codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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ALINORM 97/18

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION
Twenty-second Session
Geneva, 23-28 June 1997

REPORT OF THE TWENTY-SECOND SESSION OF THE CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Bergen, Norway, 6-10 May 1996

Note: This document incorporates Codex Circular Letter 1996/17-FFP

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CX 5/35.2

CX 1996/17-FFP
May 1996

TO:
- Codex Contact Points
- Interested International Organizations
- Participants at the 22nd Session of the Codex Committee on Fish and Fishery Products

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

SUBJECT: Distribution of the Report of the 22nd Session of the Codex Committee on Fish and Fishery Products

A) MATTERS FOR ADOPTION BY THE 22nd SESSION OF THE CODEX ALIMENTARIUS COMMISSION

Proposed Draft Guidelines at Step 5 of the Procedure

1. Proposed Draft Guidelines for the Sensory Evaluation of Fish and Shellfish (para. 75, Appendix II)

Governments wishing to submit comments on the implication which the above document may have for their economic interests should do so in writing in conformity with the Procedure for the Elaboration of Codex Standards and Related Texts at Step 5 to the Secretary, Joint FAO/WHO Food Standards Programme, FAO, via delle terme di Caracalla, 00100, Italy before **15 December 1996**.

B. DOCUMENTS TO BE ELABORATED FOR GOVERNMENT COMMENTS PRIOR TO THE NEXT SESSION OF THE COMMITTEE

Proposed Draft Code of Practice at Step 3

2. Proposed Draft Code of Practice for the Products of Aquaculture (para. 62)

The Proposed Draft Code of Practice for the Products of Aquaculture, as contained in document CX/FFP 96/7, was returned to Step 3 for further comments and redrafting in the light of the comments received and the discussions of the Committee. Governments and international organizations are invited to present additional comments on the text to the Secretary, Joint FAO/WHO Food Standards Programme, FAO, via delle terme di Caracalla, 00100, Rome Italy **before 15 September 1996**.

C. REQUEST FOR COMMENTS AND INFORMATION

Proposed Draft Guidelines

3. Proposed Draft Appendix to the Guidelines Levels for Methylmercury in Fish (CAC/GL 7-1991) Definition of Predatory Species to which the Higher Level of Methylmercury Applies (para. 79)

Countries are invited to identify families of fish which contain naturally high levels of methylmercury, in order to prepare a list which will be circulated at Step 3 of the Procedure.

Governments wishing to present comments on point 3. above are invited to do so to the Secretary, Joint FAO/WHO Food Standards Programme, FAO, via delle terme di Caracalla, 00100, Rome Italy, with a copy to the Chairman of the Committee, Dr. J. Race, Norwegian Food Control Authority, P.O. Box 8187, Dep., 0034 Oslo, Norway **before 15 December 1996**.

Note

4. Proposed Draft Model Certificate for Fish and Fishery Products (para.8)

The Proposed Draft Model Certificate will be circulated at Step 3 in a separate Circular Letter.

SUMMARY AND CONCLUSIONS

The summary and conclusions of the 22nd Session of the Codex Committee on Fish and Fishery Products are as follows:

Matters for adoption by the Commission:

The Committee:

- agreed to advance to Step 5 the Proposed Draft Guidelines for the Sensory Evaluation of Fish and Shellfish (para. 75, Appendix II)

Other matters of interest to the Commission:

The Committee:

- agreed to return to Step 3 the Proposed Draft Revised Codes of Practice for Frozen Fish, Minced Fish, Fresh Fish, Canned Fish, Frozen Shrimps and Prawns, Molluscan Shellfish, Salted Fish, Smoked Fish for redrafting according to the recommendations made during the session (para. 57)

- agreed to return the Proposed Draft Code of Hygienic Practice for Frozen Surimi for redrafting at Step 3 by the Delegations of Japan and the United States, using the same approach as in the Revised Codes (para. 55)

- agreed to return to Step 3 the Code of Practice for the Products of Aquaculture for additional comments and redrafting (para. 62)

- decided to apply the current procedure for the inclusion of additional species in the standards to four proposed species (sardines; tuna and bonito) (para. 25-28)

- agreed to prepare a list of fish families which contain naturally high levels of methylmercury for the next session of the Committee and to inform the CCFAC of the difficulties pertaining to the definition of "predatory fish" (para. 79)

- decided to initiate the drafting of a model certificate for fish and fishery products (para. 8)

- decided to initiate the elaboration of standards for molluscan shellfish, smoked fish and salted herring (paras. 81-83)

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LIST OF APPENDICES

OPENING OF THE SESSION (Agenda Item 1)

1. The Codex Committee on Fish and Fishery Products held its Twenty-second Session in Bergen, Norway, from 6-10 May 1996, by courtesy of the Government of Norway, under the Chairmanship of Mr. John A. Race, National Food Control Authority. The session was attended by 116 delegates from 36 member countries and 2 international organizations. A complete list of participants is included as Appendix I to this report.

2. The session was opened by Mr. Viggo Jan Olsen, Director-General of Fisheries, who recalled that Norway had always strongly supported the work of Codex, especially as host country for the Committee on Fish and Fishery Products. He emphasized the importance of Codex standards and related texts in the context of the World Trade Organization Agreements on Sanitary and Phytosanitary Measures and Technical Barriers to Trade, and the need for committees to ensure that their decisions were based on scientific evidence and regularly reviewed. This also contributed to develop consumer confidence with respect to food safety.

3. Recalling that member countries had constantly demonstrated their active commitment to the work of the Committee, as evidenced by successful revision of the standards, he wished participants all success in their discussions.

ADOPTION OF THE AGENDA (Agenda Item 2)[1]

4. The Committee adopted the Provisional Agenda as proposed, and agreed that an informal Working Group chaired by the Delegation of the United Kingdom would consider general aspects of the revision of the Codes of Practice, in order to facilitate the discussion of Agenda Item 7, which would also include the Proposed Draft Code of Practice for Frozen Surimi (Agenda Item 9).

MATTERS REFERRED TO THE COMMITTEE BY THE CODEX ALIMENTARIUS COMMISSION AND OTHER COMMITTEES (Agenda Item 3)[2]

5. The Committee was informed that the 10th Session of CCASIA had agreed to forward the Proposed Draft Standard for Fish Crackers and the Proposed Draft Standard for Dried Salted Anchovies to the Executive Committee for adoption at Step 5, following which the drafts would be circulated for comments at Step 6 and submitted to the next CCFFP Session for consideration at Step 7.

Certification of fishery products

6. It was recalled that following earlier consideration of this matter by CCFFP and CCFICS, the 4th Session of CCFICS had considered a document prepared by Canada proposing essential requirements to be included in certificates for fish and fishery products and decided to refer it to CCFFP for further elaboration. It was also agreed that CCFICS would consider the feasibility of developing general guidelines concerning official certificates at its next session. In this perspective, the Committee discussed the opportunity of undertaking specific work on fish certificates and had an exchange of views on the document, presented for information only at this stage.

7. Several delegations and the Observer from the EC stressed the importance of certification for the facilitation of international trade in fishery products and the need to develop international guidelines, while allowing for enough flexibility, especially according to the hazards involved and the import

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[1] CX/FFP 96/1

[2] CX/FFP 96/2 (including the Draft Model Certificate as Annex 1)

requirements. While recognizing harmonized certification alone would not address all the issues relating to import/export control, the Committee generally agreed on the need to proceed with this work. It was also noted that specific consideration should be given to the following aspects: the requirements for identification of the processing establishment, whether that should be by name or by code, and the exporter; the reference to destination; the identification of a lot including different species if processing and presentation were identical.

8. The Committee agreed that, subject to approval by the CCEXEC, a proposed draft model certificate would be prepared by Norway and Canada in the light of the discussions of the present session, and circulated at Step 3 for consideration by the next session, with the understanding that CCFICS would be kept informed of this work.

METHODS OF ANALYSIS FOR FISH AND FISHERY PRODUCTS (Agenda Item 4)[3]

9. The Committee noted that the Codex Committee on Methods of Analysis and Sampling (CCMAS) at its 20th Session had decided to recommend to the Commission the deletion of CAC/RMs (Codex Methods of Analysis and Sampling) and to encourage Commodity Committees to replace them with the original references (ALINORM 97/23, para. 52).

Determination of Salt Content in Salted Fish and Dried Salted Fish of the *Gadidae* Family

10. The Delegation of Germany explained the method elaborated by Germany and Norway and stated that it had the lowest standard deviation among all methods considered that were simple and available in literature. The Committee was informed of on-going collaborative studies in Germany on this method.

11. The Committee decided to accept the method and to forward it for endorsement by the CCMAS along with performance characteristic data[4] which would become available in August.

12. In response to the request by the CCMAS of information on possible problems in indirect determination, the Committee agreed that the indirect determination of salt would not raise problems.

Estimation of Proportion of Fish Fillet and Minced Fish Flesh

13. The Committee noted that the WEFTA method to determine the proportion of fish fillet and minced fish flesh in quick frozen fish sticks (fish fingers) had been tested with cod, pollack and hake.

14. The Delegation of South Africa pointed out possible problems when using this method for soft-textured fish, such as certain hakes, and proposed to submit data on its application to various species of hake in the Southern Hemisphere. The Delegation of India also expressed its willingness to study the applicability of the method to tropical fish species.

15. The Committee decided to reintroduce the method into the standard and to forward it for endorsement by the CCMAS along with performance characteristic data after the completion of collaborative studies ongoing in Germany and the United Kingdom.

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[3] CX/FFP 96/3 (methods proposed by Germany and Norway); CRD 1 (comments from South Africa); CRD 18 (comments from USA: "A Status Report on the Weight Determination Methods for the Codex Committee on Fish and Fishery Products")

[4] The following instructions should be followed when forwarding data to CCMAS: "Recommendations for a Checklist of Information Required to Evaluate Methods of Analysis Submitted to the CCMAS " (Volume 13, Part III)

Determination of Net Weight of Products

16. Following the decision made at the last session to study net weight determination in all standards, the Delegation of the United States presented the review of methods they had carried out for both canned products and frozen products covered by glaze in comparison with methods used in several countries, and pointed out the differences found in the review: description of definitions (frozen products) versus procedures (canned products), sieve, temperature, etc.. It was more difficult to select appropriate and consistent methods for frozen products than for canned products where little difference existed between methods. It was also stated that these methods needed performance characteristics in order for the Committee to determine their adequacy.

17. The Committee encouraged Member countries to perform comparative studies on the methods of net weight determination prescribed for existing Codex Standards for quick frozen and canned products to obtain performance characteristics and also to compare them with nationally used methods with the understanding that quick frozen shrimps and prawns should be given the highest priority (see next paragraph). The results should be sent to the USA for collation and consideration by the next session.

18. The Committee decided to reinstate as Section 7.3.2 of the Codex Revised Standard for Quick Frozen Shrimps and Prawns, the method for determination of net weight of products covered by glaze (Section 7.6 of the original standard, CODEX STAN 92-1981) as the Committee did not recall any decision to delete it.

FOOD ADDITIVES IN FISH AND FISHERY PRODUCTS (Agenda Item 5)[5]

19. The Committee recalled that the 27th Session of the Committee on Additives and Contaminants had not endorsed the additives provisions in the revised standards as they did not adequately follow the General Principles for the Use of Food Additives and the Preamble of the General Standard for Food Additives (GSFA); they had therefore been circulated for further comments and consideration. The Committee was also informed of further developments concerning the clarification of relations between the CCFAC and commodity committees in the framework of the GSFA.

20. The Committee agreed that the additives provisions should be amended according to the request of the CCFAC, as follows: additives with no ADI allocated by JECFA should be deleted from the list; when the ADI was "not specified (NS)", the additives should be allowed under conditions of "Good Manufacturing Practice (GMP)". These changes would be incorporated into a revised paper which would be forwarded for endorsement to the next CCFAC session.

21. The Committee agreed that technological justification, as provided earlier to CCFAC when the provisions were endorsed, was still valid for the revised standards. Notwithstanding the extensive comments received on the inclusion of other additives in the standards, the Committee noted that no relevant technological justification had been put forward to support these proposals, and consequently reasserted its earlier decision to leave the additives provisions otherwise unchanged.

22. While recalling its earlier decision to allow the use of thickening agents for canned products when applicable, the Committee agreed to add the phrase "other than oil, water or brine" after "for use in packing medium only," for further clarification.

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[5] CX/FFP 96/4, Add.1 (comments of Czech Republic, Russia, Japan, Poland) and Add.2 (Spain), CRD 2 (USA), CRD 15 (Sweden), CRD 16 (France), CRD 19 (Slovak Republic), CRD 12 (International Food Additives Council)

INCLUSION OF ADDITIONAL SPECIES IN FISH STANDARDS (Agenda Item 6)[6]

23. The Committee noted that the Commission at its 21st Session had invited countries wishing to include additional species to the Definitions for Shrimps and Prawns; Sardines; Tuna and Bonito to submit relevant data on taxonomy, resources and processing technology to the Committee and agreed that the Accelerated Procedure should be used for the addition of species to the relevant standards.

24. The Committee decided to reinstate the two species, *Sardinella fimbriata* and *Sardinella srim* in the Revised Standard for Canned Sardines and Sardine-Type Products as these had been accidentally omitted. The Committee also decided to add *Etrumeus whiteheadi* in the same standard as *Etrumeus teres*, already included in the standard had been reclassified in 1983 as the former and since had been used as its synonym.

25. After some discussion on the proposals for species to be included in the Standards, the Committee reconfirmed that the current procedure[7] should be applied. As it was pointed out that these proposals did not meet all of 4 requirements, especially the fourth one, the Committee decided to request organoleptic testing of the proposed species by 3 laboratories which would reported back to the next session, while acknowledging the desire of the Commission to proceed as quickly as possible. Proposing countries were requested to provide samples of the proposed species and other countries were asked to provide comparison samples to lead countries upon request. The Delegations of Germany (lead country), Finland and France offered to test the products of the following species against the products of species currently included in the relevant standards:

Standard	Proposed species	Proposed by
Canned Sardines and Sardine-Type Products	*Clupea bentincki*	Chile
Canned Tuna and Bonito	*Allothunnus fallai* *Auxis rochei* *Auxis thazard*	USA Thailand, USA Thailand, USA

26. The other proposals of Chile, *Cervimunida johni* and *Pleuroncodes monodon*, for inclusion in the Standards for Quick Frozen Shrimps and Prawns and for Canned Shrimps and Prawns were also considered. The Committee discussed whether the proposed species should be compared to shrimps and prawns or to lobsters and could not reach a conclusion. The Delegation of Chile stated that it would present the results of studies carried out in Chile on the classification of these species for consideration by the next session. It was pointed out that as the family *Galatheidae* was not included in the current standards for lobsters or for shrimps and prawns, amendment of the Product Definition would be required if this family was added to the standards. The Observer from the EC indicated that the term "shrimp" could not be used to designate these species in the EC.

27. The Delegation of the United States informed the Committee that *Pleuroncodes monodon* was called "langostino" in that country and that the use of the terms "lobster", "shrimp" or "prawn" was not allowed.

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[6] CX/FFP 96/5-I (comments from South Africa); CX/FFP 96/5-II (Chile); CRD 3 (USA); CRD 6 (Morocco); CRD 10 & 10-Add.1 (Thailand).

[7] ALINORM 79/18, para. 111, ALINORM 79/13, para. 339 & CL 1995/30-FFP

Status of "Inclusion of Additional Species in Fish Standards"

28. The Committee agreed to return the proposals for additional species to Step 3 of the Accelerated Procedure pending a report of organoleptic testing.

REVISION OF THE CODES OF PRACTICE FOR FISH AND FISHERY PRODUCTS (Agenda item 7) [8]
PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR FROZEN SURIMI (Agenda Item 9) [9]

29. The Committee recalled that its last session had agreed to undertake the revision of the following codes under the direction of lead countries responsible for coordinating the work: Frozen Fish and Minced Fish (Canada), Fresh Fish (United Kingdom and Ireland), Canned Fish (France), Frozen Shrimps and Prawns (Mexico), Molluscan Shellfish (Netherlands), Smoked Fish (Denmark), Salted Fish (Norway). As agreed by the last session, those countries had held a Working Group in London in September 1995 in order to coordinate the revision of the codes, and to agree on a harmonized approach. The Committee expressed its appreciation to the Delegation of the United Kingdom, which presented the conclusions of the WG (CRD 7), and all countries involved for their efforts and the significant progress achieved in this considerable task. It further agreed to focus the discussions on major issues which would determine the future development of the codes: terminology used for definitions; layout of the codes; simplification of existing texts; relevance of risk assessment; possible merging of certain codes.

30. The Observer from the EC expressed the view that, following the revision of the General Principles of Food Hygiene, specific codes of practice should be limited to aspects which were not covered by the GPFH. The Chairman recalled that this option had received significant support at the last session of the Committee on Food Hygiene, although some delegations were in favour of retaining both general and specific hygiene requirements.

31. Some delegations felt that it should be clarified whether the codes were destined primarily to be used by governments or the industry, as the requirements to be included might be different. The Representative of FAO, while emphasizing the involvement of FAO/FII in the implementation of HACCP training programmes, stressed that the codes were of great value as guidance to the industry, especially in developing countries; simplification should therefore be carried out while taking into account those needs. He also noted that HACCP based systems were used not only to ensure safety but also in relation to quality and trade requirements. It was however recalled that the Codes were recommended to governments, as indicated in the Introduction.

32. The Committee had an exchange of views on the inclusion of non-essential requirements removed from the standards, and reasserted its earlier view that they should be included in the codes; the Committee agreed that consideration should be given to the development of additional standards where these would assist in the development of the codes (see also paras. 81-83)

33. The Committee considered the conclusions of the informal Working Group (CRD 20)[10] held during the session to discuss the issues indicated above and made the following recommendations, on the basis of the example proposed (Code of Practice for Frozen Fish).

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[8] CX/FFP 96/6-A,B,C,D,E,F,G,H and Add.1 (comments of New Zealand, Russia, Spain), CRD 4 (Morocco), CRD 5 (Chile), CRD 6 (New Zealand)

[9] CX/FFP 96/8 (prepared by Japan and USA), CRD 21 (additional comments of Japan)

[10] The WG included Brazil, Canada, China, Cuba, Denmark, Finland, France, Germany, India, Ireland, Mexico, Morocco, Netherlands, New Zealand, Norway, South Africa, Spain, Thailand, United Kingdom, Uruguay, USA

Terminology

34. The Representative of WHO proposed to make a clear distinction between the use of the HACCP system to ensure food safety and the application of a similar system to ensure compliance with non-safety mandatory requirements. After detailed discussion of this issue and in order to avoid repetition of definitions, section 3. was redrafted as follows:

> **Introduction**
>
> The Hazard Analysis Critical Control Point (HACCP) is a science-based system which identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a management system (see Figure 1) which identifies specific hazards and control measures rather than relying on end-product testing.
>
> This section looks at the application of HACCP to the production of frozen fish meeting health and safety requirements. Similar principles can also be applied to non-safety mandatory requirements (defect action point analysis).
>
> **Principles**: delete first sentence

In order to clarify the introduction, the following definition was included:

> **Non safety mandatory requirements** means the requirements contained in the Codex Standards for Fish and Fishery Products, which cover description, essential quality and composition, and labelling of the products, but do not include optional product specifications.

35. While considering the use of a HACCP based system for such requirements, the Committee discussed the name of the point where control should be exercised to correct defects. It was agreed that, as the use of "control point" would create confusion with the Critical Control Point of the HACCP system, reference should be made to "Defect Action Point" (DAP) in the decision tree. Some delegations however were of the view that the concept of "control" applied in both cases and the term "Defect Control Point" should be used. It was pointed out that in any event, the definitions in the Codes amply clarified the issue.

36. It was agreed to align the definitions applying both to CCPs and DAPs with those in the GPFH, and to add to the relevant definitions "for the purpose of this code this also applies to a DAP".

37. The definition of **glazing** (including the use of clean sea water) was aligned on the definition included in the relevant standard. The definition of **disinfection** was aligned with the revised GPFH. As regards the definition of Decomposition, it was agreed to add a reference to texture as the revised standard referred to odour, flavour and texture, whereas colour was taken into account in the Proposed Draft Code for Sensory Evaluation.

Layout of the Codes

38. In the perspective of the revision of the GPFH, the Committee agreed to introduce a **Prerequisite Programme**, including essential hygiene requirements to be complied with before the actual HACCP system was implemented. This section would not include summary boxes relating to CCPs.

39. The introduction of the section concerning Fishing Vessel Hygiene was amended to indicate that the requirements applied "as appropriate", as several delegations pointed out that small traditional fishing vessels, accounting for a large part of their fish supply, could not comply with them.

40. The Committee had an exchange of views on the flow chart and some delegations felt that it should be put in an annex to clarify that it was not prescriptive but intended as an example; it was also pointed out that in the codes elaborated by CCFH, HACCP examples were presented in an annex. Notwithstanding, the Committee agreed that the flow chart should be included within the section on Operating Practices as an example, since the CCPs and DAPs referred directly to the process presented in the diagram.

Simplification of the codes

41. The Committee agreed that simplification should be carried out carefully, allowing for flexibility of use both by governments and industry, as the text should be of practical use to facilitate trade, while detail should be removed and presentation improved. The Committee also clarified that records keeping would apply only to the HACCP system and not to DAPs.

Risk Assessment

42. The Committee agreed that it would be premature to undertake risk assessment work at this stage, as this issue was currently under consideration by general subject committees, and could be further considered in the future.

Merging of Codes

43. The Committee agreed that the Codes of Practice for Fresh Fish, Frozen Fish and Minced Fish would be combined under the direction of the Delegations of Canada and the United Kingdom, special attention being given to the articulation between general prerequisite programmes and operation requirements. The Representative of FAO pointed out as regarded Fresh Fish, consideration should be given to the hazards associated with parasites other than nematodes in view of the implications for public health.

44. The Committee considered the other codes and noted the aspects that should be taken into consideration in the revision process.

FROZEN SHRIMPS AND PRAWNS

45. The Delegation of Mexico indicated that while the initial revision had focused essentially on the incorporation of the HACCP approach, they intended to proceed with the simplification and redrafting of provisions, especially relating to quality, and interested countries were invited to participate in the revision. The Delegation also confirmed that the Code was general in scope and would cover fresh shrimps and fresh water shrimps.

46. The Committee agreed to delete the definition of "shrimps" referring to families in the Scope for consistency, as the definition of products was included in the standards, not in the codes. The Committee noted that when shrimps were washed with chlorinated water, consideration should be given to residual levels and recommended levels for use in processing; it was agreed that the advice of the CCFH would be sought to address this concern.

CANNED FISH

47. The Delegation of Japan asked for clarification on the reference to histamine only as a safety hazard, as more emphasis should be put on bacterial contamination. The Delegation of France indicated that this question was addressed in general terms in the Essential Health and Hygiene Requirements and it was noted that further comments could be addressed to France, as it would proceed with the revision of the code.

MOLLUSCAN SHELLFISH

48. The Delegation of the Netherlands highlighted the specificity of this code which dealt only with safety issues. No standard existed for molluscs and consideration should be given to the development of such a standard (see also para 81). The format of the Code was slightly different from the other codes; in particular, growing area requirements had been included before general hygiene requirements, which would be presented as a Prerequisite programme, as decided earlier.

49. As the monitoring of the growing area was the main issue in the revision of the code for molluscan shellfish, the systems applied in the EC and in the USA had been presented in an annex as examples of good monitoring systems. The Observer from the EC pointed out that a scientific review of both systems was underway, for consideration by the Scientific Committee for Foods, and that countries may choose to apply one or the other if they were found to be equivalent. He also stressed the differences between various types of molluscan shellfish with respect to the possibilities of decontamination. The Committee agreed to limit the Scope of the Code to bivalves molluscs at this stage.

50. The Representative of WHO informed the Committee that a Red Tide Task Force had been formed in Eastern Asia and invited concerned countries to submit data and participate in its activities. The Delegation of the Philippines indicated that in the framework of this programme, monitoring was carried out in certain growing areas with an especially high risk and the areas closed for production when necessary. The Delegation of Thailand also noted that in the case of PSP, contaminated areas had to be abandoned altogether if the toxin could not be eliminated. The Committee agreed that specific consideration should be given to biotoxins in the revised code.

SALTED FISH

51. The Delegation of Norway pointed out that the scope of the code was general whereas the standard applied only to heavy salted fish, which created some difficulties in the revision. The Committee confirmed that the code should apply to all salted fish and noted that further information would be required, especially on anchovies and herring. The Committee noted that some light salted herring products required freezing in view of nematode contamination, and this question should also be addressed.

52. As regarded the salting process, the Committee noted the practical difficulties of complying with the temperature requirement of 10°C in tropical and temperate conditions; in the wet salting process, at the salting stage, the need to control the hazards (defects) of "pink" and "dun" should be further investigated.

SMOKED FISH

53. The Delegation of Denmark highlighted some of the issues to be addressed by the revised code, especially the differences between the hot-smoking and cold-smoking processes, the evolution of processing technology and safety concerns, and the need to incorporate information concerning smoked fish production in tropical areas. The Committee considered the opportunity of combining the Smoked Fish and Salted Fish Codes since certain aspects of processing were similar, and agreed to continue with two separate codes at this stage.

54. The Delegation of Morocco suggested that, instead of referring to the absence of parasites, for inspection purposes, it would be preferable to refer to the processing (freezing) time and temperature.

FROZEN SURIMI

55. The Committee confirmed that this code should also be redrafted following the general principles decided for the revised codes. The Committee accepted the offer of Japan and the United States to continue the work and encouraged other countries to comment on a revised draft.

OTHER CODES

56. The Committee considered the feasibility of undertaking the revision of other codes, as discussed at the last session. The Delegation of Brazil informed the Committee that, although they were currently working on the development of a code for lobsters as a matter of high priority, and developing the application of the HACCP system, they needed more time to consider the implications which the amendments decided at this meeting might entail for their national industry, and could not undertake a comprehensive revision.

Status of the Draft Revised Codes of Practice for Fish and Fishery Products and Proposed Draft Code of Hygienic Practice for Frozen Surimi

57. The Committee agreed that the codes should be returned to Step 3 to be redrafted according to the above recommendations for circulation and consideration by the next session, and welcomed the offer of the following countries to proceed with the revision of the codes, with the participation of all interested countries:

Canada/UK	:	Frozen Fish, Minced Fish, Fresh Fish
France	:	Canned Fish
Mexico	:	Shrimps and Prawns
Netherlands	:	Molluscan Shellfish
Norway	:	Salted Fish
Denmark	:	Smoked Fish
Japan/USA	:	Frozen Surimi

The combined Fresh Fish/Frozen Fish/Minced Fish Code would be forwarded to coordinating countries to serve as a template for the revision of the other codes. The Chairman thanked the responsible countries and all delegations for their constructive approach and active participation, while noting that significant progress had been achieved.

PROPOSED DRAFT CODE OF PRACTICE FOR THE PRODUCTS OF AQUACULTURE[11] (Agenda Item 8)

58. The Representative of FAO introduced the draft which had been revised by FAO Fisheries Utilization and Marketing Service (FIIU) in the light of the discussions held at the last session of the Committee and information received from Canada, Japan, USA and WHO. He stressed the importance of obtaining more comments from member countries, particularly from major aquaculture producing countries in Asia, and informed the Committee of the programmes developed by FAO to implement HACCP and ensure the safety of small-scale aquaculture products.

59. The Representative of WHO indicated that a number of producing countries were currently examining their food safety regulations concerning aquaculture, in view of considerable health problems due to trematodes as a result of eating raw or inadequately cooked fish or aquaculture products; all health and safety issues should therefore be thoroughly reviewed in the revision process. It was noted that FAO and WHO were planning to organize a joint consultation on food safety issues associated with products from aquaculture in the Spring of 1997, the conclusions of which would assist in the redrafting of the code.

60. The Committee discussed whether the document should cover all aquaculture products or only those intended for international trade. Some delegations felt that the document did not apply to small scale fish farming common in their countries. Other delegations indicated that the document should cover aquaculture in general and the Committee agreed to proceed with a single code, while recognizing that extensive work was needed to address these issues.

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[11] CX/FFP 96/7; CRD 13 (comments from USA); and Comments from Japan.

61. The Observer from the EC expressed the view that certain sections of the Code related to animal health, which was the competence of the Office International des Epizooties (O.I.E.), and should be deleted. The Chairman noted that OIE would be informed of the work of the Committee.

Status of the Proposed Draft Code of Practice for the Products of Aquaculture

62. The Committee agreed that the Proposed Draft should be returned to Step 3 for further comments on the issues raised, redrafted by FAO and WHO in the light of those comments and circulated for consideration by the next session.

PROPOSED DRAFT GUIDELINES FOR THE SENSORY EVALUATION OF FISH AND SHELLFISH (Agenda Item 10)[12]

63. The Committee recalled that following earlier discussions on inspection procedures, its last session had considered a comprehensive code of practice for Sensory Evaluation[13] and agreed that the paper be redrafted by the Secretariat as Guidelines, focusing on criteria for the interpretation of the standards and for inspection purposes, taking into account the comments received.

64. While discussing the general orientation of the Guidelines, the Committee agreed that they should not be too prescriptive and that some sections needed to be amended accordingly. There was general consensus on the necessity to include specific provisions on training, especially with a view to harmonizing inspection procedures and the Committee welcomed the offer of the Delegation of the United States to draft a section on standard training procedures.

65. The Observer from the EC expressed the view that this work was of great importance to facilitate international trade and informed the Committee that sensory evaluation was required for fish and shellfish by Directive 91/493/CEE, while evaluation criteria defined by Regulations 103/76 and 104/75 were currently under revision. The Observer, supported by the Delegation of France, also pointed out that in view of the difficulties inherent to such training, intercalibration tests should be carried out for fish inspectors, and the Committee agreed that this aspect should be taken into account while developing training recommendations. The Committee considered the document section by section and made the following amendments.

66. In Section I. Scope, the Committee had an extensive discussion on the objectives of the Guidelines, as some delegations felt that only provisions relating to existing standards should be included, while others noted that the initial purpose of the Guidelines was of a more general nature. The Committee agreed to indicate that the guidelines also included provisions for requirements not covered by current standards but used for fish inspection purposes. A footnote was added to the effect that additional criteria might be included if new recommendations were made by the Committee.

67. In Section 2.2.2 Preparation Area, a reference to the light box for detection of parasites (initially in 2.2.3) was included as it related to sample preparation rather than evaluation. The list of equipment in Section 2.2.5 was modified accordingly.

68. In Section 2.2.3 Evaluation Area, the Committee agreed to include only a general statement concerning the hygienic condition of the area and to delete specific provisions in this respect. The Committee discussed the opportunity to require separate rooms for the evaluation of cooked and raw products, and agreed that this was not necessary if adequate measures were taken to minimize disturbing sensoric stimuli, and specific recommendations were included to this effect. Reference to the neutral colour of the area (walls, etc.) was also added, and the section on lighting was retained.

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12 CX/FFP 96/9, CRD 8 (comments of New Zealand), CRD 14 (USA)

13 CX/FFP 94/10, prepared by Mr. P. Howgate (UK), FAO consultant

69. The figure illustrating sections 2.2.2 and 2.2.3 was deleted, as the text was sufficiently explicit. In Section 2.2.4, the Committee deleted a reference to ventilation and noted that water should not contain substances likely to interfere with sensory evaluation.

70. In Section 3.1 Collecting and transporting samples, the Committee agreed that sampling according to the Codex Sampling Plans for Prepackaged Foods may not be applicable for examining wholesomeness (para. 2). It was also agreed to allow some frozen fish assessment to be done on site (para. 4); to specify that temperature during transport to the laboratory should not exceed 2°C (para. 5); that temperature control may be necessary (para. 8); and that fresh and chilled products should be examined on the day they were received (para. 9).

71. In section 3.3 Cooking, some delegations felt that products presented with a coating or in sauce should be evaluated as consumed, whereas current provisions applied only to the evaluation of fish. The Committee however did not come to a conclusion on this point and, while leaving the section unchanged, agreed that further comments would be requested on this issue.

72. In Section 3.4, it was agreed that assessment should take into account the characteristics of species.

73. The Committee had an exchange of views on some of the criteria included in the Table and retained them as currently drafted, with the understanding that further work would be needed to define them more accurately for inspection purposes.

74. In Section 3.4.2, the reference to hot smoked products was deleted as this example might create confusion and these products were not covered in the Guidelines at this stage, while Section 3.4.3 was amended to make it less prescriptive for assessors (para. 4).

Status of the Proposed Draft Guidelines for the Sensory Evaluation of Fish and Shellfish

75. The Committee agreed to forward the Proposed Draft Guidelines, as included in Appendix II, to the Commission for adoption at Step 5, with the understanding that the section on training would be drafted later by the United States and circulated later for comments at Step 3.

DEFINITION OF PREDATORY SPECIES OF FISH TO WHICH THE HIGHER LEVEL OF METHYLMERCURY APPLIES (Agenda Item 11)[14]

76. The Committee recalled that it had been requested to establish a list of predatory fish, following the adoption by the Commission of Guideline Levels for Methylmercury in Fish of 0.5 mg/kg for non-predatory fish and 1 mg/kg for predatory fish, and that the last session had agreed to proceed with the establishment of a list on the basis of information provided by member countries.

77. As some delegations were in favour of one Guideline level, namely 1 mg/kg, while others supported a level of 0.5 mg/kg for most fish species and 1 mg/kg for fish at the end of the food chain, no consensus could be reached on this issue. However, the Committee agreed that the concept of predatory and non-predatory was not viable as most fish species traded were "predatory" but only a limited number of "predatory" fish species contained levels higher than 0.5 mg/kg. It was noted that in some cases, levels would exceed 1 mg/kg.

78. The Committee noted that the major difficulties met in the establishment of a list were due to the lack of definition for the term "predatory". The Committee stressed that all Codex texts including guideline levels should be based on sound science, and that health and safety implications for consumers should be taken into consideration.

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14 CL 1995/19-FFP; CX/FFP 96/10 (comments from Czech Republic, Egypt, France, Japan, South Africa, Spain, USA and New Zealand); CRD 4 (Morocco); CRD 5 (Chile); CRD 10 & 10-Add.1 (Thailand).

79. The Committee decided to compile a list of fish families containing naturally high levels of methylmercury for circulation at Step 3, while emphasizing that accidental or industrial contamination must be clearly separated from natural accumulation. The Committee further agreed that the CCEXEC, the Commission and the CCFAC should be informed of its conclusions and of the difficulties identified in the development of a list. Countries were encouraged to submit new data, especially on intake and monitoring of methylmercury in fish, such as presented at the last session by FAO[15], to the CCFAC for review of the Guideline Levels.

OTHER BUSINESS, FUTURE WORK, AND DATE AND PLACE OF NEXT SESSION (Agenda Item 12)

FUTURE WORK

80. The Delegation of Canada presented CRD 11 which considered possible future work on new standards. In view of its heavy workload the Committee agreed that priority should be given to those products for which codes of practice were being revised, and proposed to undertake the following new work in order to facilitate the revision of the codes, subject to the approval of the Executive Committee.

Standard for Molluscan Shellfish

81. The Committee agreed to develop a standard for molluscan shellfish and accepted the offer of the Netherlands to prepare a draft. Member countries were requested to provide comments on what type of products and what shellfish should be covered by the standard.

Standard for Smoked Fish

82. The Committee agreed to develop a standard for cold-smoked fish, the inclusion of other products to be considered at a later stage. Denmark, in collaboration with France and Norway, would prepare a draft for circulation before the next Session.

Standard for Salted Atlantic Herring

83. The Committee noted the increasing resources and expanding market of Atlantic herring, with greatly diversified and new products. Recognizing the complexity of herring products, the Committee decided for the time being to focus on the newly developed light-salted herring. Norway, in collaboration with Iceland and Germany, would prepare an information document on light-salted herring as well as a proposal for a draft for the next session, which would decide whether to proceed with the standard.

OTHER BUSINESS

84. The Committee noted that FAO had published a book[16] presenting updated information on the influence on fresh fish quality of handling practices on board, including catching methods, especially trawling. The Representative of FAO would undertake to compile information provided by member countries on the incidence of catching methods on fish quality for the next session.

85. The Committee reiterated the importance of greater participation of developing countries, especially those in tropical area where different conditions prevail, in developing codes and standards.

DATE AND PLACE OF NEXT SESSION

86. The Committee was informed that its next Session would be held in the Spring of 1998, the exact date and place to be determined between the Host Government and the Codex Secretariat.

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15 CX/FFP 94/15

16 "Fresh Fish Quality and Quality Changes" (H.H. Huss, FAO, 1996)

SUMMARY STATUS OF WORK

Subject Matter	Step	Action by	Document Reference in ALINORM 97/18
Guidelines on the Sensory Evaluation of Fish and Shellfish	5	CAC Governments	para. 75 Appendix II
Revision of the Codes of Practice: - Frozen Fish - Minced Fish - Fresh Fish - Canned Fish - Frozen Shrimps and Prawns - Molluscan Shellfish - Salted Fish - Smoked Fish	3	Canada and United Kingdom France Mexico Netherlands Norway Denmark Governments 23rd CCFFP	para. 57
Code of Hygienic Practice for Frozen Surimi	3	Japan/USA Governments 23rd CCFFP	para. 55
Code of Practice for the Products of Aquaculture	3	FAO/WHO Governments 23rd CCFFP	para. 62
Inclusion of Additional Species	3	Germany, France Finland 23rd CCFFP	paras. 25-27
Food Additives in Standards		CCFAC	para. 20
Methods of Analysis in Standards		CCMAS USA-23rd CCFFP	paras. 11,15 para. 17
Model Certificate for Fish and Fishery Products		CCEXEC Norway/Canada Governments 23rd CCFFP	para. 8
List of Predatory Species to which the higher level of methylmercury applies	3	CCFAC-CAC Secretariat 23rd CCFFP	para. 79
Proposals for New Standards		CCEXEC Norway,Denmark Netherlands Governments 23rd CCFFP	paras. 81-83

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PROPOSED DRAFT GUIDELINES FOR THE SENSORY EVALUATION OF FISH AND SHELLFISH

(At Step 5 of the Procedure)

PROPOSED DRAFT GUIDELINES FOR THE SENSORY EVALUATION OF FISH AND SHELLFISH

(At Step 5 of the Procedure)

I. SCOPE AND PURPOSE OF THE GUIDELINES

The guidelines are intended to be used by officials in regulatory bodies who need to use sensory methods when enforcing mandatory standards which include criteria based on sensory attributes of the products. Though the guidelines have been written with Codex standards in mind they include some provisions for products not covered by these standards but where sensory evaluation is used in the testing of fishery products for conformity with requirements.[1]

The objective of the guidelines is to ensure uniformity of application of standards by making recommendations for inspection purposes concerning the facilities required in sensory testing and the procedures for carrying out sensory tests.

II. FACILITIES FOR SENSORY EVALUATION

2.1 General observations

Sensory evaluation of fishery products for official inspection purposes should be carried out by adequately trained personnel (see Section IV), but the specific conditions of fish inspection should be taken into account when establishing requirements for facilities and evaluation procedures. These may be very different from the recommendations applied in research institutes or industry, and need not be as elaborate. In fact, the circumstances of fish inspection dictate that at times evaluations must be carried out with no facilities at all. Fish inspectors carry out their work at simple landing sites, at ports and inland markets, in factories and in inspection laboratories, and usually work singly, or perhaps in pairs, and rarely as members of a panel. They evaluate a specialised range of products, and use one sensory methodology - grading.

2.2 Inspection laboratories

2.2.1 Location and layout. Fish inspectors usually work from an office or research institute and an inspection laboratory should be provided in the premises used by the inspection service. Figure 1 illustrates a plan of a laboratory that would be suitable for use by inspectors for examining fishery products. The two rooms occupy a total of about 35 m^2 which should be sufficient for two or three persons to work there together without overcrowding. Preferably the facilities should be on the ground floor of a building and should have easy access for bringing in batches of fishery products.

Office accommodation, storage rooms, staff facilities, and possibly other test facilities should to be provided elsewhere in the premises. The evaluation area must not be used for chemical or microbiological analyses.

2.2.2 Preparation area. This area is to be used for the handling and storage of fishery products, and for the preparation of samples for sensory evaluation. It should be constructed so as to comply with the requirements of good manufacturing practices for the design and construction of fish processing establishments, and all equipment used in the area must also comply with the requirements for equipment used in fish processing establishments.

The preparation area should contain adequate facilities for the temporary storage of chilled and frozen fish, and of dry products like canned fish and cured fish.

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[1] Additional criteria may be included if new recommendations are made by the Committee

There should be one or more tables and benches for the preliminary handling and inspection of batches of material, and one table at least should be suitable for wet processing operations like filleting of fish and peeling of shrimps.

There should be a large sink for washing containers, ustensils and equipment used in the preparation and evaluation areas.

There should be a light box for detection of parasites and bones in fillets where their presence are criteria in local standards.

2.2.3 Evaluation area This area is intended for the sensory evaluation of fish and fishery products. There should be no preparation of products in this area other than final trimming of samples prior to cooking.

The area should be constructed and finished so that it can be maintained in a clean and hygienic state.

The area, ventilation, procedures and sample sequence should be organized to minimize disturbing sensoric stimuli. Also influence and disturbances from fellow evaluators and other personnel should be minimized. The colour of the evaluation area should be neutral.

The benches should be illuminated by fluorescent tubular lighting to give an intensity of around 1 000 lux/m^2. The lighting should not be coloured and be of artificial daylight or colour-matching quality, that is with a colour temperature in the region of 5 000-5 500 °K with a Colour Rendering Index of 90%. The lighting fixtures should be placed so that the evaluation area is evenly lit.

Drinking water should be available.

2.2.4 Services The rooms should be provided with an electricity supply of sufficient capacity to run large refrigerators and freezer cabinets and, if fitted, electrical cooking facilities. There should be a supply of potable water and preferably hot water, but this can be provided by water heaters. Water should not contain substances which could interfere with sensory evaluation. A gas supply, piped or bottled, might be needed for cooking equipment.

In tropical climates the evaluation area at least should be air conditioned.

2.2.5 Equipment The exact type and amount of equipment required will depend to some extent on the nature of the products to be inspected and the number and intensities of the examinations. The following are recommended for a general purpose facility for examining a range of fishery products, but mainly chilled and frozen products.

Preparation area

-light box for inspection of fillets for parasites and bones
-refrigerator
-freezer cabinet
-plastics fish boxes of 30-50 l capacity
-plastics or stainless steel trays, of a white or neutral gray colour, size approximately 50x40 cm
-plastics or stainless steel trays, size approximately 70x60 cm
-filleting boards, filleting knives, sharpening stone and steel
-butcher's saw (for cutting frozen fish)
-plastics or metal container for fish offal
-container for other rubbish
-assorted utensils and materials for cleaning, and disinfecting premises, equipment and utensils

Evaluation area

-double burner gas hob or double heater electric hob, (a gas or electric oven might also be required), with hood and extractor fan fitted above them
-microwave oven, large capacity, with variable power control
-glass or ceramic casseroles with lids, 500-750 ml capacity, suitable for use in a microwave oven
-saucepans with lids, 1.5 to 2 l capacity
-warming plates to keep dishes of cooked samples warm
-digital thermometer, range -30 to +100 °C
-direct reading balance, 500x1 g
-plastics waste container, lined with disposable plastics bags
-assorted kitchen utensils - knives, serving spoons, fish slices
-cutlery - table knives and forks - preferably disposable
-jugs and beakers, the latter preferably disposable, for water or other mouth rinsing agent
-where canned fishery products are inspected, equipment for inspection of cans - electric can-opener, tin-snips, micrometer, viewer
- unscented hand cleaner, disinfectant and rinsing material

2.3 Facilities for evaluations in factories

It is becoming increasingly common for food legislation, either general or specific to fishery products, to require that processing establishments have quality assurance systems in place. A quality assurance programme requires that samples be taken at appropriate places and times and be subjected to test, which will often be by sensory assessment. Whether or not a laboratory is required for this monitoring depends on circumstances. A small plant with simple processing could conduct all the testing required quite effectively on the processing line; a larger plant, particularly one making added-value products should have a quality control laboratory.

Inspectors are required to visit processing plants and to monitor the quality of products and the effectiveness of quality assurance programmes. If it is necessary as part of this excercise to test products then samples could be taken back to the offices of the inspection service, but it is often more convenient, and immediate, to evaluate the products in the factory. Fish processing companies should be encouraged to set up small test laboratories even where legislation does not specifically require that they institute quality assurance programmes, and where factories have laboratories for testing products by sensory evaluation then inspectors should be allowed to use them.

The evaluation area recommended in section 2.2.1 above would be suitable for a small to medium-sized factory. It would be large enough for two or three quality controllers to assess samples in reasonable comfort assuming office services are provided elsewhere and all fish preparation is carried out in the processing area of the factory.

2.4 Facilities at markets and landing sites

It can not be expected that test facilities will be provided at markets and landing sites, and indeed it is not necessary to provide them. For most purposes in official inspection it would be sufficient to evaluate the quality of products by appearance and odour, and if a more comprehensive examination is required then samples can be brought back to the offices of the inspection service.

III. PROCEDURES FOR SENSORY EVALUATION

3.1 Collecting and transporting samples

In most circumstances where fishery products are subjected to official inspection a decision is made about a batch of fish, for example, acceptance or rejection of a consignment of imported products, classification of batches of fish on a market into freshness grades. The decision is made on the basis of an examination of a sample drawn from the batch, and official regulations, or guidelines based on regulations, will usually

specify how the sample is to be taken, the number of sample units to be taken, and how the decision about the fate of the batch is made on the basis of the results of the examination.

Sampling should be carried out, as applicable, in accordance with the Codex Sampling Plans for Prepackaged Foods (CAC/RM 42-1969) and the General Guidelines on Sampling (under elaboration).

The variation in sensory properties in a batch of fish of the same origin and subjected to uniform handling is quite high and a reasonably large sample should be taken by the inspector, between 12 and 20 units would be suitable. Sensory analysis procedures used in fish inspection are rapid and are inexpensive to carry out, especially when compared with microbiological and chemical procedures, and the costs of the sensory evaluation should not be a major factor when deciding on the size of sample to

take. In some circumstances, for example the evaluation of the freshness of unfrozen fish, the sample is not destroyed and could be returned to the batch, hence not incurring any loss to the owner.

When collecting a sample for inspection the inspector should ensure that the procedures used for taking the sample, and the subsequent handling of the sample, do not materially affect its sensory properties. In some circumstances, for example inspection of unfrozen fish at landing sites and markets, and in factories, the samples can be inspected immediately and the question of possible changes do not arise. Where frozen fish is being inspected samples may be taken to the inspection laboratory for evaluation.

Where unfrozen fish has to be removed for evaluation it should be handled carefully to avoid damage and should be packed in ice or kept at a temperature not exceeding 2°C for transport back to the laboratory.

Frozen products should be transported in insulated or refrigerated containers. Small packs of products can be carried in insulated containers, but it might be necessary to use commercial refrigerated trucks for transporting large fish or blocks of frozen fish.

The inspector should make complete records of the taking of the sample(s) - description of the material, location of the sampled batch, registration number or any other official record of the premises, identification marks and process batch numbers, date, time and circumstances of the sampling, number of sample units taken and any code marks attached to them, the name of the inspector taking the sample, and how the samples were packed and returned to the inspection laboratory. The inspection service should provide a pre-printed form on which all this information can be entered.

The inspector should check that the sample is properly packed and where necessary, under temperature control before despatching it to the inspection laboratory. If the sample is not under the supervision of officials during transport the inspector should ensure that the sample can not be tampered with during the journey.

On receipt at the inspection laboratory, samples, if not evaluated immediately, should be stored under appropriate conditions. However fresh and chilled products should be examined on the day they are received. Products in either chill or frozen storage should be appropriately wrapped to prevent drying out or desiccation.

3.2 Preparation of samples for examination

Chilled whole fish can be evaluated as they are, and this is how products would be assessed at landing sites and markets, but in laboratories a more full assessment can be carried out if the fish are first prepared. The fish, if entire, should be gutted and the guts retained. The head should be removed, and the fillet from one side taken off. The portions should be assembled together on a tray for inspection.

QF Products can be laid out on the examination bench in the evaluation area, but it is often more convenient for presentation and for clearing up after if sample units are presented on trays.

Frozen products should first be examined in the frozen state. The complete sample unit or portions of the unit should then be thawed. Whether the units can, or should be subdivided, depends on the nature of the products. Packs of IQF shrimps or fillets can be opened and subsamples taken. Portions could be sawn off large fish or off blocks, but this might be difficult in the case of thick material unless a bandsaw is available.

Frozen material should be thawed out as quickly as possible, but without raising the temperature of all or part of the product so that it might spoil. The simplest procedure is to spread out the sample units on the benches and tables in the preparation area and leave them to thaw at ambient temperature. They should be covered to prevent drying and contamination. The samples shoud be examined when the internal temperature reaches 40°F (4.4 °C). The progress of thawing should be monitored and when it is judged that thawing is complete the products should be evaluated, or transferred to a refrigerator. Products should be covered with plastics film before storing in the refrigerator. Storage should be limited in order to maintain sample integrity. If possible sample units should be thawed out on trays so that the amount and nature of the thaw drip can be assessed.

Thawing can be accelerated by immersion of the material in water maintained at around 25°C. This is acceptable if the product is protected from contact with water by suitable wrappings, or if contact with water does not materially affect the sensory properties of the product. Small sample units such as IQF fillets or small packs of shrimps or shellfish meats could be thawed in a microwave cooker on the defrost setting, but care must be taken not to use too high power settings otherwise parts of the material will be overheated.

Large frozen fish or large blocks of frozen products will take many hours to thaw out at ambient temperature, longer than a normal working day, and they can not be properly monitored thoughout the whole process of thawing. One solution is to lay the products out for thawing at the end of a working day when they will just be completely, or almost completely, thawed by the following morning. Alternatively the material can be put out to thaw as early as possible in the day and transferred to a chill room at the end of the day to complete the process at low temperature. It is helpful to break apart blocks of product when they are partially thawed to accelerate thawing if this can be done without damaging the material.

3.3 Cooking

Whole fish, including crustacean shellfish and cephalopods, can be accurately assessed for freshness in the raw state, but a complete examination should include an assessment of cooked material. Processed products like fillets and shellfish meats, and frozen products, should be assessed after cooking.

Official regulations are usually not concerned with commercial aspects of the quality of products and these guidelines are not intended for the evaluation of the sensory properties of consumer products as complete dishes. Coated products should have the coating removed before cooking the fish component. Fish products in sauces, and canned fish, should have the sauces removed, by gentle washing if necessary.

The fat line should be removed before evaluation for species where it is usual to remove it before cooking. Fillets or steaks of vertebrate fish may be used in assessment of cooked material. Portions should not be more than about 2 cm thick. Steaks can be cut to this thickness and more than one steak might be required from small fish to provide sufficient material. Thick fillets from large fish should be sliced if necessary. More than one item might be required to make up sufficient material in the case of small products like shrimps and small fish.

Whole shrimps should be beheaded, but otherwise shell-on material can be cooked in the shell. Cephalopods should be cleaned and the edible portions prepared for cooked assessment.

Samples of 50-100g should be cooked to an internal temperature of 65-70°C and must not be overcooked. The exact times required for cooking different products should be determined by experiment for the cooking equipment and procedures used in the laboratory. Any procedure is suitable that does not impart odours or flavours of itself. Frying is not suitable. The following are recommended.

Steaming. Place the product in a casserole and suspend the casserole over boiling water, or place in a boiling water bath, (bain-marie), or in a steam chest.

Boil-in-the-bag. Place the sample in a plastic bag suitable for use with foods, loosely close the bag and immerse it in boiling water with the open end above the level of the water - over the side of the pan held down by the lid is a convenient way. Several samples can be cooked at once.

Poaching. Place the sample in a pan with a small amount of water; about 0.5 cm deep is usually adequate. Fit a lid, rapidly bring the water to boiling and simmer gently until the sample is cooked. Put only one sample in a pan.

Microwave cooking. Place the sample in a container suitable for use in microwave ovens and cook according to the instructions for the loading in the oven. Though microwave cooking is fast and convenient the process requires more monitoring and control than the other procedures. It is usually necessary to reduce power to about 70% of maximum to avoid localised overheating of thinner parts of the sample. Oily fish will also tend to 'spit' at high energies. Samples should be cooked to an internal temperature of 65-70°C The time for the samples to be cooked at a given power rating depends on the total loading in the oven cavity and a table of heating times and load will have to be compiled. Heating can be uneven throughout the oven in some microwaves resulting in differential heating when several samples are put into the oven together. It is also important if several samples are being cooked together that samples weights are similar in each container. All samples should be checked by appearance or by measuring their temperatures on removal from the oven that they are cooked before presenting them for assessment and samples are evaluated while warm.

3.4 Procedures for the assessment of products

Standards and specifications for fishery products will specify the features of the product that are to be evaluated, and the criteria for accepting or rejecting products or for allocating them to grades. Table 1 lists sensory attributes and criteria which appear in standards and quality grading schemes. In order to apply quality criteria consistently in inspection of products it is necessary to conduct the sensory assessments in a consistent and systematic manner. Samples should be assessed relative to the characteristics of the species concerned.

Assessors must pay particular attention to those features of the product which are referred to in any standards and which determine conformance to the standard, but in addition they should assess and record other relevant attributes of the samples, as appropriate. Fish inspection services often have advisory functions and a full sensory analysis of products can often prove useful in identifying and correcting mistakes in processing and storage.

Table 1. Examples of attributes of fishery products used in sensory evaluation[2].

Vertebrate fish, chilled

Presentation	Feature	Criteria and descriptions
Raw whole, gutted or ungutted	outer surface, skin	colour: bright, dull, bleached
		slime: colourless, discoloured
		damage: none, punctures, abrasions
	eyes	shape: convex, flat, concave brightness: clear, cloudy colour: normal, discoloured
	belly cavity	guts (in intact fish): intact, digested cleanliness (in gutted fish): completely gutted and cleaned, incompletely gutted, not washed
		belly walls: bright, clean, discoloured, digested
		parasites: absent, present
		blood: bright red, brown
	texture	skin: smooth, gritty flesh: firm, soft
	appearance of gills	colour: bright red or pink, bleached, discoloured
		mucus: clear, opaque, discoloured
	odour of gills	fresh, characteristic, neutral, slightly sour, slightly stale, definite spoilage, putrid
Raw fillets	appearance	translucent, glossy, natural colour, opaque, dull, blood-stained, discoloured
	texture	firm, elastic, soft, plastic
	odour	marine, fresh, neutral, sour, stale, spoiled, putrid
Cooked fillets	odour	spoilage: marine, fresh, neutral, musty, sour, spoiled
		taints: absent, disinfectant, fuel oil, chemicals, sulphides
	flavour	spoilage: sweet, creamy, fresh oil, neutral, sour, **oxidised, putrid, musty, fermented**, rancid, bitter, taints: absent, disinfectant, fuel oil, very bitter, alkaline, polyphosphates, chemicals
	texture	succulent, firm, soft, pasty, gelatinous, **dry**

[2] References to be included for the clarification of sensory properties, as established by ISO

Table 1. Examples of attributes of fishery products used in sensory evaluation. (Cont.)

Vertebrate fish, frozen

Presentation	Feature	Criteria and descriptions
Frozen	appearance	freezer burn: absent, slight, superficial, extensive, deep
		colour: normal, yellow to bronze discolouration in fatty fish
Thawed fillets, raw	texture	firm, elastic, flexible, very firm, hard, stiff
		drip: slight, moderate, abundant odourspoilage and taints: as for chilled fish cold storage: absence of cold storage odours, sharp, cardboardy, rancid
Thawed fillets,	odour & flavour	spoilage and taints: as for chilled fish
		cold storage: absence of cold storage odours or flavours, cardboardy, rancid
	texture	firm, succulent, tough, fibrous, dry

Crustacean shellfish, chilled

Raw	appearance, shell-on	bright colours, slight blackening on the head, blackening on head and body
	appearance, peeled meats	translucent, overall white or light grey, slight black discolouration, extensive black discolouration, very translucent, slimy, yellowish discolouration on butt end of tail meat taken from head-on products
	odour	fresh, marine, musty, ammoniacal, sour, spoiled, putrid
Cooked meats	appearance,	white, opaque, blacks spots, extensive black discolouration, slightly translucent
	odour	fresh, boiled milk, musty, ammoniacal, rancid, sour, spoiled
	flavour	sweet, creamy, neutral, musty, sour, bitter, spoiled
	texture	firm, elastic, soft, mushy

Crustacean shellfish, frozen

Criteria specific to the grading of frozen shellfish, and their descriptions, are essentially the same as those applied to the grading of frozen vertebrate fish.

3.4.1 Assessment of raw products. At fish markets and landing sites fish will be assessed by appearance and odour. Fish change in appearance in a number of ways during spoilage in ice and it is not usually difficult to accurately grade iced fish by appearance alone. The characteristics to look for are listed in Table 1. The marked changes which occur in fish stored in melting ice are easy to categorise and are described in a number of freshness scoring systems. However, the appearance of fish not stored in ice, even if it is stored under chill conditions, does not change as much as does iced fish, and in this case appearance is not necessarily a good indication that a sample is unfit for consumption. A knowledge of the history of the fish should warn the inspector about this, but an experienced assessor should be able to tell if fish have not been stored in ice. The eyes will change shape slightly, but will not become cloudy. The skin will retain its colours and might become slightly shiny rather than dull. The skin might be dry to the touch and be slightly wrinkled, and will not develop the discoloured slime that is typical of fish spoiled in ice.

Where there is doubt about freshness on the basis of appearance the inspector should assess the odour of the gills as this reflects more closely the extent of microbiological spoilage and decomposition of the sample. Samples at fish markets might be cold, (they should be if the fish is being handled according to good manufacturing practices), which reduces the volatility of odours from the fish, but an experienced person should still be able to assess the freshness of fish accurately by odour, particularly in the critical region where the fish is spoiling.

Evaluation in the laboratory should be more thorough than is possible in the field. Samples should be laid out on the inspection bench and be allowed to warm to ambient temperature.

Whether the fish has been stored in ice or in air, the odour of the gills will be a good indication of the freshness of the sample. The assessor should record the nature of the odour, particularly of any unusual odours that might indicate contamination or unusual storage conditions.

A fillet taken from the fish should be examined. In spoiled fish there will be reddening of flesh below the backbone which might also be seen on the flesh of the fillet. Extensive self-digestion of the guts in ungutted fish will show up as a brown staining of the flesh around the belly cavity and as softening or complete dissolution of the flesh of the belly wall. The flesh should be examined for parasites, including proteolytic parasites, and for abnormal conditions like gelatinous textures.

Filleted products should be assessed first for appearance looking for defects just described. The odour should be assessed and if it is weak and difficult to characterise the fillet should be cut to expose a fresh surface.

Whole, shell-on shrimp should be assessed for appearance, particularly the presence of black spot. A small amount of melanosis can be tolerated in acceptable products and final judgement of wholesomeness should be based on odour of the raw material and flavour of the cooked. For head-on shrimp the head should be broken off and the appearance and odour of the inside of the carapace, and the appearance of the butt end of the tail meat, should be assessed. Peeled meats should be assessed for appearance, particularly melanosis, and for odour.

3.4.2 Assessment of cooked samples. Cooked samples should be held in a closed container, allowed to cool to a comfortable tasting temperature, and kept warm unless they are assessed immediately. Products which have already been cooked, for example cooked shrimps, should be warmed up slightly.

The assessor should note the appearance of the product and record any unusual features. The odour should be smelled and its character and strength recorded, particularly any unusual odours like chemical taints. Assessors should be encouraged to taste cooked samples unless clearly decomposed, as some compounds can only be detected by mouth (e.g. low levels of decomposition or fuel contamination)

The characteristics and strength of the odour should be sufficient for the assessor to make a judgement as to the quality of the product, but unless there are reasons for not doing so, the sample should be tasted. Reasons for not tasting would include the sample's being offensively spoiled, or a suspicion that the

product could be contaminated by bacteria, toxins, or chemicals that might be injurious to health. Assessors should spit out samples after tasting them so the amount of possibly dangerous material that might be ingested is very small and there is little risk to health under normal conditions of sensory testing.

The flavour of a sample in the mouth should confirm the assessment based on odour, but can give additional information. For example most additives such as salt, sorbates, polyphosphates, are not detectable by odour, but are detectable by taste. Sensory analysis alone should not be used to determine the presence of additives and any suspicion that non permitted additives have been used, or that excess amounts of permitted additives are present, should be confirmed by chemical analysis.

The texture of the product can be assessed by manipulating the cooked sample with a fork, and can also be evaluated in the mouth.

Rinsing between samples should be encouraged, although generally the flavours of chill-stored fish, even when spoiled are not persistent and do not carry over from one sample to another. Distilled, filtered or bottled water at ambient temperature should be used preferably so as to impart no flavor or odor to the sample, and plain, unsalted crackers or plain bread can be used to cleanse the palate. Palate cleansers might be needed when tasting oily, particularly rancid oily, samples.

3.4.3 Assessment of frozen products Frozen fish should be examined in the frozen state. The assessor should note the nature and state of any wrappings and glazes and the product should be examined for any discolourations and for the extent and depth of any dehydration. The assessor should note if there are signs that the product might have been thawed or partially thawed and refrozen. Signs of slumping or distortion of blocks, the collection of frozen drip in pockets in the wrappings, (not to be confused with water that might have been present on the fish at the time of freezing), and the partial loss of glaze.

Thawed samples should be presented and examined as for the corresponding unfrozen product. It is not easy to evaluate the freshness of thawed whole fish by appearance because the freezing and thawing processes alter characteristics like the eyes, skin and colour of gills and blood. The gills have a leathery or slightly rancid odour even after short periods of frozen storage which have no significance for the quality of the product.

Thawed fillets, and fillets from thawed whole fish, should be assessed for visual defects, particularly in the case of oily fish for the yellow or bronze colours produced by lipid oxidation. They should be pressed with the fingers or squeezed in the hand and the amount of liquor released should be noted. No liquor will be released by manual pressure from unfrozen fish or from fish which has been stored under good conditions in the frozen state.

The odour of the raw fillet should be assessed. Frozen lean fish develop characteristic carboardy and sharp, slightly pungent odours. Oily fish develop rancid odours. Experienced assessors can also discriminate in the odour and flavour of the cooked sample those odours due to the product's freshness before freezing and those due to frozen storage provided neither set is too strong.

There is a wide range in sensitivities to the chemical which develops during frozen storage of lean fish among individuals to the extent that some are completely insensitive. Also individuals vary in their sensitivities to the rancid odours formed in frozen fatty fish, though complete insensitivity seems to be rare. Frozen storage brings about changes in texture of products and even in people who are relatively insensitive to odour stimuli changes in texture often provides enough clues for them to be able to grade products.