitish or bluish or yellowish (characteristic of species)	Off colour
Odour	No foul or rancid smell	No foul or rancid smell

ANNEX B

DETERMINATION OF ACID INSOLUBLE ASH

1. PREPARATION OF SAMPLE

1.1 Use sample from A1.1

2. REAGENT

2.1 Dilute hydrochloric acid, 1:1

3. PROCEDURE

3.1 Weigh accurately about 2 g of the dried sample (from A1.1) in a tared porcelain, silica or platinum dish. Ignite with a burner for about 1 hour. Complete the ignition by putting sample in a muffle furnace at 600 ± 20°C until grey ash results.

3.2 Cool and add 25 ml of dilute hydrochloric acid, cover with a watch-glass and heat on a water bath for 10 min.

3.3 Cool and filter through Whatman filter paper No. 42 or its equivalent.

3.4 Wash the residue with hot water until the washings are free from chlorides as tested with silver nitrate solution and return the filter paper and residue to the dish. Keep it in an electric air oven maintained at 135 ± 2°C for about 3 hours.

3.5 Ignite it in a muffle furnace at 600 ± 20°C for 1 hour. Cool in a desiccator and weigh. Ignite the dish again for 30 min, cool and weigh. Repeat this procedure until the difference between two successive weightings is less than 1 mg. Record the lowest weight.

3.6 CALCULATION

$$\text{Acid insoluble ash, per cent by weight} = \frac{(W_2 - W)}{(W_1 - W)} \times 100$$

where,

W is the weight in grammes, of the empty dish

W_1 is the weight in grammes, of the dish with the dried sample taken from the test

W_2 is the lowest weight in grammes, of the dish with the acid insoluble ash.

ANNEX C

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.

DRAFT STANDARD FOR SALTED ATLANTIC HERRING AND SALTED SPRATS (At Step 6 of the Procedure)

1. SCOPE

The standard applies to salted Atlantic herring (*Clupea harengus*) and sprats (*Sprattus sprattus*)[1]. Fish products produced by use of added natural or artificial enzymic preparations, acids and/or artificial enzymes are not covered by this standard.

2. DESCRIPTION

2.1 PRODUCT DEFINITION

The product is prepared from fresh or frozen fish. The fish is salted as whole fish or as headed or nobbed or headed and gutted or gibbed or filleted (skin-on or skin-off) fish. Spices, sugar and other optional ingredients may be added. The product is either intended for direct human consumption or for further processing.

2.2 PROCESS DEFINITION

The fish after any suitable preparation shall be subjected to a salting process and shall comply with the conditions laid down hereafter. The salting process including the temperature should be sufficiently controlled to prevent the development of *Clostridium botulinum* or fish should be eviscerated prior to brining.

2.2.1 Salting

Salting is the process of mixing fish with the appropriate amount of food grade salt, sugar spices and all optional ingredients and/or of adding the appropriate amount of salt-solution of the appropriate concentration. Salting is performed in watertight containers (barrels etc.).

Types of salted fish

2.2.2.1 Very lightly salted fish

The salt content in the fish muscle is 4 g/100 g or less in water phase.

2.2.2.2 Lightly salted fish

The salt content in the fish muscle is above 4 g/100 g in water phase and below or equal to 10 g salt/100 g in water phase.

2.2.2.3 Medium salted fish

The salt content in the fish muscle is above 10 g salt/100 g water phase and below or equal to 20 g salt/100 g in water phase.

2.2.2.4 Heavily salted fish

The salt content of the fish muscle is above 20 g salt /100 g in water phase.

2.2.3 Storage temperatures

The products shall be kept frozen or refrigerated at a time/temperature combination which ensures their safety and quality in conformity with Sections 3 and 5.

2.3 PRESENTATION

Any presentation of the product shall be permitted provided that it:

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[1] For the purpose of the standard, fish includes herring and sprats

2.3.1 meets all requirements of this standard, and

2.3.2 is adequately described on the label to avoid confusing or misleading the consumer.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 FISH

Salted Atlantic herring and salted sprats shall be prepared from sound and wholesome fish which are of a quality fit to be sold fresh for human consumption after appropriate preparation.

3.2 SALT AND OTHER INGREDIENTS

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

3.3 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.

3.4 DECOMPOSITION

The products shall not contain more than 10mg /100 g of histamine per fish flesh based on the average of the sample unit tested

4. FOOD ADDITIVES

Only the use of the following additives is permitted.

	Maximum level in the final product
Ascorbic acid	
300 Ascorbic acid	GMP
330 Citric acid	GMP
Antioxidant	
310 Propyl gallate	100 mg/kg
200 – 203 Sorbates	200 mg/kg (expressed as sorbic acid)
Preservatives	
210 – 213 Benzoates	200 mg/kg (expressed as benzoic acid)

5. HYGIENE AND HANDLING

5.1 It is recommended that the products covered by the provisions of this standard 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 Salted Fish (CAC/RCP 26-1979);

(ii) the Recommended International Code of Practice for Fresh Fish (CAC/RCP 9-1976);

(iv) the Recommended International Code of Practice for Frozen Fish (CAC/RCP 16-1978)

5.2 The products should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria to Foods (CAC/GL 21-1997)

5.3 The product 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.

PARASITES

Fish flesh shall not contain living larvae of nematodes. Viability of nematodes shall be examined according to Annex I. 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 II.

5.4 HISTAMINE

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

6. LABELLING

In addition to the provisions of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 1-1991) the following specific provisions apply:

Information specified above should be given either on the container or in accompanying documents, except that the name of the food, lot identification, and the name of and address of the manufacturer or packer or importer as well as storage instructions shall always appear on the container.

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

6.1 NAME OF THE FOOD

6.1.1 The name of the product shall be ...-salted herring or ...- salted sprats in accordance with the law and custom of the country in which the product is sold, in a manner not to mislead the consumer.

6.1.2 In addition the label shall include other descriptive terms that will avoid misleading or confusing the consumer.

7. SAMPLING, EXAMINATION AND ANALYSIS

7.1 SAMPLING PLAN FOR CONTAINERS (BARRELS)

(i) Sampling of lots for examination of the product for quality shall be in accordance with the sampling plan defined below. The sample unit is the entire container.

Lot Size (Number of containers)	Sample Size (Number of containers to be tested) (n)	Acceptance Number (c)
<15	2	0
16-50	3	0
51-150	5	1
151-500	8	1
501-3200	13	2
3201-35 000	20	3
>35 000	32	5

If the number of defective containers in the sample is less than or equal to c, accept the lot: otherwise, reject the lot.

(ii) Sampling of lots for examination of net weight shall be carried out in accordance with an appropriate sampling plan meeting the criteria established by the CAC.

(iii) For products in smaller containers the Codex Sampling Plan for Prepackaged Foods (AQL-6.5) (CODEX STAN 233-1969) should be applied.

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 Section 7.3 through 7.8 and Annexes and in accordance with the Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories (CAC/GL 31-1999).

7.3 DETERMINATION OF SALT CONTENT: SEE ANNEX III

7.4 DETERMINATION OF WATER CONTENT: SEE ANNEX IV

To be elaborated

7.5 DETERMINATION OF THE VIABILITY OF NEMATODES: SEE ANNEX I

7.6 DETERMINATION OF HISTAMINE

AOAC 977.13

7.7 DETERMINATION OF NET WEIGHT

The net weight (excluding packaging material) of each sample unit in the sample lot shall be determined.

Specific method to be elaborated

7.8 DETERMINATION OF DRAINED WEIGHT

To be elaborated

8. DEFINITION OF DEFECTIVES

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

8.1.1. Foreign matter

The presence in the sample unit of any matter which has not been derived from fish, 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.

8.1.2 Parasites

[The presence of readily visible parasites in a sample of the edible portion of the sample unit detected by normal visual inspection of the fish flesh.]

8.1.3 Odour and flavour/taste

Fish affected by persistent and distinct objectionable odours or flavours indicative of decomposition (such as sour, putrid, fishy, rancid, etc.) or contamination by foreign substances (such as fuel oil, cleaning compounds, etc.).

9. LOT ACCEPTANCE

A lot shall 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 Section 7; and

(ii) the average net weight of all sample units is not less than the declared weight, provided no individual container is less than 95% of the declared weight; and

(iii) does not exceed the acceptance number (c) of the appropriate sampling plan in Section 7;

(iv) the Food Additives, Hygiene and Handling and Labelling requirements of Sections 4, 5.1, 5.2 and 6 are met.

ANNEX I

VIABILITY TEST FOR NEMATODES (modified method according to Reference 1)

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 II

Treatment procedures sufficient to kill living nematodes

- e.g. freezing to - 20° C for not less than 24 h in all parts of the product
- the adequate combination of salt content and storage time (To be elaborated by Germany)
- or by other processes with the equivalent effect (To be elaborated)

ANNEX III

Determination of the salt content in Salted Atlantic Herring and Salted Sprats (method from salted cod standard).

ANNEX IV

Determination of water: to be elaborated.

PROPOSED DRAFT MODEL CERTIFICATE FOR FISH AND FISHERY PRODUCTS
(At Step 5 of the Procedure)

INTRODUCTION

Certification is one method that can be utilized by regulatory agencies of importing and exporting countries to compliment the control of their inspection system for fish and fishery products. To help facilitate international trade, the numbers and types of certificates should be limited and could be promoted through international (Codex) model certificates. Notwithstanding, alternatives to the use of official and officially recognized certificates[2] should be considered wherever possible, in particular where the inspection system and requirements of an exporting country are assessed as being equivalent to those of the importing country. The establishment of bilateral or multilateral agreements, such as mutual recognition agreements may provide the logical basis for discontinuing with the issuance of certificates.

SCOPE

The model certificates apply to fish and fishery products presented for international trade that meet food safety, wholesomeness and conformity to food production requirements of the importing country. Animal and plant health matters are not covered. Where administratively and economically feasible, certificates may be issued in an electronic format provided that the relevant authorities of both the importing and exporting country are satisfied with the security of the certification system.

Certificates should adequately describe one or several lots or batches of product's compliance with regulatory requirements based on regular inspections by the inspection service. Additional examinations, analytical results, evaluation of quality assurance procedures or product specifications may also be attested to.

DEFINITIONS [3] [4]

Certification is the procedure by which official certification bodies or officially recognized certification bodies provide written or equivalent assurance that fish and fishery products or their control systems conform to requirements. Certification of fish and fishery products may be, as appropriate, based on a range of inspection activities which may include continuous on-line inspection, auditing of quality assurance systems, and examination of finished products.

Certifying Bodies[5] are official certification bodies and officially recognized certification bodies.

Inspection is the examination of fish and fishery products or systems for control of fish and fishery products, raw materials, processing, and distribution including in-process and finished product testing, in order to verify that they conform to requirements.

Inspection system means official and officially recognized inspection systems.

Official inspection systems and official certification systems are systems administered by a government agency having jurisdiction empowered to perform a regulatory or enforcement function or both.

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2 For the purpose of this document, "certificates" shall mean "official certificates" and "officially recognized certificates"

3 *Principles for Food Import and Export Inspection And Certification* (CAC/GL 20-1995)

4 *Guidelines for the Development of Equivalence Agreements Regarding Food Import and Export Inspection and Certification Systems* (CAC/GL 34-1999)

5 *Guidelines for Generic Official Certificates Formats and the Production and Issuance of Certificates* (CAC/GL 38-2001)

Officially recognized inspection systems and officially recognized certification systems are systems which have been formally approved or recognized by an government agency having jurisdiction.

Official Certificates [6] are certificates issued by an official certification body of an exporting country, in accordance with the requirements of the importing or exporting country.

Officially Recognized Certificates [4] are certificates issued by an officially recognized certification body of an exporting country, in accordance with the conditions of that recognition and in accordance with the requirements of the importing or exporting country.

Requirements are the criteria set down by the competent authorities relating to trade in fish and fishery products covering the protection of public health, the protection of consumers and conditions of fair trading.

GENERAL CONSIDERATIONS CONCERNING THE PRODUCTION AND ISSUANCE OF CERTIFICATES

4.1 It is recommended that the production and issuance of the certificates for fish and fishery products should be carried out in accordance with the principles and appropriate sections of the:

- Guidelines for Generic Official Certificate Formats and the Production and Issuance of Certificates (CAC/GL 38-2001);
- Principles for Food Import and Export Inspection And Certification (CAC/GL 20-1995);
- Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CAC/GL 26-1997);
- Guidelines for the Development of Equivalence Agreements Regarding Food Import and Export Inspection and Certification Systems (CAC/GL 34-1999);
- Proposed Draft Revised Code of Ethics for International Trade in Foods (under revision by the CCGP).

4.2 The selection of the appropriate language(s) of certificates should be based on adequacy for the importing country's purpose, comprehension by the certifying officer and minimizing unnecessary burden on the exporting country.

5. THE FORMAT AND USE OF MODEL CERTIFICATES

5.1 FORMAT

5.1.1 **Model Sanitary Certificate (ANNEX I)** - The format of the model sanitary certificate should be considered when developing a certificate to attest that fish and fishery products contained in a shipment were produced in establishments that are under the control of and produced to the laws and requirements of the exporting country, or under conditions cited in equivalence or compliance agreements.

5.2 USE

Each field of the Model Sanitary or Inspection Certificate must be filled in or else, marked in a manner that would prevent alteration of the certificate. The Model Certificates should contain and completed as follows:

[6] Guidelines for the Generic Official Certificate Formats and the Production and Issuance of Certificates (CAC/GL 38-2001)

5.2.1 **Reference Number** should be unique for each consignment and should be maintained and assigned by the competent authority of the exporting country. Where more than one certificate is issued for a consignment as stipulated in 5.1.3 above, each certificate should bear the identical reference number.

5.2.2 **Country of Dispatch** for the purposes of the model certificate, designates the name of the country **[**in which the fish and fishery products was last handled**]** |**[**of the competent authority which has jurisdiction over the production establishment**]**.

5.2.3 **Competent authority** [7] is the competent official organisation empowered to execute various functions. Its responsibility may include the management of official systems of inspection or certification at the regional or local level.

5.2.4 **Certifying Bodies** are official certification bodies and officially recognized certification bodies.

5.2.5 **State or type of processing** describes the state in which the fish and fishery product is presented (i.e. fresh, frozen, canned , etc.) and/or the processing methods used (i.e. smoked, breaded, etc.).

5.2.6 **Type of packaging** could be cartons, boxes, bags, cases, drums, barrels, pallets, etc.

5.2.7 **Lot identifier / Date code** is the lot identification system developed by a processor to account for their production of fish and fishery product thereby facilitating traceability of the product in the event of public health investigations and recalls.

5.2.8 **Means of transport** should describe the flight/train/truck/container number, as appropriate and the name of the air carrier, vessel, etc.

5.2.9 **Attestation** is a statement confirming the product or batches of products' conformity with regulatory requirements of the importing or exporting country or other international requirements.

5.2.10 **Original Certificate** should be identifiable and this status should be displayed appropriately with the mark "ORIGINAL" or if a copy is necessary, this certificate should be marked as "COPY" or terms of this effect. The term "REPLACEMENT" is reserved for use on certificates where, for any good and sufficient reason (such as damage to the certificate in transit), a replacement certificate is issued by the certifying officer.

5.2.11 **Page numbering** should be used where the certificate occupies more than one sheet of paper.

5.2.12 **Seal and signature** should be in a colour different to that of the printing to minimize the risk of fraud.

[7] Guidelines for the Development of Equivalence Agreements Regarding Food Import and Export Inspection and Certification Systems (CAC/GL 34-1999)

ANNEX I

PROPOSED DRAFT MODEL SANITARY CERTIFICATE
COVERING FISH AND FISHERY PRODUCTS
(At Step5 of the Procedure)

(*LETTERHEAD or LOGO*) Reference number: _____

Country of Dispatch:	Tel:
Competent Authority:	Fax:
Certifying Body:	E-mail: (optional)

I. Details identifying the fishery products

Description - Species (scientific name)	State or type of processing	Type of packaging	Lot Identifier/ date code	Number of packages	Net weight
			Sum :		

Temperature required during storage and transport: °C

II. Provenance of the fishery products

Address(es) and/or the Registration number(s) of production establishment(s) authorized for exports by competent authority:

_____

Name and address of consignor: _____

_____

III. Destination of the fishery products

The fishery products are to be dispatched from: _____
(Place of dispatch)

to: _____
(Country and place of destination)

by the following means of transport: _____

Name of consignee and address at place of destination: _____

_____

IV. Attestation

The undersigned official inspector hereby certifies that:

1) The products described above originate from (an) approved establishment(s) and

2) have been handled, prepared or processed, identified, stored and transported under a competent HACCP and sanitary programme consistently implemented and in accordance with the requirements laid down in Codex Alimentarius Recommended International Code of Practice for Fish and Fishery Products, CAC/RCP [8]xx-xxxx.

Done at _____ on _____ 20___
(Place) (Date)

(*SEAL*)

_____ _____
(Signature of official inspector) (Name and official position)

[8] Under elaboration

PROPOSED DRAFT AMENDMENT TO THE STANDARD FOR QUICK FROZEN LOBSTERS[9]
(At Step 5 of the Procedure)

(CODEX STAN 95 - 1981, Rev 1 - 1995)

1. SCOPE

This standard applies to quick frozen raw or cooked lobsters, rock lobsters, spiny lobsters and slipper lobsters.[10] **Furthermore it applies to quick frozen raw or cooked squat lobters (red and yellow).**

2. DESCRIPTION

2.1. The product is prepared from lobsters from the genus *Homarus* of the family *Nephropidae* and from the families *Palinuridae* and *Scyllaridae*. It may also be prepared from *Nephrops norvegicus* provided it is presented as Norway lobster. **For squat lobters the product is prepared from species of *Cervimundia johnii* and *Pleuroncodes monodon* of the family *Galatheidae*.**

2.1.2 The pack shall not contain a mixture of species.

2.2 PROCESS DEFINITION

The water used for cooking shall be of potable quality or clean seawater.

The product, after any suitable preparation, shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C or colder at the thermal centre after thermal stabilization. The product shall be kept deep frozen so as to maintain the quality during transportation, storage and distribution.

Quick frozen lobsters shall be processed and packaged so as to minimize dehydration and oxidation.

2.3. PRESENTATION

2.3.1 Any presentation of the product shall be permitted provided that it:

2.3.1.1 meets all requirements of this standard;

2.3.1.2 is adequately described on the label to avoid confusing or misleading the consumer.

2.3.2 The lobster may be packed by count per unit of weight or per package or within a stated weight range.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 LOBSTERS

The product shall be prepared from sound lobsters which are of a quality fit to be sold fresh for human consumption.

3.2 GLAZING

If glazed, the water used for glazing or preparing glazing solutions shall be of potable quality or shall be clean sea-water. Potable water is fresh-water fit for human consumption. Standards of potability shall not be less than those contained in the latest edition of the WHO "International Guidelines for Drinking Water Quality". Clean sea-water is sea-water which meets the same microbiological standards as potable water and is free from objectionable substances.

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9 Amendments are highlighted

10 Hereafter referred to as lobster.

3.3 OTHER INGREDIENTS

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

3.4 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.

4. FOOD ADDITIVES

Only the use of the following additives is permitted.

ADDITIVE		MAXIMUM LEVEL IN THE FINAL PRODUCT
Moisture/Water Retention Agents		
451(i)	Pentasodium triphosphate	10 g/kg expressed as P_2O_5, singly or in combination (includes natural phosphate)
451(ii)	Pentapotassium triphosphate	
452(i)	Sodium polyphosphate	
452(iv)	Calcium polyphosphates	
Preservatives		
221	Sodium sulphite	100 mg/kg in the edible part of the raw product, or 30 mg/kg in the edible part of the cooked product, singly or in combination, expressed as SO_2
223	Sodium metabisulphite	
224	Potassium metabisulphite	
225	Potassium sulphite	
228	Potassium bisulphite (for use in the raw product only)	
Antioxidants		
300	Ascorbic acid	GMP
301	Sodium ascorbate	
303	Potassium ascorbate	

5. HYGIENE AND HANDLING

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

5.2 When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission , the product:

(i) shall be free from microorganisms or substances originating from microorganisms in amounts which may present a hazard to health in accordance with standards established by the Codex Alimentarius Commission;

(ii) 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.

5.3 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 3-1997) and the following relevant Codes:

(i) The Recommended International Code of Practice for Lobsters (CAC/RCP 24-1978);

(ii) The Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976);

(iii) The sections on the Products of Aquaculture in the Proposed Draft International Code of Practice for Fish and Fishery Products (under elaboration).[11]

[11] The Proposed Draft Code of Practice, when finalized, will replace all current Codes of Practice for Fish and Fishery Products

6. LABELLING

In addition to the provisions of the General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 1-1991) the following specific provisions apply:

6.1 THE NAME OF THE FOOD

The product shall be designated:

(i) Lobster if derived from the genus *Homarus*;

(ii) Rock Lobster, Spiny Lobster or Crawfish if derived from species of the family *Palinuridae*;

(iii) Slipper Lobster, Bay Lobster or Sand Lobster if derived from species of the family *Scyllaridae*;

(iv) Norway Lobster if derived from the species *Nephrops norvegicus*.

(v) Squat Lobster if derived from the species *Cervimundia johnii* and *Pleuroncodes monodon*

6.1.1 There shall appear on the label, reference to the form of presentation in close proximity to the name of the product in such descriptive terms that will adequately and fully describe the nature of the presentation of the product to avoid misleading or confusing the consumer.

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

6.1.3 Products shall be designated as cooked or raw as appropriate.

6.1.4 If the product has been glazed with sea-water, a statement to this effect shall be made.

6.1.5 The term "quick frozen", shall also appear on the label, except that the term "frozen" may be applied in countries where this term is customarily used for describing the product processed in accordance with subsection 2.2 of this standard.

6.1.6 The label shall state that the product should be maintained under conditions that will maintain the quality during transportation, storage and distribution.

6.2 NET CONTENTS (GLAZED PRODUCTS)

Where the food has been glazed the declaration of net contents of the food shall be exclusive of the glaze.

6.3 STORAGE INSTRUCTIONS

The label shall include terms to indicate that the product shall be stored at a temperature of -18°C or colder.

6.4 LABELLING OF NON-RETAIL CONTAINERS

Information specified above shall be given either on the container or in accompanying documents, except that the name of the food, lot identification, and the name and address of the manufacturer or packer as well as storage instructions shall always appear on the container.

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

7. SAMPLING, EXAMINATION AND ANALYSES

7.1 SAMPLING

(i) Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL - 6.5) (CODEX STAN 233-1969). In the case of shell on lobster the sample unit is an individual lobster. In the case of shell-off lobster the sample unit shall be at least a 1 kg portion of lobster from the primary container. **In the case of squat lobster the sampling unit shall be at least 1 kg portion.**

(ii) Sampling of lots for examination of net weight shall be carried out in accordance with an appropriate sampling plan meeting the criteria established by the Codex Alimentarius Commission.

7.2 SENSORY AND PHYSICAL EXAMINATION

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and using procedures elaborated in Sections 7.3 through 7.6, Annex A and the *Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories (CAC/GL 31 - 1999).*

7.3 DETERMINATION OF NET WEIGHT

7.3.1 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.

7.3.2 Determination of Net Weight of Products Covered by Glaze

(Alternate Methods)

(1) As soon as the package is removed from frozen temperature storage, open immediately and place the contents under a gentle spray of cold water 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.

(2) The pre-weighed glazed sample is immersed into a water bath by hand, until all glaze is removed, which preferably can be felt by the fingers. As soon as the surface becomes rough, the still frozen sample is removed from the water bath and dried by use of a paper towel before estimating the net product content by second weighing. By this procedure thaw drip losses and/or re-freezing of adhering moisture can be avoided.

(3) (i) As soon as the package is removed from frozen temperature storage, place the product in a container containing an amount of fresh potable water of 27°C (80°F) equal to 8 times the declared weight of the product. Leave the product in the water until all ice is melted. If the product is block frozen, turn block over several time during thawing. The point at which thawing is complete can be determined by gently probing the block.

(ii) Weigh a dry clean sieve with woven wire cloth with nominal size of the square aperture 2.8 mm (ISO Recommendation R565) or alternatively 2.38 mm (U.S. No. 8 Standard Screen.)

(a) If the quantity of the total contents of the package is 500 g (1.1 lbs) or less, use a sieve with a diameter of 20 cm (8 inches).

(b) If the quantity of the total contents of the package is more than 500 g (1.1 lbs) use a sieve with a diameter of 30 cm (12 inches).

(iii) After all glaze that can be seen or felt has been removed and the lobsters separate easily, empty the contents of the container on the previously weighed sieve. Incline the sieve at an angle of about 20° and drain for two minutes.

(iv) Weigh the sieve containing the drained product. Subtract the mass of the sieve; the resultant figure shall be considered to be part of the net content of the package.

7.4 DETERMINATION OF COUNT

When declared on the label, the count shall be determined by counting all lobsters or tails in the primary container and dividing the count of lobster by the average deglazed weight to determine the count per unit weight**.**

7.5 PROCEDURE FOR THAWING

The sample unit is thawed by enclosing it in a film type bag and immersing in water at room temperature (not greater than 35°C). The complete thawing of the product is determined by gently squeezing the bag occasionally so as not to damage the texture of the lobster, until no hard core or ice crystals are left.

7.6 COOKING METHODS

The following procedures are based on heating the product to an internal temperature of 65-70°C. The product must not be overcooked. Cooking times vary according to the size of the product and the temperature used. The exact times and conditions of cooking for the product should be determined by prior experimentation.

Baking Procedure: Wrap the product in aluminum foil and place it evenly on a flat cookie sheet or shallow flat pan.

Steaming Procedure: Wrap the product in aluminum foil and place it on a wire rack suspended over boiling water in a covered container.

Boil-in-Bag Procedure: Place the product into a boilable film-type pouch and seal. Immerse the pouch into boiling water and cook.

Microwave Procedure: Enclose the product in a container suitable for microwave cooking. If plastic bags are used check to ensure that no odour is imparted from the plastic bags. Cook according to equipment specifications.

8. DEFINITION OF DEFECTIVES

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

8.1 DEEP DEHYDRATION

Greater than 10% of the weight of the lobster in the sample unit or greater than 10% of the surface area of the block exhibits excessive loss of moisture clearly shown as white or yellow abnormality on the surface which masks the colour of the flesh and penetrates below the surface, and cannot be easily removed by scraping with a knife or other sharp instrument without unduly affecting the appearance of the lobster .

8.2 FOREIGN MATTER

The presence in the sample unit of any matter which has not been derived from lobster, 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.

8.3 ODOUR/FLAVOUR

Lobster affected by persistent and distinct objectionable odours or flavours indicative of decomposition or rancidity, or feed.

8.4 DISCOLOURATION

Distinct blackening of more than 10% of the surface area of the shell of individual whole or half lobster, or in the case of tail meat and meat presentations distinct black, brown, green or yellow discolourations singly or in combination, of the meat affecting more than 10% of the declared weight.

9. LOT ACCEPTANCE

A lot shall 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 Prepackaged Foods (AQL-6.5) (CODEX STAN 233-1969);

(ii) the total number of sample units not meeting the count or weight range designation as defined in Section 2.3 does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (AQL - 6.5) (CODEX STAN 233-1969);

(iii) 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;

(iv) the Food Additives, Hygiene and Labelling requirements of Sections 4, 5 and 6 are met.

"ANNEX A": SENSORY AND PHYSICAL EXAMINATION

1. Complete net weight determination, according to defined procedures in Section 7.3 (de-glaze as required).
2. Examine the frozen lobster for the presence of deep dehydration. Determine the percentage of lobster affected.
3. Thaw using the procedure described in Section 7.5 and individually examine each sample unit for the presence of foreign and objectionable matter.
4. Examine product count and weight declarations in accordance with procedures in Section 7.4.
5. Assess the lobster for odour and discolouration as required.
6. In cases where a final decision regarding the odour/flavour cannot be made in the thawed state, a small portion of the sample unit (100 to 200 g) is prepared without delay for cooking and the odour/flavour confirmed by using one of the cooking methods defined in Section 7.6.

PROPOSED DRAFT CODEX STANDARD FOR LIVE AND PROCESSED BIVALVE MOLLUSCS

(At Step 3 of the Procedure)

1. SCOPE

This standard applies to live and processed bivalve molluscs including scallop with gonads and viscera attached and scallop gonads.

[Traceability] / Product tracing is an important feature for bivalve molluscs and must be secured.

(The Proposed Draft Standard for Quick Frozen Scallop Muscle Adductor Meat includes scallops without gonads and viscera.)

2. DESCRIPTION

2.1 Product Definition

Live bivalve molluscs are products that are alive immediately prior to consumption. Presentation includes the shell. Processed bivalve molluscs are products that are no longer alive immediately prior to consumption but were alive immediately prior to the commencement of processing. Processed bivalve molluscs include, but are not necessarily limited to the following market forms: quick-frozen, [post-harvest treated], breaded, smoked, marinated, salted, dried, shucked, cooked-ready-to-eat, and canned. Canned bivalve molluscs may be made from products that have already undergone processing.

[Post-harvest treated bivalve molluscs are products prepared from live bivalve molluscs that have been treated after harvest to eliminate, reduce, or limit specified target organisms within the product, and to retain the sensory qualities of a live bivalve mollusc.]

2.2 Process Definition

[Live bivalve molluscs shall be organisms which are harvested alive for direct human consumption from an approved growing area and/or from an another appropriately classified area followed by an approved purification process such as natural container (raft, float or tank) relaying or depuration or from an approved purification centre.] The approval mentioned in this subsection must be given by the official agency having jurisdiction.

Frozen bivalve molluscs shall after suitable preparation be derived from organisms which meet the requirements for live bivalve molluscs and the product shall, after any suitable preparation [deshelling], be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The freezing process shall not be regarded as complete unless and until the product temperature has reached -18ºC or colder at the thermal centre after thermal stabilization. The product shall be kept deep frozen so as to maintain the quality during transportation, storage and distribution. Frozen bivalve molluscs shall be processed and packaged so as to minimize dehydration and oxidation.

Processed bivalve molluscs shall be derived from organisms which meet the requirements for live bivalve molluscs.

Canned bivalve molluscs are packed in hermetically sealed containers and shall have received a processing treatment sufficient to ensure commercial sterility.

Other approved processes including heat processing (other than canning) may be applied to provide sterilisation.

Covered in Code of Practice.

[Post-harvest treated bivalve molluscs shall be organisms that meet the requirements for live bivalve molluscs, either because they are derived from organisms that meet these requirements or because they have received post-harvest treatment, or because of a combination of the two. The post-harvest treatment shall assure the elimination, reduction, or limitation of the target organisms to the satisfaction of the official agency having jurisdiction.]

2.3 PRESENTATION

Any presentation of the product shall be permitted provided that it:

- meets all requirements of this standard; and
- is adequately described on the label to avoid confusing or misleading the consumer.

The bivalve molluscs may be packed in count per unit of weight or per package.

In the case of live bivalve molluscs, they may be packed by weight, count, count per unit of weight, volume or per package.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Live Bivalve Molluscs

Bivalve molluscs intended for direct consumption or intended to be processed shall be alive immediately prior to consumption or prior to the commencement of processing and of a quality fit for human consumption.

Bivalve molluscs must respond adequately to percussion and must contain a normal quantity of intravalvular liquid as determined by product specialists familiar with the species.

3.2 Glazing (for frozen bivalve molluscs)

If glazed, the water used for glazing or preparing glazing solutions shall be clean water. (Clean water defined in the Code.)

3.3 Other Ingredients

The packing medium and all other ingredients used shall be of food grade quality and conform to all applicable Codex standards.

3.4 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.

4. FOOD ADDITIVES

Only the use of the following addtiivese is permitted in processed bivalve molluscs

Antioxidants

For marinated molluscs and fully preserved (canned molluscs), any antioxidants listed in Table III of the General Standard for Food Additives (CODEX STAN 192-1995).

For fresh shucked molluscs any antioxidant listed in food category 09.1.2 (Fresh Mollusks, crustaceans and echinoderms) of the General Standard for Food Additives (CODEX STAN 192-1995) at levels not to exceed good manufacturing practices (GMP).

For fresh raw frozen molluscs any antioxidant listed in food category 09.2.1 (Frozen fish, fish fillets, and fish products, including mollusks, crustaceans, and echinoderms) of the General Standard for Food Additives (CODEX STAN 192-1995) at levels not to exceed good manufacturing practices (GMP).

For fresh raw frozen molluscs any antioxidant listed in food category 09.2.2 (Frozen battered fish, fish fillets and fish products, including mollusks, crustaceans, and echinoderms) of the General Standard for Food Additives (CODEX STAN 192-1995) at levels not to exceed good manufacturing practices (GMP).

For fresh raw frozen molluscs any antioxidant listed in food category 09.2.5 (Smoked, dried, fermented, and/or salted fish and fish products, including mollusks, crustaceans, and echinoderms) of the General Standard for Food Additives (CODEX STAN 192-1995) at levels not to exceed good manufacturing practices (GMP).

Sequestrant

For canned bivalve molluscs any sequestrant listed in Table III of the General Standard for Food Additives (CODEX STAN 192-1995) at levels not to exceed good manufacturing practices (GMP)."

5. HYGIENE AND HANDLING

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

5.2 Live bivalve molluscs intended for direct consumption should possess visual characteristics associated with freshness and viability, including shells free of dirt, an adequate response to percussion, and normal amounts of intravalvular liquid as determined by product specialists familiar with the species.”

5.3 When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission (CAC), the following requirements shall be met:

(i) Live bivalve mollusc shall be free from micro-organisms or substances originating from micro-organisms or virus in amounts which may present a hazard to health in accordance with standards established by the CAC.

(ii) [Live bivalve molluscs must not contain more than 300 faecal coliforms or more than 230 E.coli per 100 g of mollusc flesh and intravalvular liquid. Determination by the 5 tube, 3 dilution MPN testing method or any other method equivalent.]

AND/OR – for discussion

[Live bivalve molluscs must not contain more than 330 fecal coliforms. In an analysis involving five (5) samples, none may contain more than 330 fecal coliforms; and if two (2) or more of the five (5) contain between 230 and 330 fecal coliforms, the five samples must be analyzed for E coli. In that analysis, no sample may contain more than 330 E coli, and not more than one (1) of the five (5) samples may contain between 230 and 330 E coli.]

(iii) [Live bivalve molluscs and products thereof must not contain Salmonella in 25 g flesh.]

(iv) [In the edible parts of bivalve molluscs (the whole part or any part intended to be eaten separately.) the total Paralytic Shellfish Poison (PSP) content must not exceed 80 microgrammes of saxitoxin equivalent per 100 g of mollusc flesh

(v) [In the edible parts of the bivalve molluscs (the whole part or any part intended to be eaten separately) the Diarrhetic Shellfish Poison (DSP), using the customary biological testing methods (on rats or mice) there must not be a positive result. .]

In the edible parts of the bivalve molluscs (the whole part or any part intended to be eaten separately) the maximum level of Okadaic acid, Dynophysistoxins and Pectenotoxins together, must not exceed 160 microgrammes of Okadaic equivalents per kg.

(vi) [In the edible parts of bivalve molluscs (the whole part or any part intended to be eaten separately)the content of Amnesic Shellfish Poisoning (ASP) must not exceed 20 microgrammes domoic acid per g of mollusc flesh.

(vii) [In the edible parts of bivalve molluscs (the whole or any part intended to be eaten separately) the total Neurotoxic Shellfish Poison (NSP) content must not exceed 20 mouse units.

(viii) In the edible parts of bivalve molluscs (the whole or any part intended to be eaten separately) the level of Azaspiracid (AZP) must not exceed16 microgrammes per 100g.

(ix) In the edible parts of bivalve molluscs (the whole or any part intended to be eaten separately) the level of Yessotoxins must not exceed 100 microgrammes per 100g.

(*Note – comments on methodology is transferred to Section 7.)*

(x) The product must not contain any other substance in amounts which may present a hazard to health in accordance with standards established by the CAC.

5.4 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the following Codes: the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 3 (1997));

- [the [draft] recommended International Code of Practice for Fish and Fishery Products];
- the [draft revised] Recommended International Code of Practice for Canned Fish;
- the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976);
- the Draft International Code of Hygienic Practice for the Products of Aquaculture (under elaboration, 1994);
- the Recommended International Code of Hygienic Practice for Low Acid and Acidified Low Acid Canned Foods (CAC/RCP 23-1979).

6. LABELLING

In addition to the provisions of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 1, 1991) the following specific provisions apply:

6.1 The Name of the Food

The name of the product as declared on the label shall be [the name of the species of bivalve molluscs [the common or usual name of the species of bivalve molluscs] according to the law, custom or practice in the country in which the product is to be distributed.]

6.1.1 There shall appear on the label, reference to the presentation provided for in Section 2.3-Presentation in close proximity to the name of the product in such descriptive terms that will adequately and fully describe the nature of the presentation of the product to avoid misleading or confusing the consumer.

6.1.2 In addition to the specified labelling designations above, the usual or common trade names of the variety 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 Content Declaration

Live bivalve molluscs shall be labelled by weight, count, count per unit weight, or volume as appropriate to the product.

Processed bivalve molluscs shall have a net weight declaration in accordance with:- *Refer to other codex standards*.

6.3 Storage Instructions

The label shall specify the conditions for storage and/or temperature that will maintain the quality/viability during transportation, storage and distribution.

6.4 Labelling of Non-Retail Containers (for bulk transport of live and raw shucked bivalve molluscs)

Information shall specify on the container and in accompanying documents,

- the name of the food,
- lot identification,
- harvesting location,
- date of harvest and/or
- date of processing and
- the name and address and authorisation or registration number of packer or manufacturer, and
- [storage instructions, as appropriate].

However, lot identification, and the name and address may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents in which this information is given.

6.5 Other Labelling Requirements

6.5.1 For live bivalve molluscs this product shall declare the date of minimum durability, harvest date or packing date.or a statement to this effect.

6.5.2 [For live and raw shucked bivalve molluscs] OR [For live and processed bivalve molluscs], identification of the establishment approved by the official agency with the jurisdiction, for the production of the product.

6.5.3 [Safety claims made for post-harvest treated bivalve molluscs should be specific to the target organisms that have been eliminated, reduced, or limited by the post-harvest treatment.]

6.5.4 [Every package containing purified bivalve molluscs must be provided with a label certifying that all molluscs have been purified.]

7. SAMPLING, EXAMINATION AND ANALYSES

7.1 Sampling

(i) Sampling of lots for examination of the product shall be in accordance with the Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL - 6.5) (CODEX STAN 233-1969).

(ii) Sampling of lots for examination of net weight shall be carried out in accordance with an appropriate sampling plan meeting the criteria established by the CAC.

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 7.6, and Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories" (CAC/GL 31-1999).

7.3 Determination of Net Weight and Drained Weight

The net weight and drained weight of all sample units shall be determined by the procedures described or mentioned in sections 7.3.1, 7.3.2, 7.3.3 and 7.3.4..

7.3.1 Determination of Net Weight

(i) Weigh the unopened container;

(ii) Open the container and remove the contents;

(iii) Weigh the empty container, (including the end) after removing excess liquid and adhering meat;

(iv) Subtract the weight of the empty container from the weight of the unopened container.

(v) The resultant figure will be the total net content.

7.3.2 Determination of Net Weight of Frozen 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.

7.3.3 Determination of Net Weight of Products Covered by Glaze

AOAC official method 963.18, Net Contents of Frozen Seafoods

7.3.4 The AOAC official method 963.26 should be used to determine the net weight of products with water added that is inside a "block-frozen" product.

7.3.5 Determination of Drained Weight

(i) In the case of canned bivalve molluscs, maintain the container at a temperature between 20 ºC and 30 ºC for a minimum period of 12 hours prior to examination;

(ii) Open and tilt the container to distribute the contents on a pre-weighed circular sieve which consists of wire mesh [with square openings of 2.8 mm x 2.8 mm – confirm AOAC mesh size] or [*2.5 mm x 2.5 mm*];

(iii) Incline the sieve at an angle of approximately 17-20 º and allow the bivalve molluscs to drain for two minutes, measured from the time the product is poured into the sieve;

(iv) Weigh the sieve containing the drained bivalve molluscs;

(v) The weight of drained bivalve molluscs is obtained by subtracting the weight of the sieve and drained product.

7.4 Determination of Count per Unit Weight or Volume

When declared on the label, the count of bivalve molluscs shall be determined by counting the numbers of bivalve molluscs in the container or a representative sample thereof and dividing the count of bivalve molluscs by the actual weight/volume to determine the count per unit weight or volume.

7.5 Sample Preparation

7.5.1 Procedures for Thawing

For frozen product, the sample unit is thawed by enclosing it in a film type bag and immersing in water at room temperature (not greater than 35 ºC). The complete thawing of the product is determined by gently squeezing the bag occasionally so as not to damage the texture of the bivalve molluscs, until no hard core or ice crystals are left.

7.5.2 Cooking Methods

The following procedures are based on heating the product to an internal temperature of 65-70 ºC.

The product must not be overcooked. Cooking times vary according to the size of the product and the temperature used. The exact times and conditions of cooking for the product should be determined by prior experimentation.

Baking Procedure: Wrap the product in aluminium foil and place it evenly on a shallow flat pan.

Steaming Procedure: Wrap the product in aluminium foil and place it on a wire rack suspended over boiling water in a covered container.

Boil-in-Bag Procedure: Place the product into a boilable film-type pouch and seal. Immerse the pouch into boiling water and cook.

Microwave Procedure: Enclose the product in a container suitable for microwave cooking. If plastic bags are used, check to ensure that no odour is imparted from the plastic bags. Cook according to equipment instructions.

7.6 MPN Method For Analyses of E.Coli/Faecal Coliforms

(to be elaborated)

Method for E. coli proposed by Germany:

Donavan et al. (1998): Modification of the standard UK method for the enumeration of *Eschericia coli* in live bivalve molluscs. Communicable Disease and Public Health 1. 188-196.

In the absence of routine virus testing procedures and the establishment of virological standards, an assessment of the risks from viruses must be based on faecal bacteria counts and sanitary shoreline survey.

This indicator may be amended or replaced in the future by more suitable indicators like bacteriophage.

7.7 Determination of Biotoxins

(to be elaborated)

PSP - biological testing method in association if necessary with a chemical method for detection of Saxitoxin.

DSP - customary biological testing methods (on rats or mice).

Okadaic acid, Dynophysistoxins and Pectenotoxins – measurement of Okadaic acid equivalent. – biological methods (mouse bioassay, rat bioassay), authorised alternative chemical methods ELISA, HPLC, LCMS.

ASP - HPLC testing method.

NSP - current American Public Health Association Inc. method or other method approved by the official agency having jurisdiction.

AZP – HPLC or other method approved by the official agency having jurisdiction.

Yessotoxin – biological method or other method approved by the official agency having jurisdiction.

The above methods may be replaced by other acceptable chemical methods as they become available and approved for use.

8. DEFINITION OF DEFECTIVES

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

8.1 Deep Dehydration (Frozen Products)

Greater than 10% of the weight of the bivalve molluscs in the sample unit or greater than 10% of the surface area of the block exhibits excessive loss of moisture clearly shown as white or abnormal colour on the surface which masks the colour of the flesh and penetrates below the surface, and cannot be easily removed by scraping with a knife or other sharp instrument without unduly affecting the appearance of the bivalve molluscs.

8.2 Foreign Matter

The presence in the sample unit of any matter which has not been derived from bivalve molluscs, 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.

8.3 Odour/Flavour

Bivalve molluscs affected by persistent and distinct objectionable odours or flavours indicative of decomposition or rancidity.

8.4 Texture

Textural breakdown of the flesh, indicative of decomposition, characterized by muscle structure which is mushy or paste-like.

8.5 Objectionable Matter (Canned Products)

A sample unit affected by struvite crystals - any struvite crystal greater than 5 mm in length.

Sulphide blackening (smut): Staining of the meat in excess of [5%] of the drained contents.

8.6 Dead or Damaged Product

For bivalve molluscs sold live, the presence of dead or damaged product. Dead product is characterised by no response to percussion. Damaged product includes product that is damaged to the extent that they can no longer function biologically. Sample shall be rejected if dead or damaged product exceed 5% by count.

9. LOT ACCEPTANCE

A lot shall 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 Prepackaged Foods (AQL-6.5) (CODEX STAN 233-1969);

(ii) the total number of sample units not meeting the count designation as defined in section 2.3 does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (AQL - 6.5) (CODEX STAN 233-1969);

(iii) 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;

(iv) the Food Additives, Hygiene and Labelling requirements of Sections 4, 5.1, 5.2, 5.3 and 6 are met.

PROPOSED DRAFT STANDARD FOR QUICK FROZEN SCALLOP ADDUCTOR MUSCLE MEAT (At Step 3 of the Procedure)

1. SCOPE

This standard applies to quick frozen raw scallop adductor muscle meat[12] in which the shell, viscera and roe have been removed and which are intended for direct human consumption or for further processing. This standard does not cover scallop meat bound by fibrinogen or other binders.

Live scallops and scallop meat in which the shell, viscera and roe are attached shall meet the requirements that apply to live and processed bivalve molluscs in the Proposed Draft Standard for Live and Processed Bivalve Mollusc (*under elaboration*).

2. DESCRIPTION

2.1 Product definition

Quick frozen scallop meat is prepared by completely removing the adductor muscle from the shell and completely detaching the viscera and/or roe from the adductor muscle of live scallops belonging to the Pectinidae family.

2.2 Process definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C or colder at the thermal centre after thermal stabilization. The product shall be kept deep frozen so as to maintain the quality during transportation, storage and distribution.

The recognized practice of repacking quick frozen products under controlled conditions which will maintain quality of the product, followed by the reapplication of the quick freezing process as defined, is permitted.

These products shall be processed and packaged so as to minimize dehydration and oxidation.

2.3 Presentation

2. 3.1 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, and;
- The scallop meat may be packed by count per unit weight or, as “pieces”or terms to that effect if the scallop meat pack exhibits the presence of broken pieces that is > 5% of the sample weight.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Scallop Meat

The product shall be prepared from sound and wholesome scallops of the *Pectinidae* family which are of a quality suitable to be sold fresh for human consumption.

3.2 Glazing

If glazed, the water used for glazing or preparing glazing solutions shall be of potable quality. Potable water is fresh-water fit for human consumption. Standards for potability shall not be less than those contained in the latest edition of the WHO “International Guidelines for Drinking Water Quality.” Sea water used for glazing must meet the same microbiological standards as potable water and is free from objectionable substances.

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[12] Hereafter referred to as scallop meat

3.3 Final Product

3.3.1 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.

3.3.2 A lot of scallop meat shall not have a moisture content **[**greater than 81.0%**]**or **[**if the moisture content is greater than 81.0%, the label must indicate that water was added or a statement to this effect**]**.

4. FOOD ADDITIVES

[No food additives are permitted in these products**]**.

5. HYGIENE AND HANDLING

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

5.2 **[**For scallops that have been determined to accumulate marine biotoxins in the adductor muscle meat at levels that poses a threat to human health**]**, their meat must comply with the biotoxin provisions set out in Section 5 and as sampled and analyzed by methods given in Section 7 of the "Proposed Draft Standard for Live and Processed Bivalve Molluscs (*under elaboration*)"

5.3 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 3, 1997) and other relevant Codex texts such as:

(i) the Revised Code of Practice for Fish and Fishery Products (*under elaboration*);

(ii) the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976).

5.4 The products should comply with any microbiological criteria established in accordance with the Principle for the Establishment and Application of Microbiological Criteria in Foods (CAC/CL 21-1997).

5.5 The product 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.

6. LABELLING

In addition to the provisions of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, (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 be the common or usual name of the species of scallops according to the law, custom and practice in the country in which the product is to be distributed in a manner not to mislead the consumer.

6.1.2 There shall appear on the label, reference to the form of presentation described in Section 2.3.3, in close proximity to the name of the product in such descriptive terms that will adequately and fully describe the nature of the presentation to avoid misleading or confusing the consumer.

6.2 Net Contents (Glazed Products)

Where the food has been glazed the declaration of net contents shall be exclusive of the glaze.

6.3 Storage Instructions

The label should include terms to indicate that the product shall be stored at a temperature of -18°C or colder for describing the product processed in accordance with subsection 2.2 of this standard.

6.4 Labelling of Non-Retail Containers

Information specified above shall be given either on the container or in accompanying documents, except the name of the food, lot identification, and the name and address as well as storage instructions shall always appear on the container.

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

7. SAMPLING, EXAMINATION AND ANALYSIS

7.1 Sampling

(1) Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plan for Prepackaged Foods (AQL 6.5) CAC/RM 42-1969. The sample unit is the primary container, or for individually quick frozen products or bulk packaged, is at least a 1 kg portion of the sample unit.

(ii) Sampling of lots for examination of net weight shall be carried out in accordance with an appropriate sampling plan meeting the criteria established by the CAC.

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 Section 7.3 through 7.7 and Annexes, and in accordance with the Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories (CAC/GL 31-1999).

7.3 Determination of Count and Pieces

When declared on the label, the count of the scallop meat shall be determined by counting the numbers of scallop meat in the container or representative sample thereof and dividing the count of scallop meat by the actual de-glazed weight to determine the count per unit weight.

A scallop meat shall be considered a scallop piece when the weight of that scallop meat is less than 50% of the average weight of 10 unbroken scallop meats contained in the pack. The percentage of scallop pieces in the sample unit can be determined by using the following equation:

$$\%\ \text{Scallop Pieces} = \frac{\Sigma\ \text{weight of scallop pieces in a sample unit x } 100}{\text{weight of sample unit}}$$

7.4 Determination of Net Weight of Products Covered by Glaze

Remove surface glaze from the scallop meat under running water until no ice can be felt by the finger tips on the surface of the scallop meat but it is evident that the ice crystals remain within the product (i.e. the interior of the product remains frozen). Block frozen product should be gently separated to individual scallop meat or scallop pieces and ice within the block should be removed until the surface of the product is free of ice (from slippery to rough). Place the scallop meat on a sieve of appropriate size and drain for 1 to 1½ minutes. Weigh the product in a tared pan.

7.5 Determination of Moisture

Deglaze the scallop meat using procedures elaborated in Section 7.4 and obtain a total of approximately 100 g of scallop meat from the five sample units. Comminute the 100 g sample until a homogenous blend is attained. Collect the homogenized sample into a clean, sealable plastic cup or glass bottle. Store the sample in a refrigerator or freezer until required. Ensure that the prepared sample is still homogeneous prior to weighing. If liquid separates from the sample, reblend before use.

Accurately weigh a moisture dish of appropriate size. Add approximately 10 g of the comminuted sample and reweigh. Place the container in a vacuum oven at 100°C and less than 100 mm Hg for approximately 5 hours. Remove dish from the oven, cover, cool in desiccator, and weigh. Redry 1 hr and repeat process until constant weight has been achieved, i.e., change in weight between successive dryings at 1 hour intervals is < 5 mg. The moisture content can be determined by using the following equation:

$$\%\ \text{Moisture} = \frac{\text{weight of sample} - \text{weight of dried sample}}{\text{total weight}} \text{ x } 100$$

7.6 Procedures for Thawing

The sample unit is thawed by enclosing it in a film type bag and immersing in water at room temperature (not greater than 35°C). The complete thawing of the product is determined by gently squeezing the bag occasionally so as not to damage the texture of the scallop meat until no hard core or ice crystals are left.

7.7 Cooking Methods

The following procedures are based on heating the product to an internal temperature of 65 - 70 °C. The product must not be overcooked. Cooking times vary according to the size of the product and the temperature used. The exact times and conditions of cooking for the product should be determined prior to experimentation.

Baking Procedure: Wrap the product in aluminium foil and place it evenly on a flat cookie sheet or shallow flat pan.

Steaming Procedure: Wrap the product in aluminium foil and place it on a wire rack suspended over boiling water in a covered container.

Boil-in-Bag Procedure: Place the product into a boilable film-type pouch and seal. Immerse the pouch in boiling water and cook.

Microwave Procedure: Enclose the product in a container suitable for microwave cooking. If plastic bags are used, check to ensure that no odour is imparted from the plastic bags. Cook according to equipment instructions.

8. DEFINITION OF DEFECTIVES

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

8.1 Deep Dehydration

Greater than 10% of the weight of the scallop meat or greater than 10% of the surface area of the block exhibits excessive loss of moisture clearly shown as white or yellow abnormality on the surface which masks the colour of the flesh and penetrates below the surface, and cannot be easily removed by scraping with a knife or a sharp instrument without unduly affecting the appearance of the product.

8.2 Foreign matter

The presence in the sample unit of any matter which has not been derived from scallops, 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.

8.3 Odour/Flavour

Scallop meat affected by persistent and distinct objectionable odours or flavours indicative of decomposition and/or rancidity.

[8.4 Parasites

(To be elaborated)]

9. LOT ACCEPTANCE

A lot shall 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 Prepackaged Foods (AQL 6.5) (CODEX STAN 233-1969);

(ii) where appropriate, the total number of sample units not meeting the count designation or presentation as defined in section 2.3.3 does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (AQL 6.5) (CODEX STAN 233-1969);

(iii) the moisture content of the scallop meat requirement of Section 3.3.2 is met;

(iv) 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

(v) the Food Additives, Hygiene and Handling and Labelling requirements of Sections 4, 5.1, 5.2, 5.4, 5.5 and 6 are met.

****

"ANNEX A"

SENSORY AND PHYSICAL EXAMINATION

6. Complete net weight determination, according to defined procedures in Section 7.4.

7. Examine the frozen scallop meat in the sample unit or the surface of the block for the presence of dehydration. Determine the percentage of scallop meat or surface area affected.

8. Thaw using the procedure described in Section 7.6 and individually examine each scallop meat in the sample unit for the presence of foreign matter and presentation defects. Determine the weight of scallop meat affected by presentation defects.

9. Examine product for count declarations in accordance with procedures in Section 7.3.

10. Assess the scallop meat for odour and **[**parasites**]** as required.

11. In cases where a final decision regarding the odour cannot be made in the thawed state, a small portion of the sample unit (100g to 200g) is prepared without delay for cooking and the odour/flavour confirmed by using one of the cooking methods defined in Section 7.7.

PROPOSED DRAFT AMENDMENTS IN THE STANDARD FOR SALTED FISH AND DRIED SALTED FISH OF THE GADIDAE FAMILY OF FISHES
(At Step 3 of the Procedure)[13]

7. SAMPLING, EXAMINATION AND ANALYSES

Section 7.1 Sampling is extended with one paragraph.

New

(iii) Each sampled fish is packed in a plastic bag which is sealed with tape.

The sampled fish(es) must be cooled or refrigerated from the time of sampling to the time of analysis.

The analysis must be performed within 48 hours after the fish has been sampled.

Section 7.4 Determination of Salt Content is moved to Section 7.5, and Section 7.4 is renamed Determination of Water Content in Whole Fish by Cross Section Method.

New

Section 7.4 **Determination of Water Content in Whole Fish by Cross Section Method**

1 Principle

The fish is cut in sections as described in method. The sections are cut in smaller bits to a collected sample. The water content of the collected sample is determined by drying. Examinations and experience have shown that the water content of this collected sample is closed to the "true" water content of the fish.

2 Equipment

- Soft brush
- Basins (steel, glass, porcelain)
- Scissors
- Band saw
- Knife
- Weight, 1 g precision
- Analytical weight (4 decimals)
- Oven. 103-105°C
- Desiccator

3 Preparation of sample

Salt particles on the surface of the fish are brushed away.

The weight of the fish is determined to 1 g accuracy.

The length of the fish is measured as the distance between the cleft in the tail and a line drawn between the tips of the earbones.

4 Procedure

(i) The sampling of the fish is described in the enclosed figure.

A)Wet salted fish is sliced in sections by knife

B)Salted and dried salted fish is sliced in sections by band saw.

1) A section of 20mm measured from a line drawn between the earbones, dotted line on figure, is cut.

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[13] Subject to approval as new work by the 25th Session of the Commission

2) The next cut is 2mm from the first one. This 2mm section is collected

3) The next cut is a 38mm section.

4) A new cut of a 2mm section is collected

5) The next cut is a 38mm section.

6) The entire fish is cut in sections of 2mm and 38mm, see enclosed figure.

7) All sections of 2mm, marked II, IV, VI, VIII in the figure, even numbers, are collected to a collected sample.

(ii) The 2mm sections in the collected sample are cut with scissors in smaller pieces directly in tared basins just after the fish is cut.

(iii) The basins containing the sample are weighted.

(iv) The basins containing the samples are put in the oven at 103-105°C for drying to constant weight (18 hours over night).

(v) The basins are taken from the oven to a desiccator.

(vi) The basins are weighted.

5. **Calculation of results**

In the equation of the calculation of results the following symbols are used:

W_1 = Weight of fish and basins before drying, g.

W_2 = Weight of fish and basins after drying, g.

W_s = Weight of tared basins, g

The water content in the fish is calculated by using the equation:

$$\text{Water content, g/100g} = \frac{100*(W_1-W_2)}{(W_1 - W_s)}$$

The result is reported with 1 decimal, together with the length and the weight of the analysed fish.

6. **Reference method**

As a reference method a method should be used which include drying of the whole fish.

7. **Comments**

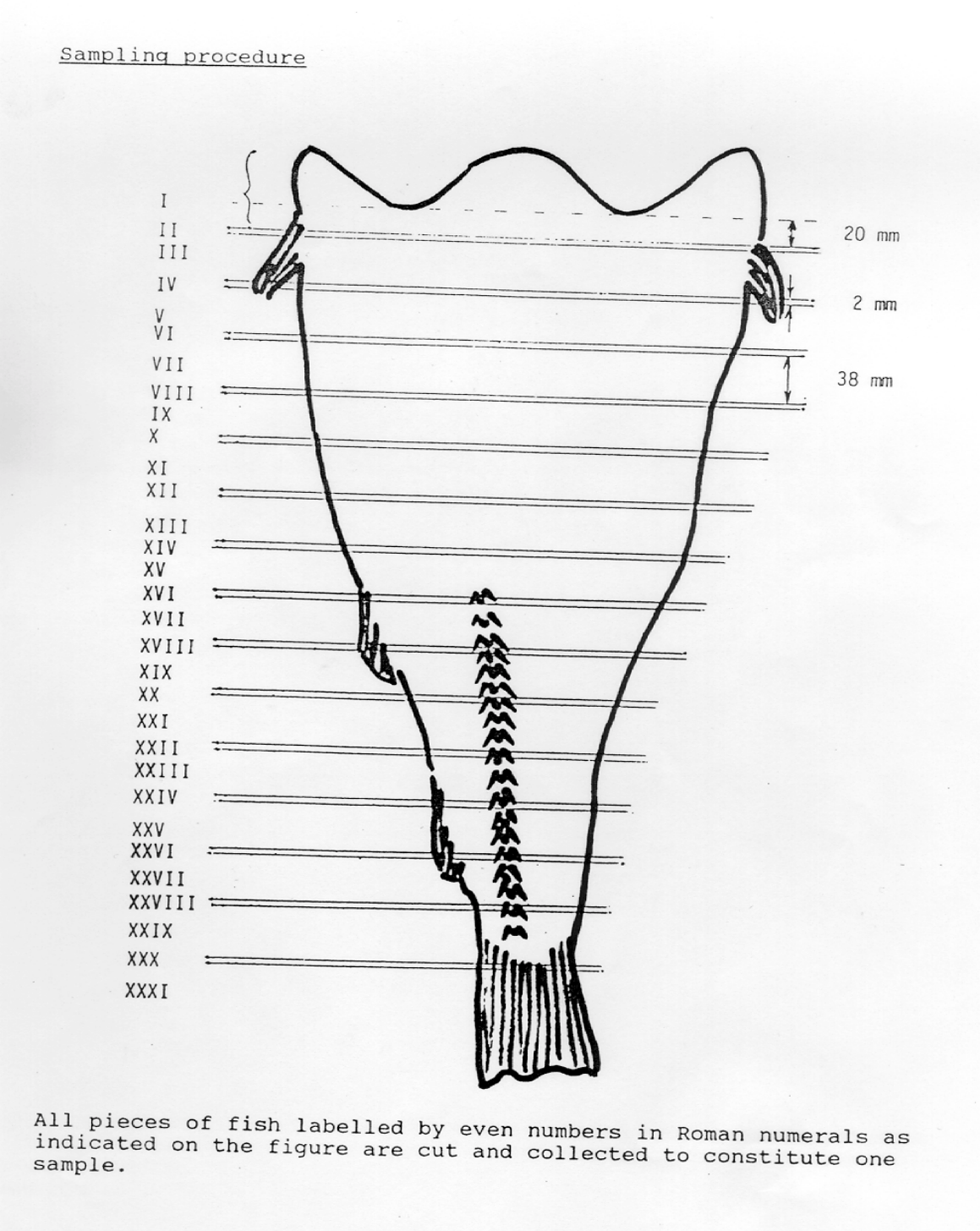
The fish must be placed in a cool store packed in plastic bags before analysis. The analysis must be performed within 48 hours after the fish has been sampled.

To work with a band saw can be dangerous. Follow the instructions given in the manual of the band saw.

To minimise the loss of water from the 2mm sections it is important to weight the collected sample immediately after the fish is cut in sections.

Equipment, saw, tables must be cleaned as soon as possible to avoid corrosion.

FIGURE



Amendments in section 7.5:

Delete old 7.4.3, replace it with new 7.5.3.

New

7.5 **Determination of Salt Content**

3. Preparation of sample

Before preparing a subsample adhering salt crystals should be removed by brushing from the surface of the sample without using water.

If only the salt content is to be determined the entire fish should be subjected to a systematic cutting in slices as described in Section 7.4 Determination of water content part 4. Procedures point (i) to (ii).

If both the water content and the salt content are to be determined in the sample, two subsamples must be collected. The subsample for the water content determination is first collected as described in Section 7.4. The subsample for the salt content determination is collected by cutting 2 mm slices from each of the remaining 38 mm sections given uneven number III, V, VII, etc in the Figure of Section 7.4.

The whole collected subsample of 2 mm slices for the salt content determination should be thoroughly homogenised preferably by using an electric homogeniser.

Determination should be performed at least in duplicate.

PROPOSED DRAFT MODEL CERTIFICATES FOR FISH AND FISHERY PRODUCTS

(At Step 3 of the Procedure)[14]

5.1 FORMAT

5.1.2 **Model Inspection Certificate (ANNEX II)** - The format of the model inspection certificate should be considered when developing a certificate to attest that the fish and fishery products contained in a shipment were produced in establishments that are under the control of and produced to the laws and requirements of the exporting country, or under conditions cited in equivalence or compliance agreements **and** that an inspection of finished product has been conducted by an inspector of the competent authority.

5.1.3 **Model Statement Document (ANNEX III and IV)** - Where a single certificate is not practical to handle all the requirements of the importing country or where special inspection requirements for an importing country exist, a model statement document could also be considered. The model statement document can be attached to the primary sanitary/ inspection certificate stating the actual monitoring tests conducted and the resulting levels. For example, such tests might include monitoring radioactivity or trace metals contaminants.

5.2 USE

Each field of the Model Sanitary or Inspection Certificate must be filled in or else, marked in a manner that would prevent alteration of the certificate. The Model Certificates should contain and completed as follows:

5.2.1 **Reference Number** should be unique for each consignment and should be maintained and assigned by the competent authority of the exporting country. Where more than one certificate is issued for a consignment as stipulated in 5.1.3 above, each certificate should bear the identical reference number.

5.2.2 **Country of Dispatch** for the purposes of the model certificate, designates the name of the country **[**in which the fish and fishery products was last handled**]** |**[**of the competent authority which has jurisdiction over the production establishment**]**.

5.2.3 **Competent authority** [15] is the competent official organisation empowered to execute various functions. Its responsibility may include the management of official systems of inspection or certification at the regional or local level.

5.2.4 **Certifying Bodies**[16] are official certification bodies and officially recognized certification bodies

5.2.5 **State or type of processing** describes the state in which the fish and fishery product is presented (i.e. fresh, frozen, canned , etc.) and/or the processing methods used (i.e. smoked, breaded, etc.).

5.2.6 **Type of packaging** could be cartons, boxes, bags, cases, drums, barrels, pallets, etc.

5.2.7 **Lot identifier / Date code** is the lot identification system developed by a processor to account for their production of fish and fishery product thereby facilitating traceability of the product in the event of public health investigations and recalls.

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14 To be read in conjunction with Appendix V

15 *Guidelines for the Development of Equivalence Agreements Regarding Food Import and Export Inspection and Certification Systems* (CAC/GL 34-1999)

16 *Guidelines for Generic Official Certificate Formats and the Production and Issuance of Certificates* (CAC/GL 38-2001)

5.2.8 **Means of transport** should describe the flight/train/truck/container number, as appropriate and the name of the air carrier, vessel, etc.

5.2.9 **Attestation** is a statement confirming the product or batches of products' conformity with regulatory requirements of the importing or exporting country or other international requirements.

5.2.10 **Original Certificate** should be identifiable and this status should be displayed appropriately with the mark "ORIGINAL" or if a copy is necessary, this certificate should be marked as "COPY" or terms of this effect. The term "REPLACEMENT" is reserved for use on certificates where, for any good and sufficient reason (such as damage to the certificate in transit), a replacement certificate is issued by the certifying officer.

5.2.11 **Page numbering** should be used where the certificate occupies more than one sheet of paper.

5.2.12 **Seal and signature** should be in a colour different to that of the printing to minimize the risk of fraud.

ANNEX II

PROPOSED DRAFT MODEL INSPECTION CERTIFICATE
covering Fish and Fishery Products
(At Step 3 of the Procedure)

(*LETTERHEAD or LOGO*) Reference number: _____

Country of Dispatch:	Tel:
Competent Authority:	Fax:
Inspection Body:	E-mail: (optional)

I. Details identifying the fishery products

Description - Species (scientific name)	State or type of processing	Type of packaging	Lot Identifier/ date code	Number of packages	Net weight
			Sum:		

Temperature required during storage and transport: _____ °C

II. Provenance of the fishery products

Address(es) and/or Registration number(s) of production establishment(s) authorized for exports by competent authority:

_____

_____

Name and address of consignor: _____

_____

III. Destination of the fishery products

The fishery products are to be dispatched from: _____
(Place of dispatch)

to: _____
(Country and place of destination)

by the following means of transport: _____

Name of consignee and address at place of destination: _____

_____

IV. Attestation

The undersigned official inspector hereby certifies that at the time of inspection:

1) The products described above originate from (an) approved establishment(s) and

2) have been handled, prepared or processed, identified, stored and transported under a competent HACCP and sanitary programme consistently implemented and in accordance with the requirements laid down in Codex Alimentarius' Recommended International Code of Practice for Fish and Fishery Products, CAC/RCP xx-xxxx.

3) Comply with Codex Alimentarius's Standard for (xxxxxxx fish), CODEX STAN xx-xxxx.

Done at _____ on _____ 20 ___
(Place) (Date)

(*SEAL*)

_____ _____
(Signature of official inspector) (Name and official position)

ANNEX III

(*LOGO*)

(COUNTRY)

(NAME OF COMPETENT AUTHORITY)

STATEMENT CONCERNING RADIOACTIVITY LEVEL IN FISH

ISSUED BY (NAME OF THE INSPECTION BODY) FOR FISH AND FISHERY PRODUCTS

As Addendum to Sanitary/Inspection Certificate no.: _____

One of the main tasks of (Name of the Inspection Body) for fish and fishery products is to guarantee the wholesomeness and good quality of fish and fishery products exported from (Name of Country).

The level of radioactive caesium 134 and caesium 137 in fish of commercial value is monitored by the (Name of Competent Authority). The monitoring programme started in (year) and in no instances the level of radioactivity has been found to exceed the natural background level.

The detection limit for this analysis is … Bq/kg for caesium 134 and caesium 137 combined.

(Name of Inspection Body)

(Sign.) (Sign.)

Director General of (Name of Competent Authority) Head of (Name of Division)

Done at _____ on _____ 20 ____
(Place) (Date)

(*SEAL*) _____ _____
(Signature of Official Inspector) (Name and official position)

ANNEX IV

(*LOGO*)

(COUNTRY)

(NAME OF COMPETENT AUTHORITY)

STATEMENT CONCERNING TRACE METALS IN
(NAME OF FISH SPECIES + SCIENTIFIC NAME)

ISSUED BY (NAME OF THE INSPECTION BODY) FOR FISH AND FISHERY PRODUCTS

As Addendum to Sanitary/Inspection Certificate no.: _____

One of the main tasks of (Name of the Inspection Body) for fish and fishery products is to guarantee the wholesomeness and good quality of fish and fishery products exported from (Name of Country).

To this end, microbiological, chemical and organoleptical analyses are performed.

Chemical analyses of the following trace metals have been performed for (Name fish species + scientific name), all values are in milligrams per kg wet weight:

Mercury (Hg)	:	……..
Cadmium (Cd)	:	……..
Lead (Pb)	:	……..
Other metals	:	……..

These concentrations represent normal values for fish caught in open sea. It will be seen that all values are low, and well below permissible concentrations for those trace metals where limiting values have been given by international regulating bodies.

(Name of Inspection Body)

(Sign.) (Sign.)

Director General of (Name of Competent Authority) Head of (Name of Division)

Done at _____ on _____ 20 ____
(Place) (Date)

(*SEAL*) _____ _____
(Signature of Official Inspector) (Name and official position)