



**JOINT FAO/WHO FOOD STANDARDS PROGRAMME
CODEX COMMITTEE ON METHODS OF ANALYSIS AND SAMPLING**

43rd Session

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13 – 18 May 2024

**REVIEW OF METHODS OF ANALYSIS IN CXS 234
FISH AND FISHERY PRODUCTS WORKABLE PACKAGE**

(Prepared by the EWG led by Norway)

Codex Members and Observers wishing to submit comments on the recommendations in this document should do so as instructed in CL 2024/15-MAS available on the Codex webpage/Circular Letters:

<https://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/>

INTRODUCTION

1. CCMAS42 (2023) agreed to start the review of methods in the fish and fishery products package; to establish an EWG chaired by Norway, and working in English, to review the package and proposals for consideration by CCMAS43 (2024).¹
2. CCMAS42 recalled that the work of the review of methods in the *General Standard for Methods of Analysis and Sampling* (CXS 234-1999) is to remove inconsistencies, make editorial corrections, check if the methods are still fit for purpose and to look at the Typing. To ease the work, new methods should not be considered in the EWG unless directly related to finding replacement methods for those no longer fit for purpose.
3. CCMAS reminded Members and Observers:
 - they could present new methods for provisions in standards to active commodity committees for their consideration and submission to CCMAS as part of the endorsement process; or
 - if the committee is adjourned sine die, that new methods could be submitted directly to CCMAS for review by the PWG on endorsement.

EWG PROCESS

4. In preparing for the EWG, the Chair of the EWG elaborated working documents based on the following steps:
 - Listing methods and provisions outlined in the commodity standards developed by the Codex Committee on Fish and Fishery Products (CCFFP) (24 in total) and listing the entries for Fish and Fishery Products from the CXS 234.
 - Verifying if the methods listed in the CCFFP standards are included in the CXS 234.
 - Verifying if there are methods listed in CXS 234 without provision in any CCFFP standard.
 - Assessing if the listed methods are available and fit for the intended purpose, identifying any method that may need replacement either due to unavailability or use of specific hazardous chemicals.
5. The EWG was initiated and operated through the on-line Codex forum. The list of participants in the EWG is presented in Appendix II.

¹ [REP23/MAS](#) paragraph 66(ii)(a).

OUTCOMES OF WORK IN THE EWG

6. Based on the comments and recommendations from the working documents, Appendix I was prepared to explain and track changes to CXS 234. The table in Appendix I maintains the information (Commodity, Provision, Method, Principle, Type) currently in CXS 234. Additional information (No., Codex Standard reference number, Comments) is also included in Appendix I to assist the Committee in its review of the recommended changes.

7. Appendix I contains the list of methods and the proposed changes to CXS 234.

- The EWG observed that:
 - some provisions and methods referred in the CCFFP Standards are not currently listed in CXS 234;
 - some entries in CXS 234 have no reference in any CCFFP Standard;
 - some entries have been endorsed for provisions which are not determined by the referred methods (e.g. the provision is water content or gelatinous condition, while the referred analytical method determines moisture);
 - some entries refer to methods which include hazardous chemicals, and hence replacement is required. For total nitrogen in fish sauce (CXS 302) and for crude protein in crackers from marine and freshwater fish, crustacean and molluscan shellfish (CXS 222), the titrimetric methods include mercury/mercuric oxide;
 - for drained weight in quick frozen raw scallop products – block frozen products, two possibly non-identical methods (AOAC 967.13 and AOAC 970.60) are included as Type I method;
 - for determination of amino acid nitrogen (determination of formaldehyde titration method subtracting by ammoniacal nitrogen), the methods used are from 1920, and the formaldehyde method referred (AOAC 920.04) was declared surplus (obsolete) in 1970; and
 - method performance criteria could preferably be established for sodium chloride.
- Unformatted black text signals no changes from what is currently listed in CXS 234.
- **Bold** text signals some insertion into CXS 234 and represents a change from the current CXS 234.
- ~~Strikethrough~~ text signals a deletion from the information in CXS 234. Deletions have been made for both editorial changes and for removal of a method from CXS 234.

RECOMMENDATIONS

8. The Committee is invited to:

- i. review Appendix I, consider the proposed recommendations, and suggest relevant methods where replacements are recommended;
- ii. endorse the recommended revisions to CXS 234;
- iii. recommend CCFFP to take note of the revisions and to consider the following:
 - a. whether the provision “gelatinous conditions” could be changed to “moisture” or to “gelatinous condition determined as moisture” in CXS 190 and in CXS 166, given that moisture is the parameter determined by the referred method;
 - b. whether the provision “water content” could be changed to “moisture” or “water content determined as moisture” in CXS 244 and in CXS 167, given that moisture is the parameter determined by the referred method;
 - c. whether the wording of CXS 167, para 7.6 i) “*Determination of % salt saturation as required by the standard, should be in accordance to AOAC 950.46.B (Airdrying (a))*” could be rephrased as follows: “*For the calculation of % salt saturation, the determination of moisture should be carried out according to AOAC 950.46 B (Airdrying (a)).*” This is because AOAC 950.46 B (Airdrying (a)) determines moisture and not % salt saturation. Percent salt saturation should be determined by calculation;
 - d. which of the methods, AOAC 967.13 or AOAC 970.60, should be chosen for determining drained weight in quick-frozen raw scallop products – block-frozen products (CXS 315);
 - e. whether AOAC 950.46B (Airdrying (a)) for the determination of moisture/“water content” in salted Atlantic herring and salted sprat (CXS 244) is preferred (the choice between of option (a) and (b) are left open); and

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- f. whether inclusion of method performance criteria for sodium chloride in CXS 236 and CXS 302 is adequate.

APPENDIX I

Working Package for Fish and Fishery Products – review of CXS 234

Explanation to the Table:

- ~~Strikethrough~~ text is text recommended to be deleted.
- **Bold** text is text recommended to be included.
- The columns: "No.", "Codex Standards" and "Comments" are meant for assistance in the CCMAS discussions and will not be included in CXS 234.
- Text in brackets [] is to be considered as comments and not to be included in CXS 234

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
1	Fish and fishery products	Histamine	AOAC 977.13	Fluorimetry	II		Recommend deletion as method performance criteria applies, see below for Histamine.
2	Fish and fishery products	Mercury	AOAC 977.15	Flameless atomic absorption spectrophotometry	III		Recommend deletion as method performance criteria applies, see below for Methylmercury. Further, there is no reference to AOAC 977.15 in any CCFFP standard.
3	Fish and fishery products: canned products	Drained weight	Described in the Standard	Weighing	I	CXS 3-1981 CXS 37-1991 CXS 70-1981 CXS 90-1981 CXS 94-1981 CXS 119-1981	Recommend unchanged.
4	Fish and fishery products: canned products	Net weight	Described in the Standard	Weighing	I	CXS 3-1981 CXS 37-1991 CXS 70-1981 CXS 90-1981 CXS 94-1981 CXS 119-1981	Recommend unchanged.
5	Boiled dried salted anchovies	Sodium Chloride (chloride)	AOAC 937.09	Titrimetry	II	CXS 236-2003	Recommend deletion as method performance criteria is suggested for sodium

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
		expressed as sodium chloride)					chloride in this document, see below.
6	Canned shrimps or prawns	Size, determination of	Described in the Standard	Number per 100 g	†	CXS 37-1991	Recommend deletion of this entry and replacing it with the subsequent row to ensure consistency in both sensory and physical determinations for all fish and fishery products.
7	Fish and fishery products	Sensory and Physical Determinations	Described in the Standard	Sensory analysis, Visual inspections, Counting	I	All the CCFFP standards	Recommend inclusion of this entry as the provision is given in CCFFP standards, but not listed in the CXS 234.
8	Fish sauce	Total nitrogen	AOAC 940.25 AOAC 978.02	digestion Titrimetry (Kjeldahl digestion)	I	CXS 302-2011	Recommend replacement of method due to the use of mercury. AOAC 940.25 (for seafood) refers to AOAC 955.04 (for fertilizers), which utilizes a mercury catalyst. Suggestion: AOAC 978.02 Nitrogen (Total) in Fertilizers, using copper sulphate or chromium metal as catalyst.
9	Fish sauce	Amino acid nitrogen	AOAC 920.04 and AOAC 920.03 [replacement?]	determining formaldehyde titration method subtracting by ammoniacal nitrogen (magnesium oxide method)	I	CXS 302-2011	Recommend considering replacement of these methods, as AOAC 920.04 was Surplus 1970. In CXS 302: • AOAC 920.04 is referred AOAC 2.066

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
							<ul style="list-style-type: none"> • AOAC 920.03 is referred AOAC 2.065
10	Fish sauce	pH	AOAC 981.12 The pH shall be measured in a sample of fish sauce diluted with water to 1:10 using a pH meter. The dilution of fish sauce is necessary because of the high ionic strength in the undiluted sauce.	Electrometry Potentiometry	III IV	CXS 302-2011	<p>Recommend changing the Principle and Type.</p> <p>AOAC 981.12 is for vegetables and no validation information is included. If no validation data is available, Type IV is suggested.</p>
11	Fish sauce	pH	NMKL 179	Potentiometry	II	CXS 302-2011	Recommend inclusion of this entry as NMKL 179 is validated and already in Codex as Type II. Dilutions series are described in the method.
12	Fish sauce	Sodium chloride	AOAC 976.18	Potentiometry	II	CXS 302-2011	<p>Recommend deletion as method performance criteria is suggested for sodium chloride in this document, see below.</p> <p>CXS 302 refers to the following methods: FAO 1981, Technical Paper 219 AOAC 937.13 or 976.18 or 976.19.</p> <p>AOAC 937.13 is for mold in butter (maybe a typing error – should have been AOAC</p>

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
							937.09) and AOAC 976.19 is a strip method.
13	Fish sauce	Sodium chloride	AOAC 937.09	Titrimetry	IV	CXS 302-2011	Recommend deletion as method performance criteria is suggested for sodium chloride in this document, see below.
14	Fish sauce	Histamine	AOAC 977.13	Fluorimetry	II	CXS 302-2011	Recommend deletion as method performance criteria has been established, see below.
15	Frozen abalone (covered by glaze)	Net weight	AOAC 963.18	Gravimetry	I	CXS 312-2013	Recommend unchanged.
16	Quick Frozen Raw Scallop Products	Net weight	AOAC 963.18	Gravimetry	I	CXS 315-2014	Recommend inclusion of this entry, as it is described in CXS 315, but not in CXS 234.
17	Quick Frozen Raw Scallop Products – Block Frozen Products	Drained weight	AOAC 967.13 or AOAC 970.60?? and Described in the Standard	Gravimetry	I	CXS 315-2014	Recommend inclusion of this entry, as it is described in CXS 315, but not in CXS 234. Recommend clarification from CCFFP if AOAC 967.13 and AOAC 970.60 are identical (appear not do be) and if not which method to be retained.
18	Frozen fish and fishery products	Thawing and cooking procedures	Described in the Standards	Thawing and heating	I	Several CCFFP standards	Recommend unchanged.
19	Quick frozen blocks of fish fillet, minced fish flesh and mixtures of fillets	Proportion of fish fillet and minced fish	AOAC 988.09	Physical separation	I	CXS 165-1989	Recommend unchanged. In CXS 165, the AOAC 988.09 is written in incorrectly (AOAC 988, 09)

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
	and minced fish flesh						
20	Quick frozen blocks of fish fillet, minced fish flesh and mixtures of fillets and minced fish flesh	Net content of frozen fish blocks covered by glaze	Described in the Standard	Gravimetry	I	CXS 165-1989	Recommend unchanged.
21	Quick frozen blocks of fish fillet, minced fish flesh and mixtures of fillets and minced fish flesh	Sodium chloride	AOAC 971.21 (Codex general method)	Potentiometry	II	CXS 165-1989	Recommend deletion as this entry is not listed in CXS 165.
22	Quick frozen fish fillets	Net weight of products covered by glaze	Described in the Standard	Water spraying and sieving	I	CXS 190-1995	Recommend unchanged.
23	Quick Frozen Fish Fillets	[Gelatinous Condition Determined as] Moisture	AOAC 983.18 and AOAC 950.46A	Gravimetry	I	CXS 190-1995	Recommend inclusion of this entry, as it is described in CXS 190, but not in CXS 234. In CXS 190, the provision is " Gelatinous Condition ". The method determines moisture . Recommend changing the provision accordingly, and request CCFFP if determination of moisture is adequate. 950.46A (AOAC 983.18 is sample prep. AOAC 950.46A only refers to AOAC 934.01.)
24	Quick frozen fish sticks (fish fingers) and fish portions - breaded or in batter	Fish content (declaration)	AOAC 996.15 and calculation (described in the standard)	Gravimetry	I	CXS 166-1989	Recommend unchanged.

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
25	Quick frozen fish sticks (fish fingers) and fish portions - breaded or in batter	Net weight	Described in the Standard	Weighing	I	CXS 166-1989	Recommend unchanged.
26	Quick frozen fish sticks (fish fingers) and fish portions-breaded and in batter (except for certain fish species with soft flesh)	Proportion of fish fillet and minced fish	WEFTA Method (Described in the Standard)	Gravimetry	I	CXS 166-1989	Recommend deletion of the phrase "except for certain fish species with soft flesh", as it is not specified in CXS 166.
27	Quick frozen fish sticks (fish fingers) and fish portions - breaded or in batter	Sodium chloride	AOAC 971.27 (Codex general method)	Potentiometry	II	CXS 166-1989	Recommend deletion as this entry is not listed in CXS 166.
28	Quick Frozen Fish Sticks (Fish Fingers Fingers), Fish Portions and Fish Fillets - Breaded or in Batter	[Gelatinous Condition Determined as] Moisture	AOAC 983.18 and AOAC 950.46A	Gravimetry	I	CXS 166-1989	Recommend inclusion of this entry, as it is described in CXS 166, but not in CXS 234. See No.23.
29	Salted Atlantic herring and salted sprat	[Water content Determined as] Moisture	AOAC 950.46B a) [AOAC 950.46B a) or b)?]	Air-drying Gravimetry	I	CXS 244-2004	Recommend changing the Provision and Principle. Recommend requesting CCFFP if this provision could be aligned with the parameter being measured.

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
							Further, requesting which option of the AOAC 950.46B should be applied. <ul style="list-style-type: none"> • AOAC 950.46B a) 16-18h at 100-102°C, or • AOAC 950.46B b) 2-4h at 125°C For entry No. 31, (CXS 167), AOAC 950.46B a) is given.
30	Salted fish and dried salted fish of the Gadidae family of fishes	Salt content (salt determined as chloride expressed as sodium chloride)	AOAC 937.07 and Described in CXS 167-1989	Titrimetry (Mohr) Salt determined as chloride expressed as sodium chloride	I	CXS 167-1989	Recommend changing the Commodity, Provision and Method according to the CXS 167.
31	Salted fish and dried salted fish of the Gadidae family of fishes	Salt Content Water Moisture content (in the determination of % salt saturation)	AOAC 937.07 and AOAC 950.46B (airdrying a) Sampling and method Described in the Standard	Gravimetry	I	CXS 167-1989	Recommend changing the Provision and Method. In CXS 167, AOAC 950.46B a) for determination of moisture is used for determination of % salt saturation . The formulas for the calculations of % salt saturation are not given in CXS 167. Recommend requesting CCFFP if the CXS 167 provision for "Water" could be changed to "Moisture" AOAC 937.07 is sample prep.
32	Salted fish and dried salted fish of the Gadidae family of fishes	Water content in the whole fish	Described in the Standard	Gravimetry	I	CXS 167-1989	Recommend inclusion of this entry, as it is described in CXS 167, but not in CXS 234. In CXS 234, No. 31 and No. 32 might be merged.

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
33	Smoked fish, smoke-flavoured fish and smoke-dried fish	Water phase salt (salt determined as chloride expressed as sodium chloride)	AOAC 952.08 and AOAC 937.09 Described in Standard * $(\% \text{ salt} \times 100 / (\% \text{ water} + \% \text{ salt}))$	Gravimetry and Titrimetry (Mohr) and Calculation	I	CXS 311-2013	Recommend changing the Provision, Method and Principle. In the column Method, the word "and" recommend added, as AOAC 952.08 and AOAC 937.09 are complementary methods for calculation of the provision. Recommend deletion of the footnote as calculation is described in the Standard.
34	Smoked fish, smoke-flavoured fish and smoke-dried fish	Water activity	NMKL 168 ISO 21807	Electrometry	III	CXS 311-2013	Recommend deletion of ISO 21807 as it is withdrawn. ISO 18787 is included in the subsequent row.
35	Smoked fish, smoke-flavoured fish and smoke-dried fish	Water activity	ISO 18787	Electrometry	II	CXS 311-2013	Recommend inclusion of the entry as ISO 18787 was endorsed for commodity 'Dried Meat' at CCMAS41 as a Type II method. The method is applicable for foodstuffs.
36	Sturgeon caviar	Salt content (Salt determined as chloride expressed as sodium chloride)	AOAC 937.07 and Described in CXS 167-1989	Titrimetry (Mohr) Salt determined as chloride expressed as sodium chloride	I	CXS 291-2010	Recommend changing the Provision, Method and Principle. Sample prep. according to AOAC 937.07.
37	Live and raw bivalve molluscs	Paralytic shellfish toxicity	AOAC 959.08	Mouse bioassay	IV	CXS 292-2008	Recommend unchanged. Should preferably not be used due to animal welfare, however,

No.	Commodity	Provision	Method	Principle	Type	Codex Standards	Comments
							CCMAS35 agreed to retain as a Type IV and again during CCMAS36.
38	Live and raw bivalve molluscs	Paralytic shellfish toxicity	AOAC 2011.27	Receptor binding assay	IV	CXS 292-2008	Recommend unchanged. Should preferably not be used due to animal welfare, however, CCMAS35 agreed to retain as a Type IV and again during CCMAS36.
39	Crackers from marine and freshwater fish, crustacean and molluscan shellfish	Crude Protein	AOAC 2001.11	Titrimetry (Kjeldahl Digestion)	I	CXS 222-2001	Recommend inclusion of this entry, as it is described in CXS 222, but not in CXS 234. Recommend method AOAC 2001.11 Protein (crude) in animal feed, Forage (plant tissue), Grain, and oilseed. In CXS 222, AOAC 920.87 or 960.52 are included. Both methods include mercury/mercuric oxide, replacement is required due to hazardous chemicals.

Method performance criteria for histamine for fish and fishery products

Provision	ML (mg/100 g)	Minimum applicable range (mg/100 g)	LOD (mg/100 g)	LOQ (mg/100 g)	RSDR(%)	Recovery (%)	Applicable methods that meet the criteria	Principle
Histamine	10 (average)	8 - 12	1	2	16.0	90 - 107	AOAC 977.13 1 NMKL 99, NMKL 196, ISO 19343	Fluorometry, HPLC-UV, HPLC-UV HPLC-FLD
Histamine	20 (each unit)	16 – 24	2	4	14.4	90 - 107	AOAC 977.13 1 NMKL 99, NMKL 196, ISO 19343	Fluorometry, HPLC-UV. HPLC-UV HPLC-FLD

Determination of biotoxins in live and raw bivalve molluscs

The method selected should be chosen on the basis of practicability and preference should be given to methods which have applicability for routine use.

Criteria for determination of toxin analogues by chemical methods

Methods shall meet the numerical criteria listed in Table 1 and may either meet the minimum applicable range, or LOD and LOQ criteria listed.

Table 1. Criteria for determination of toxin analogues by chemical methods

Toxin group	Toxin	Minimum applicable range (mg/kg)	LOD (mg/kg)	LOQ (mg/kg)	Precision (RSD _R) (%) No more than	Recovery percent (%)	Applicable methods that meet the criteria
STX group	Saxitoxin (STX)	0.05 – 0.2	0.01	0.02	44%	50 – 130	AOAC 2005.06 (HPLC-FLD), NMKL 182 (HPLC-FLD), EN 14526 (HPLC-FLD), AOAC 2011.02 (HPLC-FLD), NMKL 197 (HPLC-FLD)
	NEO	0.05 – 0.2	0.01	0.02	44%	50 – 130	
	dcSTX	0.05 – 0.2	0.01	0.02	44%	50 – 130	
	GTX1	0.05 – 0.2	0.01	0.02	44%	50 – 130	
	GTX2	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	GTX3	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	GTX4	0.05 – 0.2	0.01	0.02	44%	50 – 130	
	GTX5	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	GTX6	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	dcGTX2	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	dcGTX3	0.1 – 0.5	0.03	0.06	38%	50 – 130	
	C1	0.1 – 0.5	0.03	0.06	38%	50 – 130	
C2	0.1 – 0.5	0.03	0.06	38%	50 – 130		

Toxin group	Toxin	Minimum applicable range (mg/kg)	LOD (mg/kg)	LOQ (mg/kg)	Precision (RSD _R) (%) No more than	Recovery percent (%)	Applicable methods that meet the criteria
	C3	0.5 – 1.5	0.1	0.2	32%	50 – 130	
	C4	0.1 – 0.5	0.1	0.2	32%	50 – 130	
OA group	OA	0.03 – 0.2	0.01	0.02	44%	60 – 115 80-120	EU-harmonised SOP using HPLC-MSMS (see reference below*) For other methods see references **
	DTX1	0.03 – 0.2	0.01	0.02	44%	60 – 115 80-120	
	DTX2	0.1 – 0.5	0.03	0.06	38%	60 – 115 80-120	
Domoic acid	DA	14 – 26	2	4	20%	80 - 110	EN 14176
AZA group	AZA1	0.03 – 0.2	0.01	0.02	44%	40 – 120 80 -120	EU-harmonised SOP using HPLC-MSMS (See reference below*) For other methods see references **
	AZA2	0.03 – 0.2	0.01	0.02	44%	40 – 120 80-120	
	AZA3	0.03 – 0.2	0.01	0.02	44%	40 – 120 80-120	

Reference: http://aesan.msssi.gob.es/en/CRLMB/web/procedimientos_crlmb/crlmb_standard_operating_procedures.shtml Harmonised SOP-LCMS-OAVersion4.pdf

* https://www.aesan.gob.es/en/CRLMB/docs/docs/metodos_analiticos_de_desarrollo/EU-Harmonised-SOP-LIPO-LCMSMS_Version5.pdf

** H.J. van den Top, A. Gerssen, P. McCarron, H.P. van Egmond. Quantitative determination of marine lipophilic toxins in mussels, oysters and cockles using liquid chromatography-mass spectrometry: inter-laboratory validation study. Food Additives & Contaminants: Part A, 2011, Vol. 28, Iss. 12.

Total toxicity is estimated as the sum of the molar concentrations of detected analogues multiplied by the relevant specific toxicity equivalency factors (TEFs). Internationally scientifically validated TEFs must be used. The science behind TEFs is developing. Current internationally validated TEF's will be found on the FAO website. Information on TEFs could be incorporated in this standard at a future date.

Methods should be validated and used for the relevant toxin analogues that may contribute to total toxicity. Currently known toxin analogues to consider are listed in Table 1. Where toxin analogues that are not listed in Table 1 are determined the competent authority must assess the contribution of these analogues to total toxicity whilst conducting further investigations.

Performance Criteria for methods of analysis of methylmercury*

Commodity	Provision	ML (mg/kg)	Min. Appl. Range (mg/kg)	LOD (mg/kg)	LOQ (mg/kg)	Precision (%) No more than	Recovery (%)	Examples of applicable methods that meet the criteria	Principle
All tuna	methylmercury*	1.2	0.64 – 1.8	0.12	0.24	31	80 - 110	EN 16801 / NMKL 202	GC-ICP/MS
Alfonsino	methylmercury*	1.5	0.82 – 2.2	0.15	0.30	30	80 - 110	AOAC 988.11 ? EN 16801 / NMKL 202	GC-electron capture GC-ICP/MS
All marlin	methylmercury*	1.7	0.95 – 2.5	0.17	0.34	30	80 - 110	AOAC 988.11 ? EN 16801/ NMKL 202	GC-electron capture GC-ICP/MS
Shark	methylmercury*	1.6	0.88 – 2.3	0.16	0.32	30	80 - 110	AOAC 988.11 ? EN 16801 / NMKL 202	GC-electron capture GC-ICP/MS

*Countries or importers may decide to use their own screening when applying the ML for methylmercury in fish by analysing total mercury in fish. If the total mercury concentration is below or equal to the ML for methylmercury, no further testing is required, and the sample is determined to be compliant with the ML. If the total mercury concentration is above the ML for methylmercury, follow-up testing shall be conducted to determine if the methylmercury concentration is above the ML. The ML also applies to fresh or frozen fish intended for further processing.

[NEW] Performance criteria for methods of analysis of sodium chloride determined as chloride*

Commodity	Provision	ML* (%)	Min. Appl. Range (%)	LOD (%)	LOQ (%)	Precision (%) No more than	Recovery (%)	Examples of applicable methods that meet the criteria	Principle
Boiled dried salted anchovies	Sodium chloride (chloride expressed as sodium chloride),	15	12 – 18	2	3	15	90 - 107	NMKL 178 AOAC 971.27 AOAC 937.09	Potentiometric titration Potentiometric titration Titration
Fish Sauce	Sodium chloride (chloride expressed as sodium chloride)	≥ 20	≥ 16	2	4	14	90 - 107	NMKL 178 AOAC 971.27 AOAC 976.18 AOAC 937.09	Potentiometric titration Potentiometric titration Titration Titration

* The criteria are established for NaCl, as ML are for NaCl. For conversion into Cl, the parameters should be divided by 1.6 as $\text{NaCl}(\%) = \text{Cl}(\%) \cdot 1.6485$

List of standards developed by CCFFP (for reference purposes)

CXS 3-1981	Standard for Canned Salmon
CXS 36-1981	Standard for Quick Frozen Finfish, Uneviscerated and Eviscerated
CXS 37-1991	Standard for Canned Shrimps or Prawns
CXS 70-1981	Standard for Canned Tuna and Bonito
CXS 90-1981	Standard for Canned Crab Meat
CXS 92-1981	Standard for Quick Frozen Shrimps or Prawns
CXS 94-1981	Standard for Canned Sardines and Sardine-Type Products
CXS 95-1981	Standard for Quick Frozen Lobsters
CXS 119-1981	Standard for Canned Finfish
CXS 165-1989	Standard for Quick Frozen Blocks of Fish Fillets, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh
CXS 166-1989	Standard for Quick Frozen Fish Sticks (Fish Fingers), Fish Portions and Fish Fillets - Breaded or in Batter
CXS 167-1989	Standard for Salted Fish and Dried Salted Fish of the Gadidae Family of Fishes
CXS 189-1993	Standard for Dried Shark Fins
CXS 190-1995	Standard for Quick Frozen Fish Fillets
CXS 191-1995	Standard for Quick Frozen Raw Squid
CXS 222-2001	Standard for Crackers from Marine and Freshwater Fish, Crustaceans and Molluscan Shellfish
CXS 236-2003	Standard for Boiled Dried Salted Anchovies
CXS 244-2004	Standard for Salted Atlantic Herring and Salted Sprat
CXS 291-2010	Standard for Sturgeon Caviar
CXS 292-2008	Standard for Live and Raw Bivalve Molluscs
CXS 302-2011	Standard for Fish Sauce
CXS 311-2013	Standard for Smoked Fish, Smoke-Flavoured Fish and Smoke-Dried Fish
CXS 312-2013	Standard for Live Abalone and for Raw Fresh Chilled or Frozen Abalone for Direct Consumption or for further Processing
CXS 315-2014	Standard for Fresh and Quick Frozen Raw Scallop Products

APPENDIX II

List of participants

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Norway

MEMBERS

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New Zealand

Norway

Portugal

Republic of Korea

St. Kitts & Nevis

Thailand

Uganda

Uruguay

United States

OBSERVER ORGANIZATIONS

AOAC INTERNATIONAL

GOED - Global Organization for EPA and DHA
Omega-3sNMKL – Nordic Baltic Committee on Food
Analysis