CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - E-mail: codex@fao.org - www.codexalimentarius.org

REP24/CF17

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION

Forty-seventh Session
25-30 November 2024

REPORT OF THE 17th SESSION OF THE CODEX COMMITTEE ON CONTAMINANTS IN FOODS

Panama City, Panama

15-19 April 2024

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Responsible Party	Purpose	Text/Topic	Code	Step(s)	Appendices & Paragraphs
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Responsible Party	Purpose	Text/Topic	Code	Step(s)	Appendices & Paragraphs
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LIST OF ABBREVIATIONS

2-CE	2-chloroethanol
AFB1	Aflatoxin B1
AFT	Total aflatoxins
ALARA	As Low As Reasonably Achievable
CAC	Codex Alimentarius Commission
CCCF	Codex Committee on Contaminants in Foods
CCEXEC	Executive Committee of the Codex Alimentarius Commission
CCFA	Codex Committee on Food Additives
CCMAS	Codex Committee on Methods of Analysis and Sampling
CCPR	Codex Committee on Pesticide Residues
CCRVDF	Codex Committee on Residues of Veterinary Drugs in Foods
CCSCH	Codex Committee on Spices and Culinary Herbs
CET	Central European Time
CL	Circular Letter
CoP	Code of Practice
CRD	Conference Room Document
CTF	Codex Trust Fund
CTX	Ciguatoxin
CXC	Codex code of practice
CXG	Codex guideline
CXS	Codex standard
DAS	Diacetoxyscirpenol
dl-PCBs	Dioxin-like Polychlorinated Biphenyls
EFSA	European Food Safety Authority
EIs	Environmental Inhibitors
EtO	Ethylene Oxide
EU	European Union
EWG	Electronic Working Group
FAO	Food and Agriculture Organization
FFP	For Further Processing
GAP(s)	Good Agricultural Practice(s)
GEMS/Food	Global Environment Monitoring System
IAEA	International Atomic Energy Agency
INF	Information
ISO	International Organization for Standardisation
JECFA	Joint FAO/WHO Expert Committee on Food Additives
LCn3PUFA	Long chain omega-3 fatty acids
MeHg	Methylmercury
ML(s)	Maximum Level(s)
MOAH	Mineral Oil Aromatic Hydrocarbons
MOH(s)	Mineral Oil Hydrocarbon(s)
MOSH	Mineral Oil Saturated Hydrocarbons

NFPS	New Food Sources and Production Systems
OHPL	Overall Highest Priority List
PAs	Pyrrolizidine Alkaloids
PAHO	Pan American Health Organization
PCBs	Polychlorinated Biphenyls
PFAS	Per- and polyfluoroalkyl substances
PWG	Physical Working Group
RTE	Ready-To-Eat
TAs	Tropane Alkaloids
TEF	Toxic Equivalency Factor
TWI	Tolerable Weekly Intake
UNICEF	United Nations Children's Fund
USA	United States of America
VWG	Virtual Working Group
WFP	World Food Programme
WG	Working Group
WHO	World Health Organization

LIST OF CONFERENCE ROOM DOCUMENTS
(CRDs)

CRD No.	Agenda Item	Submitted by
1	Division of Competence	European Union
2	5	Chair (Brazil)
3	6	Chair (New Zealand)
4(Rev.)	18	Chair (Canada)
5	19	Chair (European Union)
6	20	Chair (USA)
7	17	Chair (European Union)
8(Rev.)	5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18	European Union
9	5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 18	Kenya
10	15	IDF
11(Rev.)	5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16	Indonesia
12	7	Philippines
13	7, 8, 10, 11, 14, 15	USA
14	5, 8, 10	Türkiye
15	5, 6, 7, 8, 9, 10, 11, 15, 16, 18, 19, 20	Singapore
16	9	FAO
17	5	Malaysia
18	5, 6, 7, 8, 9, 11, 13, 14, 15, 17, 18	India
19	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	South Africa
20	9	Cabo Verde
21	5, 6, 7, 8, 9, 15, 16	Ghana
22	5, 6, 11, 13, 14, 15	Nigeria
23	12	Institute of Food Technologist (IFT)
24(Rev.)	13	WHO
25	5, 13	Bangladesh
26	5, 7, 14, 15	Senegal
27	14	El Salvador
28	12	FoodDrinkEurope
29	9	Chair (USA)
30(Rev.)	8	Chair (India)
31	16	USA
32	5, 6, 7, 11, 12, 14, 15	Russian Federation
33	5, 6, 7, 8, 10, 14, 15	Thailand
34	8	Brazil
35	5, 7, 9, 13, 14, 15	Egypt
36	13	Peru with the support of Argentina, Brazil, Chile, Costa Rica, Ecuador, Jamaica, Paraguay, Suriname, and Uruguay
37	5	Host Country and Codex Secretariats
38	3, 5, 6, 7, 8, 9, 13, 15, 16, 18	Burundi
39	5, 7, 8, 13	Guyana
40	6, 8, 14, 15, 16	Republic of Korea
41	5, 6, 7, 9, 13, 14, 15, 16	International Union of Food Science and Technology (IUFOST)

INTRODUCTION

1. The Codex Committee on Contaminants in Foods (CCCF) held its 17th Session, in Panama City, Panama, from 15 to 19 April 2024, at the kind invitation of the Governments of Panama and Netherlands (Kingdom of the). Dr Sally Hoffer, Manager Safe and Sustainable Food, Ministry of Agriculture, Nature and Food Quality, Plant Agro Chains and Food Quality, Netherlands (Kingdom of the) chaired the session which was attended by 54 Member countries, one Member organization and 7 Observer organizations. The list of participants is contained in Appendix I.

OPENING OF THE SESSION

2. His Excellency Laurentino Cortizo Cohen, President of the Republic of Panama, opened the session and extended his warmest welcome to all participants. His Excellency underlined the importance of ensuring food safety and quality in international trade, and the key role played by the Codex Alimentarius Commission (CAC) in this regard. His Excellency highlighted the enabling role played by science and technology in detecting food contaminants for the protection of public health.

3. His Excellency Sander Cohen, the Ambassador of the Kingdom of the Netherlands to Panama, also addressed the Committee, highlighting the fundamental role of food standards for both countries in relation to their roles as key logistical hubs for food trade.

4. The following representatives also addressed the Committee:

- Dr. Sally Hoffer, Chairperson of the Codex Committee on Contaminants in Food;
- Mr. Raj Rajasekar, Vice-Chairperson of the Codex Alimentarius Commission;
- H. Sra. Ana Rivière Cinnamond, Pan American Health Organization (PAHO) Representative in Panama; and
- Dr. Vittorio Fattori, Food and Agricultural Organization of the United Nations (FAO) Representative.

Division of Competence[1]

5. CCCF noted the division of competence between the European Union and its Member States, according to paragraph 5, Rule II of the Procedure of the CAC.

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

6. CCCF adopted the Provisional Agenda as the Agenda for the Session.

MATTERS REFERRED TO THE COMMITTEE BY THE CODEX ALIMENTARIUS COMMISSION AND/OR ITS SUBSIDIARY BODIES (Agenda item 2)[3]

7. CCCF noted that most items were for information purposes and that the reply from the Codex Committee on Pesticide Residues (CCPR) on ethylene oxide had been considered in the pre-session working group on the priority list and would be considered further under Agenda item 20.

Maximum Levels for total aflatoxins in various cereal products

8. The Chairperson clarified that a review of the maximum levels (MLs) depended on the availability of data and that it was initially necessary to determine whether there were enough data to proceed. The Chairperson further noted that CCCF17 could request the Joint FAO/WHO Expert Committee on Food Additives (JECFA) to issue a call for data for the MLs on total aflatoxins agreed at CCCF15 and prepare an overview to facilitate a decision on a possible review of the MLs at CCCF18. The Chairperson concluded her intervention by explaining that if not enough data were available for a review of the MLs, the same process would be repeated after two years.

Circular letters

9. CCCF was informed of circular letter, CL 2024/24-CAC, requesting information on a proposal for the investigation and development of recycling guidance in Codex which was of particular relevance for the work of CCCF. The Codex Secretariat also informed CCCF17 that although the deadline for the CL on the Strategic Plan 2026-2031 had passed, Members still had a chance to contribute to the new Strategic Plan by engaging with their Regional Coordinators.

10. In relation to CL 2024/20-CAC, two members suggested that a joint CCCF and the Codex Committee on Food Additives (CCFA) working group could take on the work on the recycling guidance, as both committees had the relevant experts to lead such work. In response to this intervention, the Codex Secretariat invited Members and Observers to submit any relevant information and proposals in reply to the CL as these comments would be further considered by CAC47.

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1 CRD01
2 CX/CF 24/17/1
3 CX/CF 24/17/2

Codex Committee on Methods of Analysis and Sampling (CCMAS)

11. CCCF considered the request from CCMAS42 on sampling plans in the *General Standard for Contaminants in Food and Feed* (CXS 193-1995), specifically to provide numeric performance criteria for aflatoxin methods utilizing the sum of components concept for all relevant commodities to replace the existing numeric criteria, and to evaluate all sampling plans in CXS 193, to determine if the plans were still in line with the revised *General Guidelines on Sampling* (CXG 50-2004).

12. Brazil volunteered to review the numeric performance criteria for aflatoxins in CXS 193 with the objective of submitting proposals for consideration by CCCF18. The Committee noted that the review of all sampling plans in CXS 193 in light of the revised *General Guidelines on Sampling* could be considered under Agenda item 18.

Conclusion

13. CCCF noted the information presented and agreed to:

(i) encourage Members and Observers to actively contribute to the discussions in CCEXEC and CAC (e.g. sharing experience on application of the draft guidance on Statements of Principle and providing inputs on the development of Codex Strategic Plan 2026-2031 through their Regional Coordinators who will participate in the discussions in CCEXEC);

(ii) note the encouragement to submit discussion papers or new work proposals on New Food Sources and Production Systems (NFPS) using existing mechanisms;

(iii) encourage Members and Observers to submit comments in reply to CL 2024/20-CAC "Request for information on a proposal for the investigation and development of recycling guidance in Codex Alimentarius";

(iv) request Brazil, to revise the Numeric Performance Criteria for methods for Total Aflatoxins utilizing the sum of components concept; and

(v) request JECFA to issue a call for data to support review of the MLs for total aflatoxins in various cereal products and prepare an overview to facilitate a decision at CCCF18 on a possible review of the MLs.

MATTERS OF INTEREST ARISING FROM FAO AND WHO INCLUDING JECFA (Agenda item 3)[4]

14. The FAO JECFA Secretariat introduced the item and provided an update regarding the FAO activities of relevance to CCCF, including the following:

- JECFA had scheduled its next meeting dedicated to contaminants (i.e. JECFA101) for October 2025 and JECFA101 would be focusing on the evaluation of dioxins and dioxin-like PCBs and arsenic. JECFA had published the call for data and the deadline for data submission would be 1 December 2024.
- FAO and WHO, in considering that new evidence has become available regarding the risks and benefits of fish consumption since the last FAO/WHO assessment in 2010, convened an expert consultation in October 2023 to review the new evidence and to update the conclusions and recommendations of the 2010 report[5] as needed. The consultation drew a number of conclusions on the health benefits and risks associated with fish consumption. The Summary Report has been made available on the FAO[6] and WHO[7] websites, and the full report would be published in the coming months.
- FAO was finalizing a report that analysed the current and emerging evidence around the various challenges and opportunities to manage food safety in the context of a circular economy. While circular economy initiatives offered considerable promise in improving sustainability and increasing performance, these benefits needed to be considered vis-a-vis with the possible food safety risks arising from contaminants that could be (re) introduced, persist, and accumulate in circular systems. Therefore, protecting food safety was key to the success of transitioning the current linear agrifood systems to be more sustainable and resilient through circular economy. In the report, food safety implications were explored across four themes – water reuse, food loss and waste, packaging waste, and integrated farming systems. The report was currently being finalized and should be ready in the coming months.

4 CX/CF 24/17/3

5 Report of the Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption. Rome, 25-29 January 2010

6 Joint FAO/WHO Expert Consultation on Risks and Benefits of Fish Consumption - Summary and Conclusions. Rome, Italy, 9-13 October 2023

7 jecfa-summary-risks-and-benefits-of-fish-consumption.pdf (who.int)

- FAO had started a project to provide scientific advice in collaboration with WHO on chemical water safety (including emerging contaminants), which could serve as the basis for possible future Codex work. It was noted that the use of good quality water at different stages of the agrifood system – from irrigation, animal farming, aquaculture, cleaning, food processing up to drinking water – was crucial for food safety. This in turn affected public health and had implications for trade in food commodities. Concurrently, the growing evidence of various chemical substances and their mixtures in water was a major cause for concern, especially with no harmonized standards for chemical parameters. Intensified use of some compounds, as may be the case for agrochemicals, and synthetic fluorine compounds, could threaten human health through contamination of food commodities.
- FAO published a report "*Food safety implications from the use of environmental inhibitors in agrifood*" which provided an in-depth analysis on the food safety implications from the use of environmental inhibitors in agrifood systems. The challenge of feeding an increasing global population while responding to the climate crisis required developing practices and technologies that enhanced the sustainability of food production. Environmental inhibitors were one of the approaches used to minimize the harmful effects of agrifood systems on the environment. Not only could they reduce greenhouse gas emissions, such as methane from ruminants or limit the loss of nitrogen from cultivated fields and pastures, but they could also improve the efficiency of livestock and crop production. However, an inadvertent presence of environmental inhibitors' residues in food commodities could raise health concerns as well as disrupt trade if standards or appropriate measures were not established. The possible food safety issues associated with these substances could be challenging to assess and manage due to the lack of internationally harmonized regulatory approaches, an agreed definition for environmental inhibitors and insufficient food safety information for some compounds. Considering the interest that this topic had been generating, also at Codex level, a webinar on this subject has been scheduled for 9 May at 14.30 -15.30 CET.
- FAO continued to collaborate with the World Food Programme (WFP), United Nations Children's Fund (UNICEF), and Doctors without Borders to develop a roadmap to manage the specific risks faced by food aid agencies in ensuring safe and nutritious foods for humanitarian aid, taking into account food security, sustainability, and nutrition. FAO provided risk assessment advice to these agencies on 3-monochloropropane 1,2-diol, glycidol, and their fatty acid esters in lipid-based nutrient supplements and ready to use therapeutic food. The report was being finalized and should be published soon.

15. The WHO JECFA Secretariat, reporting on the activities of WHO, informed CCCF that WHO had devised a novel, transparent, and systematic approach for establishing Toxic Equivalency Factor (TEF) values for dioxins and dioxin-like-PCBs. The scientific paper detailing the methodology was now accessible and provided a comprehensive description of the entire process, encompassing data collection to the final determination of the new values. The upcoming JECFA 2025 meeting would utilize the newly determined TEF values to re-evaluate dietary exposure.

16. The WHO JECFA Secretariat also mentioned that the Codex Trust Fund (CTF) expanded its worldwide reach by sponsoring new countries bringing the total to 59. The CTF released three videos demonstrating the accomplishments of advanced initiatives in Azerbaijan, Honduras, and collaboration between Bhutan, India, and Nepal. The CTF has been building a repository for CTF2 project deliverables.

17. The WHO JECFA Secretariat further informed that WHO commissioned preliminary work on per- and polyfluoroalkyl substances (PFAS), which included a comprehensive review of the health effects of PFAS. Additionally, a thorough evaluation would be conducted to propose the relevant methodology for assessing the potential risks to human health from dietary exposure to PFAS, considering both individual and combined compounds. The approach should utilize the knowledge gained from the development of the methodology used to produce the new WHO TEF values for dioxin and dioxin-like compounds. This preliminary work would serve as the foundation for the JECFA evaluation of PFAS anticipated in 2027.

Conclusion

18. CCCF thanked the FAO and WHO, and noted the information provided.

MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONAL ORGANIZATIONS (Agenda item 4)[8]

19. The Representative from the International Atomic Energy Agency (IAEA) provided an update, noting that 2024 would be the 60th anniversary of the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture, and highlighting activities in the past year. He also thanked all those that had provided comments in response to CL 2023/17-CF and indicated that the information document on natural radionuclides in food, feed and water would be updated for CCCF18 in line with these comments. The document would also reflect revised information to be published by the United Nations Scientific Committee on the Effect of Atomic Radiation later in the year.

[8] CX/CF 24/17/4

Conclusion

20. CCCF expressed its appreciation to the Joint FAO/IAEA Centre and noted the information provided by the IAEA representative.

MAXIMUM LEVELS FOR LEAD IN CERTAIN FOOD CATEGORIES (at Step 4) (Agenda item 5)[9]

21. Brazil, as Chair of the Electronic Working Group (EWG), introduced the item and provided background to the work, a summary of key points of discussion in the EWG and the VWG held prior to the Session, and presented the recommendations for consideration by CCCF. The EWG Chair, referring to Conference Room Document 2 (CRD02), highlighted the proposals for Maximum Levels (MLs) for lead in dried spices and in dried and fresh culinary herbs.

22. CCCF considered the proposals for MLs as follows:

Spices, dried flowers

23. The Chairperson noted general support to discontinue work on the ML for spices, dried flowers because Members considered that in most countries, camomile is mostly used as herbal infusions.

Conclusion

24. CCCF agreed to discontinue work on an ML for spices, dried flowers.

Spices, dried aril

25. CCCF noted the general support for an ML of 0.9 mg/kg for spices, dried aril and for the following reasons:

- India stressed that more time/research was needed to collect data to contribute to the establishment of a more geographically representative ML. Brazil, as Chair of the VWG, explained that a new call for data was not expected to provide more geographically representative data as a call for data had already been issued three times, noting at the same time that, if new information would become available in the future, CCCF could revisit the ML.
- The proposed categories for the MLs were considered appropriate even though India raised the concern that these were developed by the Codex Committee on Spices and Culinary Herbs (CCSCH) for internal use only, that for some categories only data were available for limited products and that MLs could better be set on individual spices.

26. CCCF further noted that, even though mace was the only aril spice, specifying MLs only for spices for which data was available might restrict the use of the proposed categories, and that the information on spices included in the data analysis could better be taken in the 'notes for CCCF' column in the working document presented at each session of the CCCF for information (CF/INF) and used in discussions related to contaminants rather than as a note to the ML in CXS 193.

Conclusion

27. CCCF agreed to establish an ML of 0.9 mg/kg for Spices, dried aril, removing the note on mace and to include it in the information document.

Spices, dried seeds, excluding celery seeds

28. CCCF discussed the proposal for 0.9 mg/kg for spices, dried seeds, excluding dried celery seeds, and noted the following comments:

- A higher ML of 3.0 mg/kg for the spices categories dried bark, dried flower parts, dried fruits and berries, including Sichuan pepper and star anise, dried rhizomes, bulbs and roots, and also dried seeds, and also to include spice mixtures was more appropriate as the dried weight consumption of spices was relatively low otherwise to advance the ML to Step 5 only to allow further discussion on how to implement this ML on mixed spices.
- The rejection rate should not be too close to 5% and that the rejection rate at an ML of 0.9 mg/kg could be therefore supported.
- The statement "ML does not apply to celery seeds" should be specified in the notes/remarks in CXS 193 and not in the commodity/product name.
- India reiterated that more time/research was needed to collect more geographically representative data, including from developing countries.

[9] CL 2024/2-CF; CX/CF 24/17/5; CX/CF 24/17/5-Add.1 (Comments of Canada, Chile, Cuba, Egypt, Iraq, Japan, Panama, Peru, Philippines, Singapore, Türkiye, USA, and Institute of Food Technologists (IFT))

- The EWG and the VWG had not proposed ML(s) for mixture of spices, as CXS 193 did not establish limits for multi-ingredient products, and it was possible to obtain MLs considering the percentage of specific ingredients in the mixture. In addition, the contamination profiles differed between spice mixtures dependent on the ingredients. CCCF noted that the issue of mixtures was not limited to spices, discussed a proposal in CRD37 to include a note in CXS 193 on the application of individual ML of ingredients to the whole mixture based on their relative proportions in the product and noted the following views:
    - For ingredients without Codex MLs, MLs may be considered as 0 when applying the ML to the mixture.
    - In case the proportions of the ingredient are unknown an alternative approach could be to apply the most conservative/lowest ML to the whole mixture.
    - A note was not necessary as information on calculation of maximum concentration in multi-ingredient foods was already included in Annex I of CXS 193.
    - A Member noted that mixtures may not include labelling to identify individual spices; also spice mixtures could be potentially more contaminated with lead, arising from the diversion of rejected spices to the production of spice mixtures. A request was made for an analysis of the available data for spice mixtures in order to determine the concentration range of lead in these products, to be presented at CCCF18 and enable further understanding of mixtures. In response to this request, the JECFA secretariat clarified that such an analysis was possible, but that no information was available on the composition of the spice mixtures which could limit the interpretation.

29. CCCF noted that the Codex Secretariat could issue a circular letter (CL) requesting comments on the necessity and content of further guidance for multi-ingredient products. The CL would include a sample calculation to reflect the proposal to include ingredients without Codex ML and a mixture where the proportion of ingredients are unknown.

30. CCCF agreed to request the JECFA Secretariat to review the data in the GEMS/Food database that are already available on products labelled as spice mixtures and to present an analysis of the data for discussion at CCCF18.

Conclusion

31. CCCF agreed to establish an ML of 0.9 mg/kg for spices, dried seeds, excluding dried celery seeds, and to request the Codex Secretariat to issue a CL requesting comments on the necessity and content of further guidance for multi-ingredient products.

Spices, dried celery seeds

32. CCCF noted the general agreement on the proposal for establishing an ML of 1.5 mg/kg for spices, dried celery seeds, while EU made a proposal for an ML of 0.9 mg/kg as this would be more appropriate based on As Low as Reasonably Achievable (ALARA) and the relevant data.

33. India reiterated that more time and research was needed to collect data to contribute to the establishment of a more geographically representative ML, and that such data should also include relevant information from developing countries.

Conclusion

34. CCCF agreed to establish an ML of 1.5 mg/kg for spices, dried celery seeds.

Spices, dried rhizomes, and roots

35. CCCF considered the ML proposal of 1.5 mg/kg for spices, dried rhizomes and roots and noted the following comments:

- The proposed ML at 1.5 mg/kg presented a rejection rate at 4.8%, which was too close to 5%, and therefore an ML of 2.0 mg/kg was proposed with the rejection rate at 2.8%. Galangal should be included in the group, even though galangal contains a higher concentration of lead. However, since the number of galangal samples did not provide sufficient information to establish a separate ML for it, exclusion of galangal from the group ML could have a negative effect on galangal trade.
- The ML 1.5 mg/kg was too low considering the occurrence data of dried ginger as the root had a much higher rejection rate than 5%, and 2.0 mg/kg would be more appropriate.
- The EU, supported by Indonesia and Egypt, explained that considering the principle As Low as Reasonably Achievable (ALARA principle), and with a view of protecting consumer health, a lower ML of 1.5 mg/kg would be more appropriate on the basis of available data.

- India highlighted that, based on the data discussed during the EWG and VWG, the proposed MLs were based on one spice only, i.e. ginger and were therefore not representative of the entire group. India further reiterated that more time and research was needed to collect data to contribute to the establishment of a more geographically representative ML.
- Garlic should be removed from the notes or remarks since it was decided to exclude bulbs from the category.

Conclusion

36. CCCF agreed to establish an ML of 2.0 mg/kg for spices, dried rhizomes and roots, including galangal and to remove garlic from the notes/remarks column.

Spices, dried bark

37. CCCF considered the proposal of 3.0 mg/kg for spices, dried bark and noted the following comments:
    - The ML of 3.0 mg/kg was a compromise solution agreed upon by the VWG as this had a sample rejection rate of 2.7%, which was considered more appropriate than the rejection rate of 4.2% at the level of 2.5 mg/kg.
    - An ML of 2.0 mg/kg would be feasible and more appropriate as cinnamon was present in many products destined to children, particularly in pre-packaged foods and in home-made meals, and that children were especially vulnerable to the negative effects of lead.
    - EU supported that an ML of 2.5 mg/kg was for dried bark but could also support an ML of 2.0 mg/kg.
    - A Member noted they had new data available on cinnamon and requested that this data be analysed and not to forward the ML for adoption. The Member further noted that the intake for bark, was only 0.4 g per day when highly consumed.
    - Brazil, as Chair of the VWG, proposed to establish an ML of 2.5 mg/kg and to advance this ML to Step 5 and to further consider new data in the following year should such data be made available.
    - Members supporting the proposal of the VWG Chair, further requested that any new data that could be reflective of economic adulteration needed to be excluded; that this task would fall on the EWG rather than on the GEMS/Food database; and that the EWG could, for example, remove the outliers as they could increase the high percentile samples. The United States of America (USA) offered help in sorting out the data.

Conclusion

38. CCCF agreed to advance an ML of 2.5 mg/kg to Step 5 for spices, dried bark, and to request the JECFA Secretariat to issue a call for data with a note that data which could be related to economic adulteration should not be submitted and that the EWG would consider the newly collected data in their review.

Spices, dried floral parts

39. While there was general agreement on the proposal for establishing an ML of 2.5 mg/kg for spices, dried floral parts, the European Union noted that considering the ALARA approach and based on the relevant available data for saffron and capers, an ML of 1.0 mg/kg was considered more appropriate. The European Union further noted that according to its data concentration of lead in cloves appeared to be below 0.5 mg/kg so the few samples with concentrations above 2 mg/kg could be considered to be outliers. Egypt and Türkiye noted that their data were in line with the ones presented by the European Union and that they would therefore support an ML of 1.0 mg/kg.

40. India proposed to exclude saffron from this category as there were only 15 data points available and noted that more time and research was needed to collect data to contribute to the establishment of a more geographically representative ML.

Conclusion

41. CCCF agreed to establish an ML of 2.5 mg/kg for spices, dried floral parts.

Spices, dried fruit, and berries, excluding dried Sichuan pepper, star anise, paprika and sumac

42. CCCF noted the general support for an ML of 0.6 mg/kg.

43. India noted that more time/research was needed to collect data to contribute to the establishment of a more geographically representative ML.

Conclusion

44. CCCF agreed to establish an ML of 0.6 mg/kg for spices, dried fruit, and berries, excluding dried Sichuan pepper, star anise, dried paprika and sumac.

Spices, dried paprika and sumac

45. CCCF noted that there was general agreement for the establishment of an ML of 0.8 mg/kg for dried paprika and sumac.

Conclusion

46. CCCF agreed to establish an ML of 0.8 mg/kg for spices, dried paprika and sumac.

Spices, dried Sichuan pepper and star anise

47. The European Union noted that based on data available in the EU, a lower ML of 0.8 mg/kg for star anise could be established. The Delegation further noted that while they could not agree to an ML of 3.0 mg/kg for star anise, however, they could support an ML of 3.0 mg/kg for dried Sichuan pepper.

48. A Member noted that more data was necessary to establish an ML for dried Sichuan pepper and dried Star anise and requested to hold the ML at Step 4 until such data would be made available.

Conclusion

49. CCCF agreed to establish an ML of 3.0 mg/kg for spices, dried Sichuan pepper and star anise.

Fresh and dried culinary herbs

50. The Chairperson reminded the Committee that CCCF15 agreed that if an agreement for the establishment of MLs on fresh and dried culinary herbs was not reached at CCCF17, work on this category would be discontinued.

Culinary herbs, dried

51. While there was general agreement on the proposal for an ML of 2.5 mg/kg for culinary herbs, dried, the European Union noted that based on the data available in the European Food Safety Authority (EFSA) database, composed by over 1500 samples for dry culinary herbs, a lower ML of 1.5 mg/kg could be established for dried culinary herbs.

52. The VWG Chair noted that these data were not identified in the GEMS/Food data extraction and that the current ML was based on the available data and that if this data should be considered, it could be proposed to advance the ML at Step 5 in order to allow for data submission. A request could be made to the JECFA secretariat to issue a call for data.

53. A Member proposed to use the term “moisture content” in place of “humidity” in the note to the ML.

Conclusion

54. CCCF agreed to establish an ML of 2.5 mg/kg to be advanced to Step 5 for dried culinary herbs, to change “humidity” with “moisture content” in the note to the ML, and to request the JECFA Secretariat to issue a call for data for lead in dried culinary herbs and that the EWG should consider new available data in their review.

Fresh culinary herbs

55. CCCF considered the recommendation to discontinue establishment of an ML for fresh culinary herbs.

56. In response to a request for clarification, CCCF noted that the ML for fresh culinary herbs could be derived from the ML for the dried culinary herbs, taking into account the average water content of the fresh and the dry herbs.

57. It was stressed that the note “MLs for fresh culinary herbs can be derived considering the moisture content of the fresh and dry herb” should be deleted based on the decision of CCCF14 to not support the use of concentration factors to derive an ML for dried culinary herbs.

58. A Member proposed to defer discontinuation of work until the ML for culinary herbs, dried was adopted as the decision on an ML for fresh culinary herbs was contingent on having an ML for dried culinary herbs and it was not sure that there would be an ML for this category.

59. The Codex Secretariat explained that advancing the ML for dried culinary herbs to Step 5 was an indication that an ML for this category of culinary herbs would be established by CCCF.

Conclusion

60. CCCF agreed to discontinue work on lead in fresh culinary herbs, in light of continuation of the development of an ML for dried culinary herbs, and to consider whether or not the note on the use of moisture content to the ML for fresh culinary herbs is warranted.

General Conclusion

61. CCCF agreed to:

(i) forward to CAC47 the following (Appendix II):

(a) An ML of 0.9 mg/kg for spices, dried aril for adoption at Step 5/8, noting the reservation of India for the reasons explained in paragraph 25;

(b) An ML of 0.9 mg/kg for dried seeds, excluding celery seeds for adoption at Step 5/8, noting the reservations of India for the reasons explained in paragraph 28;

(c) An ML of 1.5 mg/kg for dried celery seeds for adoption at Step 5/8, noting the reservations of the European Union and India for the reasons explained in paragraphs 32 and 33;

(d) An ML of 2.0 mg/kg for dried rhizomes and roots for adoption at Step 5/8 noting the reservations of the European Union, Indonesia, Egypt, and India for the reasons explained in paragraph 35;

(e) An ML of 2.5 mg/kg for dried bark for adoption at Step 5;

(f) An ML of 2.5 mg/kg for dried floral parts for adoption at Step 5/8, noting the reservations of the European Union, Egypt, Türkiye, and India for the reasons explained in paragraphs 39 and 40;

(g) An ML of 0.6 mg/kg for spices, dried fruit, and berries, excluding Sichuan pepper, star anise, paprika and sumac for adoption at Step 5/8, noting the reservation of India for the reasons explained in paragraph 43;

(h) An ML of 0.8 mg/kg for spices, dried paprika and sumac for adoption at Step 5/8;

(i) An ML of 3.0 mg/kg for dried Sichuan pepper and dried Star anise for adoption at Step 5/8, noting the reservations of the European Union for the reasons explained in paragraph 47; and

(j) An ML of 2.5 mg/kg for dried culinary herbs for adoption at Step 5.

(ii) discontinue work on the MLs for spices, dried flowers and for fresh culinary herbs and to inform CAC47 accordingly;

(iii) re-establish the EWG chaired by Brazil, working in English only, to work on MLs for lead in dried bark and dried culinary herbs, to consider the relevance of the note on moisture content to the ML for fresh culinary herbs, for comments and consideration by CCCF18;

(iv) request JECFA to:

(a) issue a call for data for lead in spices, dried bark, including a note not to submit data that could be related to economic adulteration and for dried culinary herbs; and

(b) perform an analysis of the available data for spice mixtures for consideration by CCCF18; and

(v) request the Secretariat to issue a CL requesting comments on application of MLs to multi-ingredient products.

SAMPLING PLANS FOR METHYLMERCURY IN FISH (AT STEP 4) (Agenda item 6)[10]

62. New Zealand, as Chair of the EWG and VWG, speaking also on behalf of the co-Chair, Canada, introduced the item, provided background to the work and decisions of previous sessions of the Committee (i.e. to not include monetary value, to continue work to confirm the sampling plans practicality). She explained that information on national sampling plans for methylmercury or other contaminants in fish and data on methylmercury distribution in fish had been requested to inform the work of the EWG.

63. Referring to CRD03, the VWG Chair explained the key decisions of the VWG held prior to the Session and indicated that there was agreement on the changes made but that the definition for decision rule had been added on request of the VWG and would need further consideration by the Committee. She proposed that CCCF consider advancing the sampling plan to Step 5/8 noting that:

- The changes made to the sampling plan addressed all written comments submitted and discussions in the EWG and VWG.
- MLs for methylmercury in fish should be accompanied by sampling plans.
- Tissue distribution data on methylmercury was submitted only for tuna.
- Tissue distribution data for shark, alfonsino, marlin, orange roughy and pink cusk eel, this was not likely to become available in the near future.
- Practicality of the sampling plan will only be confirmed only once the sampling was in place.

[10] CL 2024/3-CF; CX/CF 24/17/6; CX/CF 24/17/6-Add.1 (Comments of Brazil, Canada, Egypt, EU, Iraq, Japan, Peru, Suriname, USA, and Venezuela (Bolivarian Republic of))

Discussion

64. CCCF considered the sampling plan as presented in CRD03 and in addition to editorial corrections, agreed to the definition for the decision rule.

65. Noting that all issues had been addressed, CCCF considered the sampling plan ready for advancement in the Step process.

66. A Member proposed to advance the sampling plan to Step 5 only in order to continue work on the distribution of methylmercury in fish. The VWG Chair clarified that currently there was no data on this except for tuna and that no new data would become available in the near future, and therefore the sampling plan should be advanced for final adoption.

67. Further points of clarification were requested as follows:

- Whether representative sample referred to the size of a sample, the frequency of the sample or the sample that is mixed before analysis. It was clarified that representative sample referred to taking the correct amount of sample from each size or weight class/category weight from appropriate lots or sublots.
- Whether the sampling plan should be for tuna only in view of the data used. It was clarified that the sampling plan was drafted on the basis of available national sampling plans or national guidance from the seafood industry for methylmercury in fish in general and was therefore applicable to all fish.

68. CCCF noted an observation that it was important to gain experience on using the sampling plan and that in future CCCF could come back with a revision/amendment if needed.

Conclusion

69. CCCF agreed to:

(i) forward the sampling plan (Appendix III) to CAC47 for adoption at Step 5/8; and

(ii) send the sampling plan to CCMAS43 for endorsement.

DEFINITION FOR READY-TO-EAT PEANUTS FOR THE ESTABLISHMENT OF A MAXIMUM LEVEL FOR TOTAL AFLATOXINS IN THIS PRODUCT (Agenda item 7)[11]

70. India, as Chair of the EWG, introduced the item, recalled the decision of CCCF16 to work over 2 years to first develop a definition for ready to eat (RTE) peanuts, followed by data compilation and analysis for the development of the ML for this category of peanuts. She summarized the discussion in the EWG and explained that the definition proposed by the EWG included wide variants of peanuts considered to be ready to eat. The proposed definition had been shared with the GEMS/Food database administrator who had concluded based on his analysis that it would not be possible to compare concentrations of total aflatoxins (AFT) between RTE peanuts and peanuts intended for further processing (FFP), because all the peanuts could be considered RTE under the proposed definition.

71. The EWG Chair recommended that CCCF consider the proposed definition and to request a call for occurrence data from producers and importing countries in RTE peanuts in line with the definition to be concluded for RTE peanuts after ensuring that the data to be submitted reflect the implementation of the CoP.

Discussion

72. The WHO Representative informed CCCF that the data from GEMS/Food supports the work of ML setting in CCCF. He presented the interactions between the GEMS/Food database administrator and the EWG since 2022, as well as the findings from the available data analysis. The analysis demonstrated the difficulties in discriminating between RTE peanuts and FFP peanuts. More than 80% of the supplied data could not be categorized (Unknown), in particular the data supplied as raw peanuts. This emphasized the importance of a high-quality description of submitted data. The GEMS/Food database administrator suggested to extend the Codex definition for RTE treenuts in CXS 193 to RTE peanuts. Its application in classifying samples as RTE/non-RTE would be substantially facilitated in the future by stating whether raw peanuts are intended for human consumption with or without further processing to reduce aflatoxin.

73. On the issue of examples in Codex definitions, the Codex Secretariat explained that definitions need to be clear, concise and easy to use and that examples were not normally included in definitions used by CCCF or Codex in general.

74. Concerns were expressed on the aspect of “labelled as RTE” as RTE products intended for direct human consumption are usually readily identifiable. This requirement should therefore be removed from the definition. It was noted by a delegation that such a requirement should be retained in the definition and to restrict this requirement to raw peanuts as other RTE peanuts were easily identifiable. The delegation also noted that the term “labelled as RTE” could be expanded to “labelled or clearly identified as RTE”.

[11] CX/CF 24/17/7

75. In relation to the examples, delegations expressed the view that the examples could be removed from the definition, as they were more relevant for data submission and could therefore be a guide in calls for data. Furthermore, concerns were expressed on the inclusion of peanut butter as an example of RTE peanuts since peanut butter was not considered an RTE peanut, but a product derived from peanuts which could contain other ingredients.

76. A Member noted that the definition by itself would not solve the problem of sorting the data submitted to GEMS/Food as the definition would not provide clarity on how data should be submitted and that there was still a lack of clarity in the GEMS/Food database especially with regard to raw peanuts, whether these were RTE or FFP as they could be both.

77. The Chairperson noted the issue was not so much about the definition, but rather about the guidance that is given on how data is submitted especially in relation to raw peanuts, and these could better be considered as two separate issues.

78. The Chairperson therefore proposed that the existing definition for RTE treenuts in CXS 193 is used for RTE peanuts. She noted that the issue of data sorting would then have to be addressed. There was the current data set as well as a proposal to have a new call for data. For the new call for data, the call would include guidance that for raw peanuts (shelled or in-shell) it has to be specified whether raw peanuts were FFP or RTE and the call should be (i) clear in which field of the GEMS Food database template this information should be recorded so to ensure consistency in the reporting and (ii) the call would request data from 2014 onwards, to capture 10 years of data to allow comparison before and after implementation of the *Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts* (CXC 55-2004).

79. For the current data set already in GEMS/Food, the Chairperson proposed to request the GEMS/Food administrator to go back to submitters of the data to clarify whether the products sampled and currently identified as unknown were RTE or FFP. This would be down to a tight schedule to have the data available by September 2024. If clarification on certain the data cannot be provided in this timeframe, these would not be used for the establishment of the ML. In addition, peanut butter would not be considered RTE peanuts. An additional proposal was made to compare the data before and after 2018. It was clarified by the EWG Chair that the analysis would be done for AFT and not the individual aflatoxin components.

Conclusion

80. CCCF agreed to:

(i) apply the existing definition for RTE treenuts in CXS 193 to RTE peanuts;

(ii) establish an EWG chaired by India and co-chaired by USA, working in English, to develop the ML for AFT in RTE peanuts and the associated sampling plan for comments and consideration by CCCF18;

(a) to include in the data analysis the elements as described in paragraphs 78-79;

(b) request that the EWG should work closely with the GEMS/Food Administrator and the WG on data analysis, should take into account the points raised in REP22/CF15, paragraphs 170-177, and to have two rounds of comments.

(iii) request JECFA Secretariat to issue a call for data, with a guidance to specify the raw peanuts as RTE or FFP; and

(iv) request the GEMS/Food database administrator to clarify with the submitters whether the data currently identified as unknown were RTE or for further processing.

SAMPLING PLANS FOR TOTAL AFLATOXINS AND OCHRATOXIN A IN CERTAIN SPICES (AT STEP 4) (Agenda item 8)[12]

81. India, as Chair of the EWG, introduced the item and provided background to the work, a summary of key points of discussion in the EWG and recommendations for consideration by CCCF.

82. India, referring to CRD30(Rev.), highlighted points for discussion:

- Definition for large and small particle sizes.
- Number of Incremental samples for spices with for large particle size (Table 1) and number of incremental samples to be taken depending on the weight of the lot and number of subdivisions of the aggregate sample (Table 2).
- Definition for decision rule.
- Numeric performance criteria for methods of analysis.

[12] CX/CF 24/17/8

83. The EWG Chair proposed that CCCF provide guidance on the outstanding issues to assist the EWG to continue developing the sampling plan for consideration and finalization by CCCF18.

Discussion

General issues

84. CCCF noted that the sampling plan was for total aflatoxins and ochratoxin A in nutmeg, dried chilli and paprika, the spices for which MLs had been established.

Definition for particle sizes (large, small, and powdered)

85. CCCF had an exchange on the proposals in CRD30(Rev.) and noted the following comments/questions:

- Concerns were expressed on the classification of small particle size, and it was questioned whether there was a need for definitions for small particle sizes as the corresponding standards for the spices in question developed by CCSCH already defined the styles of spices, e.g. small can be crushed, cracked, broken and flakes.
- How to define powdered form of spices. It was clarified that it was normally based on sieve size and that consideration could be given to using the International Organization for Standardization (ISO) definition for this form of spices. A Member mentioned that no definition was needed in the sampling plans as the Codex standards for the spices under consideration already defines powdered spices.

Conclusion

86. CCCF agreed:

- with the definition for spices with large particle sizes as whole nutmeg, dried chilli and paprika;
- to define small particle sizes as crushed, cracked, broken and flakes in accordance with the definitions in standards developed by CCSCH; and
- to define powdered spices as spices obtained by fine grinding.

Aggregate sample weight – Table 1

87. CCCF noted the general support for the aggregate sample weight of 10 kg. The EU, supported by a member country, expressed the view that the heterogeneity of aflatoxin (and ochratoxin A) contamination in batches of large particle size spices is similar to the heterogeneity of aflatoxin contamination in peanuts and treenuts. The proposed decision rule is in line with the decision rule for RTE treenuts provided for in the Codex sampling plans for aflatoxin contamination in RTE treenut and treenuts for further processing in CXS 193. In these sampling plans the aggregate sample is 20 kg divided into two 10 kg samples. However, in view of the high value of spices, 10 kg sample size could be considered.

88. CCCF agreed to an aggregate sample weight of 10kg and in view of this decision, subsequent relevant texts and Table 2 were amended accordingly.

Decision Rule

89. CCCF agreed to align the definition for decision rule with the definition agreed for the sampling plan for methylmercury in fish (Agenda item 6) and to request the EWG to consider the best place for the decision rule, i.e. under each section of the sampling plan where applicable or to have a general statement that it applies to all forms of spices.

Outstanding issues

90. CCCF noted that the following issues required consideration in order to finalize the sampling plan:

- Development of numeric performance criteria and that the proposal presented in CRD34 would be the basis for further consideration.
- Possible amendment of the sampling method for powdered spices. The EU, referring to their written comment (CRD08(Rev.)) noted that the current proposal was based on the EU sampling plan and results from recent research on the applicability of the sampling plans for powdered spices indicated that the current sampling plan did not guarantee obtaining a sample that is representative for the sampled lot.

91. CCCF noted the offer of the EU to provide the outcomes of the aforementioned research to the EWG to assist the EWG to consider to what extent the sampling method for powdered spices in the sampling plan could be amended. In the meanwhile, based on the preliminary information provided, CCCF agreed to include in square brackets alternate proposals for incremental sample size and aggregate sample weights for powdered spices (section c of the sampling plan) for further consideration by the EWG.

Conclusion

92. CCCF agreed to:

(i) forward the sampling plan to CAC47 for adoption at Step 5 (Appendix IV);

(ii) re-establish the EWG, chaired by India, working in English to consider the outstanding issues with the aim of finalising the sampling plan at CCCF18. The revised sampling plan would be circulated for comments and consideration by CCCF18; and

(iii) request CCEXEC86 to extend the timeline for completion of work to 2025.

CODE OF PRACTICE/GUIDELINES FOR THE PREVENTION AND REDUCTION OF CIGUATERA POISONING (AT STEP 4) (Agenda item 9)[13]

93. The United States of America, as Chair of the EWG and PWG, speaking also on behalf of the co-Chairs France, Panama, and Spain, introduced the item and provided a background to the discussions in the EWG and PWG. Referring to CRD29, the PWG Chair explained the key changes made at the PWG held prior to the Session and explained that based on comments submitted after the PWG definitions had been included, and the term "prevalence" replaced by "incidence". She noted that the PWG had not identified any outstanding issues to be addressed and proposed that CCCF consider advancing the Code of Practice (CoP) to Step 5/8.

Discussion

94. CCCF noted the general support to advance the CoP to Step 5/8 and in addition to some editorial corrections, noted the following comments/clarifications:

- Clarification on the meaning of sub-chronic exposure. It was explained that this was a standard term used in risk assessment indicating an intermediate exposure duration between acute (less than a day) and chronic (long-term/lifetime) exposure.
- To a question on whether the list of species in Annex I were examples of banned fish mentioned in paragraph 21 of the CoP, it was explained that the list of species in Annex I were those species that were known or associated with ciguatoxins (CTX) based on the FAO/WHO Expert Meeting on Ciguatera Poisoning.
- A concern was expressed on the value of the approaches in paragraph 21, in particular, the approach to ban fish species and that not all measures should be included as some were not practical and implementation of the CoP containing these measures could lead to trade problems. It was clarified that paragraph 21 did not mean that the international community agreed with the approaches but that it was merely an inventory of approaches used for the management of ciguatera poisoning.

Annex 2

95. The Codex Secretariat proposed removing Annex 2 from the CoP and publishing it as an information document on the Codex website, with inclusion of the relevant links. She clarified that it was not appropriate to publish references to national/regional authorities in a Codex text. Acknowledging the importance and usefulness of the information, publication as an information document would still make the information available to the user; and would allow easier update of the information without having to go through the Codex step process. With the migration to a new Codex website, there will be a function to indicate to users of Codex texts any associated documents such as information documents and year of publication, thereby facilitating use of such information documents.

96. CCCF agreed with the proposal to remove Annex 2 from the CoP and to publish the information in Annex 2 as an information document on the Codex website and as a consequence agreed to amend paragraphs 16 and 39 by removing reference to the annex.

Conclusion

97. CCCF agreed to:

(i) forward the code of practice for the prevention and reduction of ciguatera poisoning (Appendix V) to CAC47 for adoption at Step 5/8; and

(ii) request the Codex Secretariat to publish the information on resources (examples of monitoring programmes and training and guidance resources) with the relevant links, as an information document (Appendix VI).

[13] CL 2024/6-CF; CX/CF 24/17/9; CX/CF 24/17/9-Add.1 (Comments of Australia, Canada, Chile, Cuba, Ecuador, Egypt, EU, Iraq, Japan, New Zealand, Panama, Philippines, USA, and Venezuela (Bolivarian Republic of))

PYRROLIZIDINE ALKALOIDS (Agenda item 10)[14]

98. The European Union, as Chair of the EWG, introduced the item and provided a summary of the key points of discussion and recommendations.

99. The EWG Chair stated that there was large agreement on initiating new work to update of the *Code of Practice for Weed Control to Prevent and Reduce Pyrrolizidine Alkaloid Contamination in Food and Feed* (CXC 74-2014), and that different views were expressed in the EWG on the need for a separate CoP for the prevention and reduction of the presence of pyrrolizidine alkaloids (PAs) in honey, and on the need for a guidance document for sampling analytical minimum requirements for occurrence data to be submitted to the GEMS/Food database.

Discussion

100. In response to a request for clarification on whether the recommendation implied the establishment of different EWGs, the Chair of the EWG clarified that it was subject to the decision of CCCF on e.g. having a separate CoP for honey, in which case the work would be taken into consideration by a separate EWG, as it would become a different CoP.

101. As for the need for a separate CoP for honey, the EWG Chair further clarified that the measures for weed control as mentioned in CXC 74 might not be all appropriate for the prevention and reduction of presence of PAs in honey but be limited to the foraging range of bees. The EWG Chair further stated that processing of honey might have a different influence on the presence of PAs than for the presence in other foods affected by contamination with PAs. However, in his view, practices for prevention and reduction of PAs in honey could also be addressed through an annex to the existing CoP.

102. In response to a question regarding the aim of the guidance document, the EWG Chair explained that the aim was to draft a supporting document to be used for a call for data, which would provide information on sampling and analytical performance criteria for gathering data. Data collection could help to evaluate the effect of implementation of the CoP, could give further indication of which foods to monitor but would also be needed in case of future establishment of MLs, however for these purposes there were different requirements for data collection. It was clarified that there would not be a guidance document, but the EWG would consider what guidance could be considered for analytical data submission and then provide that guidance in a future call for data. The purpose of a call for data would need to be clearly defined, noting that such a call for data would be issued post CCCF18.

103. A Member sought clarification on the measures that needed to be added to the CoP beside those already included in the text. The EWG Chair clarified that while the weed control measures contained in CXC 74 would be widely applicable, it could benefit from the inclusion of specific measures for the commodities identified by JECFA as of potential concern for public health, i.e. herbal infusions, tea, and honey, and for commodities for which since the JECFA evaluation significant levels of pyrrolizidine alkaloids were found such as food supplements and certain spices.

Conclusion

104. CCCF agreed:

(i) to further develop the discussion paper on the revision of the *Code of Practice to Prevent and Reduce Pyrrolizidine Alkaloid Contamination in Food and Feed* (CXC 74-2014) which would address also practices for honey; provide a proposal for the revised CoP as well as a project document;

(ii) to develop guidance on sampling and analysis performance characteristics for the collection of data to be submitted to the GEMS/Food database, which would be incorporated in a call for data drafted at CCCF18; and

(iii) to establish an EWG chaired by Türkiye, co-chaired by the United Kingdom and The Netherlands, working in English, to develop the discussion paper.

TROPANE ALKALOIDS (Agenda item 11)[15]

105. China, as Chair of the EWG, speaking also on behalf of the co-Chair Saudi Arabia, presented the item and highlighted that the purpose of the discussion paper was to introduce background information on the toxicology, analysis, data, health risk and management related to the presence of tropane alkaloids (TAs) in food to determine follow-up actions for the Committee. The EWG Chair explained that there were risk management measures in place that focused on either limiting the noxious seeds in grains, or on MLs or intervention levels for TAs in food.

[14] CX/CF 24/17/10
[15] CX/CF 24/17/11

106. The EWG Chair provided a summary of the discussion at the EWG highlighting that there was general support in EWG to initiate work on a CoP, noting that a CoP including all steps of agricultural practices and processing would be more useful for decreasing TAs in food than establishing MLs at this time. The EWG also recommended to consider issuing a call for data and to request JECFA to do a full risk assessment to determine the necessity for developing MLs in the future.

Discussion

107. CCCF noted the general support for the development of a CoP to prevent and reduce the presence of TAs in food. The following points were also noted:

- The current discussion paper was on TAs in food, but a revised discussion paper should also look into management of TAs in feed as there is evidence of the transfer of TAs into milk that can be relevant for public health.
- More occurrence data on TAs related to the harvested crops in the post-harvest and preprocessing stages, could contribute to a better understanding of the efficacy of mitigation measures and application of good agricultural practices (GAPs) and therefore it was important, in a call for data or in the submission of occurrence data, to mention the stage at which the sample had been taken as, for example, cleaning and sorting processes could remove seeds containing TAs.
- A call for data would therefore be helpful and appropriate, but it was premature to request a full JECFA evaluation.

108. In response to the request for a call for data for TAs in food and feed, the FAO JECFA Secretariat confirmed their availability to prepare such a call.

Conclusion

109. CCCF agreed to:

(i) re-establish the EWG chaired by China and co-chaired by Saudi Arabia, working in English, to prepare a revised discussion paper including proposal for a new code of practice and project document for consideration by CCCF18; and

(ii) request the JECFA Secretariat to issue a call for data on tropane alkaloid contamination in food and feed, with guidance to indicate the stage of sampling.

ACRYLAMIDE IN FOODS (Agenda item 12)[16]

110. India, as Chair of the EWG, speaking also on behalf of the co-Chair Saudi Arabia, introduced the item, presenting a summary of the discussion paper which included an analysis on the formation in foods of acrylamide, toxicology and epidemiology information, analytical methods, and relevant data. The EWG Chair further presented the recommendation of the EWG, which included revising the *Code of Practice for the Reduction of Acrylamide in Foods* (CXC 67-2009) and consider issuing a call for data.

Discussion

111. CCCF noted the general support for the revision of CXC 67 if supported by further work to assess the availability of additional or new available mitigation measures which could be included in a revised discussion paper for consideration by CCCF18.

112. CCCF considered that it was premature for a call for occurrence and other data and that this could be considered in future, but that a CL to gather information on mitigation measures/practices would be more appropriate to support the EWG to develop the discussion paper and proposal for a revised CoP.

113. A Member suggested that this proposal would be due for review in the coming year based on the framework established within the review of Codex standards (Agenda item 18).

Conclusion

114. CCCF agreed to:

(i) re-establish the EWG, chaired by India and co-chaired by Saudi Arabia, working in English, to develop a discussion paper with a proposal for a draft revised Code of Practice and a project document; and

[16] CX/CF 24/17/12

(ii) issue a CL to collect information on new risk management measures for the reduction of acrylamide.

CADMIUM AND LEAD IN QUINOA (Agenda item 13)[17]

115. The Representative of the WHO introduced the item on behalf of the Joint FAO/WHO JECFA Secretariats and recalled the request from CCCF16. He explained that a call for data had been issued, the data points obtained for lead and cadmium in quinoa through the GEMS/Food database, the analysis undertaken and conclusions that an ML of 0.1 or 0.2 mg/kg for cadmium and lead in quinoa would have little impact on dietary exposure to cadmium and lead, respectively. He recommended that CCCF consider the recommendations as proposed in the paper.

116. The Chairperson recalled that CAC40 had requested CCCF to consider MLs for lead and cadmium in quinoa (extension of the existing MLs for lead and quinoa in cereal grains) and proposed that the Committee consider the recommendations proposed by the Joint FAO/WHO JECFA Secretariats.

Discussion

117. CCCF noted the general support for establishing MLs for cadmium and lead in quinoa for the following reasons:

- MLs for cadmium should be set at levels following the ALARA principle because cereal grains as a group was a serious contributor to exposure to cadmium and in their region, the tolerable weekly intake (TWI) was exceeded for many consumers. If the commodity group (cereal grains) is split into smaller sub-groups, or individual commodities, then these commodities would have limited contribution to the exposure, however, cereals as a category are relevant contributor to the exposure of both cadmium and lead and therefore setting MLs for the entire group of cereals, including quinoa was supported.
- There was sufficient data for the establishment MLs for cadmium and lead in quinoa, however, separate MLs should be established as quinoa was not a cereal, but a pseudo-cereal. MLs of 0.15 mg/kg for cadmium and 0.2 mg/kg for lead were proposed as these MLs would generate the lowest rejection rates worldwide.
- There was sufficient evidence to extend the existing MLs for cereal grains to quinoa, i.e. 0.1 mg/kg for cadmium and 0.2 for lead.
- On the basis of the evidence presented, there was no need to establish MLs for cadmium or lead in quinoa, however, if other members were of the opinion that MLs should be developed, then an ML of 0.15 mg/kg for both cadmium and lead could be supported.

118. Noting the general support for establishing MLs for cadmium and lead separate from the cereal grains, the Chairperson proposed that CCCF consider an ML of 0.15mg/kg for cadmium and 0.2 mg/kg for lead.

Conclusion

119. CCCF agreed to forward the ML of 0.15 mg/kg for cadmium and of 0.2 mg/kg for lead in quinoa for adoption by CAC47 (Appendix VII).

REVIEW OF THE *CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF AFLATOXIN CONTAMINATION IN PEANUTS* (CXC 55-2004) (Agenda item 14)[18]

120. Brazil, as Chair of the EWG, introduced the item, provided background to the work, a summary of discussions in the EWG and its recommendations. She highlighted that new measures/practices had been identified for the prevention and reduction of aflatoxin contamination in peanuts that support the revision of CXC 55 and that the EWG had prepared a proposal for such revision to support this new work.

Discussion

121. CCCF noted the general support to start new work on the revision of CXC 55 and made slight amendments to the project document to indicate that this new work would be to support the implementation of MLs for AFT in peanuts.

122. To a comment on also addressing feed in CXC 55 and merging this work with the revision of *Code of Practice for the Reduction of Aflatoxin B1 in Raw Materials and Supplemental Feedingstuffs for Milk-producing Animals* (CXC 45-1997) (Agenda item 15). CCCF noted:

- that the scope of CXC 55 was limited to peanuts for human consumption but that the EWG could consider possible extension of the scope to animal feed; and

[17] CL 2024/28-CF; CX/CF 24/17/13; CX/CF 24/17/13-Add.1 (Comments of Bolivia (Plurinational State of), Canada, Chile, Ecuador, Egypt, Iraq, Japan, Panama, Peru, United Arab Emirates (UAE), and USA)

[18] CX/CF 24/17/14

- that merging of CXC 55 with CXC 45 could be considered under Agenda item 15.

Conclusion

123. CCCF agreed to:

(i) start new work on the revision of *Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts* (CXC 55-2004);

(ii) forward the project document (Appendix VIII) to CAC47 for approval; and

(iii) establish an EWG, chaired by Brazil and co-chaired by India, working in English, to prepare a proposed revision of the CoP for comments and consideration by CCCF18.

REVIEW OF THE *CODE OF PRACTICE FOR THE REDUCTION OF AFLATOXIN B1 IN RAW MATERIALS AND SUPPLEMENTAL FEEDINGSTUFFS FOR MILK-PRODUCING ANIMALS* (CXC 45-1997) (Agenda item 15)[19]

124. Canada, as Chair of the EWG, introduced the item, provided background to the work, and summarized key points of discussion and the recommendations to CCCF. The EWG Chair explained that the development of the current discussion paper was a result of the work in the working group on the Review of Codex Standards for Contaminants (Agenda item 18), and that this CoP was identified as a priority for revision.

125. The EWG Chair in particular highlighted some of the new/additional measures identified in the CX 24/17/15 to control AFB1 in raw materials and supplemental feedingstuffs for milk-producing animals and other possible revisions that might be needed for the CoP. She noted that revision of CX 45 would draw on information from other CoPs relevant to animal feed, i.e. *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* (CXC 51-2003), *Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Tree Nuts* (CXC 59-2008) and the *Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts* (CXC 55-2004) and drew the attention to possible overlap with these CoPs and suggested that consideration should be given on how to leverage information from these CoPs. She proposed that the EWG be re-established to further develop the discussion paper and include a proposal for the revision of the CoP for consideration by CCCF18.

Discussion

126. CCCF generally agreed that there was sufficient information available for the revision of the CoP and agreed with the recommendation to further develop the discussion paper. CCCF further noted the following observations:

- Concerns were raised with the use of some chemicals as mitigation measures and its possible impact on the quality of feed.
- Other CoPs of relevance should be taken into account in the revision of the CXC 45. CXC 51 is of the most relevance and should be considered for alignment and that CXC 9 and CXC 55 was of less relevance, and of lesser priority for future alignment.
- The term “animal-derived” should be deleted as the usage of the term animal-derived milk and milk product seems to imply the possibility of using non-animal derived milk and milk products which would contradict the Codex definition for milk contained in the *General Standard for The Use of Dairy Terms* (CXS 206-1999).

127. On the question of alignment or merging of related Codex texts to avoid duplication, inconsistencies and overlap, the Codex Secretariat stressed that while it was important to ensure alignment, this could be considered as separate work in the future and proposed that in the review of CXC 51, issues of inconsistencies with other related texts could be flagged for possible action by the Committee, i.e. proposing consequential amendments.

Conclusion

128. CCCF agreed to:

(i) re-establish the EWG chaired by Canada and co-chaired by Saudi Arabia working in English to revise the discussion paper, with a proposal for a revised CoP and a project document for new work; and

(ii) consider in future how the different CoPs could be integrated or merged to avoid overlap, inconsistencies, and redundancies.

129. The Chairperson in concluding this item, noted the decision to continue the development of the discussion paper in the EWG in order to have another year of discussion, to allow inclusion of a draft CoP to have a better basis for decision on starting new work. She noted that, as this practice was already applied several times in CCCF, this could be a common working practice for the Committee, i.e. first develop a discussion paper which contains a proposal for a new or revised CoP and the project document. This approach would allow CCCF to determine the feasibility of finalizing the work in a

[19] CX/CF 24/17/15

timely manner.

DEVELOPMENT OF A CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF CADMIUM CONTAMINATION IN FOODS (Agenda item 16)[20]

130. The United States of America introduced the item recalling that development of the discussion paper followed from comments in the working group on the Review of Codex standards for contaminants (Agenda item 18) that a CoP should be considered prior to review or revision of cadmium MLs. She explained that the aim of the discussion paper was to present risk management practices to support the development of a CoP for the prevention and reduction of cadmium contamination in foods. She also explained that the previous Codex work on cadmium, most recently the *Code of Practice for the Prevention and Reduction of Cadmium Contamination in Cocoa Beans* (CXC 81-2022) had served as a basis for the proposed CoP.

131. The United States of America pointed out that based on risk management practices identified from the literature review and information provided by Codex Members, there was sufficient data to support a code of practice. She further noted that while additional information from Members would be needed to further develop the CoP, input was required on whether there was a need for development of annexes that could contain commodity-specific recommendations.

Discussion

132. CCCF noted the general support for the development of a CoP for the prevention and reduction of cadmium contamination in foods, and the following points:

- There was enough information to start work on the CoP.
- Considering the various factors affecting cadmium levels in seafood, regional or national specific mitigation measures, such as consumer advice or regional standards, may also be considered and appropriate;
- The development of annexes that could contain commodity-specific recommendations would depend on the information provided to the EWG, i.e. whether they were detailed or specific enough to warrant commodity-specific annexes.
- If commodity specific annexes were developed, foods that contribute significantly to cadmium exposure such as rice, cereals and cereal products, vegetables, fish, and seafood should be prioritized.

Conclusion

133. CCCF agreed to:

(i) start new work on a code of practice for the prevention and reduction of cadmium contamination in foods,

(ii) forward the project document to CAC47 for approval (Appendix IX); and

(iii) establish an EWG chaired by the United States of America, working in English, to develop a code of practice for the prevention of reduction of cadmium contamination in foods for comments and consideration by CCCF18; and to determine the need for development of annexes with commodity specific recommendations.

GUIDANCE ON DATA ANALYSIS FOR DEVELOPMENT OF MAXIMUM LEVELS AND FOR IMPROVED DATA COLLECTION (Agenda item 17)[21]

134. The European Union, as Chair of the EWG, and also on behalf of the co-Chairs Japan, the Netherlands, and United States of America, introduced the item and summarized the discussion that had taken in place in the WG meeting held prior to the session.

135. The EWG Chair recalled that CCCF16 agreed on the changes to be proposed on the GEMS/Food database template to improve data collection[22]. Preliminary feedback was provided by the GEMS/Food database administrator. The feedback was preliminary given the late request and the time needed to discuss certain proposed changes with the GEMS/Food database template developers.

136. The EWG Chair also highlighted that the WG discussed and agreed on the feedback to be provided to the GEMS/Food Database administrator based on the preliminary comments on the changes proposed by CCCF16 on the GEMS/Food database template (see CRD07, paragraph 15). No comments were made by the Plenary on the feedback that had been agreed in the WG.

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[20] CL 2024/26-CF; CX/CF 24/17/16; CX/CF 24/17/16-Add.1 (Comments of Canada, Chile, Cuba, Ecuador, Egypt, Iraq, Jamaica, Japan, New Zealand, Panama, Peru, UAE, USA, and IFT)

[21] CX/CF 24/17/17

[22] REP23/CF16, paragraph 98 (i)

137. Due to time constraints, there was no discussion in the WG on:

- The topics for the sections "Data selection/clean-up" and "statistical data analysis", in particular the matter regarding the merging/combining of certain topics from the section "statistical data analysis" with topics of the section "data selection/clean-up".
- The topics for which further discussion and a check for completeness was needed.
- Confirming the correctness of the integration of the outcome of the discussions at CCCF16 into the sections "Data selection/clean up" and "statistical data-analysis".

138. Further details on these matters have been provided for information in CRD07 Annexes II, III and IV respectively.

New work procedure

139. As the work on the Guidance on data analysis for development of MLs and for improved data collection had not progressed as initially foreseen, due to the inactivity of the Chair of the EWG, another work procedure was presented for discussion at CCCF17.

140. The EWG Chair proposed that as the guidelines on data analysis were being developed for internal CCCF working procedure, this work could be undertaken in a pre-session working group (which could operate in a physical or virtual mode) or an in-session working group (hereafter referred to as "the WG") similar to the format taken to manage work on the Follow-up to the outcomes of JECFA evaluations and FAO/WHO expert consultations, and the Review of Codex standards for contaminants. Consideration would be given to convening VWG meetings to discuss and advance the work on certain sections of the guidance document. The outcome of the VWGs would be circulated for comments via a CL and the comments would be discussed in a pre-session WG (virtual or physical) or an in-session WG. The Codex EWG Platform would also be used to facilitate this work.

141. The EWG Chair further proposed that the chairmanship structure be retained with the European Union as Chair, and Japan, The Netherlands, and United States of America as co-Chairs.

Work for the coming year

142. The EWG Chair proposed that the work during the coming year would focus on:

- finalizing the modifications to the GEMS/Food database template and related guidance. It was foreseen to organize one VWG meeting to discuss on data collection and submission and data extraction; and
- the discussion on the structure and the content of the main document for the section data selection/clean up and statistical data analysis with a decision on which of the more complex issues were to be addressed in the future in separate Annex(es) to the main document. It was foreseen to organize one other VWG to discuss this part. Following the discussions at the VWG, it could be considered if one round of comments within the EWG would be appropriate before the main document on these parts would be finalized for circulation as a CL to gather comments.

Discussion

143. One Member recalled that under Agenda item 5, MLs for lead had been established in various spices even when the data was based on a small number of samples collected. The Member requested for a cut-off on the number of samples to be included in the document, to ensure that MLs are propagated to food categories in a scientific manner. The EWG Chair clarified that in the establishment of the lead MLs, the guidance had already been applied appropriately. As there had already been 3 to 4 calls for data related to the elaboration of the MLs for lead, it would be CCCF's responsibility to proceed with an ML to protect public health even if these multiple requests and opportunities had not yielded a high amount of data.

144. CCCF agreed with the intention to produce a document that would provide practical guidance to the EWG performing data analysis for the development of MLs, for consideration by CCCF18. CCCF17 also agreed that in the future, the more complex issues identified would be addressed in separate annexes that would be developed and discussed post-CCCF18, following completion of the main guidance, together with the issues identified for future discussion (see Appendix II of CX/CF 24/17/17 and CRD07 Annex III).

Conclusion

145. CCCF agreed:

(i) on the feedback to be provided to the GEMS/Food database administrator based on the preliminary comments on the changes proposed by CCCF16 on the GEMS/Food database template as outlined in paragraph 15 of CRD07; and

(ii) on the proposed new work procedure for finalizing the Guidance on data analysis for development of maximum

levels (MLs) and for improved data collection as outlined in paragraphs 140 to 141.

REVIEW OF CODEX STANDARDS FOR CONTAMINANTS (Agenda item 18)[23]

146. Canada, as Chair of the VWG, introduced the item, summarized the key points of discussion of the VWG held prior to the Session and highlighted the seven recommendations made at the VWG as outlined in paragraphs 23 of CRD04(Rev.), including recommendations for the edits to the Overall High Priority List (OHPL), additions and deletions to the List A (Codex Contaminant Standards Established or Reviewed ≥25 and ≥15 and >25 Years Ago), and List B (Codex Contaminant Standards Recommended for Re-Evaluation) and Member country volunteers to take on new work.

147. The VWG Chair were of the opinion that qualitative evaluation criteria and the performance indicators provided sufficient information to evaluate the established framework and that no quantitative evaluation would need to be developed.

148. The VWG Chair also emphasized that the VWG agreed to maintain the prioritization of existing Codex contaminant standards for review as an annual CCCF agenda item, based on a flexible approach which would not increase the administrative burden and resulted in clear rationales for updating standards. The VWG Chair concluded the intervention by recommending soliciting relevant information every year via CL, presenting consequent recommendations to the pre-session working groups and the plenary as needed, and while noting that this exercise had already resulted in new work being undertaken, encouraged members to take up further new work from the OHPL as it was important that existing standards reflect current science.

Discussion

149. The Codex Secretariat reminded CCCF that under Agenda item 2, the Committee discussed the request from CCMAS42 to evaluate the sampling plans in CXS 193, to determine if the plans were still within the revised *General Guidelines on Sampling* (CXG 50-2004).

150. In response to this intervention, the VWG Chair noted that such a request did not fit into the existing framework, that more time was needed to reflect on possible options and that further consideration on how to proceed could be requested to Codex Members and Observers via the CL on this item which would be issued in advance of CCCF18.

151. CCCF, recalling that 2024 signalled the end of the trial period established at CCCF14, commended the work of the EWG noting that the review of Codex standard would become a standing item on the agenda of CCCF.

152. It was noted that CCCF should reflect on where in the process input on volunteer countries would be solicited.

Conclusion

153. CCCF agreed:

(i) with the editorial amendments to Lists A, B and OHPL;

(ii) to maintain the prioritization of existing Codex contaminant standards for review as an annual CCCF agenda item;

(iii) to solicit information annually via a CL and that Canada would present recommendations to plenary;

(iv) that the CL would also include a request for views on whether the request from CCMAS on the review of sampling plans was appropriate for this item or would best fit under another agenda item; and

(v) to re-convene the WG chaired by Canada as needed.

FOLLOW-UP WORK TO THE OUTCOMES OF JECFA EVALUATIONS AND FAO/WHO EXPERT CONSULTATIONS (Agenda item 19)[24]

154. The European Union, as Chair of the VWG, introduced the item and summarized the key points of discussions in the VWG held prior to the Session, as contained in CRD05. The VWG Chair presented recommendations on possible follow-up actions to the outcomes of JECFA evaluations and FAO/WHO expert consultations which were on the outcome of the FAO/WHO expert consultation on Risks and Benefits of Fish Consumption and a re-iteration on the follow-up to JECFA evaluations on ergot alkaloids and T-2, HT-2 toxin and diacetoxyscirpenol (DAS).

155. The EWG Chair highlighted that the FAO/WHO Expert Consultation on Risks and Benefits of Fish Consumption was held in October 2023 and the summary and conclusions[25] of the consultation have been published. The Committee was informed that the full report would be available prior to CCCF18. In the VWG, the following two recommendations from

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23 REP23/CF16, para. 105; CL 2023/83-CF; CX/CF 24/17/18 (Comments of Canada, Chile, Egypt, Iraq, New Zealand, Peru, Saudi Arabia, and USA)

24 REP23/CF16 para. 113; CX/CF 24/17/3

25 https://www.who.int/publications/m/item/ad-hoc-joint-fao-who-expert-consultation-on-risks-and-benefits-of-fish-consumption

the summary and conclusions were highlighted for follow-up while awaiting the publication of the full report:

- Collect standardized data on fish contaminants and nutrients.
- Develop, maintain, and improve existing databases on levels and trends over time of specific contaminants, in particular methylmercury (MeHg), dioxins and dl-PCBs, as well as nutrient content, such as selenium and long chain omega-3 fatty acids (LCn3PUFAs), for fish consumed by region.

156. No concrete proposals for follow-up to these recommendations were proposed and discussed in the VWG but it was highlighted that this was related to the ongoing discussions on the Guidance on data analysis for development of maximum levels and for improved data collection (Agenda item 17), in particular the part of the guidance on data collection and submission.

157. At the VWG, it was brought to the attention of Members that while the WG in the previous year agreed to follow-up on the JECFA evaluation on ergot alkaloids and T-2, HT-toxin and diacetoxyscirpenol, no member country volunteered to take up the work at CCCF16. No objection was raised at the WG this year to forward the recommendation, which was agreed at the WG in the previous year with slight updates, for consideration by CCCF:

- As regards ergot alkaloids, to establish an EWG, working in English, to prepare a discussion paper on ergot alkaloids to look into the need and feasibility of possible follow-up actions for consideration by CCCF18. In this discussion paper, analytical performance characteristics as guidance for generation and submission of data to the GEMS/Food database should be considered in view of issuing a call for data on the presence of ergot alkaloids in food and feed; and
- As regards T-2, HT-2, and diacetoxyscirpenol (DAS), to establish an EWG, working in English, to prepare a discussion paper on T-2, HT-2, and DAS to look into the need and feasibility of possible follow-up actions for consideration by CCCF18. In this discussion paper, analytical performance characteristics as guidance for generation and submission of data to the GEMS/Food database should be considered in view of issuing a call for data on the presence of T-2, HT-2 and diacetoxyscirpenol (DAS) in food and feed.

158. It was also noted that no member country volunteered at the VWG this year to take up the work on preparing a discussion paper on ergot alkaloids and on T-2, HT-2 and diacetoxyscirpenol (DAS).

159. The VWG Chair indicated that the VWG requested CCCF to consider if the WG should be reconvened for CCCF18 if no remaining issues would be identified, given that there were no JECFA evaluations on contaminants scheduled prior to CCCF18. Upon this request, the Chairperson proposed to merge this WG with the WG on the Priority list of contaminants for evaluation by JECFA. The USA, as Chair of this WG, indicated their willingness to chair this merged WG.

160. A suggestion was made at the VWG to list all the previous JECFA evaluations and FAO/WHO expert consultations with an indication of the follow-up given by CCCF, i.e. discussion paper and/or CoP and/or establishment of MLs. The VWG Chair informed CCCF that a first draft of the inventory has been provided as Annex to the Report of the VWG (CRD05). The VWG Chair added that the preliminary list contained all JECFA evaluations and FAO/WHO expert consultations of relevance for CCCF. Certain contaminants had been evaluated several times and the follow-up had been provided to the last full evaluation of the contaminant by JECFA, even if certain follow-up actions were already undertaken following previous JECFA evaluations or not directly related to the JECFA evaluation. The VWG Chair invited CCCF to consider the inventory of previous JECFA evaluations or FAO/WHO expert consultations on which no or no complete follow-up was undertaken.

Discussion

161. Japan, in noting its usefulness, offered to assist in updating the list of all previous JECFA evaluations and FAO/WHO expert consultations and their follow-up, (see paragraph 160). It was suggested by the VWG Chair that it would be useful to separate the recent and older evaluations and to include the list of older evaluations as an annex in the working document for information and use in discussions on contaminants and toxins in the CXS 193 (CF/INF).

162. The USA noted that while this document was not usually discussed at CCCF meetings, it was a helpful resource to learn about the history of Codex standards on contaminants and expressed her appreciation to Japan and the Netherlands for preparing this document and proposed to have the shorter list of more recent evaluations as part of the report of the outcomes of the working group on the priority list/follow-up to JECFA evaluations.

163. CCCF noted that Japan and the USA would coordinate the separation of the recent and older evaluations to be maintained as separate lists as described in paragraphs 161-162.

Conclusion

164. CCCF agreed to:

(i) address the recommendations "Collect standardized data on fish contaminants" and "Develop, maintain and improve existing databases on levels and trends over time of specific contaminants, in particular MeHg, dioxins and dl-PCBs" in the frame of the ongoing discussions on the Guidance on data analysis for development of maximum levels and for improved data collection, in particular the part of the guidance on data collection and submission (Agenda item 17);

(ii) reconsider the elaboration of a discussion paper on the need and feasibility of possible follow-up actions on ergot alkaloids and trichothecenes T-2, HT-2, and DAS at CCCF18 by integrating these evaluations in the inventory of follow-up to previous JECFA evaluations (paragraphs 161-162);

(iii) merge this WG with the WG on the priority list of contaminants for evaluation by JECFA and that USA would chair this merged WG. The Chair of the WG on the priority list of contaminants for evaluation by JEFA (United States of America) agreed on this merger; and

(iv) separate the inventory of the follow-up to JECFA evaluations and FAO/WHO expert in recent and older evaluations; that the list of more recent evaluations would be part of the report of the merged WG on the priority list/follow-up to JECFA evaluations and that the list of older evaluations would be included as an Annex to the INF document, which was updated yearly by Japan and the Netherlands.

PRIORITY LIST OF CONTAMINANTS FOR EVALUATION BY JECFA (Agenda item 20)[26]

165. The United States of America, as Chair of the VWG, introduced the item and summarized the key points of discussion in the VWG held prior to the Session. The VWG Chair presented recommendations on amendments to the priority list based on comments in reply to CL 2023/95-CF and those received during the VWG including updates on data availability for dioxins and dioxin-like PCBs (dl-PCBs), arsenic (inorganic and organic), thallium, and PFAS.

166. In addition, the VWG Chair also recalled that at CCCF16, a proposal for addition of ethylene oxide (EtO) and 2-chloroethanol (2-CE) to the priority list be deferred for consideration until the following year to request input from the CCPR. The VWG Chair noted that, following the recommendation from CCPR (Agenda item 2), the VWG recommended adding EtO and 2-CE to the priority list. The Chair of the WG concluded that in response to a request from CCC16, a table summarizing matters for action by the JECFA Secretariat had been prepared for inclusion in the report.

167. In response to a question, the FAO Representative clarified that a call for data for EtO and 2-CE would be issued once the Joint FAO/WHO JECFA Secretariat had determined when this evaluation could be carried out by JECFA, taking also into account other work priorities, resources, as well as confirmation of data availability (to be confirmed at CCCF18).

Conclusion

168. CCCF agreed to:

(i) endorse the priority list as amended (Appendix X);

(ii) continue to request comments and/or information on the priority list for consideration by CCCF18; and

(iii) re-convene the WG at CCCF18 chaired by the United States of America.

FORESIGHT ON EMERGING ISSUES IN FOOD AND FEED SAFETY RELEVANT TO CONTAMINANTS (Agenda item 21)[27]

169. The Chairperson introduced the item by recalling the side event on foresight held during CCCF16 and the subsequent decision of the Committee to include an agenda item for exchange of information on Member activities in the field of emerging issues relevant to the work of the Committee.

Discussion

170. CCCF noted the information provided by Members in reply to CL 2024/7-CF, including:

- The document submitted by New Zealand on Environmental Inhibitors (EIs) which also informed CCCF delegates of their proposal to hold informal workshops on EIs as side events to the forthcoming Codex CCPR and the Codex Committee on Residues from Veterinary Drug in Foods (CCRVDF) meetings. New Zealand further mentioned that these workshops would help facilitate recognition and understanding of the importance of environmental inhibitors to advancing global interests around mitigating the impact of climate change, transforming food systems while advancing broader food security and sustainability goals.

[26] REP23/CF16, Appendix VII; CL 2023/95-CF; CX/CF 24/17/19 (Comments of Canada, Chile, Cuba, Indonesia, Iraq, New Zealand, Peru, Saudi Arabia, UAE, USA, International Commission for Uniform Methods of Sugar Analysis (ICUMSA), and Public Research and Regulation Initiative (PRRI))

[27] REP23/CF16, paras. 135 and 138; CL 2024/7-CF; CX/CF 14/17/20 (Comments of Canada, Chile, Cuba, EU, New Zealand, Peru, UAE, and USA)

- The document submitted by the European Union on their ongoing activities on emerging issues in food and feed safety relevant to contaminants, which included, *inter alia*, information on:
    - The mineral oil hydrocarbons (MOHs) including their subcategories, mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH).
    - Heavy metals in algae.
    - Quinolizidine alkaloids in lupins and lupin-derived food.

171. The FAO Representative expressed his appreciation for the information provided by Members on emerging issues. In this respect, the Representative reminded CCCF of the results of the FAO/WHO Expert Meeting on Seaweed (2021) noting at the same time that plant-based food products and their associated food safety issues, was one of the focus areas of the recently held FAO foresight meeting (2023).

Conclusion

172. CCCF:

(i) thanked the Members for the information submitted;

(ii) agreed to remove foresight as a standing agenda item of the Committee and to organize a side event at subsequent CCCF meetings to have further exchange on this topic; and

(iii) agreed to issue a circular letter annually to gather more information on emerging issues relevant to the work of the Committee.

173. CCCF also noted that modalities on how to deal MOH, MOSH, MOAH, heavy metals in algae and quinolizidine alkaloids in lupins and lupin-derived food would need to be discussed.

OTHER BUSINESS (Agenda item 22)

Review of proposed agenda for CCCF18

174. The Assistant to the Chairperson did a stock take of all decisions taken at the Session to provide an overview of the agenda for the next Session. CCCF confirmed the decisions taken under the relevant agenda items for inclusion in the agenda for CCCF18.

DATE AND PLACE OF NEXT SESSION (Agenda item 23)

175. CCCF was informed that CCCF18 was scheduled from 23-27 June 2025, the final arrangement subject to confirmation by the Host Country and the Codex Secretariats.

APPENDIX I

LIST OF PARTICIPANTS
LISTE DES PARTICIPANTS
LISTA DE PARTICIPANTES

CHAIRPERSON – PRÉSIDENTE - PRESIDENTA

Dr Sally Hoffer
Manager Safe and Sustainable Food
Ministry of Agriculture, Nature, and Food Quality
The Hague

CHAIR'S ASSISTANT – ASSISTANTE DE LA PRÉSIDENTE – ASISTENTA DE LA PRESIDENTA

Mrs Astrid Bulder
Senior Risk Assessor
National Institute for Public Health and Environment (RIVM)
Ministry of Health, Welfare and Sport
Bilthoven

MEMBERS NATIONS AND MEMBER ORGANIZATIONS
ÉTATS MEMBRES ET ORGANISATIONS MEMBRES
ESTADOS MIEMBROS Y ORGANIZACIONES MIEMBROS

ALGERIA - ALGÉRIE - ARGELIA

Mr Zakari Terbaoui
Conseiller
Ambassade d 'Algérie au Mexique

AUSTRIA - AUTRICHE

Mrs Kristina Marchart
Senior Expert
AGES - Austrian Agency for Health and Food Safety
Vienna

AUSTRALIA - AUSTRALIE

Mr Damien Farrington
Manager Environmental Health - Townsville Public Health Unit
Queensland Health

Mr Nick Fletcher
Manager Standards and Surveillance
Food Standards Australia New Zealand

BELGIUM - BELGIQUE - BÉLGICA

Mr Andrea Carletta
Expert Contaminant
FPS Public Health
Bruxelles

Mrs Christelle Cape
Expert relation international
FPS Public Health
Brussels

Ms Mona Lepadatu
Political Administrator
Council of the European Union
Bruxelles

Mr Fabio Enrico Occhetti
Expert in chemical contaminants in food
Federal Agency for the Safety of the food chain
Brussels

BRAZIL - BRÉSIL - BRASIL

Ms Larissa Bertollo Gomes Pôrto
Health Regulation Specialist
Brazilian Health Regulatory Agency – ANVISA
Brasília

Ms Flávia Beatriz Custódio
Ph.D of Food Science
Universidade Federal de Minas Gerais
Belo Horizonte

Ms Ligia Lindner Schreiner
Food risk assessment manager
Brazilian Health Regulatory Agency - Anvisa
Brasília

Mr Wilkson Oliveira Rezende
Federal Food Inspector
Ministry of Agriculture, Livestock and Food Supply - MAPA
Brasília

Mr Rafael Ribeiro Goncalves Barrocas
Federal Food Inspector - Department of Plant Inspection - DIPOV/SDA
Ministry of Agriculture and Livestock - MAPA
Brasília

CABO VERDE - CAP-VERT

Mr Edmilson Semedo
Técnico de Regulação da ERIS
ERIS
Praia

CANADA - CANADÁ

Mr John Field
Chief, Chemical Health Hazard Assessment Division
Food Directorate
Ottawa

Dr Rosalie Awad
Section Head, Food Contaminants Section
Health Canada
Ottawa

Mr Jason Glencross
International Policy Analyst
Canadian Food Inspection Agency
Ottawa

Dr Beata Kolakowski
Science Leader
Canadian Food Inspection Agency
Ottawa

CHILE - CHILI

Mrs Lorena Delgado Rivera
Encargada Laboratorio Biotoxinas
Ministerio de Salud
Santiago

CHINA - CHINE

Prof Yongning Wu
Chief Scientist
China National Center for Food Safety Risk Assessment
Beijing

Dr Huihui Bao
Doctor
China National Center for Food Safety Risk Assessment
Beijing

Ms Fung Man Cheung
Scientific Officer (Contaminant)
Centre for Food Safety, Food and Environmental
Hygiene Department, HKSAR Government
Hong Kong

Dr Yi Shao
Professor
China National Center for Food Safety Risk Assessment
Beijing

Prof Jun Wang
Professor
China National Center for Food Safety Risk Assessment
Beijing

Mr Jin Ye
Associate Professor
Academy of National Food and Strategic Reserves
Administration, China
Beijing

Prof Pingping Zhou
Professor
China National Center for Food Safety Risk Assessment
Beijing

CONGO

Mr Alexis Jean-Jacques Ngoko Mouyabi
Directeur Général de l'Agence un Congolaise de
Normalisation et de la Qualité
Agence Congolaise de Normalisation et de la Qualité
Brazzaville

Mr Émile Pascal Blaise Opangault
Directeur de cabinet du Ministre
Ministère du développement industriel et de la
promotion du secteur privé
Brazzaville

COSTA RICA

Mrs Ana Cristina Briones Rodrigue
Investigadora
Universidad de Costa Rica
San Pedro. Montes de Occa

CUBA

Mr Osvaldo Vladimir Puñales Sosa
Funcionario
Ministerio de Salud Pública
La Habana

Ms Rocio Hernandez Dustó
Especialista Principal de Grupo de Calidad
MINAL
La Habana

Mrs Daimy Hernández Duarte
Especialista Superior de Calidad
Corporación Alimentaria SA
La Habana

Ms Vilmaris Matos Moya
Jefe Dpto. Química Aditivos
Instituto de Higiene, Epidemiología y Microbiología
INHEM
La Habana

Yessika Valdés Echeverría
Especialista de Normalización
Empresa Sociedad Mercantil Stella SA
La Habana

CZECH REPUBLIC – TCHÈQUE, RÉPUBLIQUE – CHECA, REPÚBLICA

Mr Jakub Fisnar
Expert
Ministry of Agriculture of the Czech Republic
Prague 1

ECUADOR - ÉQUATEUR

Ms Natalia Piedad Quintana Garzón
Secretaría del Comité Coordinador FAO/OMS para América Latina y El Caribe CCLAC
Ministerio de Agricultura, Ganadería, Acuacultura y Pesca - MAGAP
Quito

EGYPT - ÉGYPTE - EGIPTO

Eng Noha Mohamed Atia
Food standards specialist
Egyptian Organization for Standardization and Quality (EOS)
Cairo

EL SALVADOR

Mrs Claudia Guzmán De López
Jefa de Punto de Contacto Codex
Organismo Salvadoreño de Reglamentación Técnica
San Salvador

EUROPEAN UNION - UNION EUROPÉENNE - UNIÓN EUROPEA

Mr Frans Verstraete
Deputy Head of Unit
European Commission
Brussels

Ms Judit Krommer
Policy Officer
European Commission
Brussels

Ms Veerle Vanheusden
Administrator
European Commission
Brussels

FINLAND - FINLANDE - FINLANDIA

Ms Elina Pahkala
Chief Specialist
Ministry of Agriculture and Forestry

FRANCE - FRANCIA

Mr Laurent Noël
Chef du Bureau d'appui à la maîtrise des risques alimentaires
Ministère de l'agriculture et de la souveraineté alimentaire
Paris

Mr Niels Enslen
Chargé d'études risques chimiques
Ministère de l'agriculture et de la souveraineté alimentaire
Paris

GHANA

Ms Mariam Larbi
Principal Research Officer
Quality Control Company Ltd
Accra

GUYANA

Dr Ozaye Dodson
Director
Veterinary Public Health Unit

Ms Odile Broomes
Analytical Scientific Officer
Government Analyst- Food and Drug Department

HAITI - HAÏTI - HAITÍ

Mr Valdimy Adolphe
Conseiller Technique
MSPP
Port-au-Prince

HONDURAS

Ms Maria Eugenia Sevilla
Coordinator Technical Subcommittee
SENASA

INDIA - INDE

Mr Praveen Kumar
Director
Ministry of Commerce & Industry

Ms Reeba Abraham
Deputy General Manager
Agricultural and Processed Food Products Export Development Authority (APEDA)

Dr Dinesh Singh Bisht
Scientist C
Spices Board India

Mr Nagabhooshana G
Technical Officer
FSSAI
New Delhi

INDONESIA - INDONÉSIE

Dr Dasep Wahidin
Deputy Director/Food Inspector
Indonesian Food and Drug Authority
Jakarta

Ms Fuji Anrina
Analyst
Ministry of Trade of Republic of Indonesia
Jakarta

Ms Cita Tri Aryuni
Senior staff laboratory
Indonesian FDA
Jakarta

Mrs Miranti Reine Devilana
Food Safety Inspector
National Food Agency
Jakarta

Mr Imran Fahmi
Analyst
Ministry of Trade of Republic of Indonesia
Indonesia

Mr Widhi Handoyo
Senior Public Relations Officer
Indonesian FDA
Jakarta

Mr Natan Kambuno
Director of Trade Defense
Ministry of Trade of Republic of Indonesia
Jakarta

Mr Arif Ludyansyah
Senior Public Relation
Indonesian FDA
Jakarta

Dr Romsyah Maryam
Senior Researcher
National Research and Innovation Agency of Indonesia (Brin)
Bogor

Ms Desiana Nurwanti
Regulatory Staff
Indonesia FDA
Jakarta

Mrs Puji Sulastri
First Secretary
Embassy of Indonesia
Panama

Ms Ika Wiharyanti Suryaningsih
Secretariat Sub-Division Head for Deputy of Processed Food Control
Indonesian FDA
Jakarta

IRELAND - IRLANDE - IRLANDA

Dr Joe Hannon
Senior Technical Executive
Food Safety Authority of Ireland

JAMAICA - JAMAÏQUE

Dr Linnette Peters
Veterinary Public Health Consultant
Ministry of Health & Wellness

JAPAN - JAPON - JAPÓN

Mr Tetsuo Urushiyama
Associate Director
Ministry of Agriculture, Forestry and Fisheries
Tokyo

Mr Kazuma Haruta
Technical Official
Consumer Affairs Agency
Tokyo

Ms Miyu Hashimoto
Section Chief
Ministry of Agriculture, Forestry and Fisheries
Tokyo

Mr Junichi Kidoh
Unit Chief
Consumer Affairs Agency
Tokyo

Mr Yutaro Kobayashi
Section Chief
Ministry of Agriculture, Forestry and Fisheries
Tokyo

Mr Yoshiyuki Takagishi
Associate director
Food Safety Commission Secretariat
Tokyo

MALAYSIA - MALAISIE - MALASIA

Mr Ahmad Faizal Abdull Razis
Assoc. Prof. Dr
University Putra Malaysia (UPM)
Serdang

MONGOLIA - MONGOLIE

Ms Khurandaabaatar Delger
Chemist
State Central Veterinary Laboratory
Ulaanbaatar

MOROCCO - MAROC - MARRUECOS

Mrs Keltoum Darrag
Représentante régionale Nouacer- Settat
MOROCCO FOODEX

Rabat

Dr Karom Mohamed El Mahdi
Ingénieur en Industrie Agro-alimentaire
ONSSA
Rabat

NETHERLANDS - PAYS-BAS – PAÍSES BAJOS

Mrs Nikki Emmerik
Senior Policy Officer
Ministry of Health, Welfare and Sport
The Hague

Mrs Weiluan Chen
Science Officer
National Institute for Public Health and Environment (RIVM)
Bilthoven

NEW ZEALAND - NOUVELLE-ZÉLANDE - NUEVA ZELANDIA

Ms Jeane Nicolas
Senior Adviser Toxicology
Min Primary Ind
Wellington

Mr Raj Rajasekar
Senior Programme Manager
Ministry for Primary Industries
Wellington

OMAN - OMÁN

Mr Ahmed Almazrooi
Food Analysis Specialist
Food Safety & Quality Center
Mascate

PAKISTAN - PAKISTÁN

Dr Uzma Maqbool
Deputy Chief Scientist
Nuclear Institute for Agriculture & Biology (NIAB),
Pakistan Atomic Energy Commission (PAEC)
Faisalabad

PANAMA - PANAMÁ

Eng Joseph Gallardo
Ingeniero de Alimentos/Punto de Contacto Codex
Ministerio de Comercio e Industrias
Panama

Eng Rafael Gutierrez
Asuntos Regulatorios y Científicos
Sindicato de Industriales de Panamá
Panama

Eng Hildegar Mendoza
Gerencia
Cámara Panameña de Alimentos
Panama

Mr Marco Pino
Asesor y Asistente Ejecutivo 2 Salud Pública Alimentaria
Ministerio de Salud
Panama

PARAGUAY

Prof Edith Magdalena Gayoso Rojas
Química
SENACSA
San Lorenzo

Mrs Zuny Mabel Zarza De Riquelme
Coordinador de Asuntos Regulatorios
Instituto Nacional de Alimentación y Nutrición (INAN)
Asunción

Prof Hilce Ávalos
Ingeniera Agrónoma
Área de Calidad e Inocuidad de Vegetales SENAVE - Servicio Nacional de Calidad y Sanidad Vegetal y de Semillas
Asunción

PERU - PÉROU - PERÚ

Mr Javier Neptali Aguilar Zapata
Coordinador Titular de la Comisión Técnica Nacional sobre Contaminantes de Alimentos en Perú
SENASA
La Molina

José Mario D'Andrea Rivera
Agregado civil
Embajada del Perú en Panamá
Misión diplomática
Panamá

PHILIPPINES - FILIPINAS

Mr Phelan Apostol
Chair, NCO Sub-Committee on Contaminants in Food
National Codex Organization

Mr Neri Camitan
Co-Chair, SCCF
National Codex Organization
Taguig

Dr Karen Kristine Roscom
Member, SCCF
National Codex Organization
Quezon City

POLAND - POLOGNE - POLONIA

Ms Marzena Chacinska
Head of International Cooperation Department
Agricultural and Food Quality Inspection
Warsaw

Ms Joanna Maryniak - Szpilarska
Main Expert
Agricultural and Food Quality Inspection

Mr Andrzej Starski
Senior Expert
National Institute of Public Health NIH - National Research Institute

QATAR

Dr Aneez Ahamad P. Yossouff
Laboratory Specialist
Ministry of Public Health

REPUBLIC OF KOREA – RÉPUBLIQUE DE CORÉE – REPÚBLICA DE COREA

Dr Soyoung Chun
Scientific Officer
Ministry of Food and Drug Safety

Dr Hyung Wook Chung
Senior Scientific Officer
MFDS (Ministry of Food and Drug Safety)

Ms Jooyeon Kim
Researcher
Ministry of Food and Drug Safety

Dr Theresa Lee
Senior Research Scientist
NAS (National Institute of Agricultural Sciences) of RDA

Mr Seung-Hwa Lee
Scientific Officer
National Agriculture Products Quality Management Service (NAQS)

Dr Junghyuck Suh
Senior Scientific Officer
Ministry of Food and Drug Safety

Dr Ji-Hyock Yoo
Research Scientist
Rural Development Administration

SAUDI ARABIA - ARABIE SAOUDITE - ARABIA SAUDITA

Mr Yasir Alaqil
Specifications and Regulations Expert
Saudi Food and Drug Authority
Riyadh

Mr Mohammed Al Mutairi
Head of the Inorganic Chemistry Department
Saudi Food and Drug Authority
Riyadh

Ms Lama Almaiman
Senior risk assessment specialist I
Saudi Food and Drug Authority
Riyadh

Mr Khalid Alzahrani
Head of International Communication of Standards Section
Saudi Food and Drug Authority
Riyadh

SINGAPORE - SINGAPOUR - SINGAPUR

Dr Jun Cheng Er
Acting Branch Head (Risk Assessment and Communications)
Singapore Food Agency
Singapore

Dr Wesley Zongrong Yu
Specialist Team Lead (Organic Contaminants)
Singapore Food Agency
Singapore

SPAIN - ESPAGNE - ESPAÑA

Ms Ana Cabrales Miró-granada
Técnica superior
Organismo Autónomo Agencia Española de Seguridad Alimentaria y Nutrición (AESAN OA). Ministerio de Consumo
Madrid

María Noelia Loro Martín-gil
Técnico Superior del Servicio de Gestión del Riesgo de Residuos de Plaguicidas en alimentos
Organismo Autónomo Agencia Española de Seguridad Alimentaria y Nutrición (AESAN OA). Ministerio de Consumo
Madrid

SURINAME

Ms Jenna Wijngaarde
Codex Contact Point
National Institute for Food Safety Suriname - NIVS
Wanica

SWEDEN - SUÈDE - SUECIA

Mrs Carmina Ionescu
Principal Regulatory Officer
Swedish Food Agency
Uppsala

SWITZERLAND - SUISSE - SUIZA

Mrs Judit Valentini
Scientific Officer
Federal Food Safety and Veterinary Office FSVO
Bern

THAILAND - THAÏLANDE - TAILANDIA

Mr Pisan Pongsapitch
Secretary General
Ministry of Agriculture and Cooperatives
Bangkok

Mrs Chutiwan Jatupornpong
Standards Officer, Senior Professional Level
Ministry of Agriculture and Cooperatives
Bangkok

Ms Nareerat Junthong
Deputy Director
Thai Frozen Foods Association
Bangkok

Ms Nitzachon Khacharin

Trade and Technical Manager of Fisheries Products

Thai Food Processors Association

Bangkok

Mr Sompop Lapviboonsuk
Scientist, Senior Professional Level
Ministry of Higher Education, Science, Research and Innovation
Bangkok

Mr Lertchai Lertvut
Deputy Secretary-General of Food and Drug Administration
Ministry of Public Health
Nonthaburi

Dr Kwantawee Paukatong
Federation of Thai Industries
The Federation of Thai Industries
Bangkok

Mr Supat Sangsuay
Medical Scientist, Senior Professional Level
Ministry of Public Health
Nontaburi

Ms Wiphada Sirisomphobchai
Scientist, Expert Level
Ministry of Agriculture and Cooperatives
Pathum Thani

Mrs Supanoi Subsinserm
Senior Expert in fishery products quality inspection
Ministry of Agriculture and Cooperatives
Bangkok

Mr Sirichai Sunya
Medical Scientist, Senior Professional Level
Ministry of Public Health
Nontaburi

Ms Jarunee Wonglek
Food and Drug Technical Officer, Senior Professional Level
Ministry of Public Health
Nonthaburi

TÜRKIYE

Mr Sinan Arslan
Expert
Ministry of Agriculture and Forestry
Ankara

Mr Devrim Kilic
Food Engineer
Ministry of Agriculture and Forestry
Ankara

UNITED KINGDOM - ROYAUME-UNI – REINO UNIDO

Mr Craig Jones
Senior Policy Advisor
Food Standards Agency

Ms Holly Howell-Jones
Contaminants policy advisor
Food Standards Agency
Cardiff

UNITED STATES OF AMERICA – ÉTATS-UNIS D'AMÉRIQUE – ESTADOS UNIDOS DE AMÉRICA

Dr Lauren Posnick Robin
Chief, Plant Products Branch
FDA, Center for Food Safety and Applied Nutrition
College Park, MD

Dr Eileen Abt
Chemist, Plant Products Branch
FDA, Center for Food Safety and Applied Nutrition
College Park, MD

Dr Anthony Adeuya
Chemist, Plant Products Branch
FDA, Center for Food Safety and Applied Nutrition
College Park, MD

Mr Alexander Domesle
Senior Advisor for Chemistry, Toxicology, and Related Sciences
Food Safety and Inspection Service
U.S. Department of Agriculture
Washington, DC

Mr Jim Elder
Peanut Export Quality Consultant
American Peanut Council

Ms Alexandra Ferraro
International Issues Analyst
U.S. Codex Office
U.S. Department of Agriculture
Washington, DC

Mr. Andrew Mack
Agricultural Science Advisor
Foreign Agricultural Service
U.S. Department of Agriculture
Washington, DC

Mr Richard White
Consultant
Corn Refiners Association
Washington, D.C.

URUGUAY

Mrs Raquel Huertas
Jefe Departamento
Laboratorio Tecnológico del Uruguay
Montevideo

VENEZUELA (BOLIVARIAN REPUBLIC OF) - VENEZUELA (RÉPUBLIQUE BOLIVARIENNE DU) VENEZUELA (REPÚBLICA BOLIVARIANA DE)

Mr Luis Farias
Jefe
División de Análisis y Desarrollo de Normas
SENCAMER
Caracas

VIET NAM

Mrs Ha Lan Anh
Official
Institute for Nuclear Science and Technology
Hanoi

OBSERVERS - OBSERVATEURS – OBSERVADORES
INTERNATIONAL GOVERNMENTAL ORGANIZATIONS –
ORGANISATIONS GOUVERNEMENTALES INTERNATIONALES –
ORGANIZACIONES GUBERNAMENTALES INTERNACIONALES

INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE (IICA)

Dr Lisa Harrynanan
Agricultural Health and Food Safety Specialist
Inter-American Institute for Cooperation on Agriculture (IICA)
St Augustine

ORGANISMO INTERNACIONAL REGIONAL DE SANIDAD AGROPECUARIA (OIRSA)

Mr Raúl Guillermo Peralta Girón
Director Regional de Inocuidad de los Alimentos
OIRSA
San Salvador

NON-GOVERNMENTAL ORGANIZATIONS
ORGANISATIONS NON GOUVERNEMENTALES
ORGANIZACIONES NO GUBERNAMENTALES

FOODDRINKEUROPE

Mette Blauenfeldt
Regulatory Affairs Manager, EMEA
FoodDrinkEurope

INTERNATIONAL CONFECTIONERY ASSOCIATION (ICA/IOCCC)

Ms Natalie Thatcher
Global Lead for Toxicology
International Confectionery Association

INTERNATIONAL COUNCIL OF BEVERAGES ASSOCIATIONS (ICBA)

Dr Sachin Bhusari
Senior Manager
The Coca-Cola Company
Atlanta, GA

INTERNATIONAL MEAT SECRETARIAT (IMS)

Dr Ashley Johnson
Director
International Meat Secretariat
Washington, DC

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

Dr Carl Blackburn
Food Irradiation Specialist
Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture
Vienna

FAO PERSONNEL
PERSONNEL DE LA FAO
PERSONAL DE LA FAO

Dr Vittorio Fattori
Food Safety Officer
Food and Agriculture Organization of the U.N.
Rome

WHO PERSONNEL
PERSONNEL DE L'OMS
PERSONAL DE LA OMS

Dr Moez Sanaa
Unit Head
World Health Organization (WHO)
Geneva

Mr André Luis De Sousa Dos Santos
Advisor, Food Safety and Surveillance
Pan American Center for Foot-and-Mouth Disease and Veterinary Public Health
Brasilia

CCCF SECRETARIAT – THE NETHERLANDS

Dr Marie-Ange Delen
Senior Policy Officer
Ministry of Agriculture, Nature, and Food Quality
The Hague

Mrs Judith Amatkarijo
Policy Supporter
Ministry of Economic Affairs & Climate
The Hague

Mrs Sheela Khoesial
Policy officer
Ministry of Agriculture, Nature, and Food Quality
The Hague

CCCF SECRETARIAT – PANAMA

Mrs Auri Ayala
Secretaria
Ministerio de Comercio e Industrias
Panama

Mrs Gabriela Herrera
Secretaria
Ministerio de Comercio e Industrias
Panama

Mr Hector Sanchez
Promotor de Exportaciones
Ministerio de Comercio e Industrias

Mrs Oldith Guillen
Promotora de Inversiones
Ministerio de Comercio e Industrias
Panama

Mr Julio Mock
Asesor
Ministerio de Comercio e Industria
Panama

CODEX SECRETARIAT

Ms Verna Carolissen Mackay
Food Standards Officer
Joint FAO/WHO Food Standards Programme
Food and Agriculture Organization of the U.N.
Rome

Mr Giuseppe Di Chiera
Public Information Specialist
Joint FAO/WHO Food Standards Programme
Food and Agriculture Organization of the U.N.
Rome

Mr Chun Yin Johnny Yeung
Food Standards Officer
Joint FAO/WHO Food Standards Programme
Food and Agriculture Organization of the U.N.
Rome

APPENDIX II

MAXIMUM LEVELS FOR LEAD IN CERTAIN FOOD CATEGORIES

(For adoption at Step 5/8)

Commodity/ Product name	Maximum level (ML) mg/kg	Portion of the commodity/ Product to which the ML applies	Notes/Remarks
Spices, dried aril	0.9	Whole, ground, powder, crushed	
Spices, dried floral parts	2.5	Whole, ground, powder, crushed	Relevant Codex commodity standard is CXS 344-2021.
Spices, dried fruit and berries	0.6	Whole, ground, powder, crushed	The ML does not apply to dried Sichuan pepper, star anise, dried paprika and sumac.
Spices, dried paprika and sumac	0.8	Whole, ground, powder, crushed	Relevant Codex commodity standard is CXS 353-2022.
Spices, Dried Sichuan pepper and Star anise	3.0	Whole, ground, powder, crushed	
Spices, dried rhizomes, and roots	2.0	Whole, ground, powder, crushed	Relevant Codex commodity standard is CXS 343-2021.
Spices, dried seeds	0.9	Whole, ground, powder, crushed	The ML does not apply to dried celery seeds. Relevant Codex commodity standards are CXS 327-2021 and CXS 352-2022.
Spices, dried celery seeds	1.5	Whole, ground, powder, crushed	

(For adoption at Step 5)

Commodity/ Product name	Maximum level (ML) mg/kg	Portion of the commodity/ Product to which the ML applies	Notes/Remarks
Spices, dried bark	2.5	Whole, ground, powder, crushed	-
Culinary herbs, dried	2.5	Whole commodity	MLs for fresh culinary herbs may be derived based on the moisture content of the fresh herb in relation to the dry herb.

APPENDIX III

SAMPLING PLAN FOR METHYLMERCURY CONTAMINATION IN FISH

(For adoption at Step 5/8)

GENERAL CONSIDERATIONS

DEFINITION

Lot	An identifiable quantity of a food commodity delivered at one time and determined by the official to have common characteristics, such as origin, variety, type of packing, packer, consignor, or markings. A lot of whole fish should consist of one species and the length and/or weight should be comparable. In case the length and/or weight of the fish is not comparable, the consignment may still be considered as a lot, but a specific sampling procedure has to be applied (as described in paragraph 8).
Sublot	Designated part of a larger lot in order to apply the sampling method on that designated part. Each sub-lot must be physically separate and identifiable.
Sampling plan	A procedure for sampling of food from a certain lot with a view of a specific chemical analysis of that lot, in order to ensure that the sample that is taken, is representative for the concentration of the concerned chemical within the lot.
Methylmercury test procedure	A methylmercury test procedure consists of three steps: sample selection, sample preparation and methylmercury quantification. It contains an accept/reject level.
Decision rule	The accept/reject level is a level usually equal to the Codex maximum level (ML).
Incremental sample	The quantity of material taken from a single random place in the lot or sub-lot.
Aggregate sample	The combined total of all the incremental samples that is taken from the lot or sub-lot. The aggregate sample has to be at least as large as the laboratory sample or samples combined. The entire aggregate sample should be comminuted in a mill.
Laboratory sample	A sample intended for the laboratory, which consists out of a comminuted quantity of fish muscle, or whole fish. The laboratory sample may be a portion of or the entire aggregate sample. If the aggregate sample is larger than the laboratory sample(s), the laboratory sample(s) should be removed in a random manner from the homogenised aggregate sample.
Test portion	A randomly removed portion of the comminuted laboratory sample for the extraction of the methylmercury for chemical analysis.

MATERIAL TO BE SAMPLED

1. Each lot or sub-lot which is to be examined must be sampled separately.
2. Fresh or frozen whole (in general after removing digestive tract) or dressed fish (eviscerated fish with head and tail removed) and other non-bulk fishery products of lots greater than or equal to 15 metric tons (MT) should be subdivided into sub-lots of 15-30 MT in accordance with Table 2.
3. Lots of fishery products traded as bulk commodities of greater than 100 MT should be subdivided into sub-lots in accordance with Table 1 to be sampled separately.

Table 1. Subdivision of sub-lots according to bulk consignment lot weight

Commodity	Lot weight (MT[a])	Weight or number of sub-lots (MT)
Fishery products (traded as bulk consignments)	≥ 1500	500
	> 300 and <1500	3 sub-lots (minimum 100 MT)
	≥ 100 and ≤300	100
	< 100	-

[a]1 metric tonne (MT) = 1000 kilograms

Table 2. Subdivision of sublots according to other products lot weight

Commodity	Lot weight (MT[a])	Weight or number of sub-lots (MT)
Fish (traded as non-bulk consignments)	≥ 15	15-30
	< 15	-

[a]1 metric tonne (MT) = 1000 kilograms

4. Taking into account that the weight of the lot is not always an exact multiple of the weight of the sub-lots, the weight of the sub-lot may exceed the mentioned weight by a maximum of 20 %.

INCREMENTAL SAMPLE

5. The recommended minimum number of incremental samples taken from the lot or sub-lot is dependent on the size of the lot or sub-lot as specified in Table 3.

6. The aggregate sample should contain a quantity of sample of at least 1 kilogram. The minimum weight of the incremental sample should be determined by dividing 1 kilogram by the required number of incremental samples as listed in Table 3. Incremental samples taken from a lot or sub-lot should be of comparable weight.

Table 3. Number of incremental samples to be taken depending on the weight of the lot or sublot

Lot weight (MT[a])	Number of incremental samples	Minimum laboratory sample weight (kg)
≤ 0.05	3	1
> 0.05 - ≤ 0.5	5	1
> 0.5	10	1

[a]1 metric tonne (MT) = 1000 kilograms

7. Whole fish are considered to be of comparable length and weight class where the differences in size and/or weight do not exceed about 50%.

8. For lots where fish are not of comparable length and/or weight the following approaches are to be applied to taking the incremental samples:

   a. Where a length or weight class/category is predominant (80% or more of the fish lot or sub-lot are within the same length and/or weight class), the aggregate sample is combined only from incremental samples of fish within the predominant category and outliers are excluded. This aggregate sample is to be considered as being representative for the whole lot/sub-lot.

b. Where there is no predominant weight or size class and where the overall length and/or weight of the fish present in the lot or sub-lot varies by more than 50% but less than 100%, the lot or sub-lot is separated into two length or weight classes and separate aggregate samples are composited from incremental samples taken independently from each length and/or weight class.

c. Where there is no predominant weight or size class and where the overall length and/or weight of the fishes present in the lot differ more than 100%, the lot or sub-lot is separated into three length or weight classes and separate aggregate samples are composited from incremental samples taken independently from each length or weight class.

9. For lots or sub-lots of whole fish the part of the fish where the incremental sample is taken is informed by the weight of the whole fish as specified in Table 3. Some examples on sampling of batches of fishes of different size and/or weight can be found in Annex II.

Table 4. Tissue area the incremental sample is taken from for whole fish based on weight classes

Weight class of an individual whole fish	**Sampled part**
< 1 kg	Whole fish (after removing the digestive tract) For lots of 0.05MT or greater where the aggregate sample would exceed 3 kg the midline (halfway between the gill opening and the anus) strip from backbone to belly can be sampled
1-6 kg	Midline (halfway between the gill opening and the anus) strip from backbone to belly
> 6 kg	Midline (halfway between the gill opening and the anus) strip from backbone to belly Alternatively, equal composite parts of muscle from behind the head and close to the tail can be sampled For tuna, incremental samples can instead be taken from the muscle from close to the tail.

PACKAGING AND TRANSPORTATION OF SAMPLES

10. Each laboratory sample should be placed in a clean, inert container offering adequate protection from contamination, loss of analytes by adsorption to the internal wall of the container and against damage in transit. All necessary precautions, for example temperature control and storage in airtight containers, should be taken to avoid any change in composition of the sample which might arise during transportation or storage (for example avoiding excess heat or the sample drying out).

SEALING AND LABELLING OF SAMPLES

11. Each laboratory sample taken for official use shall be sealed at the place of sampling and identified. A record must be kept of each sample, permitting each lot, or sub-lot, to be clearly identified and giving the date and place the sampling occurred, together with any additional information likely to be of assistance to the analyst.

SAMPLE PREPARATION PRECAUTIONS

12. In the course of sampling, precautions, such as correct-sampling technique and limitation of cross contamination, should be taken to avoid any changes which would affect the levels of methylmercury, adversely affect the analytical determination, or make the aggregate samples unrepresentative.

13. Wherever possible, apparatus and equipment coming into contact with the sample should not contain mercury and should be made of inert materials, e.g. plastics such as polypropylene, polytetrafluoroethylene (PTFE) etc. These should be acid cleaned to minimise the risk of contamination. High quality stainless steel may be used for cutting edges to take increment samples and make comminuted samples.

HOMOGENIZATION – GRINDING

14. The complete aggregate sample should be finely comminuted and thoroughly mixed using a process that has been demonstrated to achieve complete homogenization. Depending on the equipment available frozen samples may need to be thawed prior to homogenisation.

TEST PORTION

15. Procedures for selecting the test portion from the comminuted laboratory sample should be a random process. Following homogenization and thorough mixing, the test portion can be selected from any location throughout the comminuted laboratory sample.

16. It is suggested that three test portions be selected from each comminuted laboratory sample. The three test portions will be used for enforcement, appeal, and confirmation if needed.

ANALYTICAL METHODS

17. A criteria-based approach, whereby a set of performance criteria is established with which the analytical method used should comply, is appropriate. The performance criteria-based approach has the advantage that, by avoiding setting down specific details of the method used, developments in methodology can be exploited without having to reconsider or modify the specific method. Utilizing this approach, laboratories would be free to use the analytical method most appropriate for their facilities.

18. Refer to The Procedural Manual of the Codex Alimentarius Commission for principles for the establishment of methods of analysis.

19. Method performance criteria for methylmercury and total mercury are detailed for the species of fish for which there are Codex MLs in Annex I.

20. 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.

RECONDITIONING LOTS/SUB-LOTS

21. A lot or sub-lot where fish are not of comparable length and/or weight that is separated in to 2 to 3 length and/or weight classes should be analysed sequentially from the largest class first.

22. A lot or sub-lot where fish are not of comparable length and/or weight can be considered in compliance with the ML if the methylmercury concentration of the aggregate sample taken from the highest length and/or weight class is below the ML. However, export or trade requirements (e.g. certificates of analysis) may require testing lots or sub-lots of smaller length and/or weight classes.

23. Where the methylmercury concentration in the aggregate sample taken from a length and/or weight class is above the ML then the next largest length/weight class should also be analysed. If the methylmercury concentration in this sample is below the ML the lot or sub-lot can be reconditioned to remove length and/or weight classes that exceed the ML to ensure the remaining fish are in compliance with the ML.

24. For a lot or sub-lot separated into three length or weight classes paragraph 23 should be repeated for the smallest length/weight classes if the methylmercury concentration in the aggregate sample taken from the middle length/weight class is also above the ML.

ANNEX I

Method performance criteria for methylmercury and total mercury in fish

Species	ML (mg/kg)	LOD (mg/kg)	LOQ (mg/kg)	Precision (%)	Recovery (%)	Minimum applicable range (mg/kg)
Alfonsino	1.5	≤ 0.15	≤ 0.30	≤ 30	80-110	0.82 - 2.2
Marlin (all species)	1.7	≤ 0.17	≤ 0.34	≤ 30	80-110	0.95 – 2.5
Orange roughy	0.8	≤ 0.08	≤ 0.16	≤ 33	80-110	0.35- 1.04
Pink cusk-eel	1.0	≤0.10	≤ 0.20	≤ 32	80-110	0.52 – 1.5
Shark (all species)	1.6	≤ 0.16	≤ 0.32	≤ 30	80-110	0.88 - 2.3
Tuna (all species)	1.2	≤ 0.12	≤ 0.24	≤ 31	80-110	0.64 – 1.8

ANNEX II

Examples on how to apply provisions in the Sampling Plan

EXAMPLE 1

In case the size and/or weight of the fishes present in the lot differs more than 50 % but less than 100 %: two separate representative samples are taken from each size or weight class/category within a lot.

Example: 5 MT lot of fishes with weights from 2 kg to 3.5 kg.

A first aggregate sample is taken of the smaller sized (lot relative) fishes, which weigh about 2-2.75 kg: 10 incremental samples (fishes) are taken. Each incremental sample is constituted from the muscle meat of the middle part of the fish (slice backbone to belly, symmetrically taken around line B in Figure 1) and weighs about 100 grams. This results in one aggregate sample of about 1 kg to be homogenised and analysed separately.

A second aggregate sample is taken of the larger sized (lot relative) fishes, which weigh about 2.75 -3.5 kg: 10 incremental samples (fishes) are taken. Each incremental sample is constituted from the muscle meat of the middle part of the fish (slice backbone to belly, symmetrically taken around line B in Figure 1) and weighs about 100 grams. This results in one aggregate sample of about 1 kg to be homogenised and analysed separately.

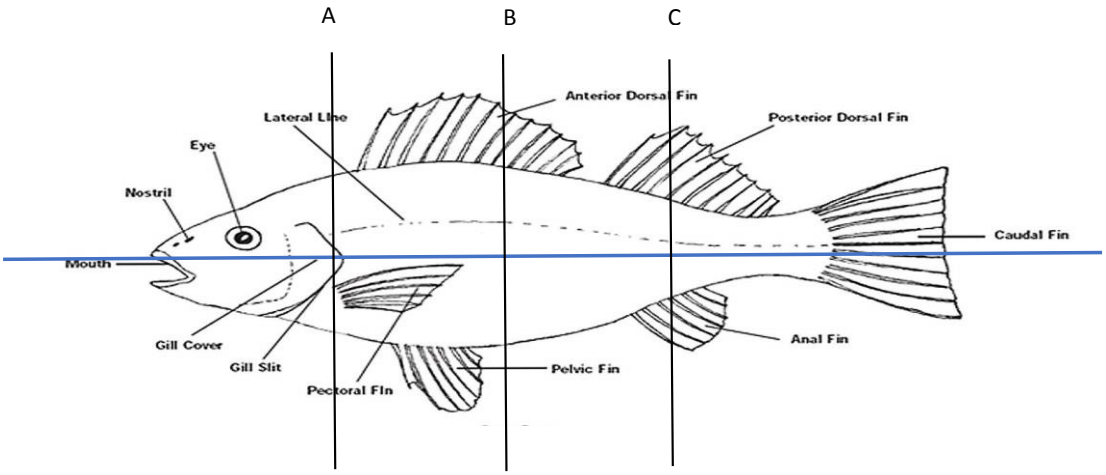

Figure 1: The different sections of a fish.

A) Laboratory performs a sequential analysis:

First the sample of the larger sized fishes is homogenised and analysed separately.

- In case the analytical result is compliant, the whole lot is compliant.
- In case the analytical result is non-compliant, as a second step the sample of the smaller sized fishes is homogenised and analysed separately.
- In case the analytical result of the sample of the smaller sized fishes is non-compliant, the whole lot is non-compliant.
- In case the analytical result of the sample of smaller sized fishes is compliant, then the smaller sized fishes (2-2.75 kg) have to be sorted out and these fishes are compliant. The remaining larger sized fishes (2.75-3.5 kg) are non-compliant.

B) Laboratory analyses both samples at the same time:

- In case both analytical results are compliant, the whole lot is compliant.
- In case both analytical results are non-compliant, the whole lot is non-compliant.
- In case the sample of the smaller sized fishes (2-2.75 kg) is compliant and the sample of the larger sized fishes (2.75-3.5 kg) not, then the smaller sized fishes (2-2.75 kg) have to be sorted out and these small sized fishes are compliant. The remaining larger sized fishes (2.75-3.5 kg) are non-compliant.

EXAMPLE 2

In case the size and/or weight of the fishes present in the lot differs more than 100%: three separate representative samples are taken from each size or weight class/category within a lot

Example: 10 MT lot of fishes with weights from 2 kg to 8 kg.

A first aggregate sample is taken of the smaller sized (lot relative) fishes, which weigh about 2-4 kg: 10 incremental samples (fishes) are taken, each incremental sample is constituted from the muscle meat of the middle part of the fish (slice backbone to belly, symmetrically taken around line B in Figure 1) and weighs about 100 grams. This results in one aggregate sample of about 1 kg, to be homogenised and analysed separately.

A second aggregate sample is taken of the fishes of medium size (lot relative) of about 4-6 kg: 10 incremental samples (fishes) are taken, each incremental sample is constituted from the muscle meat of the middle part of the fish (slice backbone to belly) and weighs about 100 grams. This results in one aggregate sample of about 1 kg, to be homogenised and analysed separately.

A third aggregate sample is taken of the larger sized (lot relative) fishes of about 6-8 kg: 10 incremental samples (fishes) are taken, each incremental sample is

- constituted of the right side dorso-lateral muscle meat in the middle part of the fish (symmetrically around line B in Figure 1 and above the horizontal line in Figure 1) and weighs about 100 grams. This results in one aggregate sample of about 1 kg to be homogenised and analysed separately.

  OR

- constituted of equal parts of 50 grams of the muscled meat close to the tail part (the region around line C in Figure 1) and the muscle meat close to the head part of one fish (the region of line A in Figure 1) which are combined to form an incremental sample of about 100 grams per fish. This results in one aggregate sample of about 1 kg to be homogenised and analysed separately.

APPENDIX IV

SAMPLING PLAN FOR TOTAL AFLATOXINS AND OCHRATOXIN A IN NUTMEG, DRIED CHILLI AND PAPRIKA

(For adoption at Step 5)

A) Spices with large particle size (Whole nutmeg, whole dried chilli and whole paprika)

In case of large lots and on condition that the sublot can be separated physically, each lot shall be subdivided into sublots following Table 1. Taking into account that the weight of the lot is not always an exact multiple of the weight of the sublots, the weight of the sublot may exceed the mentioned weight by a maximum of 20 %.

Table 1: Subdivision of lots into sublots depending on product and lot weight

Commodity	Lot weight (tonnes)	Weight or number of sublots	No incremental samples	Aggregate sample weight (kg)
Spices with large particle size	≥ 500	100 tonnes	100	10
	> 125 and < 500	5 sublots	100	10
	≥ 15 and ≤ 125	25 tonnes	100	10
	< 15	—	10-100 (*)	10
(*) Depending on the lot weight — see Table 2.				

Each sub-lot shall be sampled separately

Number of incremental samples: 100

(*) The number of incremental samples of 100 g to be taken depends on the weight of the lot, with a minimum of 10 and a maximum of 100.

The figures in the following Table 2 may be used to determine the number of incremental samples to be taken and the subsequent division of the aggregate sample.

Table 2: Number of incremental samples to be taken depending on the weight of the lot and number of subdivisions of the aggregate sample

Lot weight (tonnes)	No of incremental samples	Aggregate sample Weight (kg)	No of laboratory samples from aggregate sample
≤ 0.1	10	1	1
> 0.1 – ≤ 0.2	15	1.5	1
> 0.2 – ≤ 0.5	20	2	1
> 0.5 – ≤ 1.0	30	3	1
> 1.0 – ≤ 2.0	40	4	1
> 2.0 – ≤ 5.0	60	6	1
> 5.0 – ≤ 10.0	80	8	1
> 10.0 – ≤ 15.0	100	10	1

The accept/reject level is a level usually equal to the Codex maximum level.

B) Spices with small particle size (crushed/cracked/broken/flakes of nutmeg, dried chilli and paprika)

In the case of large lots and on condition that the sublot can be separated physically, each lot shall be subdivided into sublots following Table 3. Taking into account that the weight of the lot is not always an exact multiple of the weight of the sublots, the weight of the sublot may exceed the mentioned weight by a maximum of 20 %.

The accept/reject level is a level usually equal to the Codex maximum level.

Table 3: In case of large lots, subdivision of lots into sublots depending on product and lot weight

Commodity	Lot weight (tonnes)	Weight or number of sublots	Number of incremental samples	Aggregate sample Weight (kg)
Spices	≥ 15	25 tonnes	100	10
	< 15	—	5-100 (*)	0.5-10
(*) Depending on the lot weight — see Table 4				

Each sublot shall be sampled separately.

Number of incremental samples: 100, incremental sample size = 100g, Weight of the aggregate sample = 10 kg.

(*) For lots of spices less than 15 tonnes the sampling plan shall be used with 5 to 100 incremental samples, depending on the lot weight, resulting in an aggregate sample of 0.5 to 10 kg.

The figures in the following Table 4 can be used to determine the number of incremental samples to be taken.

Table 4: Number of incremental samples to be taken depending on the weight of the lot of spices

Lot weight (tonnes)	Number of incremental samples	Aggregate sample weight (kg)
≤ 0.01	5	0.5
> 0.01-≤ 0.1	10	1
> 0.1-≤ 0.2	15	1.5
> 0.2-≤ 0,5	20	2
> 0,5-≤ 1.0	30	3
> 1.0-≤ 2.0	40	4
> 2.0-≤ 5.0	60	6
> 5.0-≤ 10.0	80	8
> 10.0-≤ 15.0	100	10

C) Powdered spices (Obtained by grinding nutmeg, dried chilli and paprika)

In the case of large lots and on condition that the sublot can be separated physically, each lot shall be subdivided into sublots following Table 5. Taking into account that the weight of the lot is not always an exact multiple of the weight of the sublots, the weight of the sublot may exceed the mentioned weight by a maximum of 20 %.

The accept/reject level is a level usually equal to the Codex maximum level.

Table 5: Subdivision of lots into sublots depending on lot weight

Commodity	Lot weight (tonnes)	Weight or number of sublots	Number of incremental samples	Aggregate sample Weight (kg)
Powdered spices	≥ 15	25 tonnes	50	2
	< 15	—	3 – 50 (*)	0.1 – 2.0
(*) Depending on the lot weight — see Table 6				

Each sublot shall be sampled separately

Number of incremental samples: 50. Incremental sample size: [40 g] [80 g]. Weight of the aggregate sample: 2 kg

(*) For lots of powdered spices less than 15 tonnes the sampling plan shall be used with 3 to 50 incremental samples, depending on the lot weight, resulting in an aggregate sample of [0.1 to 2.0 kg] [0.24 kg to 4 kg].

The figures in the following Table 6 can be used to determine the number of incremental samples to be taken.

Table 6: Minimum number of incremental samples to be taken depending on the weight of the lot of powdered spices

Lot weight (tonnes)	Minimum number of incremental samples	Minimum aggregate sample weight (kg)
≤ 0.1	3	0.1 [0.24]
> 0.1 - ≤ 0.5	10	0.4 [0.8]
> 0.5 - ≤ 5.0	25	1.0 [2]
> 5.0 - ≤ 10.0	35	1.4 [2.8]
> 10.0 - ≤ 15.0	50	2.0 [4]

Method performance criteria

Table 7: Method performance criteria for the analysis of total aflatoxins and ochratoxins A in spices

Commodity	Analyte	ML (µg/kg)	LoD (µg/kg)	LoQ (µg/kg)	Precision (%)	Minimal applicable range (µg/kg)	Recovery (%)
Chilli pepper, Nutmeg	AF B1+B2+G1+G2	20	≤4	≤8	≤44	11.2-28.8	60-115
	AFB1	-	≤1	≤2	≤44	2.8-7.2	40-120
	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

APPENDIX V

CODE OF PRACTICE FOR THE PREVENTION OR REDUCTION OF CIGUATERA POISONING
(For adoption at Step 5/8)

I. Introduction

1. Ciguatoxins (CTXs) are a class of toxins produced by marine dinoflagellates (motile unicellular algae). These toxins enter the marine food web when CTX-containing dinoflagellates/algae are consumed by herbivorous fish or shellfish, including some echinoderms. CTXs can bioaccumulate in these and higher trophic level marine organisms. Ciguatera poisoning (CP) is an illness resulting from consumption of marine organisms containing toxic levels of CTXs. Sub-chronic exposure to ciguatoxic fish or shellfish can also lead to toxic effects. CP has become a global health concern and is increasing in prevalence due to factors that likely include climate change. Coastal communities that rely on local fishing as a food supply and as a source of income are particularly at risk from increasing occurrences of CP. In 2018, FAO and WHO convened a joint expert meeting to perform an evaluation of CTX and provide guidance for development of risk management options (published in 2020 as *the Report of the Expert Meeting on Ciguatera Poisoning: Rome, 19-23 November 2018*).

2. The benthic dinoflagellate genus *Gambierdiscus* is the main known producer of CTXs, and some species of *Fukuyoa* may also produce CTX-like toxins. These dinoflagellates tend to grow in tropical and subtropical marine environments and are typically associated with coral reefs. *Gambierdiscus* and *Fukuyoa* are known to attach to various substrates (e.g. turf algae, macroalgae, and coral, although they can also be detected in the water column). Recent reports have identified these organisms in more temperate regions as well, including Korea, Japan, northern territories of New Zealand, southern Australia, the northern Gulf of Mexico, and the Mediterranean Sea. CTXs were initially categorized as belonging to one of three major classes that corresponded with their global location (Pacific P-CTXs, Caribbean C-CTXs and Indian Ocean I-CTXs); however, experts now recommend that toxins be categorized into four classes, derivatives of CTX4A, CTX3C, C-CTX, and I-CTX, according to their chemical structure (I-CTX structures have not been fully determined). CTXs are lipophilic, do not degrade under heat or mild pH changes, and are known to be resistant to degradation by cooking, freezing, or canning processes. They may undergo structural transformations as they are metabolized by marine organisms, often increasing in toxicity as they do so. More than 30 unique analogues of CTXs have been reported and many more have yet to be fully characterized.

3. The impact of CTXs to humans is primarily through the consumption of wild-caught herbivorous fish or predatory fish or shellfish that have accumulated CTXs. The risk of intoxication from aquacultured fish is considered to be low. The diet of the individual marine organism is the primary contributing factor for CTX accumulation; however, the size and age of marine organisms are believed to influence CTX accumulation as well. CTXs are lipophilic and may be present in tissues such as meat (flesh), head, liver, viscera, and roe (eggs). The 2020 *FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning* referenced more than 425 species of fish that have been identified as having been contaminated with CTXs, including examples such as barracuda, amberjack, grouper, snapper, and parrotfish. Many of these fish are territorial, which can help identify vulnerable fishing areas, though territories can overlap and change with time. CTXs do not appear to be fatal to fish and there are no outward signs that a wild-caught fish is contaminated with CTXs, such as change in behaviour, taste, odour, or texture; meaning that toxin analysis is required to confirm CTX presence and concentration.

4. Humans can experience CP when they consume fish or other marine organisms contaminated with CTXs. Generally, the signs and symptoms of CP are acute and can appear within several hours of consuming contaminated food or up to 48 hours after consumption. CP symptoms include gastrointestinal issues (e.g. vomiting, diarrhoea), neurological issues (e.g. paraesthesia, headaches), cardiovascular issues (e.g. hypotension, bradycardia), and some symptoms that are especially characteristic of CP, such as cold allodynia and dysesthesia. CP is rarely fatal, but exposure to CTXs may prove extremely debilitating and can exacerbate the impact of pre-existing cardiovascular or neurological conditions. There is no specific treatment for CP, but some symptoms can be managed if the illness has been correctly diagnosed.

5. Reports of CP have been made since the 1500s. At present, CP is believed to be the most common type of marine biotoxin-related food poisoning worldwide. The global prevalence of CP is estimated to be 10,000 to 500,000 cases per year. In general, CP prevalence may be underestimated due to a lack of mandatory incidence reporting, misidentification of CP symptoms, limited collection of epidemiological data on a global level, and other reasons. If clinicians do not know the characteristic symptoms, they may misdiagnose CP, leading to underreporting of the disease.

6. Consuming CTX-contaminated fish was once geographically limited to local residents and visitors to tropical and subtropical regions with suitable coral reef habitats, but global trade of fish and the impacts of climate change, including an increase in ocean temperature, prevalence of cyclones, and changes in currents, have caused CP illnesses to be observed among a wider range of individuals and reported in non-CTX endemic countries in temperate regions. Analogues of CTXs that were formerly found to be endemic to specific regions can now be found in other areas of the world. Some regions have been monitoring CP cases for many years, developing expertise in analysis and area management, and some are experiencing an increase in CP as an emerging issue and must learn how to develop monitoring programs, inspection protocols, and regulations to protect the public.

   Successful surveillance and monitoring of CTXs depends on the availability of accurate epidemiological data and/or analytical methods validated according to international standards/guidelines. Presently, formal validation of analytical methods for CTXs is limited due to the lack of certified standards and certified or uncertified matrix reference materials. The analytical methods currently available for detection of CTXs are diverse and target different properties of the toxins (e.g. structure, cytotoxicity) and encompass both screening and quantitative measurements. Some analytical methods can simultaneously quantify individual CTX analogues, while others are more selective in the analogues that can be detected. However, there are no internationally agreed harmonized protocols to determine CTXs. Most CTX detection methods are suitable for analysing a variety of matrices (i.e. algae or seafood tissues) and some have sufficient sensitivity to detect CTXs at the levels that may be associated with adverse health effects in humans. CTX analogues are believed to vary depending on the species of toxin-producing algae, as well as the metabolism of marine organisms. CTXs can be extracted from CTX-producing algae or contaminated marine organisms; a limited number of CTX analogues have been synthesized (e.g. CTX1B, CTX3C, and 51-hydroxy-CTX3C). The dinoflagellates grow slowly in laboratory conditions and can be difficult to maintain; large quantities of ciguatoxic fish material are required for the isolation of toxins, which means production of CTX standards is limited. However, recent advancements in culturing, materials handling, and chemical characterization have significantly improved the capabilities to make reference materials. Toxins from cultured algae and fish with varying metabolite profiles are available.

7. In their 2020 report, FAO/WHO concluded that “effective and integrated risk management options would require definition of toxin profiles in each region, both in algal strains and in seafood to define risk evaluation protocols […] conclusions should be considered as of local or regional significance only […]” Some of the recommendations from the FAO/WHO report are included in the “Recommended Practices” sections below.

II. Scope

8. This document provides guidance on recommended practices to prevent or reduce CP for different types of stakeholders including competent authorities, fish sector operators (fishers, seafood processors, and seafood retail workers), health care professionals, and consumers. Because of differences in CTXs, analytical methods and standards, and regional prevalence levels of CP, not all recommended practices will be applicable in all situations or to all stakeholders.

III. Definitions

- **Analogue**: A compound that has a structure similar to another compound but differs from it in certain components, such as functional groups or substructures. When referring to CTX, analogues have similar backbone structures but different functional groups in specific locations.
- **Ciguatoxic**: Containing toxic levels of CTXs.
- **CTX-contaminated**: Containing levels of CTX which may or may not be considered toxic.
- **Fish sector operators**: People who work in the areas of fishing, seafood processing, and seafood retail.
- **Sentinel species**: An organism used to detect existing or emerging health hazards from the environment. Sentinel species are sensitive indicators of a chemical contaminant in the environment due to their ability to concentrate or integrate exposures within a food web or ecosystem, and they may provide early indication of potential adverse health effects and provide insight into toxic mechanisms of a given hazardous agent.
- **Surrogate**: a substitute species used to assess the quality of the environment when testing the target species is not feasible. In this case, testing of sentinel fish or water may be preferable to testing fish for consumption when determining if an area should be restricted to fishing.

IV. Recommended practices

Government-sponsored surveillance and monitoring programs

9. As knowledge improves and reliable methods become available, competent authorities should consider establishing or strengthening programs to monitor outbreaks and CTXs in algae, sentinel fish species, and fish for consumption. Overall, the function of monitoring programs is to provide information that may be used to develop warnings of the potential for CP problems and provide feedback notices to the fishing industry or consumers to warn against fishing in certain areas. It is currently impractical (i.e. costly and labour-intensive) to test fish to a sufficient degree for the complete prevention of CP, but recommendations outlined below should help to reduce the prevalence of CP.

10. Environmental monitoring may be undertaken with a two-tiered approach: initial test of *Gambierdiscus* or *Fukuyoa* algae or fish using a functional biological screening method, then confirmation of any positive results using a chemical analytical method to identify well- known toxins and determine CTX content. Local officials should determine if there are sentinel species of fish that consume toxic algae and whether monitoring those fish as well as predatory fish that feed on affected fish in the area is appropriate. A non-exhaustive list of fish known or suspected to be associated with CP is included as Annex I. This list is provided as an example to users of the Code of Practice (CoP).

11. Competent authorities should define the causative organisms of CTX in their region. Monitoring of algae in the local region can be used to positively identify blooms of *Gambierdiscus* or *Fukuyoa* and characterize their toxin content when present in sufficient quantity. Passive sampling of toxins in the water column by Solid Phase Adsorption Toxin Tracking (SPATT) devices containing lipophilic resins can be used to collect toxins from water and have the potential to serve as an early warning tool but are not used routinely for CTX monitoring. More details on analyzing benthic algae are presented in Analytical Methods section below.

12. Monitoring of both algae and fish is recommended, as the concentration and/or CTX profile of benthic dinoflagellates does not always correlate to contamination in fish; i.e. a high concentration of CTX in an algal bloom may not correlate to a high concentration of CTX in local fish, and certain species of fish may contain high concentrations of CTXs even though the density of dinoflagellates in the sea water is low. This relationship has been used by some competent authorities to set limits on size or species of fish permitted for consumption from a particular region.

13. Because toxin profiles typically differ in algae versus contaminated fish and humans (due to metabolism and behavior, for instance large migratory species that can feed in other areas), it is important to experimentally determine the correlation between environmentally sampled toxins and toxins isolated from fish and humans to enable traceback and targeted surveillance activities. It may be possible to identify the preferred substrate for dinoflagellates (e.g. seagrass and macroalgae) and if there is a selectivity or preference by herbivores for consumption of those substrates in a region.

14. Competent authorities could consider developing maps based on epidemiological data and identified prevalence of *Gambierdiscus* and *Fukuyoa* species in a region, and the associated food chains for toxin transfer in those areas. These maps may be useful to competent authorities when trying to determine if an area needs to be closed to commercial, subsistence, and recreational fishing. Maps indicating toxic fish or algae should be updated at reasonable intervals as blooms or migratory patterns may change season-to-season or with climate change, and results can be more precise as testing methods improve. Creating high-risk maps may not be appropriate for all regions, e.g. it may be difficult for countries or regions with many islands and coral reefs because high-risk areas are variable.

15. A more complex map could include information on the temporal and geographic toxin profiles of CTXs in the local area for both algae and fish. It may be possible to use information on the migratory patterns of reef fish (i.e. species of fish that migrate from an area with low *Gambierdiscus* or *Fukuyoa* density to one of high density) and the temporal swings in toxicity of the area and correlate them to possible toxin load, but this has not yet been practically demonstrated.

16. Competent authorities should consider developing and routinely updating an epidemiological database to collect information on human illnesses, which includes the species of the fish suspected of causing the illness and its original catch area if known (for countries reporting CP). Ideally, the data collected by these programs should include the origin and date of capture of contaminated fish, the fish species involved, CTX analogue profiles identified from meal remnants and patient samples, the concentration of toxins, severity of short and long-term symptoms experienced by the patient, the amount of fish consumed, the anatomical parts of the fish consumed, and other relevant information. Examples of monitoring programs that report information on CP are listed in the 2020 FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning.

17. Competent authorities could utilize social science approaches such as surveys and interviews to solicit information from local fishers about which areas yield toxic fish. Local fishers often possess knowledge about areas of CP risk, and this information represents a cost-effective way to supplement more costly surveillance of toxins in algae or seafood by analytical methods.

18. When competent authorities are notified of CP cases, it is important to first identify the species of seafood involved, locate the area and date of capture, determine the amount (weight) of fish the patient consumed, record the type and severity of symptoms, and recover any meal remnants (if available) for confirmation of CTXs. An initial risk assessment should include identification of whether the seafood was sourced locally or imported from another area. If the fish was captured locally, investigation of the concentration of CTXs in the algae, fish, and other animals in the capture area would be the next step to determine if an area should be restricted to fishing.

Other governmental activities

19. When sufficient data linking epidemiology and toxicology are available, competent authorities could consider developing maximum levels (MLs) for the concentration of CTXs permitted in susceptible fish. Because of current limitations in analytical methods and toxic equivalency factors of different CTXs, MLs may not be appropriate for all toxins or regions.

20. Examples of approaches some authorities have taken to reduce incidence of CP in their region are listed below. These approaches can be considered but may not be appropriate for all regions or all types of seafood.

- A list of banned fish species (forbidden to be imported or sold).
- A list of fish species recommended not to be eaten (but not forbidden).
- A list of banned species that can be imported only if the same species caught in the specific sea area of the exporting country are usually consumed in the exporting country, no CP has occurred, and it is tested and confirmed to be free of CTX.
- A size limit for some fish species depending on origin or previous link to CP cases.
- A positive list of species that may be sold at a regional or local market depending on place of origin and season.
- A protocol whereby listed species equal to or above a certain maximum weight must be checked at authorized points of first sale to discard CTX activity in flesh tissue.
- A positive list of certain marine fish species permitted for import.

21. If appropriate, competent authorities should develop regulations and voluntary guidelines to minimize the possibility that CTX-contaminated fish are caught or sold. Depending on the point of application, these may include requirements for food hygiene systems that include Hazard Analysis and Critical Control Point (HACCP) plans. In that case, authorities should conduct inspections to ensure that the HACCP plan contains the appropriate critical limits, monitoring procedures, and record-keeping elements, and is properly and consistently implemented.

22. If monitoring and surveillance is conducted, competent authorities should report the results of their monitoring to stakeholders and post warnings/fishing advisories in areas where fish species linked to CP may be caught.

23. When establishing regulations or other activities such as surveillance and monitoring protocols, it is recommended that authorities seek the advice of experts on CP. It may be beneficial to consult a committee with varied backgrounds and expertise to make the most informed decisions.

Analytical methods

24. Standardized protocols for testing of seafood matrices, algae, or passive water samples should be used so that results are comparable across laboratories or between regions and countries. This includes monitoring *Gambierdiscus* and *Fukuyoa* diversity (e.g. molecular approach vs. morphotaxonomy, how to approach inclusion of new species) or when collating epidemiological data. CTX sample collection and testing should be done using single or multi-laboratory validated methods to ensure comparability of results.

25. When possible, molecular techniques such as DNA barcoding should be used to determine the species of fish contaminated with CTXs (either at the time the fish is caught or as a meal remnant). Information on fish species can be used to help trace contaminated products back to their origin and to determine if follow-up CTX testing of other fish in the harvest area is necessary. Testing meal remnants for the presence of CTXs is important to link CP cases with the source of the CTXs.

26. Analytical methods with the capability to quantify toxins should be used, either methods that measure individual CTX analogues or methods that report the sum of all toxins present (i.e. cannot distinguish individual analogues). Because CTX profiles are known to vary by location or marine species, different reference materials may be needed based on the toxin profile observed and method used.

27. When possible, laboratories should consider storing aliquots of CTX-contaminated seafood or algae. These naturally contaminated samples can be used for development of reference materials or to share with other researchers performing method validations.

28. Entities with expertise in analytical methods and in developing reference materials are strongly encouraged to share knowledge and expertise and initiate collaboration with regions that are developing or improving their surveillance and monitoring activities.

29. Because analytical technologies will continue to evolve, it is not appropriate to recommend specific methods in a CoP. Detection of CTXs can be performed using a number of techniques, each with differing sensitivities, advantages, and limitations. Methods that have been reported in the literature are: the neuroblastoma assay (N2A), receptor-binding assay (RBA), enzyme-linked immunosorbent assay (ELISA), mouse bioassay (MBA), and liquid chromatography/(tandem) mass spectrometry (LC-MS or LC-MS/MS). The *FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning* contains a list of methods that were available when the report was published in 2020.

30. As mentioned in paragraph 11, environmental monitoring may be undertaken with a two-tiered approach: initial qualitative screening of seafood or algae using a functional biological method (e.g. N2Aa) followed by quantitative analysis of positive samples to determine the overall concentration of CTXs. For CTXs where the structure is known and/or reference materials are available, confirmation of positive results can be performed using a method that can identify CTX analogues and determine their individual contribution to the overall CTX concentration (e.g. LC-MS). Stakeholders are encouraged to contact their competent authorities for assistance or consult with international agencies such as the International Atomic Energy Agency (IAEA) on method development and sharing of technology.

Fish sector operators

31. Fish sector operators (people who work in the areas of fishing, seafood processing, and seafood retail) should adhere to any national or regional legislation for food hygiene systems that include HACCP plans pertaining to CTXs or CP in relevant commodity species. If not specifically required by competent authorities, firms should consider adding CP to their HACCP plans to reduce the likelihood of CTX-contaminated fish entering the marketplace. These plans could include any relevant national, regional, or local limits on size or source of fish, traceability of fish products from fishing areas to retail, training on CP hazards and regulations, and criteria for rejecting shipments.

32. When possible, HACCP plans should contain limits on the areas or time of the year where and when fish can be caught, describe how monitoring will be conducted and how frequently, establish criteria for rejection of the commodity, and utilize an organized record-keeping system.

33. HACCP plans should include a hazard analysis; for CP, that would include local awareness of the species of fish caught which may be susceptible to CTX accumulation and an understanding of the location of the potentially toxic areas for avoidance. If appropriate, restrictions on the species and/or size of fish known to accumulate CTXs could be part of the HACCP plan. HACCP plans could include a requirement that fish known to accumulate CTXs and above a size limit are tested for CTXs before sale, but such wide-scale testing could be very costly or burdensome and access to analytical facilities might be restrictive.

34. Fish sector operators should institute policies for traceability of fish and accurate identification of the species being sold, especially for fish that are intended for export, so that the processing or retail firm can confirm that the product was not caught from a restricted area or is a locally restricted species.

35. Seafood processors who purchase fish directly from fishers should obtain information about fishing locations to determine the potential for ciguatoxic fish based on knowledge of the regions where CP occurs (comparing to risk maps, see paragraph 15, from competent authorities where available). Primary seafood processors should avoid purchasing fish species associated with CP from established or emerging areas linked with CP.

36. Where MLs of CTXs in fish for consumption are established or recommended by competent authorities (see paragraph 20), fish sector operators could set critical limits on CTX concentrations in surrogates to reduce the likelihood that commercial fish are contaminated. Examples of surrogates are sentinel fish, algae, or water in a particular fishing area depending on what has been determined to be appropriate for the region (see paragraphs 13-14).

37. CTXs are known to concentrate in fish viscera, liver, heads, and roe. Therefore, it is highly recommended that these organs or body parts from fish species linked to CP are not sold or consumed. Seafood processors should have policies and procedures for handling and disposal of seafood by-products and seafood-derived products to minimize risks to public and animal health and to protect the integrity of the food and feed chain.

Data sharing and training

38. Competent authorities are encouraged to share their guidance and best practices with interested parties, including for the purposes of training of scientists in relevant methodologies, to improve the global prevention of CP and encourage harmonization of data and reporting systems.

39. Entities wishing to begin or strengthen their surveillance and monitoring programs are encouraged to contact CP experts for consultation. International agencies such as IAEA and IOC-UNESCO are promoting such work and could be contacted for assistance.

40. Competent authorities or other official institutions that have CP or CTX databases should be encouraged to share approaches on raising awareness of the risks of CP and to publish annual reports or other summaries on monitoring of illnesses to aid other regions in developing strategies for prevention and avoidance of CP.

Advice to Consumers and Healthcare Professionals

41. Competent authorities should provide advice on CP to consumers and healthcare providers. Some examples of consumer advice that have been used by competent authorities are:

- a fact sheet to consumers that contains information on the susceptible fish species, symptoms of illness, and how to preserve meal remnants for testing.
- advisory information for recreational fishers of areas where CP has been documented.
- a comic explaining the hazards for consumers.
- educational materials for patients and health professionals that includes a description of symptoms.

42. When preparing consumer advice, competent authorities should describe the signs and symptoms of CP. For example, that signs and symptoms of CP generally are acute and can appear within several hours of consuming contaminated food or up to 48 hours after consumption. CP symptoms include gastrointestinal issues (e.g. vomiting, diarrhoea), neurological issues (e.g. paraesthesia, headaches), cardiovascular issues (e.g. hypotension, bradycardia), and some symptoms that are especially characteristic of CP, such as cold allodynia and dysesthesia. CP is rarely fatal, but exposure to CTXs may prove extremely debilitating and can exacerbate the impact of pre-existing cardiovascular or neurological conditions. There is no specific treatment for CP, but some symptoms can be managed if the illness has been correctly diagnosed.

43. Consumers should be alert for advisories in regions where fish that may contain CTXs are caught, either commercially or recreationally.

44. Consumers must avoid eating fish caught from a restricted area identified by competent authorities. They should also consider limiting the portion size they consume from fish species that have been linked to CP, and avoid eating the liver, roe, head, or viscera of any CP associated species.

45. If a person suspects they have CP, they should seek medical attention and avoid eating additional portions of the suspect food. Certain beverages and food (mainly alcohol, fish, and nuts) can cause recurrent symptoms of CP in affected individuals and should be avoided for at least 6 months after experiencing CP.

46. If a food is suspected of causing CP, it is advisable to freeze any meal remnants or parts of the specific fish consumed and to contact the local food safety authority for further instruction.

47. Since CTXs may be transmitted through breastfeeding and unprotected sexual intercourse, individuals who are experiencing CP symptoms could refrain from these activities for the time being as a precautionary measure.

48. Competent authorities should advise healthcare professionals of the possibility of CP in patients, even in regions where CP is not endemic. If appropriate, authorities could offer training on how to identify CP in patients and how to notify a national or regional database of CP illnesses. Patients with symptoms of CP should be asked thoroughly about the types of fish they have consumed as well as consumption times and places.

Minimizing negative impacts of human activity

Correlations between human activity and increases in algal blooms/CP incidence have been suggested. Based on surveillance and monitoring, competent authorities could determine if changes to ecosystems are contributing to an increase in *Gambierdiscus* or *Fukuyoa* algae or CTX-contaminated fish in the area, and if steps can be taken to decrease these effects.

ANNEX I

List of marine organisms known or suspected to be associated with CP

This list was excerpted from the 2020 *FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning*, it has not been updated further. This list is not exhaustive, but rather provides examples of the variety of organisms and regions that may be associated with CP.

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Acanthurus dussumieri	Dussumier's surgeon fish (palani)	Hawaii (U.S.A.)
Acanthurus gahhm	Surgeonfish	Kiribati
Acanthurus leucopareius	Whitebar surgeonfish	French Polynesia
Acanthurus lineatus	Surgeonfish	Kiribati
Acanthurus maculiceps	Surgeonfish	Kiribati
Acanthurus nata	Surgeonfish	Kiribati
Acanthurus nigroris	Bluelined surgeon fish (maiko)	Hawaii (U.S.A.)
Acanthurus olivaceus	Orangeband surgeon fish (naenae)	Hawaii (U.S.A.)
Acanthurus striatus	Surgeonfish	Kiribati
Acanthurus xanthopterus	Yellowfin surgeon fish	Hawaii (U.S.A.), Nuku Hiva (Marquesas)
Aphareus furca	Black forktail snapper (wahanui)	Hawaii (U.S.A.)
Aprion virescens	Blue-green snapper	French Polynesia, Enewetak Island, Bikini Island
Arothron nigropunctatus	Pufferfish	Kiribati
Bodianus bilunulatus	Tarry hogfish (a'awa)	Hawaii (U.S.A.)
Bodianus rufus	Spanish hogfish	Saint Barthélemy (Caribbean Sea)
Caranx ignobilis	Giant trevally (ulua)	Enewetak Island
Caranx latus	Horse-eye jack	French West Indies, Saint Barthélemy (Caribbean Sea), Bahamas, Saint Thomas (Caribbean Sea)
Caranx lugubris	Black jack	French West Indies, Enewetak Island
Caranx melampygus	Bluefin trevally	Nuku Hiva (Marquesas), French Polynesia, Enewetak Island
Caranx papuensis	Brassy trevally	French Polynesia, Tubuai (Australes)
Caranx sp.	Trevally (ulua, papio)	Hawaii (U.S.A.)
Cephalopholis argus	Blue-spotted grouper, roi	Nuku Hiva (Marquesas), Hawaii (U.S.A.), French Polynesia, Kiribati

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Cephalopholis argus	Large grouper	Enewetak Island, Kiribati
Cephalopholis miniata	Coral cod/coral grouper	Fiji, Arafura Sea (Australia)
Chaetodon auriga	Butterflyfish	Kiribati
Chaetodon meyeri	Butterflyfish	Kiribati
Cheilinus undulatus	Humphead wrasse	French Polynesia, China, Hong Kong SAR, Enewetak Island
Chlorurus frontalis	Pacific slopehead parrotfish	French Polynesia, Tubuai (Australes)
Chlorurus microrhinos	Steephead parrotfish	French Polynesia, Tubuai (Australes)
Cnidaria sp.	Jellyfish (omnivorous)	American Samoa
Conus spp.	Cone snails	Hawaii (U.S.A.)
Coris aygula	Clown coris (wrasse)	French Polynesia, Tubuai (Australes), Enewetak Island), Kiribati
Crenimugil crenilabis	Fringelip mullet	Nuku Hiva (Marquesas), French Polynesia
Diodon hystrix	Porcupinefish	Kiribati
Diodon liturosus	Porcupinefish	Kiribati
Epinephelus coeruleopunctatus	Large grouper	Kiribati
Epinephelus coioides	Orange-spotted grouper	China, Hong Kong SAR
Epinephelus fuscoguttatus	Large grouper	Enewetak Island, Kiribati
Epinephelus hoedtii	Large grouper	Enewetak Island
Epinephelus lanceolatus	Giant grouper	China, Hong Kong SAR
Epinephelus maculatus	Large grouper	Enewetak Island
Epinephelus merra	Small grouper	Kiribati
Epinephelus microdon	Marble grouper	French Polynesia, Enewetak Island, Bikini Island
Epinephelus morio	Red grouper	Saint Barthélemy (Caribbean Sea)
Epinephelus multinotatus	Large grouper	Kiribati
Epinephelus mystacinus	Misty grouper	Saint Thomas (Caribbean Sea)
Epinephelus polyphekadion	Large grouper	Kiribati

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Epinephelus spilotoceps	Large grouper	Kiribati
Epinephelus spp.	Grouper	Canary Islands (Spain)
Epinephelus tauvina	Large grouper	Bikini Island, Kiribati
Forcipiger longirostris	Butterflyfish	Kiribati
Gymnosarda unicolor	Dogtooth tuna	Nuku Hiva (Marquesas), French Polynesia, Enewetak Island
Gymnothorax flavimarginatus	Moray eel	Kiribati
Gymnothorax funebris	Green moray eel	Saint Barthélemy (Caribbean Sea)
Gymnothorax javanicus	Moray eel	Tuamotu Archipelago and Tahiti (French Polynesia), Tarawa, Kiribati, central Pacific Ocean, Hawaii (U.S.A.), Kiribati
Hippopus hippopus	Giant clam	Vanuatu
Hipposcarus longiceps	Parrotfish	Kiribati
Holothuria spp.	Sea cucumber	Hawaii (U.S.A.)
Kyphosus cinerascens	Blue sea chub	French Polynesia, Tubuai (Australes), Nuku Hiva (Marquesas), Enewetak Island
Lethrinus miniatus	Trumpet emperor bream	French Polynesia, Enewetak Island
Lethrinus olivaceus	Longface emperor bream	Nuku Hiva (Marquesas)
Liza vaigiensis	Thinlip grey mullet	Nuku Hiva (Marquesas), Miyazaki (Japan)
Lutjanus argentimaculatus	Mangrove red snapper	China, Hong Kong SAR
Lutjanus bohar	Two-spot red snapper (red bass)	Mauritius, Minamitorishima (Marcus) Island (Japan), French Polynesia, Tubuai (Australes), Nuku Hiva (Marquesas), Hawaii (U.S.A.), French Polynesia, Enewetak Island, Bikini Island, Kiribati, India, Indonesia, Viet Nam
Lutjanus buccanella	Blackfin snapper	Saint Croix, United States Virgin Islands
Lutjanus fulvus	Snapper	Kiribati
Lutjanus gibbus	Humpback red snapper	Nuku Hiva (Marquesas), French Polynesia, Enewetak Island, Bikini Island
Lutjanus griseus	Grey snapper	French West Indies
Lutjanus kasmira	Bluestripe snapper (taape)	Hawaii (U.S.A.)

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Lutjanus monostigma	One-spot snapper	Nuku Hiva (Marquesas), Enewetak Island, Bikini Island
Lutjanus sebae	Red emperor	Mauritius (Nazareth, Saya de Malha, Soudan)
Lutjanus spp.	Snapper	Antigua, Okinawa (Japan), West Africa, Baja California (Mexico), Saint Thomas (Caribbean Sea)
Lutjanus stellatus	Star snapper	China, Hong Kong SAR
Malacanthus plumieri	Sand tilefish	Saint Barthélemy (Caribbean Sea)
Monachus schauinslandi	Hawaiian monk seal	Hawaii (U.S.A.)
Monotaxis grandoculis	Big-eye bream, emperor	French Polynesia, Enewetak Island, Kiribati
Mugil cephalus	Mullet	
Mulloidichthys auriflamma	Goldstriped goatfish	Hawaii (U.S.A.)
Mulloidichthys martinicus	Yellow goatfish	Saint Barthélemy (Caribbean Sea)
Mycteroperca bonaci	Black grouper	Key Largo, Florida (U.S.A.)
Mycteroperca fusca	Island grouper	Canary Islands (Spain)
Mycteroperca prionura	Sawtail grouper	Baja California, Mexico (Sierra-Beltran *et al*., 1997)
Mycteroperca venenosa	Yellowfin grouper	Guadeloupe and Saint Barthélemy, Caribbean Sea
Myripristis berndti	Soldier fish	Kiribati
Myripristis kuntee	Epaulette soldier fish (squirrelfish)	Hawaii (U.S.A.)
Naso brachycentron	Humpback unicorn fish	Nuku Hiva (Marquesas)
Naso brevirostris	Spotted unicorn fish	Nuku Hiva (Marquesas)
Oncorhynchus kisutch	Farmed salmon	Chile
Ophiocoma spp.	Ophiuroids (brittle stars) starfish	Hawaii (U.S.A.)
Oplegnathus punctatus	Spotted knifejaw	Miyazaki (Japan)
Pagrus pagrus	Seabream (red porgy)	Selvagens Islands
Pamatomus saltatriz	Bluefish	Canary Islands (Spain)
Panulirus penicillatus	Lobster	Kiribati

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Paracirrhites hemistictus	Hawkfish	Kiribati
Parupeneus bifasciatus	Goatfish	Kiribati
Parupeneus insularis	Twosaddle goatfish	Nuku Hiva (Marquesas)
Plectropomus areolatus	Squaretail coral grouper	China, Hong Kong SAR
Plectropomus laevis	Blacksaddled coral grouper	China, Hong Kong SAR
Plectropomus leopardus	Coral trout/leopard coral grouper	French Polynesia, Tubuai (Australes), China, Hong Kong SAR, Tahiti, French Polynesia, Enewetak Island
Plectropomus melanoleucus	Grouper	Enewetak Island
Plectropomus sp.	Coral trout	Great Barrier Reef (Australia), French West Indies
Plectropomus truncatus	Squaretail coral grouper	Enewetak Island
Pomacanthus imperator	Angelfish	Kiribati
Pomadasys maculatus	Blotched javelin grunt	Platypus Bay, Queensland (Australia)
Pterois spp.	Lionfish	Guadalupe, Caribbean Sea
Pterois volitans	Lionfish	Virgin Islands
Sargocentron spiniferum	Sabre squirrelfish	Nuku Hiva (Marquesas)
Sargocentron tiere	Squirrelfish	Kiribati
Scarus altipinnis	Filament-finned parrotfish	French Polynesia, Tubuai (Australes)
Scarus ghobban	Parrotfish	Kiribati, French Polynesia, Tubuai (Australes)
Scarus gibbus	Heavy beak parrotfish	French Polynesia, Tahiti, French Polynesia, Enewetak Island
Scarus rubroviolaceus	Ember parrotfish	Nuku Hiva (Marquesas)
Scarus russelii	Parrotfish	Kiribati
Scomberomorus cavalla	King mackerel “Coronado” (king fish)	Florida (U.S.A.), Saint Barthélemy (Caribbean Sea), Guadeloupe
Scomberomorus commerson	Spanish mackerel	Hervey Bay, Queensland (Australia)
Seriola dumerili	Greater amberjack/Kahala	Canary Islands (Spain), Madeira Archipelago, Hawaii (U.S.A.), Haiti, Saint Barthélemy (Caribbean Sea), Saint Thomas (Caribbean Sea)
Seriola fasciata	Lesser amberjack	Selvagens Islands (Madeira Archipelago), West Africa (Canary Islands)

SCIENTIFIC NAME	COMMON NAME	LOCATION WHERE FOUND
Seriola rivoliana	Almaco jack/Kahala	Canary Islands (Spain), Hawaii (U.S.A.), Saint Thomas (Caribbean Sea)
Siganus argenteus	Rabbitfish	Kiribati
Siganus rivulatus	Marbled spinefoot rabbitfish	Eastern Mediterranean
Sphyraena barracuda	Great barracuda	Bahamas, Cameroon), Florida Keys (U.S.A.), French West Indies, Saint Barthélemy (Caribbean Sea), Guadeloupe, French Polynesia, Enewetak Island
Sphyraena jello	Pickhandle barracuda	Hervey Bay, Queensland (Australia)
Sphyraena spp.	Barracuda	California (U.S.A.)
Tectus niloticus	Gastropod	French Polynesia
Tridacna maxima	Giant clam	New Caledonia, French Polynesia
Variola albimarginata	Lyretail	China, Hong Kong SAR
Variola louti	Large grouper	Enewetak Island, Kiribati
Zancius cornutus	Moorish idol	Kiribati

APPENDIX VI

INFORMATION DOCUMENT ON RESOURCES FOR CIGUATERA POISONING MONITORING AND TRAINING

(For publication on the Codex website)

In addition to the guidance provided in the Code of Practice for The Prevention Or Reduction Of Ciguatera Poisoning, the following lists provide examples of monitoring programs that report information on ciguatera poisoning (CP) for competent authorities considering developing or updating databases to monitor CP (Section I) and examples of training and guidance resources for entities wishing to begin or strengthen their surveillance and monitoring programs (Section II). Information on these topics can also be found in the 2020 *FAO/WHO Report on the Expert Meeting on Ciguatera Poisoning.*

I. Examples of monitoring programs that report information on CP

- Ciguawatch Initiative (https://ciguawatch.ilm.pf/)
- EuroCigua project II (https://www.sanidad.gob.es/en/areas/sanidadExterior/euroCiguaII/home.htm)
- EU/Rapid Alert System for Food and Feed: (https://food.ec.europa.eu/safety/rasff-food-and-feed-safety-alerts)
- Government of Canary Islands Control and quality of fishing products
- Institut Louis Malardé: ILM (www.ilm.pf, www.ciguatera.pf)
- UNESCO-IOC: HAEDAT (https://ipt.iobis.org/hab/resource?r=haedat)
- U.S. FDA: How to Report Seafood-Related Toxin and Scombrotoxin Fish Poisoning Illnesses (https://www.fda.gov/food/outbreaks-foodborne-illness/how-report-seafood-related-toxin-and-scombrotoxin-fish-poisoning-illnesses)

II. Examples of training and guidance resources

- U.S. FDA: Fish and Fishery Products Hazards and Controls (www.fda.gov/food/seafood-guidance-documents-regulatory-information/fish-and-fishery-products-hazards-and-controls)
- Ciguawatch Initiative (https://ciguawatch.ilm.pf)
- IOC-UNESCO HAB Programme (https://hab.ioc-unesco.org/ciguatera/)
- Australia: Sydney Fish Market Seafood Handling Guidelines (https://www.sydneyfishmarket.com.au/Seafood-Trading/Quality/Food-Safety)

APPENDIX VII

MAXIMUM LEVELS FOR LEAD AND CADMIUM IN QUINOA

(For adoption)

CADMIUM

Commodity/ Product name	Maximum level (ML) mg/kg	Portion of the commodity/ Product to which the ML applies	Notes/Remarks
Quinoa	0.15	Whole commodity	The relevant Codex commodity standard is CXS 333-2019.

LEAD

Commodity/ Product name	Maximum level (ML) mg/kg	Portion of the commodity/ Product to which the ML applies	Notes/Remarks
Quinoa	0.2	Whole commodity	The relevant Codex commodity standard is CXS 333-2019.

APPENDIX VIII

PROPOSAL FOR A NEW WORK ON THE REVISION OF THE
CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF AFLATOXIN CONTAMINATION IN PEANUTS
(CXC 55-2004)
PROJECT DOCUMENT
(For approval)

1) Purpose and scope of the project

The purpose and scope of the proposed new work is to revise the *Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts* (CXC 55-2004) to reflect new information available to prevent and reduce aflatoxin contamination in peanuts.

2) Relevance and timeliness

The 16th Session of the Codex Committee on Contaminants in Foods (CCCF16, 2023) identified this code of practice (CoP) for revision as part of an overall work on the review of Codex standards for contaminants. There is already a maximum level (ML) of 15 µg/kg for peanuts for further processing adopted by the Codex Alimentarius Commission (CAC) and a proposed ML for ready-to-eat (RTE) peanuts under consideration by CCCF. Aflatoxins were last evaluated by the 83rd Meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA83, 2017). JECFA83 reaffirmed the conclusions of JECFA49 (1997) that aflatoxins are genotoxic human liver carcinogens. Given the health concerns associated with aflatoxin, the new work aims to continue to reduce exposures by updating the existing CoP.

3) Main aspects to be covered

The work will address risk management measures to prevent or reduce aflatoxin contamination in peanuts, supported by scientific data, that have become available since adoption of the code of practice (CoP) which are proven to be effective and are widely applied across regions. It will also address information to contextualize aflatoxin formation in peanuts such as the identification of aflatoxigenic species and the stages of peanut reproductive growth.

4) Assessment against the criteria for establishment of work priorities

(a) Consumer protection from the point of view of health and fraudulent practices.
A revised CoP that includes measures proven to prevent and reduce aflatoxin production would result in a reduction in aflatoxins exposure from peanuts.

(b) Diversification of national legislations and apparent resultant or potential impediments to international trade.
A revised CoP is needed to ensure that the most updated information on recommended practices to prevent and reduce aflatoxin exposure from peanuts is available to all member countries. It will also provide the means to enable exporters to reduce aflatoxins levels and to assist in compliance with the current ML of 15 µg/kg for peanuts for further processing and a proposed ML for RTE peanuts under consideration by CCCF.

(c) Scope of work and establishment of priorities between the various sections of the work.
The revision of the CoP should prioritize the inclusion of relevant and efficient practices to prevent and reduce aflatoxin contamination in peanuts that are effectively and worldwide applicable.

(d) Work already undertaken by other international organizations in this field.
JECFA assessments.

5) Relevance to Codex Strategic Goals

(a) Goal 1 Address current, emerging and critical issues in a timely manner.
The proposed new work will support competent authorities and food business operators to implement practical interventions that can be used to reduce risk of aflatoxins in peanuts.

(b) Goal 2 Develop standards based on science and Codex risk-analysis principles.
Additional guidance by Codex might assist countries in reviewing their legislation to reduce the risk of aflatoxins and support fair practice in international peanuts trade.

(c) Goal 3 Increase impact through the recognition and use of Codex standards.
A revised CoP containing updated risk management practices to prevent and reduce aflatoxin contamination in peanuts will facilitate compliance with Codex MLs for aflatoxins in peanuts.

(d) Goal 4 Facilitate the participation of all Codex Members throughout the standard setting process.
Peanuts are an important commodity in international trade and there are new measures that have been identified that contribute to the reduction and prevention of aflatoxins in peanuts.

(e) Goal 5 Enhance work management systems and practices that support the efficient and effective achievement of all strategic plan goals.

This work will help developing and maintaining efficient and effective work management practices and systems to prevent or reduce aflatoxin contamination in peanuts to achieve the Codex goals of ensuring public health protection and trade facilitation.

6) Information on the relationship between the proposal and other existing Codex documents

The CoP is important to support the implementation of MLs for aflatoxins contamination in peanuts (see points 1 and 4b).

7) Identification of any requirement for any availability of expert scientific advice

JECFA83 has already provided needed expert scientific advice.

8) Identification of any need for technical input to the standard from external bodies

Currently, there is no identified need for additional technical input from external bodies, as there is information available published by ICMSF (International Commission on Microbiological Specifications for Foods) (2018) as well as other publicly available literature that can support the inclusion/revision of the CoP to include new management measures that were proven to be effective in reducing or preventing aflatoxin contamination in peanuts.

9) Timeline for completion of the new work

Work will start following approval by CAC in 2024. Completion of work is expected by 2027 or earlier.

APPENDIX IX

PROPOSAL FOR NEW WORK ON A CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF CADMIUM CONTAMINATION IN FOODS

PROJECT DOCUMENT

(For approval)

1. Purpose and scope of the project

The purpose of the proposed new work is to develop a code of practice (CoP) to prevent or reduce cadmium contamination in foods. The scope of the work encompasses measures to prevent and reduce cadmium contamination during agricultural and aquacultural production and food processing, preparation, packaging, and transport.

2. Relevance and timeliness

The 73rd Meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA73, 2011) conducted a re-evaluation of cadmium and established a provisional tolerable monthly intake (PTMI) of 25 µg/kg bw, reflecting the long half-life of cadmium in humans. Dietary exposure estimates indicated that cereals and cereal products, vegetables, seafood, and meat, including offal, were the major contributors to cadmium dietary exposure.

JECFA77 (2013) assessed dietary exposure to cadmium from cocoa and cocoa products following a request arising from the 6th Session of the Codex Committee on Contaminants in Foods (CCCF6, 2012). JECFA estimated total dietary cadmium exposure as 30-69% of the PTMI for adults and 96% for children aged 0.5-12 years. JECFA noted that these percentages were likely overestimates of total dietary cadmium exposure, as the estimates from the whole diet also included the contribution from cocoa and cocoa products.

JECFA91 (2021) conducted a new exposure assessment that included the contribution of cadmium from all food sources, in particular cocoa products. This assessment was based on more comprehensive occurrence data, including a wider geographical range of occurrence data in cocoa products. JECFA concluded that the major contributors to dietary cadmium exposure were cereals and cereal products, vegetables, and seafood, while the contribution of cocoa products to dietary cadmium exposure was minor (0.1-9.4%).

Between 2018 and 2022, CCCF adopted maximum levels (MLs) for cadmium in chocolate containing or declaring < 30%, ≥ 30% to < 50%, ≥ 50% to < 70%, and ≥ 70% total cocoa solids, and 100% cocoa powder, as well as the *Code of Practice for the Prevention and Reduction of Cadmium Contamination in Cocoa Beans* (CXC 81-2022).

The new work aims to reduce exposures that may cause exceedance of the PTMI, through the development and implementation of a CoP that covers cadmium contamination in a range of foods in addition to cocoa beans.

Comments in response to a circular letter on the review of Codex standards for contaminants issued in 2022 (CL 2022/85-CF) suggested that a CoP should be considered prior to review/revision of current cadmium MLs as provided in a conference room document submitted to CCCF16 (2023) (CF16/CRD02).

3. Main aspects to be covered

This work will address practical measures, supported by scientific data, that prevent or reduce cadmium contamination.

Measures to be addressed may include agricultural techniques (e.g. fertilization, irrigation), source-directed measures (reduction of cadmium in agricultural soil and water), and food processing modifications (e.g. use of filtration aids in juices and washing techniques for seaweed). This work will also address consumer advice.

4. Assessment against the criteria for the establishment of work priorities

a) Consumer protection from the point of view of health and fraudulent practices.

To protect consumers' health, exposures to cadmium should be reduced through best practices. A CoP to reduce cadmium will identify measures that can be taken to reduce exposures.

b) Diversification of national legislations and apparent resultant or potential impediments to international trade.

Development of a CoP is needed to ensure that information on recommended practices for preventing and reducing cadmium exposures is available to all member countries. It also will provide the means to enable exporters to ensure reduced cadmium levels and to assist in compliance with any current Codex MLs and those that may be established in the future.

c) Scope of work and establishment of priorities between the various sections of the work.

The CoP will provide measures to reduce cadmium in food, as it will address all aspects of food production from agricultural/aquacultural production to processing to packaging and transport and consumption.

d) Work already undertaken by other international organizations in this field.

Health-based guidance that address cadmium exposures have been developed for workplaces, for drinking water (e.g. WHO), and for ambient air quality (e.g. WHO). Country-specific guidances are also available.

5. Relevance to Codex Strategic Goals

Goal 1: Address current, emerging, and critical issues in a timely manner.

Establishing a CoP for the prevention and reduction of cadmium contamination in foods will address the current need for guidance to ensure the health protection of consumers.

Goal 2: Develop standards based on science and Codex risk-analysis principles. This work will apply risk analysis principles in the development of a CoP by using scientific data and results from JECFA assessments to support the reduction of cadmium in foods.

Goal 3: Increase impact through the recognition and use of Codex standards. The proposed CoP ensures that information on recommended practices to prevent and reduce cadmium consists of current best practices and are available to all member countries.

Goal 4: Facilitate the participation of all Codex Members throughout the standard process. Developing a CoP through the Codex step process will make information on recommended practices to prevent and reduce cadmium available to all Codex members.

Goal 5: Enhance the work management systems and practices that support the efficient and effective achievement of all strategic plan goals. A CoP will help ensure development and implementation of effective and efficient work management systems and practices by providing basic guidance for countries and producers.

6. Information on the relationship between the proposal and other existing Codex documents. In 2022, Codex adopted the *Code of Practice for the Prevention and Reduction of Cadmium Contamination in Cocoa Beans* (CXC 81-2022). This CoP is specific to cocoa beans and does not provide information about other crops. In addition, the *Code of Practice Concerning Source Directed Measures to Reduce Contamination of Food with Chemicals* (CXC 49-2001) includes measures relating to cadmium.

Cadmium MLs have been established for a variety of foods in the *General Standard for Contaminants in Food and Feed* (CXS 193-1995) (e.g. chocolate and cocoa products, vegetables, grains, seafood, salt) without a CoP being available.

7. Identification of any requirement for any availability of expert scientific advice

JECFA has already provided needed expert scientific advice (e.g. JECFA73, JECFA77, JECFA91).

8. Identification of any need for technical input to the standard from external bodies

Currently, there is no identified need for additional technical input from external bodies.

9. Timeline for completion of the new work

Work will commence following recommendation by CCCF and approval by the Codex Alimentarius Commission in 2024. Completion of work is expected by 2027.

APPENDIX X

PRIORITY LIST OF CONTAMINANTS FOR EVALUATION BY JECFA

SECTION A: PRIORITY LIST OF CONTAMINANTS FOR EVALUATION BY JECFA

Contaminants	Background and question(s) to be answered	Data availability (when, what)	Proposed by
Dioxins and dioxin-like PCBs	Full evaluation (toxicological assessment and exposure assessment) to update 2001 JECFA assessment and incorporate data on developmental effects from in utero exposures.	EFSA: Assessment available September 2018; occurrence data WHO: Expert consultation to develop TEFs held in October 2022; publication in 2024 (https://www.sciencedirect.com/science/article/pii/S0273230023001939) Brazil: Occurrence data on milk, raw eggs, fish, and fat (poultry and mammals) Canada: Occurrence data on foods of animal origin USA: FDA occurrence data from previous 10 years for milk, eggs, meat, and seafood and TDS data from 2018-2022 for dairy products, eggs, meat, poultry, seafood, and other foods. USDA occurrence data from 2012-2013 and 2018-2019 for meat, poultry, and Siluriformes fish. Singapore: TDS data New Zealand: occurrence data	Canada
Arsenic (inorganic and organic)	Inorganic: 2011 JECFA evaluation based on cancer effects. This evaluation would focus on non-cancer effects (neurodevelopmental, immunological and cardiovascular) and could inform future risk management needs. NOTE: Needs to be put in context to cancer risk assessment. Organic: (exploratory)	Australia/New Zealand: TDS; inorganic and organic arsenic occurrence data Brazil: Occurrence data on total arsenic in rice, poultry, pork, fish, and cattle meat, inorganic arsenic occurrence data in rice and fish. Canada: Occurrence data on inorganic and total arsenic in a variety of commercial foods. Chile: Occurrence data on inorganic and total arsenic in algae, crustaceans, gastropods, bivalve molluscs and small fish. EU: Inorganic and organic arsenic occurrence data India: Occurrence data in rice Japan and China: Occurrence data on rice and rice products New Zealand: Inorganic arsenic occurrence data in seafood Türkiye: Occurrence data in rice USA: FDA occurrence data from various foods for past 10 years. USDA occurrence data from 2017-2022 in meat, poultry, and Siluriformes fish. 2016 risk assessment. USA: Studies: • Neurodevelopmental studies of inorganic arsenic impacts on rat behaviour (2019, 2022) • Toxicokinetic studies on metabolism and disposition of inorganic and organic arsenic and metabolites in mice (various life stages) (2018-20)	USA

Contaminants	Background and question(s) to be answered	Data availability (when, what)	Proposed by
		• Developmental toxicity test in *C. elegans* on inorganic arsenic (2018) and ongoing study on organic arsenic. • Non-governmental report, Effects of Inorganic Arsenic in Infant Rice Cereal on Children's Neurodevelopment (2017) Singapore: TDS data on inorganic and total arsenic	
Scopoletin	Full evaluation (toxicological assessment and exposure assessment) in fermented noni juice	CCNASWP16 has finalised the standard for fermented noni fruit juice and requested CCCF to keep scopoletin in the priority list and provide data as it becomes available . CCNASWP15 agreed to request CCCF to retain scopoletin on the priority list and to call upon Codex members to generate and submit data to support the conduct of the safety evaluation by JECFA. CCNASWP15 also requested FAO and WHO to organize a new call for data for the safety evaluation of scopoletin. FAO reminded that a full dataset including exposure and toxicity is required. A consultant was hired by the Codex Secretariat to undertake a toxicological review of scopoletin as presented in the Annex to CX/CF 21/14/2-Add.1.	CCNASWP
Thallium	Full evaluation (toxicological assessment and exposure assessment)	EU: Two EFSA assessments, occurrence data New Zealand: TDS data USA: Occurrence data on brassica-containing foods, in baby foods, and in TDS results. U.S. National Toxicology Program is conducting studies on thallium (I) sulphate. Canada: TDS data	United States
Perfluoroalkyl substances (e.g. PFOS, PFOA, PFNA, PFHxS)	Full evaluation (toxicological assessment and exposure assessment)	EU: Occurrence data Japan: Occurrence data; summary of risk assessment report expected in 2024. Singapore: Occurrence data USA: Occurrence data from FDA TDS and targeted surveys (seafood, bottled water, and milk). Occurrence data in meat and poultry from the USDA National Residue Program. Toxicology/risk assessments from US Agency for Toxic Substances Disease Registry and Environmental Protection Agency. Canada: TDS data for dairy, fish, meat, fruits, vegetables, and prepared foods and targeted survey data in flour, cereal, popcorn, and root vegetables China: TDS data New Zealand: Occurrence data	Singapore
Ethylene oxide (EtO) and 2-chloroethanol	Full evaluation (toxicological assessment and exposure assessment)	Indonesia: data availability will be confirmed at CCCF18 (2025)	Indonesia

SECTION B: OTHER MATTERS FOR ACTION BY JECFA SECRETARIAT

Contaminant	Background and question(s) to be answered	Data call/Data review
Dioxins and dioxin-like PCBs	CCCF9 requested that JECFA conduct a full evaluation (toxicological assessment and exposure assessment) to update the 2001 JECFA assessment and incorporate data on developmental effects from *in utero* exposures.	Ongoing data call by JECFA Secretariat. Deadline for data submission is 1 December 2024.
Arsenic (inorganic and organic)	CCCF9 requested that JECFA conduct a full evaluation (toxicological assessment and exposure assessment), building on JECFA72, and focusing on non-cancer effects (neurodevelopmental, immunological, and cardiovascular).	Ongoing data call by JECFA Secretariat. Deadline for data submission is 1 December 2024.
Lead	CCCF17 requested that JECFA issue a call for data to support continued work on development of MLs for spices, dried bark, and dried culinary herbs.	JECFA Secretariat will issue call for data for CCCF18 including a note not to submit data that could be related to economic adulteration and for dried culinary herbs
Lead	CCCF17 requested that JECFA evaluate existing data on spice mixtures.	JECFA will issue a call for data on spice mixtures and conduct an analysis of available data in GEMS/Food on spice mixtures for CCCF18.
Tropane alkaloids	CCCF17 requested that JECFA issue a call for data to support development of the discussion paper on a Code of Practice.	JECFA Secretariat will issue a call for data on tropane alkaloids occurrence in food and feed at different production stages for CCCF18.
Total aflatoxins	CCCF17 requested that JECFA issue a call for data to support development of an ML for ready to eat peanuts.	JECFA Secretariat will issue a call for data on total aflatoxins occurrence in peanuts for CCCF18 according to the terms of reference in the report of CCCF17; in particular, in the call it will be asked that the submitter specify whether the data for “raw” peanuts refers to “ready to eat “or for “further processing”. The GEMS/Food Administrator will seek clarification from previous submitters on whether peanut data of unknown classification can be classified as ready to eat or for further processing.
Total aflatoxins	CCCF17 requested that JECFA issue a call for data to support review of the MLs for cereal products.	JECFA Secretariat will issue a call for data on total aflatoxins occurrence in cereal products and prepare an overview to facilitate a decision on a possible review of the MLs at CCCF18. The call is targeted to new data collected after the adoption of the MLs (CCCF15).