CODEX ALIMENTARIUS COMMISSION

Food and Agriculture Organization of the United Nations

World Health Organization

E

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

CAC/48 INF/2

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION

Forty-eighth Session

FAO headquarters Rome, Italy

10–14 November 2025

FAO/WHO SCIENTIFIC SUPPORT TO CODEX: REPORT ON ACTIVITIES, BUDGETARY AND FINANCIAL MATTERS

(Prepared by FAO and WHO)

PART I: RECENT FAO/WHO EXPERT MEETINGS AND OTHER RELEVANT INFORMATION

1. **The delivery of scientific advice continues at an accelerated level**. FAO and WHO have continued to develop the requested scientific advice. This strong activity has been made possible through the contributions of Australia, Canada, the European Union, France, Japan, and the United States of America (USA), which have been greatly appreciated. In addition, **these activities are the result of the high priority FAO and WHO assigns to the scientific advice programme,** realizing the importance of a strong scientific foundation for all Codex standards. The CAC remains the primary beneficiary of the joint FAO/WHO scientific advice programme, as the results are used extensively in the development of Codex texts and standards. However, also other UN agencies (for example, the World Food Programme) are requesting scientific advice from FAO/WHO. Furthermore, the outputs of this joint programme are also used by member countries of FAO and WHO, to strengthen the science-based decision making on food safety and nutrition issues at national and regional levels. The following summarises the scientific advice provided in the September 2024- August 2025 period since FAO and WHO's previous report to the Commission (CAC47 INF/2).

Joint FAO/WHO Expert Committee on Food Additives (JECFA)

2. **Joint FAO/WHO Expert Committee on Food Additives (JECFA). The 100th Meeting of food additives, 10 – 19 June 2025, Rome, Italy.** This meeting was held in the framework of the on-going programme on the risk assessment of food additives. The Committee undertook the toxicological evaluations, dietary exposure assessments, reviewed and prepared specifications for eight food additives, adipates, ascorbyl palmitate, carob bean gum, dioctyl sodium sulfosuccinate, gardenia blue, glycolipids, rosemary extract and thaumatin II. The Committee also revised the safety of one food procession aid, amyloglucosidase (JECFA95-4) from *Rasamsonia emersonii* expressed in *Aspergillus niger* and revised the specifications of one food additive and six processing aids. The Summary Report of the meeting is now available on both the FAO[1] and WHO[2] websites. The full Meeting Report and the Monographs will be published on the same FAO and WHO websites in due course.

Joint FAO/WHO Meeting on Pesticide Residues (JMPR)

3. **Joint FAO/WHO Meeting on Pesticide Residues (JMPR) 17–26 September 2024, Rome, Italy and the virtual session on 9 October 2024**. This meeting was held in the framework of the on-going programme on the risk assessment of residues of pesticide in foods. The Meeting evaluated 37 pesticides, including 7 new compounds and 7 compounds that were re-evaluated within the periodic review programme of the CCPR, for toxicity or residues, or both. In addition, the meeting responded to 4 concern forms, considered a number of current issues related to the risk assessment of chemicals, the evaluation of pesticide residues and the

[1] https://www.fao.org/food-safety/scientific-advice/jecfa/en/
[2] https://www.who.int/groups/joint-fao-who-expert-committee-on-food-additives-(jecfa)

procedures used to recommend maximum residue levels. These considerations and further details of the individual evaluations can be found in the report[3].

Joint FAO/WHO Expert Meeting on Microbiological Risk Assessment (JEMRA)

4. Reports for *Listeria monocytogenes* in foods: Part 1[4],viruses in foods - Part 1[5], Measures for the control of *Campylobacter* spp. in chicken meat[6] were published. Reports of meetings on Prevention and Interventions of viruses in foods (Part 2) and Risk Assessment models for *Listeria monocytogenes* in foods (Part 2) are expected to be available by fall 2025. A hybrid meeting to discuss simple and user-friendly tools for viral risk assessment was held on 26 July 2025 to deal with the request from the CCFH53.

Other activities

Ad hoc Joint FAO/WHO Expert Consultation on Risk Assessment of Food Allergens

5. FAO and WHO have convened a series of expert meetings on food allergen risk assessment since 2020, addressing priority allergens, threshold levels, precautionary labelling, exemptions, and thresholds, and published four brief brochures summarizing the outcomes. At the CCFH 54, the results were presented to improve knowledge sharing and align with the relevant Codex documents.

In June 2025, an expert consultation in Rome emphasized that food allergens are a unique category of food safety hazards, requiring distinct risk assessment and management approaches. A framework[7] was developed to guide evidence-based decision-making on labelling, process control, and risk communication throughout the supply chain. This process is applicable to all food business operators, regardless of size, and is essential for justifying precautionary allergen labelling (PAL).

Another consultation will be held in November 2025 to establish reference doses for cereals containing gluten and discuss methods for gluten detection, appropriate cleaning procedures, and minimum performance criteria for analytical testing, focusing on reducing risk to consumers with coeliac disease.

Ad hoc FAO/WHO Expert Meeting: Water quality in agrifood systems and food safety

6. The Ad hoc FAO/WHO Expert Meeting on water quality in agrifood systems and food safety implications – focus on chemical contaminants, was organized jointly FAO and WHO and took place from 20–23 May 2025 at FAO headquarters in Rome. The summary report of the meeting has been published on the FAO[8] (in June 2025) and WHO[9] websites. The full report, including the deliberations at the meeting, will be published later in 2025. The main objective of the meeting was to facilitate the finalization of the document Prioritizing food safety issues related to chemical water quality in agrifood systems.

Ad hoc Joint FAO/WHO work on risks and benefits of fish consumption

7. Recent years have brought new evidence on the risks and benefits of fish consumption since the 2010 FAO/WHO report. [10] In October 2023, a second Joint FAO/WHO Expert Consultation reviewed health benefits and toxic effects linked to fish, including dioxins, dl-PCBs, and Methylmercury with Selenium [11]. The consultation established a framework to guide the Codex Alimentarius Commission and provided recommendations for members to better manage risks and benefits, as detailed in the meeting report online[12].

Joint IAEA/FAO/WHO meetings to review Human Energy Requirements

8. Twenty years on since the publication of the Joint FAO/WHO/UNU Expert Consultation Report on Human Energy Requirements in 2004, FAO and the International Atomic Energy Agency (IAEA) are in the process of updating human energy requirements for global use. The update will draw on the growing body of literature from population groups around the world and the wealth of energy expenditure data from different age groups now available in the IAEA Doubly Labelled Water (DLW) Database. The update of energy requirements will utilize this state-of-the art data to derive new energy requirement prediction equations for various age and sex groups. Two recent consultancy meetings held in 2024 and 2025 brought together leading experts to assess

[3] https://openknowledge.fao.org/handle/20.500.14283/CD5918EN
[4] https://doi.org/10.4060/cd3383en
[5] https://doi.org/10.4060/cd3396en
[6] https://doi.org/10.4060/cc9607en
[7] https://openknowledge.fao.org/handle/20.500.14283/cd6046en and https://www.who.int/publications/m/item/ad-hoc-joint-fao-who-expert-consultation-on-risk-assessment-of-food-allergens-guidance-for-risk-assessment
[8] https://openknowledge.fao.org/items/7f015be1-d3a0-4018-b234-f68fe7000e35
[9] https://www.who.int/news-room/events/detail/2025/05/20/default-calendar/ad-hoc-fao-who-expert-meeting-on-water-quality-in-agrifood-systems-and-food-safety-implications-focus-on-chemical-contaminants/
[10] https://openknowledge.fao.org/handle/20.500.14283/ba0136e
[11] https://doi.org/10.4060/cd1548en
[12] https://doi.org/10.4060/cd2394en

the current state of scientific evidence to underpin an update of energy requirements using DLW data and potential implications for a variety of user groups. The experts also addressed the data gaps, especially under-represented population groups and environmental contexts that might modulate energy expenditures and agreed to move forward to update the existing human energy requirements.

FAO/WHO updating of nutrient requirements for infants and young children aged from birth through 3 years of age

9. FAO and WHO have conducted the updating of nutrient intake values for infants and young children from birth through 3 years of age which include requirements (e.g. average nutrient requirement [ANR], adequate intake [AI], individual nutrient level [INL_x]) and safe upper levels of intake (ULs). Using data obtained from preparatory work done by WHO, FAO and WHO identified calcium, vitamin D and zinc as the first three priority nutrients to be updated.

The work of updating the FAO/WHO nutrient requirements for calcium, vitamin D and zinc for children 0-3 years of age has been completed. Nine virtual expert meetings were held, and more than 15 systematic reviews and reports were generated, many of which have been published in peer-reviewed journals. Guidance documents are currently being drafted and should be ready for release in Q4 2025.

FAO's publications on microbiological risk assessment

10. Three scientific papers were published in the peer reviewed literature in support of the JEMRA-related work: *Salmonella* spp. in poultry production—A review of the role of interventions along the production continuum[13] A recipe for safer food: The theory of change underpinning risk analysis in the context of the Codex Alimentarius[14] and Predicting and preventing the next viral disease transmitted through food[15].

FAO expert meeting on microbiological risk assessment of protozoan parasites in foods

11. An FAO expert meeting on microbiological risk assessment of protozoan parasites in foods was convened in Rome, Italy from 26-30 May 2025. The expert committee reviewed recent scientific developments, data, and evidence associated with foodborne protozoan parasites, specifically including information on the disease burden, attribution to food commodities of highest public health concern, analytical methods in food commodities and control measures. The protozoan parasites identified as most important for foodborne risk (listed alphabetically) include *Cryptosporidium* spp., *Cyclospora cayetanensis*, *Entamoeba histolytica*, *Giardia duodenalis* (syn. lamblia and intestinalis), *Toxoplasma gondii*, and *Trypanosoma cruzi*[16].

FAO expert meeting on microbiological risk assessment of toxigenic clostridia in foodborne disease

12. The expert meeting was convened in Rome, Italy from 17-21 February 2025. The Expert Committee reviewed recent scientific developments, data, and evidence associated with foodborne toxigenic clostridia, specifically including an up-to-date review of the disease burden, attribution to food commodities of highest public health concern, analytical methods in food commodities and control measures. *Clostridium perfringens* typically causes relatively mild, self-limiting, gastroenteritis and ranks as one of the most frequent causes of foodborne illnesses in many countries. *Clostridiodes difficile* causes antimicrobial-associated diarrhoea and colitis. Recent data support a role for food in the epidemiology of *C. difficile* infections[17].

FAO work on the state of research on the interactions between food additives, the gut microbiome and the host

13. FAO has conducted a scientific literature review[18] to assess how certain food additives may affect the gut microbiome and, in turn, human health. The review aimed to gather and assess the quantity, quality, and reliability of current evidence, mapping research limitations and knowledge gaps, and exploring how microbiome data might be used to enhance chemical food safety risk assessments. The review concludes with a set of recommendations to guide and improve the integration of microbiome science into risk assessment frameworks. This work completes the reviews on the impact of veterinary drugs residues, pesticides residues and microplastics on gut microbiome and human health[19] and the conclusions of the FAO Technical Meeting on the Gut Microbiome in Food Safety Chemical Risk Assessment[20].

[13] https://doi.org/10.1016/bs.afnr.2023.11.001
[14] https://doi.org/10.1016/j.mran.2024.100313
[15] https://doi.org/10.1016/j.fm.2025.104782
[16] https://openknowledge.fao.org/handle/20.500.14283/cd5773en
[17] https://openknowledge.fao.org/handle/20.500.14283/cd6046en
[18] https://www.fao.org/food-safety/news/news-details/en/c/1738254/
[19] https://www.fao.org/food-safety/news/news-details/en/c/1638888/
[20] https://www.fao.org/food-safety/news/news-details/en/c/1707828/

Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture' activities relevant to Food Safety and Control

14. From 24–25 June and in collaboration with over 75 countries and 10 international organizations, the Joint FAO/IAEA Centre successfully concluded a 36-hour emergency exercise that tested global readiness and response to a severe nuclear emergency. This involved close liaison with colleagues at the International Atomic Energy Agency, sister Division's in FAO and in WHO. This ConvEx-3 exercise simulated a significant release of radioactive material at Romania's Cernavodă Nuclear Power Plant. Level-3 exercises are the highest and most complex and take place every three to five years to test and rehearse emergency preparedness, response and activities related to the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

The Joint FAO/IAEA Centre supports food safety and control by developing methods for detecting contaminants, residues, and food authenticity, including new analytical techniques for irradiated food. In late 2025, two research projects will launch: "Rapid Screening for Safe Food" and "Seafood Origin and Authenticity Using Nuclear and Related Techniques." Outputs will include analytical data, protocols, and databases.

Laboratory initiatives have advanced contaminant testing in foods using advanced techniques like mass spectrometry and infrared microscopy. Food authentication methods, such as stable isotope analysis and spectroscopy, help distinguish product origins and detect adulteration.

AI and machine learning are being explored to improve food fraud detection, notably using Microsoft Azure AI for rice origin prediction. The Centre also contributes to an FAO publication on fish fraud and its detection methods.

14th International Food Data Conference

15. The 14th International Food Data Conference (IFDC) was hosted by FAO from 1 to 3 September 2025. The IFDC serves as a platform for sharing innovations in data generation, analytical methods, and database management. It fosters collaboration among scientists, analysts, and data users to enhance the development and uses of food composition data. The 2025 conference theme, "Food composition databases: application for healthy diets and sustainable agrifood systems transformation", emphasizes the critical role of food composition data in fostering global health and sustainability.

Joint FAO-IAEA Protein Quality Database

16. Defining accurately the amount and quality required to meet human nutritional needs and describing appropriately the protein supplied by foods and diets is critical in meeting global nutrition targets. Scientific advice on protein quality evaluation is also relevant for the development of Codex Alimentarius food standards and guidelines. Standardized protein quality of foods data in humans has a potential to inform dialogue on recommendations for protein requirements for all age groups, especially in first 3 years of life. Two recent expert consultations held in 2022[21] and 2024[22] agreed on the development of a Joint FAO/IAEA database on ileal digestibility of protein and individual amino acids in foods consumed by humans. Data are being compiled through a systematic review process focusing on in-vivo data completion, aiming to publish the database in early 2026. The Database has been presented in key scientific events including at the 14th International Food Data Conference in September 2025.

Ad hoc FAO work on the Nutritional Composition of Foods and Beverages made from Plant-based and other Alternative Protein Sources

17. Following a request submitted at the CCNFSDU43, FAO has prepared a literature review to guide the future development of "Guidelines including General Principles for the Nutritional Composition of Foods and Beverages made from Plant-based and other Alternative Protein Sources". The review, which is expected to be published by the end of 2026, identified literature with data on the nutrient profiles of foods and beverages made from plant-based and other alternative protein sources, which are intended to replace animal-based products, currently in the marketplace and comparison with their animal-based counterparts. Key outcomes will be presented at the 14th International Food Data Conference in September 2025.

Alternative animal source foods: A comprehensive review of the evidence on their benefits and risks for nutrition, environment, livelihoods, and food safety

[21] https://doi.org/10.4060/cd1021en

[22] FAO and IAEA. 2025. *Construction of a database on ileal digestibility of protein and amino acids in foods consumed by humans. Report of a joint FAO/IAEA meeting in Paris, 26–29 November 2024*. Rome. (in publication)

18. FAO will produce a comprehensive review with related recommendations for the current state of evidence on this topic. To do so FAO has commissioned a series of robust scoping/narrative reviews of the current state of evidence on the benefits and risks of A-ASFs for nutrition, environment, socio-economic considerations, and food safety. FAO work will include defining A-ASFs and their sub-categories and developing a glossary of relevant terminology and synonyms. In addition to the FAO document, the reviews are scheduled to be published in a Special Issue in Lancet Planetary Health and key findings were presented at key scientific events including at the International Congress of Nutrition in August 2025.

FAO's work on harmful algal blooms (HABs) and biotoxins

19. FAO, IAEA and UNESCO's Intergovernmental Oceanographic Commission (IOC) are organizing an Expert Meeting on Marine Biotoxins and HABs Monitoring from 6 to 9 October 2025 in Rome, Italy. The Expert Meeting aims at the development of the new Joint FAO-IOC-IAEA Technical Guidance on Marine Biotoxins and HABs Monitoring, including aspects like classification, monitoring, and management of production areas, as well as sampling and testing. A multidisciplinary group of experts will be convened to consolidate a draft document, which will complement the Joint FAO-WHO Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes[23], the Joint FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning[24] and the Joint FAO/IOC/IAEA Technical Guidance for the Implementation of Early Warning Systems (EWS) for HABs[25]. Additionally, it will align with other relevant instruments and tools that support United Nations Member States in managing food safety risks related to bivalve molluscs[26] in general and marine biotoxins in particular.

FAO's work on import notifications for fisheries and aquaculture products

20. Since 2016, FAO has analysed import notifications of aquatic products from the leading importing countries and made them publicly available to promote transparency and disseminate information. The analysis is available on the FAO GLOBEFISH website[27] and seaweed was added in the database. Raw data on import notifications is publicly available in FAO FishstatJ. The FAO FishstatJ[28] database contains rejections, detentions, recalls, and issues reported by competent authorities in Australia from 2019 to 2024, and in China, the European Union, Japan, and the United States of America from 2016 to 2024.

FAO's Work on Food Fraud for Aquatic Products

21. In 2018, FAO developed and published the FAO Fisheries and Aquaculture Circular Overview of Food Fraud in the Fisheries Sector, which emphasizes that the fisheries and aquaculture sector is among the food sectors most vulnerable to fraud. Building on this effort, FAO collaborated with IAEA to produce a joint publication detailing tools to combat food fraud in the aquatic sector while convening experts from multiple countries to create case studies illustrating prevalent instances of food fraud in the fisheries and aquaculture sector, their frequency, and the implications for public health. The report, anticipated for publication by the end of 2025.

Microplastics in Food Commodities

22. The FAO report on "Microplastics in food commodities"[29] was presented at the 19th Session of the COFI SubCommittee on Fish Trade (COFI:FT), and it was suggested that FAO play a role in the development of standardized testing.[30] In this regard, FAO informed the CCMAS of the significance of employing suitable sampling and testing methodologies, which are essential to understanding the exposure and critical for toxicological studies and assessments by accurately ascertaining the quantity, dimensions, and morphology of particles, in addition to identifying the types of polymers and additives present in microplastics. CCMAS43 acknowledged the facts presented by FAO and recommended that the Committee should keep informed about initiatives concerning microplastics to guide evaluation strategies and eventually enhance the associated work. FAO will hold an Expert Consultation jointly with the IAEA in 2026 to provide the necessary information on sampling and testing methods for microplastics to CCMAS, potentially serving as a foundation for subsequent discussions.

[23] https://doi.org/10.4060/cb5072en
[24] https://doi.org/10.4060/ca8817en
[25] https://doi.org/10.4060/cc4794en
[26] Joint FAO-WHO Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes
[27] https://www.fao.org/in-action/globefish/markets---trade/import-notifications-for-fisheries-and-aquaculture-products/en
[28] https://www.fao.org/fishery/en/statistics/software/fishstatj
[29] https://doi.org/10.4060/cc2392en
[30] https://www.fao.org/fishery/en/meeting/41402

Cell-based foods[31] and precision fermentation[32]

23. More than 35 Codex Members are actively engaged in an FAO-facilitated informal technical working group,[33] meeting regularly to discuss regulatory issues on these novel foods. FAO co-organized the 2024 global stakeholder roundtable in Canada, bringing regulators, scientists and industry together to share experiences. The final report (expected late 2025) will provide a consolidated overview of international regulatory approaches.

Artificial intelligence for food safety

24. The FAO publication Artificial intelligence (AI) for food safety (expected late 2025), a literature synthesis, real-world applications and regulatory frameworks (2025) reviewed over 130 studies. It showcases real-world use cases from Ireland, Italy, Singapore, the United Kingdom and the United States, highlighting how AI can strengthen scientific advice, inspection, and regulatory operations. The report also provides a global snapshot of emerging AI governance frameworks and emphasizes transparency, ethics and human oversight.

Genetically modified foods and new genomic applications[34]

25. The FAO GM Foods Platform[35] now hosts more than 2,260 records of national safety assessments, ensuring open access to science-based decisions. With rapid advances in gene editing[36] and other genomics-based technologies, FAO is assessing global needs for scientific advice on protein safety.

Web-based tool for listeriosis risk assessment in foods

26. JEMRA developed a risk assessment models for listeriosis on Ready-to-eat (RTE) diced cantaloupe, frozen vegetables, and RTE cold-smoked fish[37]. In this process, WHO developed a web-based risk assessment tool, with a user-friendly interface using Shiny application platform, and published eight articles related to the topic including critical reviews of available risk assessment models for *Listeria monocytogenes* in foods[38], the description of the developed quantitative risk assessment models for the three food commodities[39] and the updated parameters of the dose–response model[40]. The tool is available here (https://worldhealthorg.shinyapps.io/WT_qraLM/).

The tool provides an overall risk estimate for scenario analysis. The dose-response model incorporating both the virulence class of the *L. monocytogenes* strain and demographic factors such as age and sex, can be used, which improves the accuracy of risk estimation across population groups and strain types. The tool also allows users to assess the impact of different testing strategies and sample sizes, supporting informed decision-making under varied production and surveillance conditions.

Joint WHO/NTU Singapore workshop on New Approach Methodologies (NAMs) in future food safety risk assessment

27. The event gathered in June 2025 over 80 participants from five WHO regions and diverse sectors including academia, government, international bodies, and industry. The workshop aimed to bridge the gap between innovation and regulation, foster international dialogue for NAMs implementation, and explore their application in assessing novel foods[41]. Key topics of the workshop included an overview of existing NAMs and their potential to enhance food and chemical safety assessments; the regulatory integration of NAMs; the need for international collaboration to promote the harmonized adoption of NAMs; and anticipated challenges in food safety assessment associated with the introduction of novel food products and emerging technologies. The workshop highlighted the importance of validating NAMs, having clear regulatory frameworks, and training risk assessors, with an update to EHC 240 recommended. Policy recommendations called for clear problem

[31] https://doi.org/10.4060/cc4855en
[32] https://doi.org/10.4060/cd4448en
[33] https://www.fao.org/food-safety/scientific-advice/crosscutting-and-emerging-issues/cell-based-food/
[34] https://www.fao.org/food-safety/news/news-details/en/c/1739229/
[35] https://www.fao.org/gm-platform/
[36] https://doi.org/10.4060/cc5136en
[37] https://openknowledge.fao.org/server/api/core/bitstreams/7be15013-c4a0-4fc3-9088-4db8a2fe6a43/content and https://www.who.int/publications/m/item/jemra-of-listeria-monocytogenes-in-foods-part-2-risk-assessment-models
[38] https://doi.org/10.3390/foods13071111; https://doi.org/10.3390/foods13050716, https://doi.org/10.3390/foods13030359; https://doi.org/10.3390/foods12244436
[39] https://doi.org/10.3390/foods13233831; https://doi.org/10.3390/foods13223610; https://doi.org/10.3390/foods14132212
[40] https://doi.org/10.3390/foods13050751
[41] https://www.who.int/news-room/events/detail/2025/06/18/default-calendar/new-approach-methodologies-(nams)-in-future-food-safety-risk-assessment

formulation to reduce animal testing, protect public health, and foster innovation through structured workflows, novel food guidance, standardized reporting, and data sharing.

A Global Network on NAMs for Food Safety Risk Assessment was proposed to advance advocacy, capacity building, and information exchange, engaging ministries, industry, and civil society, particularly in LMICs, while using real-world case studies to build trust and support regulatory change. A hybrid online and in-person session was held to share the conclusions and recommendations[42].

[42] https://www.who.int/news-room/events/detail/2025/06/20/default-calendar/new-approach-methodologies-(nams)-in-future-food-safety-risk-assessment-summary-and-conclusions-of-a-workshop-(Webinar); https://youtu.be/gKU1PwJfyAU