



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

**44th Session**

**Virtual**

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**ENDORSEMENT OF METHODS OF ANALYSIS AND SAMPLING PLANS  
FOR PROVISIONS IN CODEX STANDARDS - OTHER RELEVANT MATTERS ARISING FROM THE  
AMENDMENT OF CXS 234-1999**

(Prepared by the Codex Secretariat)

## Background

1. CAC47 (2024) adopted methods of analysis and performance criteria for inclusion in the *Recommended methods of analysis and sampling* (CXS 234-1999) with editorial corrections, and revoked methods of analysis for provisions in CXS 234-1999 consequential to this adoption.<sup>1</sup> CXS 234-1999 has been amended accordingly to reflect these adoptions and revocations.
2. Recalling that CCMAS37 (2016) reaffirmed its earlier decision to have CXS 234-1999 as the single reference for methods of analysis in Codex standards,<sup>2</sup> all methods of analysis in commodity standards must consequently be transferred to CXS 234-1999 and replaced with a reference to CXS 234-1999 in accordance with the Procedural Manual.<sup>3</sup> CXS 234-1999 has been amended to include methods of analysis from commodity standards not previously captured in CXS 234-1999 and for which their review under the workable packages have been completed. In making these amendments, the Codex Secretariat has identified several matters for action and for information by CCMAS44.

## Matters for action by CCMAS44 arising from the amendment of CXS 234-1999

3. Appendix I contains the following in two parts:
  - a. Part 1 contains methods of analysis where the principle and typing were not indicated in the respective commodity standards. These methods of analysis were not considered during the review of the respective workable packages, and CCMAS is requested to determine if these methods of analysis are still fit-for-purpose, and:
    - provide the principle and typing, if the method of analysis is still fit-for-purpose, so that it can be transferred to CXS 234-1999; or
    - recommend revocation of the method of analysis from the commodity standard, if the method of analysis is not fit-for-purpose.
  - b. Part 2 contains a method of analysis by description, where specific references to published methods have been provided. Two possible options for presenting this method of analysis in CXS 234-1999 have been proposed. CCMAS is requested to determine which option should be pursued, or otherwise recommend alternative options, noting that this would set a precedent for similar situations in the future.

<sup>1</sup> REP24/CAC paragraph 90 (i) and 96

<sup>2</sup> REP16/MAS paragraph 73 and Appendix III

<sup>3</sup> REP16/GP paragraph 7 and REP16/CAC Appendix III

**Matter for action: Numeric performance criteria for determining sodium chloride and salt determined as chloride expressed as sodium chloride in fish and fishery products**

4. CCMAS43 agreed to replace methods of analysis for determining sodium chloride and salt determined as chloride expressed as sodium chloride with numeric performance criteria, in boiled dried salted anchovies and fish sauce. These numeric performance criteria were adopted by CAC47 and have been included in CXS 234-1999.<sup>4</sup>
5. CCMAS might wish to consider also taking this approach for salted Atlantic herring and salted sprat; salted fish and dried salted fish of the Gadidae family of fishes; and sturgeon caviar for which there are methods of analysis for determining sodium chloride and salt determined as chloride expressed as sodium chloride.

**Matters for information arising from the amendment of CXS 234-1999**

6. Appendix II contains the following in four parts:
  - a. Part 1 contains editorial amendments made when methods of analysis by description were transferred from fish and fishery product standards to CXS 234-1999.
  - b. Part 2 contains consequential amendments made to CXS 234-1999 to enable appropriate references to be made to published methods of analysis, relevant appendices in CXS 234-1999 and Codex standards, following the transfer of methods of analysis from commodity standards to CXS 234-1999.
  - c. Part 3 contains consequential amendments to methods of analysis that were made as a result of the availability of numeric performance criteria for the method of analysis.
  - d. Part 4 contains a consequential amendment made as a result of the decision to align the name of the provision to 'moisture'.
7. Appendix III contains the following in two parts:
  - a. Part 1 contains methods of analysis that were not included in the format adopted by CAC47. As a result of the consequential amendments described in Appendix II Part 2 of this document, these methods of analysis would already be subsumed under the entries in the commodity tables of CXS 234-1999 that reference Appendix III of CXS 234-1999 for the provisions 'net weight' and 'drained weight'.
  - b. Part 2 contains numeric performance criteria for natural mineral waters. Although adopted by CAC47 for inclusion in the table "Numeric performance criteria for lead and cadmium in foods", the numeric performance criteria have been included in the table "Criteria applicable to health-related substances in the *Standard for natural mineral waters* (CXS 108-1981)" instead, as other numeric performance criteria for natural mineral waters already exist in this table.

**Recommendation**

8. CCMAS44 is invited to:
  - i) review the methods of analysis in Appendix I, with a view to take action in accordance with the requests outlined in paragraph 3 (a-b);
  - ii) consider the development of numeric performance criteria as identified in paragraph 5;
  - iii) note the editorial and consequential amendments made to CXS 234-1999 as detailed in Appendix II; and
  - iv) acknowledge that while the methods of analysis and numeric performance criteria in Appendix III have been included in CXS 234-1999 in a format or location different from that adopted by CAC47, this does not have an impact on their technical content or interpretation.

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<sup>4</sup> REP24/CAC Appendix II

**Appendix I****Part 1: Methods of analysis where the principle and typing were not indicated in the respective commodity standards**

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<b>Fish and fishery products</b>				
Crackers from marine and freshwater fish, crustacean and molluscan shellfish	Crude protein	AOAC 920.87 or 960.52		
Crackers from marine and freshwater fish, crustacean and molluscan shellfish	Moisture	AOAC 950.46B (air drying)		
Raw bivalve molluscs (shucked)	Drained weight	AOAC 953.11		
<b>Fats and oils</b>				
Edible Fats and Oils not Covered by Individual Standards	Peroxide Value	ISO 3961:1998		
Edible Fats and Oils not Covered by Individual Standards	Soap content	BS 684 Section 2.65		
Named animal fats	Fatty acid composition	ISO 5508: 1995/ 5509: 1999		
Named animal fats	Soap content	BS 684 Section 2.5		
Fat Spreads and Blended Spreads	Milk fat content (Butyric acid)	AOAC 990.27; AOCS Ca 5c-87 (97)		
Fat Spreads and Blended Spreads	Salt content	IDF 12B: 1988, ISO CD 1738 or AOAC 960.29.		
Fat Spreads and Blended Spreads	Vitamin A	AOAC 985.30; AOAC 992.04; or JAOAC 1980, <u>63</u> , 4.		
Fat Spreads and Blended Spreads	Vitamin D	AOAC 981.17		
Fat Spreads and Blended Spreads	Vitamin E	ISO 9936:1997		

**Part 2: Method of analysis by description, where specific references to published methods have been provided**

*Option 1: Present the method of analysis by description as an Appendix with an appropriate reference in the commodity table in CXS 234-1999*

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<u>Fish and fishery products</u>				
Quick frozen fish sticks (fish fingers), fish portions and fish fillets – breaded or in batter	Determination of fish content (declaration)	See Appendix **		

**Appendix \*\*: DETERMINATION OF FISH CONTENT (DECLARATION) IN QUICK FROZEN FISH STICKS (FISH FINGERS), FISH PORTIONS AND FISH FILLETS - BREADED OR IN BATTER**

**References**

Determination of nitrogen: ISO 937

Determination of moisture: ISO 1442

Determination of total fat: ISO 1443

Determination of ash: ISO 936

*Option 2: Present the method of analysis directly in the commodity table in CXS 234-1999, with no appendix*

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<u>Fish and fishery products</u>				
Quick frozen fish sticks (fish fingers), fish portions and fish fillets – breaded or in batter	Determination of fish content (declaration) – Determination of nitrogen	ISO 937		
Quick frozen fish sticks (fish fingers), fish portions and fish fillets – breaded or in batter	Determination of fish content (declaration) – Determination of moisture	ISO 1442		
Quick frozen fish sticks (fish fingers), fish portions and fish fillets – breaded or in batter	Determination of fish content (declaration) – Determination of total fat	ISO 1443		
Quick frozen fish sticks (fish fingers), fish portions and fish fillets – breaded or in batter	Determination of fish content (declaration) – Determination of ash	ISO 936		

**(FOR INFORMATION ONLY)**

Note: Amendments are indicated in **bold**, ~~strikethrough~~ and/or underline.

**Part 1: Editorial amendments related to methods of analysis in fish and fishery product standards****Determination of Drained Weight in crab meat**

The drained weight of all sample units shall be determined by the following procedures:

- (i) Maintain the container at a temperature between 20°C and 30°C for a minimum of 12 hours prior to examination.
- (ii) Open the container and distribute the contents on a pre-weighed circular sieve having a wire mesh with square openings of 2.8 mm x 2.8 mm.
- (iii) Remove ~~all~~ **any** wrapping material and incline the sieve at an angle of approximately 17-20° and allow the meat to drain two minutes, measured from the time the product is poured onto the sieve.
- (iv) Weigh the sieve containing the drained crab meat.
- (v) Determine the weight of drained crab meat by subtracting the mass of the sieve from the mass of the sieve with drained product.

**Determination of Net Weight in fresh and quick frozen raw scallop products**

- (i) ~~The net weight shall be determined in accordance with Official method AOAC 963.18.~~
- (ii) Block frozen products: AOAC Official Method 967.13, ~~Drained Weight of Frozen Shrimp or Crab Meat, or AOAC Official Method 970.60 Drained Weight of Frozen Crab Meat.~~ In addition to either AOAC procedure, **The** block frozen scallops shall be thawed inside waterproof bags to prevent contact with, and absorption of, the water used to thaw the product.

**Part 2: Consequential amendments following the transfer of methods of analysis from commodity standards to CXS 234-1999**

<i>Commodity</i>	<i>Provision</i>	<i>Method</i>	<i>Principle</i>	<i>Type</i>
<u>Fish and fishery products</u>				
<b><u>Canned tuna and bonito</u></b>	<b><u>Determination of presentation</u></b>	<b><u>See Appendix II</u></b>		
<b><u>Crackers from marine and freshwater fish, crustacean and molluscan shellfish</u></b>	<b><u>Crude protein</u></b>	<b><u>Described in the standard</u></b>		
<b><u>Crackers from marine and freshwater fish, crustacean and molluscan shellfish</u></b>	<b><u>Moisture</u></b>	<b><u>Described in the standard</u></b>		

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<u>Fish and fishery products</u>				
<b><u>Fish and fishery products, except raw bivalve molluscs (shucked)</u></b>	<b><u>Drained weight</u></b>	<b><u>See Appendix III</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
<b><u>Raw bivalve molluscs (shucked)</u></b>	<b><u>Drained weight</u></b>	<b><u>Described in the standard</u></b>		
<b><u>Fish and fishery products, except frozen abalone (covered by glaze), raw fresh chilled or frozen abalone, quick-frozen raw scallop products, raw bivalve molluscs</u></b>	<b><u>Net weight</u></b>	<b><u>See Appendix III</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
<b><u>Fish and fishery products</u></b>	<b><u>Washed drained weight</u></b>	<b><u>See Appendix III</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
Fish and fishery products	Sensory and physical determinations	Described in the standard <b><u>and see Appendix IV and CXG 31-1999</u></b>	Sensory analysis, visual inspections, counting	!
Frozen fish and fishery products	Thawing and cooking procedures	<b><u>Described in the standards</u></b> <b><u>See Appendix V</u></b>	Thawing and heating	!
<b><u>Quick frozen finfish, uneviscerated and eviscerated</u></b>	<b><u>Gelatinous condition (determined as moisture)</u></b>	<b><u>AOAC 983.18 and AOAC 950.46A</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
<b><u>Quick frozen blocks of fish fillet, minced fish flesh and mixtures of fillets and minced fish flesh</u></b>	<b><u>Gelatinous condition (determined as moisture)</u></b>	<b><u>AOAC 983.18 and AOAC 950.46A</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
Quick-frozen fish sticks (fish fingers) and fish portions – breaded or in batter	Fish content (declaration)	AOAC 996.15 and calculation <b><u>(Described in the standard) (See Appendix VI)</u></b>	Gravimetry	!
Quick-frozen fish sticks (fish fingers) and fish portions-breaded and in batter	Proportion of fish fillet and minced fish	WEFTA Method <b><u>(Described in the standard)</u></b> <b><u>- See Appendix VII</u></b>	Gravimetry	!
Quick-frozen raw scallop products	Net weight	AOAC 963.18 <b><u>and Appendix III</u></b>	Gravimetry	!
<b><u>Raw bivalve molluscs</u></b>	<b><u>Net weight</u></b>	<b><u>AOAC 963.18 and Appendix III</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
<b><u>Raw fresh chilled or frozen abalone</u></b>	<b><u>Net weight</u></b>	<b><u>AOAC 963.18</u></b>	<b><u>Gravimetry</u></b>	<b><u>!</u></b>
<b><u>Salted Atlantic herring and salted sprat and sturgeon caviar<sup>5</sup></u></b>	<b><u>Determination of salt content</u></b>	<b><u>See Appendix VIII</u></b>		

<sup>5</sup> If numeric performance criteria are agreed upon and adopted by CAC (see paragraph 8(ii)), this method of analysis will be revoked from CXS 234-1999.

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<u>Fish and fishery products</u>				
<u>Live and raw bivalve molluscs</u>	<u>Determination of <i>Escherichia coli</i></u>	<u>See Appendix IX</u>		
<u>Smoked fish, smoke-flavoured fish and smoke-dried fish</u>	<u>Determination of <i>Listeria monocytogenes</i></u>	<u>See Appendix IX</u>		
<u>Smoked fish, smoke-flavoured fish and smoke-dried fish</u>	<u>Determination of <i>Clostridium botulinum</i></u>	<u>See Appendix IX</u>		
Salted fish and dried salted fish of the Gadidae family of fishes	Water content in the whole fish	<del><u>Described in the standard</u></del> <u>See Appendix VIII</u>	Gravimetry	I

**Determination of biotoxins in live and raw bivalve molluscs, live abalone and raw fresh chilled or frozen abalone**

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

**Part 3: Consequential amendments to methods of analysis as a result of the availability of numeric performance criteria for the method of analysis**

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
<b><u>Processed fruits and vegetables</u></b>	<b><u>Lead</u></b>	<b><u>AOAC 972.25 (Codex general method)</u></b>	<b><u>AAS (flame absorption)</u></b>	<b><u>III</u></b>
Processed fruits and vegetables ( <b>except</b> jams, jellies, marmalades, pickled cucumbers)	Sorbates	AOAC 983.16	Gas chromatography (Flame ionization)	III
Processed fruits and vegetables ( <b>except</b> jams, jellies, marmalades, pickled cucumbers)	Sorbates	NMKL 124	Liquid chromatography (UV)	II
<b><u>Processed fruits and vegetables</u></b>	<b><u>Tin</u></b>	<b><u>AOAC 980.19 (Codex general method)</u></b>	<b><u>Atomic absorption spectrophotometry (flame)</u></b>	<b><u>II</u></b>
<b><u>Table olives</u></b>	<b><u>Tin</u></b>	<b><u>NMKL 190   EN 15764</u></b>	<b><u>Atomic absorption spectrophotometry (flame)</u></b>	<b><u>II</u></b>

**Part 4: Consequential amendment to a method of analysis made as a result of the decision to align the name of the provision to 'moisture'.**

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
Black, white and green pepper	Moisture <b><u>content</u></b>	ISO 939	Distillation	I



**Appendix III****(FOR INFORMATION ONLY)****Part 1: Methods of analysis that were not included in CXS 234-1999 in the format adopted by CAC47**

<b>Commodity</b>	<b>Provision</b>	<b>Method</b>	<b>Principle</b>	<b>Type</b>
Quick-frozen fish sticks (fish fingers) and fish portions – breaded or in batter	Net weight	Described in the standard	Gravimetry	I
Quick-frozen Raw Scallop Products – Block Frozen Products	Drained weight	AOAC 967.13 and Described in the Standard	Gravimetry	I

**Part 2: Numeric performance criteria for natural mineral waters adopted by CAC47 and included in the table “Criteria applicable to health-related substances in the *Standard for natural mineral waters (CXS 108-1981)*” in CXS 234-1999.**

<b>Provision</b>	<b>ML (%)</b>	<b>Min. Range (%)</b>	<b>Appl.</b>	<b>LOD (%)</b>	<b>LOQ (%)</b>	<b>Precision (RSD<sub>R</sub>) (%) No more than</b>	<b>Recovery (%)</b>	<b>Examples of applicable methods that meet the criteria</b>	<b>Principle</b>
Lead	0.01	0.006 – 0.014		0.002	0.004	44	60-115	ISO 17294-2 ISO 15586 EPA 200.8	ICP-MS GF-AAS ICP-MS
Cadmium	0.003	0.0017 – 0.0043		0.0006	0.0012	44	40 - 120	ISO 17294-2 EPA 200.8 EN 17851 EN 14083	ICP-MS ICP-MS ICP-MS GF-AAS