

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
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Organization

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Agenda Item 3

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

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REPORT OF VIRTUAL WORKING GROUP ON ENDORSEMENT OF METHODS OF ANALYSIS AND SAMPLING PLANS FOR PROVISIONS IN CODEX STANDARDS

*(Prepared by the Chair and co-chairs of the Virtual Working Group on endorsement of methods of analysis
and sampling plans for provisions in Codex standards)*

Agenda Item 3: Endorsement of Methods of Analysis and Sampling Plans for Provisions in Codex Standards (CX/MAS 26/45/3)

1. The virtual working group (VWG) met on March 2nd, 2026 and discussed the following items:
 - Sampling plans for total aflatoxins and ochratoxin A in certain spices (i.e. nutmeg, dried chilli and paprika (CX/MAS 26/45/3 appendix II Part A)
 - Numeric performance criteria for total aflatoxins and ochratoxin A in certain spices (CX/MAS 26/45/3 appendix II Part B)
 - Numeric performance criteria for total aflatoxins and ochratoxin A in certain food matrices (CX/MAS 26/45/3 appendix II Part C)
 - Sampling plans for regional standards (Asia) (CX/MAS 26/45/3 appendix III)
 - Methods of analysis for provisions in regional standard for maamoul (Near East) (CX/MAS 26/45/3 appendix IV)
 - Methods of analysis in spices and culinary herbs (CX/MAS 26/45/3 appendix V Part B1 updated methods from CCSC7)

CODEX COMMITTEE ON CONTAMINANTS IN FOOD (CCCF18)

Part A: Sampling plans for total aflatoxins and ochratoxin A in certain spices (i.e. nutmeg, dried chilli and paprika) (CX/MAS 26/45/3 appendix II Part A)

2. The VWG reviewed the sampling plans submitted by CCCF for total aflatoxins (AFT) and ochratoxin A in certain spices (i.e. nutmeg, dried chilli, and paprika). It was clarified that the sampling plans for paprika would include ochratoxin A only, and not total aflatoxin because there is no ML for AFT in paprika.
3. The VWG discussed the appropriateness of the proposed sampling plans in light of the ongoing and potential for future CCMAS work with respect to sampling of bulk heterogeneous lots. It was agreed that the VWG should consider the proposed sampling plans at this session, not waiting for the progress of ongoing work and recommend CCMAS to inform CCCF the results after completion.
4. The VWG also discussed the decision criteria for lots of large size (CX/MAS 26/45/3 appendix II, Part A, Table 1) and in case a lot is subdivided into sublots, whether a test result of analytical sample from one subplot greater than the Codex ML would result in rejection of the entire lot or only the subplot.
5. The VWG reviewed all sampling tables including tables with differing lot sizes as well as tables for and for whole spices (Tables 1 and 2), crushed/cracked/broken/flakes spices (Tables 3 and 4), and for ground/powdered spices (Tables 5 and 6). A consensus was achieved to recommend endorsement of the sampling plans in CX/MAS 26/45/3 appendix II Part A, and return information and a question to CCCF.

6. The VWG recommends:

- endorsement of sampling plans in CX/MAS 26/45/3 Appendix II, Part A, tables 1 – 6 for aflatoxin and ochratoxin A in certain spices; and
- returning the following question and information back to CCCF:
 - For lots ≥ 25 tonnes (tables 1, 3, and 5), would a test finding exceeding the ML in any subplot result in the entire lot being rejected, or only that subplot being rejected?
 - (Dependent on the decision of CCMAS) - To inform CCCF of new CCMAS work on the development of general guidance for acceptance sampling plans for bulk materials for inhomogeneous lots, and request their views on the need for, and possible scope of, such guidance.

Parts B and C: Numeric performance criteria for total aflatoxins and ochratoxin A in certain spices (CX/MAS 26/45/3 appendix II Part B) and in certain food matrices (CX/MAS 26/45/3 appendix II Part C)

7. The VWG reviewed the numeric performance criteria (NPC) submitted by CCCF for total aflatoxins and ochratoxin A in certain spices and foods. The VWG noted that CCMAS had previously endorsed a similar table for AFT in cereals.
8. One Observer mentioned that the low MLs proposed by CCCF necessitate expensive and sophisticated analytical technology, and that this could be difficult for some countries to obtain, which might limit trade.
9. The VWG also discussed the difficulty in understanding and using the NPC tables when an ML is set based up a 'sum of components,' such as for total aflatoxins. One Member pointed out the inconsistency between paragraph 13 and Annex A in the [Information Document](#)¹. For example, the Information Document used to calculate the NPC table specifies the minimum applicable range to be $ML/n \pm 2S_R$ and may need to be edited, since in this case the minimum applicable range does not include the total AFT ML. Members of the VWG were encouraged to bring suggested edits to the 'Sum of Components' information document, specifically paragraph 13.
10. Some Members suggested that since current methods measure only the individual components the numerical values for AFT except ML should be deleted. Other Members did not agree to delete them because screening methods directly analyzing AFT (ELISA) is available and such information could be useful. The VWG decided to put these data in square brackets.
11. One Member suggested example methods that could meet the NPC, including:
- EN 14123:2007 Foodstuffs - Determination of aflatoxin B1 and the sum of aflatoxin B1, B2, G1 and G2 in hazelnuts, peanuts, pistachios, figs, and paprika powder - High performance liquid chromatographic method with post-column derivatisation and immunoaffinity column cleanup
 - EN 17424:2020 Foodstuffs - Determination of aflatoxins in spices other than paprika by IAC clean-up and HPLC-FLD with post-column derivatization
 - EN 17250:2020 Foodstuffs - Determination of ochratoxin A in spices, liquorice, cocoa and cocoa products by IAC clean-up and HPLC-FLD
 - EN 17641:2022 Foodstuffs - Multimethod for the determination of aflatoxins, deoxynivalenol, fumonisins, ochratoxin A, T-2 toxin, HT-2 toxin and zearalenone by LC-MS/MS
12. The VWG recommends:
- endorsement of numeric performance criteria in CX/MAS 26/45/3 appendix II, Parts B and C, with example methods added (CRD02 Appendix I); and
 - returning the following questions to CCMAS:
 - Would a revision of the 'Sum of Components' information document be necessary (specifically paragraph 13) so that the minimum applicable range includes the ML be helpful to commodity committees and future CCMAS discussions? Subsequent to the decision to edit para. 13 in the information document, should the NPC tables be revised, and CCCF be notified?
 - Should the *Recommended methods of analysis and sampling* (CXS 234-1999) retain the information in the total (sum) row of the numeric performance criteria tables when there are not currently methods that measure the sum? Or should the NPC tables contain only the analytical figures of merit for the individual components?

¹ Criteria Approaches for Methods which Use a "Sum of Components"

FAO/WHO COORDINATING COMMITTEE FOR ASIA (CCASIA23)

Sampling plans for regional standards (Asia)

(CX/MAS 26/45/3 Appendix III)

13. The VWG reviewed the sampling plans from CCASIA23 for inspection by attributes (table 2) and inspection by variables (table 3).
14. One Member did not support endorsement, noting that the proposed sampling plans were not developed in accordance with revised *General guidelines on sampling* (CXG 50-2004) and that these plans should be revised following CXG 50 in order to reduce both producers' and consumers' risk. Other Members noted that since the provisions were not related to food safety, the AQL of 6.5% was appropriate and that the plans were developed taking into consideration feasibility and the current practice.
15. One Member also noted that there has been a revised version of ISO 2859-1 that could be used to revise the sampling plans. Germany and Japan agreed to again check the accuracy of the sampling plans against CXG-50 and ISO 2859-1, with a recommendation to CCMAS PWG when it convenes in person.
16. The VWG did not come to a final decision whether to recommend the sampling plans, the plans will again be discussed during the PWG and CCMAS.

FAO/WHO COORDINATING COMMITTEE FOR NEAR EAST (CCNE12)

Methods of analysis for provisions in the regional standard for maamoul (Near East)

(CX/MAS 26/45/3 Appendix IV)

17. The VWG reviewed the proposed methods for the provisions in the regional standard for maamoul. Members noted that this was a composite, finished product and not a commodity type food. It is less common to have methods validated for the finished product type foods, so many of the methods lack proper validation data.
18. With regard to extraneous matter, the VWG recommended replacing AOAC 972.32 with AOAC 970.70 as Type I method, as AOAC 972.32 has validation data for baked goods whereas AOAC 970.70 was validated for only flour.
19. With regard to pH, the VWG included recommendations for additional methods AACCI 02-52.01 and NMKL 179. AACCI 02-52.01 includes pH for flour, bread cracker, and pastry products, and NMKL 179 was validated in ketchup, mayonnaise, vegetable spread, soft cheese, salmon filet, but not biscuits or cookies. Since none of these four methods were validated for the commodity, and these were different methods, the VWG recommended all these methods as Type IV.
20. Regarding moisture, the VWG also recommended replacing ISO 712 with NMKL 206, due to the NMKL 206 method being validated for biscuits and crackers.
21. The VWG recommends endorsement of methods of analysis for provisions in the regional standard for maamoul as shown in CRD02 Appendix II.

CODEX COMMITTEE ON SPICES AND CULINARY HERBS (CCSCH8)

Part B: Methods of analysis in spices and culinary herbs

(CX/MAS 26/45/3 Appendix V Part B1)

22. The VWG discussed the methods of analysis submitted by CCSCH7 which were updated based on replies from CCSCH8. Method principles were added to those entries which lacked them, and it was agreed to revoke ISO 3513 for the provision of pungency, Scoville Heat Units and replace it with ASTA 21.3 / AOAC 995.03 which were co-developed and validated.
23. Although planned, the VWG did not complete its work on the review of methods for spices and culinary herbs including vanilla, large cardamom, and dried and dehydrated coriander. The PWG will continue the work and review the methods and make recommendations to CCMAS.

Small cardamon

24. The VWG agreed to include a footnote "100 g Test portion size" to ISO 927 for clarity.

Turmeric

25. The VWG agreed to delete ISO 2825 because it is a general preparation process and not specifically used for this analysis.

26. One Observer informed that AOAC 2016.16 (HPLC) was validated for the quantification of curcuminoids and proposed the method as Type II. However, the provision clarified by CCSCH is “colouring power expressed as curcuminoids”, and conversion factor from curcuminoids to colouring power is built in ISO 5566. The VWG agreed to retain ISO 5566 as Type I and not to include AOAC 2016.16.

Dried or dehydrated chilli pepper and paprika

27. In addition to ASTA 21.3, the VWG agreed to endorse AOAC 995.03 because they were equivalent. It was clarified that the methods should be Type I because a conversion factor was included in these methods. Regarding a question on how to describe principles for a method allowing selection of detectors (UV or FLD) as Type I method, the VWG agreed to include “calculation” in principles for clarification.
28. The VWG recommends endorsement of methods of analysis for provisions as shown in CRD02 Appendix III, including the sample size footnote of 100 g for the provision Light Seeds in small cardamom.

Appendix I

Numeric performance criteria for total aflatoxins and ochratoxin A in certain spices

Commodity	Analyte	ML (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)	Precision (%)	Minimal applicable range (µg/kg)	Recovery (%)	Example Methods
Chilli pepper, nutmeg	AFT B1+B2+G1+G2	20	≤ 4	≤ 8	≤ 44	11.2 – 28.8	60 – 115	EN 17424:2020
	AFB1	-	≤ 1	≤ 2	≤ 44	2.8 – 7.2	40 – 120	EN 17641:2022
	AFB2	-	≤ 1	≤ 2	≤ 44	2.8 – 7.2	40 – 120	
	AFG1	-	≤ 1	≤ 2	≤ 44	2.8 – 7.2	40 – 120	
	AFG2	-	≤ 1	≤ 2	≤ 44	2.8 – 7.2	40 – 120	
Chilli pepper, paprika, nutmeg	OTA	20	≤ 4	≤ 8	≤ 44	11.2 – 28.8	60 – 115	EN 17250:2020 EN 17641:2022

Numeric performance criteria for total aflatoxins in certain food matrices

Commodity	Analyte	ML (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)	Precision (%)	Minimal applicable range (µg/kg)	Recovery (%)	Example Method
Peanuts intended for further processing	AF B1+B2+G1+G2	15	[≤ 3]	[≤ 6]	[< 44]	[8.4 - 21.6]	[60 — 115]	EN 14123:2007 EN 17641:2022
	AFB1	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFB2	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFG1	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFG2	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
Tree nuts destined for further processing: almonds, hazelnuts, pistachios, and shelled Brazil nuts	AF B1+B2+G1+G2	15	[≤ 3]	[≤ 6]	[< 44]	[8.4 - 21.6]	[60 — 115]	EN 14123:2007 EN 17641:2022
	AFB1	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFB2	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFG1	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
	AFG2	-	≤ 0.75	≤ 1.5	< 44	2.1 - 5.4	40 - 120	
Ready-to-eat tree nuts: almonds, hazelnuts, pistachios and shelled Brazil nuts	AF B1+B2+G1+G2	10	[≤ 2]	[≤ 4]	[< 44]	[5.6 - 14.4]	[60 — 115]	EN 17641:2022
	AFB1	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFB2	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFG1	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFG2	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
Dried figs	AF B1+B2+G1+G2	10	[≤ 2]	[≤ 4]	[< 44]	[5.6 - 14.4]	[60 — 115]	EN 17641:2022
	AFB1	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFB2	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFG1	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	
	AFG2	-	≤ 0.5	≤ 1.0	< 44	1.4 - 3.6	40 - 120	

Appendix II

Methods of analysis for provisions in the regional standard for maamoul (Near East)

Commodity	Provision	Method	Principle	Type
Maamoul	Extraneous matter	AOAC 972.32 <u>AOAC 970.70</u>	Physical separation and microscopic examination (flotation method)	I
Maamoul	pH	AOAC 981.12	Potentiometry	IV
Maamoul	pH	ISO 1842	Potentiometry	IV
<u>Maamoul</u>	<u>pH</u>	<u>AACCI 02-52.01</u>	<u>Potentiometry</u>	<u>IV</u>
<u>Maamoul</u>	<u>pH</u>	<u>NMKL 179</u>	<u>Potentiometry</u>	<u>IV</u>
Maamoul	Water activity	ISO 18787	Electrometry	II
Maamoul	Moisture	ISO 712 <u>NMKL 206</u>	Gravimetry	I

Appendix III

Methods of analysis submitted by CCSCH7 and updated based on the replies from CCSCH8

Commodity	Provision	Method	Principle	Type
Small cardamom	Light seeds	ISO 927*	<u>Visual examination followed by gravimetry</u>	I
Turmeric	Colouring power expressed as curcuminoids	ISO 2825 and ISO 5566	Spectrophotometry- <u>UV-Vis</u>	I
Dried or dehydrated chilli pepper and paprika	Pungency, Scoville Heat Units	ISO 3513	Sensory evaluation	I
Dried or dehydrated chilli pepper and paprika	Pungency, Scoville Heat Units	ASTA 21.3 / <u>AOAC 995.03</u>	HPLC <u>FLD/UV-Vis and calculation</u>	I
Cloves	Mould visible (for whole)	ISO 927	<u>Visual examination followed by gravimetry</u>	I

* 100 g test portion size