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REVIEW OF SAMPLING PLANS IN CXS 234-1999

(Prepared by the EWG led by New Zealand and co-chaired by Germany)

Codex Members and Observers wishing to submit comments on the recommendations in this document should do so as instructed in CL 2026/5-MAS available on the Codex webpage/Circular Letters: <https://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/>

Introduction

1. The 44th Session of the Codex Committee on Methods of Analysis and Sampling (CCMAS44, 2025) considered the review of sampling plans in CXS 234-1999.
2. This document includes information on the review of sampling plans in CXS 234-1999 undertaken by the EWG for consideration at CCMAS45.
3. With regard to the review of sampling plans in CXS 234-1999, the approaches that could be taken were to:
 - Option 1: include sampling plan information in CXS 234-1999 while noting that a review of the current format is needed;
 - Option 2: include sampling plan information in each individual Codex standard;
 - Option 3: develop a new standard to include sampling plan information (in parallel to CXS 234-1999) that only contains sampling plan information and remove Part B of CXS 234-1999; or
 - Option 4: develop a standard for each commodity group that describes the sampling plans for that commodity group.
4. CCMAS44 agreed to continue developing the discussion paper, particularly the different approaches to the location of sampling plan information in the Codex system, the format, content and presentation of the information, and the responsibility for the selection of an appropriate sampling plan for a given commodity/provision combination. It was also noted the possible need for CCMAS to provide support to commodity committees in the review and development of sampling plans.
5. This document includes the following appendices:
 - Appendix I: Discussion paper on the “Inclusion of sampling plan information in CXS 234-1999”
 - Appendix II: EWG participants

EWG registration and consultation

6. EWG registration was sent out using the CCMAS forum. New Zealand and Germany worked closely together and provided an update to the EWG later in the year. There were 18 Members and three Observers registered. The list of participants is in Appendix II.
7. New Zealand and Germany worked closely to develop the discussion papers and included consideration of comments provided to CCMAS44.
8. Consultation with the EWG was sent out in August 2025 using the EWG online platform. A discussion paper was provided. It set out background including that information on sampling plans is included in Codex to ensure complete harmonization of Codex standards, to facilitate trade and to avoid disputes by ensuring fair and valid sampling plans are used and that to achieve this, a single, designated sampling inspection plan

should be specified for each provision, in the same way there is at least a single, designated analytical test method for each provision. The current format of CXS 234 was covered along with comments on the limitations. Four options for inclusion of sampling plan information in Codex standards were presented along with a “mock-up” of inclusion of sampling plan information in CXS 234. The EWG was asked to review and provide comments on the options.

9. Consultation closed in October 2025. Detailed submissions were received from Australia, Canada, European Union and Japan. In summary, there was support for option 1, combining sampling plans and test method information in one document, and preferably in an electronic searchable database. It was generally noted that this option was the most “user-friendly”.

10. Input from the respondents was used to prepare the discussion paper for presentation to CCMAS45. The EWG supported a possible layout for sampling plan information in CXS 234 to take into account in the development of the database to house information on endorsed methods and sampling plans

11. Other issues identified:

- Discussions should continue to define the content of the proposed database, how information from the current version of CXS 234 will be included and the functionality of the database system.
- The difficulties faced by commodity committees to develop sampling plans and taking into account that many commodity committees are adjourned sine die, CCMAS might need to consider how to assist with the process of developing sampling plans where they do not currently exist

Conclusion

12. The EWG has undertaken its work in accordance with its terms of reference. The discussion paper has been further developed and can be found in Appendix I. The EWG has indicated a preference for Option 1, for sampling plan information to be included in CXS 234-1999 as the single reference for such information; although, Option 4, to develop a standard describing the sampling plans for each commodity group, was also supported and remains an option for further discussion.

Recommendations

13. CCMAS45 is invited to:

- i. note the options, as presented in Appendix I, for the inclusion of sampling plan information, and consider options 1 and 4 which are as follows:
 - Include all sampling plan information in CXS 234-1999 ;
 - Develop a standard for each commodity group that prescribes sampling plans or outcomes for plans relating to that commodity group (the details of sampling plans would still be included in the CXS 234 database (or other repository) if this option is adopted);
- ii. consider the way forward depending on the agreed option. This may include:
 - Agreement on what information should be included;
 - Functionality of a tool such as a database that stores this information;
 - Population of information into the database tool;
 - Inclusion of standard and non-standard information, e.g. footnotes and comments into the tool’
 - Maintenance of the database tool; and
- iii. consider other issues such as how CCMAS could assist with the process of developing sampling plans where they do not currently exist.

14. The current EWG has completed its work and it is proposed that a new EWG should be established to continue the discussions to define the content of the proposed database, how information from the current version of CXS 234 will be included, the functionality of the database system, e.g. the ability to create new entries, to edit existing entries and how the system would display the information for selected entries.

Appendix I

DISCUSSION PAPER: INCLUSION OF SAMPLING PLAN INFORMATION IN CXS 234-1999**(For information)**

1. CCMAS44 agreed to continue developing a discussion paper on the review of sampling plans in CXS 234-1999, particularly the different approaches to placing the sampling plans in the standard(s), the format and content of the presentation of sampling plans, and the responsibility for assessing the parameters that determine the selection of the appropriate sampling plan for a given commodity/provision combination.

Location of sampling plan information

2. Information on sampling plans is included in Codex to ensure complete harmonization of Codex standards, to facilitate trade by standardizing assessments and to avoid disputes by ensuring fair and valid sampling plans are used. To achieve this, a single, designated sampling inspection plan should be specified for each provision, in the same way there is a single, designated analytical test method for each provision.

3. Sampling inspection plans should be developed in accordance with the principles set out by Codex:

- Validity (Codex PM) based on sound statistical principles including the allowances made for normal measurement error and within-lot product variation.
- Fairness (Codex PM) / Fitness for Purpose / Appropriateness (*Principles for the use of sampling and testing in international food trade* (CXG 83))

4. Sampling and testing procedures are fit for purpose in a product assessment if, when used in conjunction with appropriate decision criteria, they have acceptable probabilities of wrongly accepting or wrongly rejecting a lot or consignment.

5. CXG 83 describes the requirements for a sampling plan used to assess compliance of a lot of a product to a Codex provision, as defined by a minimum or maximum limit:

- a) The number of samples required to be taken and how they are taken,
- b) The test method used to analyze those samples,
- c) How the results are used to assess whether the lot complies with the provision.

Current state

6. Currently, information on sampling plans is included in CXS 234 in an Annex (Part B), the format of which does not lend itself to the inclusion of the information needed to specify sampling inspection plans.

7. The current table contains just three columns:

- a) Commodity categories
- b) Method of Sampling
- c) Notes

8. Further, Part B contains sampling information for only five commodity groups:

- Cereals, Pulses & Legumes list three standards relating to the physical sampling of products;
- Milk & Milk Products refers to one ISO Standard relating to physical sampling procedures for products and the two others to ISO standards on sampling inspection;
- Processed Fruit and Vegetables lists one ISO Standard relating to physical sampling; and
- Fats & Oils and Fish Oils list two standards relating to physical sampling procedures

Comments

9. There is clearly some confusion between physical sampling and sampling inspection plans.

10. The Codex Committee on Milk and Milk Products (CCMMP) specifies standards relating to sampling inspection, but those standards contain many plans without any guidance on which plan(s) should be used.

11. Otherwise, a review of 272 standards revealed that several Codex Standards contain some information on sampling, but most do not:

- 63% of the standards contained no information on sampling;

- 13% referred to the ISO sampling plans based on an AQL (PRQ) of 6.5% from the revoked CXS 233; and
- 1% referred to CXG 50 in entirety.

Documentation of sampling plan information

12. There are **four options** for inclusion of sampling plan information in Codex standards:
- Option 1: Include information on sampling plans in CXS 234-1999
- Option 2: Include information on sampling plans in each individual standard
- Option 3: Include information on sampling plans in a separate standard, parallel to CXS 234-1999
- Option 4: Include information on sampling plans in a separate standard for each commodity group
13. Proposals for the format of information on sampling included in Codex standards are presented below.

Discussion

Option 1

14. This was the preferred option based on the EWG responses as it would be the most convenient for users to have the test method and sampling information contained in a single document, either as an Excel document, or preferably in a database. Use of a database format would allow sampling plan information to be integrated with the details relating to the methods of analysis, rather than included in separate tables.

15. The development of a database to house information on endorsed methods and sampling plans was proposed at CCMAS40.

Option 2

16. This would require all standards, or at least those that did not currently contain sampling plans or test method information, to be revised and reissued, a process that would involve considerable administrative effort.

Option 4

17. There was support for the development of a “meta-standard” for each commodity group that would contain details of sampling plans, for all provisions in the commodity group. This option would streamline the development and documentation of sampling plans as it is likely that the same sampling plan would be used for ‘similar’ provisions, such as those relating to macro composition.

18. It is suggested that the details of sampling plans would still be included in the CXS 234 database (or other repository) if this option is adopted.

Format and content of CXS 234-1999

19. The standard should be published as an Excel document, or preferably in a database.
20. Sampling plan information would be presented together with the test method information for the provision to which they relate.
21. Each provision would be listed separately, bulk entries would not be permitted, although the same sampling plan could be used for multiple provisions.
22. Standardization of test method and sampling plan details in the current version of CXS 234 would be required to enable conversion to a database format. For instance, strategies for the handling of notes, footnotes and complementary methods will need to be devised.
23. The database format would also lend itself to inclusion of analytical requirements for provisions where method performance criteria rather than methods are specified. Following the suggestion from Australia, details of method performance criteria would also be included, where applicable:
- a) The Commodity
 - b) The Provision
 - c) The Maximum Level (ML)
 - d) Minimum applicable range (mg/kg) unless otherwise stated
 - e) Limit of detection (LOD) (mg/kg)
 - f) Limit of quantification (LOQ) (mg/kg)

- g) Precision (RSDR) (%)
- h) Recovery (%)
- i) Example of methods that meet the criteria
- j) Principle

24. Other information such as references to the originating standards and Nitrogen conversion factors could also be included.

25. Examples of the proposed layouts are included in the Annex.

Sampling plan parameters published in CXS 234

26. As remarked above, the current format of Part B of CXS 234 is not suitable, and it is proposed that the table containing the sampling information should be reformatted to include:

- The type of sampling plan, e.g. attributes or variables
- Details of the physical sampling procedure, such as a reference to an ISO or possibly a Codex standard
- Sampling plan details, either the sampling plan itself or outcomes for the sampling plan, particularly when measurement uncertainty is non-negligible.
- The repeatability and reproducibility of the test method, where applicable, to facilitate the design of sampling plans.
- Notes, such as references to the sources of the sampling plan if not based on CXG 50, or the producer's and consumer's risks if the default values, 5% and 10% respectively, are not used.

Other Issues

27. The responsibility for developing standards sits with the commodity committees, so it seems natural that they should also have the responsibility for developing sampling plans for each provision in those standards. It is noted that the scope of CXG 50 and CCMAS endorsement appears restricted to composition characteristics and commodity defects.

28. However, there are concerns that several commodity committees are currently in adjournment *sine die*, and that despite the publication of CXG 50 and the information document that includes links to the apps, the committees lack the expertise to be able to design sampling plans without assistance from CCMAS or external consultants. Similar issues exist with methods of analysis, but in that case commodity committees routinely refer to CCMAS for advice.

29. Under the current system, CCMAS has responsibility for the endorsement of sampling plans, although CCMAS might not be in a position to decide on the appropriateness of the consumer's and producer's risks inherent in those plans without adequate justification from or consultation with the commodity committees.

ANNEX

Example of proposed format of sampling plan information

CXS 234- 1999 (Last amendment: 2024*) * The most updated version of the method should be used, in application of ISO/IEC 17025. The present list of methods reflects the amendments adopted by the 47th Session of the Codex Alimentarius Commission in

Part III. METHODS OF SAMPLING BY COMMODITY CATEGORY, NAMES AND PROVISION:

Commodity Category	Commodity	Provision	Sampling Plan Type	Physical sampling procedure	Sampling plan details	Notes
Milk and milk products	Milk powders and cream powders	Milkfat	Variables plan	ISO 707 IDF 50	(n = 20, k = 1.5)	
Milk and milk products	Milk powders and cream powders	Milk protein	To be defined	ISO 707 IDF 50	(n = 20)	Input to PSNF calculation
Milk and milk products	Milk powders and cream powders	Scorched particles	To be defined		(PRQ = 5%, CRQ = 20%)	
Milk and milk products	Milk powders and cream powders	Scorched particles	Attributes Plan		(n = 10, c = 1)	
Milk and milk products	Milk powders and cream powders	Solubility index	To be defined	ISO 707 IDF 50	(n = 13, c = 2)	ISO 2859-1:1999 Table 2-A AQL = 15%
Milk and milk products	Milk powders and cream powders	Water ^{xxxx} (moisture)	To be defined	ISO 707 IDF 50	(PRQ = 5%, CRQ = 15%)	
Milk and milk products	Milk powders and cream powders	Water ^{xxxx} (moisture)	To be defined	ISO 707 IDF 50	(PRQ = 5%, CRQ = 15%)	
Milk and milk products	Milk fat products	Copper	Compositional Proportion	ISO 707 IDF 50	(PRQ = 5%, CRQ = 10%)	
Milk and milk products	Milk fat products	Iron	Compositional Proportion	ISO 707 IDF 50	(PRQ = 5%, CRQ = 10%)	

Example of Proposed Format for Selection of Methods based on Method Performance Criteria*

Commodity Category	Commodity	Provision	Provision - Subcategory	Method performance criteria					
				ML (mg/kg)	Minimum applicable range (mg/kg) unless otherwise stated	Limit of detection (LOD) (mg/kg)	Limit of quantification (LOQ) (mg/kg)	Precision (RSD R)(%) no more than	Recovery (%)
Milk and milk products	Milk fat products	Copper		0.05 mg/L	0.028 - 0.072 mg/L	0.01 mg/L	0.02 mg/L	44	60–115
Milk and milk products	Milk fat products	Iron		0.2 mg/L	0.08 - 0.32 mg/L	0.02 mg/L	0.04 mg/L	40.8	80–110
Milk and milk products	Edible casein products	Copper		5 mg/L	3.1 - 6.9 mg/L	0.5 mg/L	1 mg/L	25.1	80–110
Milk and milk products	Edible casein products	Iron		20 mg/L	13.9 - 26.1 mg/L	2 mg/L	4 mg/L	20.4	80–110
Milk and milk products	Edible casein products	Iron (in roller dried caseinates)		50 mg/L	36.7 - 63.3 mg/L	5 mg/L	10 mg/L	17.8	90–107
Processed fruits and vegetables	Jams, jellies and marmalades	Benzoic Acid		1000	830 – 1170	100	200	11.3	95–105
Processed fruits and vegetables	Pickled cucumbers	Benzoic Acid		1000	830 – 1170	100	200	11.3	95–105
Processed fruits and vegetables	Mango chutney	Benzoic Acid		250	197 – 302	25	50	13.9	90–107
Processed fruits and vegetables	Coconut milk and coconut cream	Benzoic Acid		1000	830 – 1170	100	200	11.3	95–105
Processed fruits and vegetables	Jams, jellies and marmalades	Sorbates		1000	830 – 1170	100	200	11.3	95–105
Processed fruits and vegetables	Pickled cucumbers	Sorbates		1000	830 – 1170	100	200	11.3	95–105
Processed fruits and vegetables	Processed fruits and vegetables	Tin		250	197 – 302	25	50	13.9	90–107
Processed fruits and vegetables	Table olives	Tin		250	197 – 302	25	50	13.9	90–107

* Additional columns showing the method principle and examples of methods that meet the criteria would also be included but are not shown in this example.

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