CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

13th Session

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MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONAL ORGANISATIONS

(Prepared by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture[1])

1. The Food and Agriculture Organization of the United Nations (FAO) and the International Atomic Energy Agency (IAEA), through the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (the "Joint FAO/IAEA Division"), support and implement activities related to food safety, quality and control systems. The activities of the Joint FAO/IAEA Division are therefore closely related to the standards of the Codex Alimentarius Commission and its committees, including the Codex Committee on Contaminants in Foods (CCCF). In relation to food and food trade, the Joint FAO/IAEA Division assists Member Countries of both FAO and IAEA in their peaceful application of nuclear techniques and related technologies through its Food and Environmental Protection Section and its associated Laboratory.

2. Joint FAO/IAEA Division activities of interest to the CCCF include the analysis and control of various chemical residues and food contaminants; food traceability and authenticity; food related radiation safety standards; food irradiation and activities concerning food and agriculture and nuclear emergency preparedness and response. Activities also include conducting applied research and providing laboratory support and training primarily through the Food and Environmental Protection Laboratory (FEPL), which is one of the FAO/IAEA Agriculture and Biotechnology Laboratories, in Seibersdorf, Austria. Programmatic activities involve collecting, analysing and disseminating information for the effective transfer of skills and technology related to the nuclear sciences in food and agriculture. The Joint FAO/IAEA Division also provides technical support for national, regional and interregional development work through technical cooperation projects.

Radionuclides in Food and Drinking Water

3. In its 2018 report, the Joint FAO/IAEA Division stated that it would keep this committee aware of a project concerning radioactivity in food. The report also mentioned the importance of the IAEA Technical Document (TECDOC) entitled Criteria for Radionuclide Activity Concentrations for Food and Drinking Water (IAEA-TECDOC-1788)[2]. This TECDOC has formed the basis of subsequent activities to address a request from IAEA Member Countries "to develop principles for harmonized guidance on radionuclide activity concentration values in food and drinking water, in continued cooperation with relevant international organizations and national authorities". The FAO, IAEA and the World Health Organization (WHO) are fully co-operating in this project, which covers non-emergency situations, with national radiation safety experts from several Member Countries. IAEA radiation safety standards specify an annual dose of 'about one millisievert' for the ingestion of food and 'about one millisievert' for drinking water in non-emergency situations. These doses cannot be measured directly and competent authorities in Member Countries are required to set reference levels, i.e. radionuclide concentrations (becquerels per kilogram), that are equivalent to these annual doses. While the WHO Drinking Water Guidelines provide guidance to national authorities in the case of drinking water, there is no equivalent international guidance for food.

4. The project is developing technical material on radioactivity in food in non-emergency situations that is consistent with international guidance relating to drinking water. The approach and information generated in this project also require careful consideration regarding food standards, food safety and trade aspects. This is important also for ensuring consistency with relevant standards for emergency exposure situations (i.e. IAEA Safety Standards Series No. GSR Part 7), which FAO is co-sponsoring. Therefore, the IAEA would like to raise a proposal at this CCCF13 to form an electronic working group (eWG) on this topic. The proposal for an eWG is attached in Annex 1. The Codex Alimentarius maintains international food standards and, therefore, the IAEA request is for an eWG of the CCCF to consider food safety and trade aspects and

[1] See: https://www.iaea.org/topics/food-and-agriculture

[2] http://www-pub.iaea.org/books/IAEABooks/11061/Criteria-for-Radionuclide-Activity-Concentrations-for-Food-and-Drinking-Water

prepare an information paper.

This paper should consider the issue of radioactivity in food, serve as an authoritative reference on the subject and provide conclusions and recommendations for consideration at the next meeting of this committee in 2020. The scope of this proposal does not include radionuclides in food in an emergency exposure situation (a nuclear or radiological emergency) because there are existing Codex Guidelines and no further work is presently considered necessary in this area.

5. Among the IAEA's key publications are its Safety Standards, which provide the fundamental principles, requirements and recommendations to ensure nuclear safety. They serve as a global reference for protecting people and the environment and contribute to a harmonized high level of safety worldwide. The IAEA is required by its Statute to promote international cooperation. Its Statute authorizes it to establish or adopt safety standards for the protection of health and to minimize the danger to life and property. The Agency develops such standards on the basis of an open and transparent process for gathering, integrating and sharing the knowledge and experience gained from the use of technologies and from the application of the Safety Standards themselves.

Technical Cooperation and Capacity Building

6. The Joint FAO/IAEA Division provides technical support to a number of projects funded through the IAEA Department for Technical Cooperation. In the area of food safety and control there are currently 62 IAEA technical cooperation projects (52 national, 9 regional and one inter-regional). Further details on these capacity building projects can be found online, including a full listing[3]. Some of these projects are drawing to an end, but new projects will begin next year at the start of the new IAEA programme and budget biennium. In 2018, the IAEA subprogramme on Food and Environmental Protection arranged and implemented 35 training courses and 17 technical meetings involving a total of approximately 1400 participants. Also, 32 IAEA sponsored fellowships and 29 scientific visits were arranged for experts from our Member Countries to gain experience from their counterparts in other institutions. The number of activities in the period covered by this report are too numerous to mention in detail, but the following four examples provide a flavour of the type of work involved:

- An Africa Food Safety Workshop to Promote Standards, Reliable Methods of Analysis and Inter-Institutional Cooperation was held in Pretoria, South Africa, in June 2018; it was organized by the Joint FAO/IAEA Division and the National Metrology Institute of South Africa. This workshop covered many topics related to food contaminants, including the analysis for mycotoxins in food, and attracted substantial international interest.
- A two-week long training course in August 2018 was conducted at the Ministry of Aquaculture and Fisheries laboratories in Guayaquil, Ecuador. Training included the laboratory analysis of contaminants (e.g inorganic arsenic, methyl mercury, cadmium, lead) and selected pesticide residues of trade significance in a wide range of different foods. This was an international event with participants from Africa, Asia and the Americas.
- A regional training course on the general requirements for competence in food testing laboratories was organized in Bogor, Indonesia, in September 2018. It was successful at promoting further collaboration between food safety and control laboratories in the region and helped promote good analytical practice and quality management systems.
- An expert mission to Viet Nam, in October 2018, provided support and helped promote interlaboratory comparison and accreditation in testing for chemical contaminants in food. This was part of a national project and involved the Joint FAO/IAEA Division along with Quatest, the Quality Assurance and Testing Institution, the Ministry of Science and Technology.

7. The Joint FAO/IAEA Division contributes to the FAO-facilitated Feed Safety Multi-stakeholder Partnership, which aims to develop capacities of relevant stakeholders along the feed and food value chain to produce and supply safer feed - thereby enhancing food safety. In the framework of its activities the Partnership organizes annual International Feed Regulators Meetings, is producing and disseminating technical information on feed contaminants and is producing a practical manual on risk assessment in feed to aid the application of the Codex Alimentarius Guidelines on the Application of Risk Assessment for Feed. More information on the activities of the Partnership can be found in the Global Feed Safety Platform[4] .

3 A full list is available in the latest issue of the Joint FAO/IAEA Division's Food and Environmental Protection Newsletter (Vol. 22, No. 1), pages 16-22: https://www-pub.iaea.org/MTCD/Publications/PDF/Newsletters/fep-22-1.pdf

[4] http://www.fao.org/feed-safety/en/

Coordinated Research Initiatives

8. The Joint FAO/IAEA Division is currently implementing five coordinated research projects (CRPs) in the field of food safety and control. The CRP of most relevance to CCCF is entitled “Integrated Radiometric and Complementary Techniques for Mixed Contaminants and Residues in Foods” (CRP D52041). Under this project several multi-class analytical methods have been developed for measuring contaminants and residues in a range of food commodities. The work directly involves institutions in Benin, Botswana, China, Colombia, Ecuador, Nicaragua, North Macedonia, Pakistan, Papua New Guinea, Peru and Uganda. In addition, institutes in Italy, the Netherlands, South Africa, Spain and the USA are collaborating with the project participants. The second research coordination meeting was co-organized by the Joint FAO/IAEA Division and the Botswana National Veterinary Laboratory (BNVL) in Gaborone, Botswana; it took place at the BNVL facilities in March 2019. The meeting and research developments have received considerable interest from both the public and private sectors.

Networking and Contributions

9. In addition to the CCCF, the Joint FAO/IAEA Division participates and provides input to the Codex Alimentarius Commission, the Codex Committee on Pesticide Residues, the Codex Committee on Residues of Veterinary Drugs in Foods and the Codex *ad Hoc* Task Force on Antimicrobial Resistance. The Joint FAO/IAEA Division has been involved in providing data to the Codex Alimentarius Commission and helping develop many Codex standards, codes of practices and guidelines; a recent example being our participation in the electronic working group (eWG) on maximum levels for cadmium in chocolate and cocoa products. The Joint FAO/IAEA Division counterparts and members of the networks have also contributed to the eWG and the discussion paper on maximum level(s) for hydrocyanic acid and mycotoxin contamination in cassava and cassava-based products.

10. The Joint FAO/IAEA Division continues to address FAO and IAEA Member Countries requests for assistance with analytical methods, standard operating procedures and technical advice. The analytical methods developed or adapted and validated in the FEPL and collaborating institutions are made available to Member Countries through various mechanisms such as training workshops; outreach events, conferences and symposia, and publications (articles in the scientific journals, technical documents and books). Two recent publications are excellent examples. One is entitled *Analytical methods for agricultural contaminants*[5]. This manual comprises standardized operating procedures for 30 analytical methods provided by the FEPL and 17 institutes in 7 countries. The other is *Integrated analytical approaches for pesticide management*[6], a book that collates information and data from the FEPL and 26 institutes in 12 different countries in order to provide generic guidelines on pesticide analysis and environmental monitoring. In addition, the Food Contaminant and Residue Information System (FCRIS)[7] is a free-to-access resource that we maintain to provide useful and informative data on food contaminants and residues and it includes a database of analytical detection methods for contaminants and residues in foods.

Nuclear and Radiological Emergency Preparedness and an International Emergency Exercise

11. An international symposium on communicating nuclear and radiological emergencies to the public was held at the IAEA Headquarters in Vienna from 1–5 October 2018. This important event was organized in cooperation with several International Organizations[8]. Almost 400 communication and emergency preparedness and response experts discussed how to better protect the public through more effective communication in a nuclear or radiological emergency. To reflect this age of social-media, being connected and interactivity were essential components of the Symposium; it was streamed live for those unable to attend in person and participants used media apps to pose and respond to questions. Over 440 questions were posed in real-time interactive polls, that contributed to recommendations included in the meeting report[9].

12. A webinar on Food Safety in a Nuclear or Radiological Emergency was organized by the IAEA’s Incident and Emergency Centre and the Joint FAO/IAEA Division, in 2018, to raise awareness on the criteria to be used to restrict the consumption, sale and distribution of food, milk and drinking water domestically as well as to restrict their international trade in a nuclear or radiological emergency; the arrangements necessary to be made at the national level, in line with IAEA Safety Standards Series No. GSR Part 7, to protect the public from ingestion of food, milk and drinking water that may be contaminated following a nuclear or radiological emergency; and the role of IAEA and FAO in preparedness for, and response to, a nuclear or radiological emergency.

5 https://www.elsevier.com/books/analytical-methods-for-agricultural-contaminants/maestroni/978-0-12-815940-8
6 https://www.elsevier.com/books/integrated-analytical-approaches-for-pesticide-management/maestroni/978-0-12-816155-5
7 http://nucleus.iaea.org/fcris/
8 The IAEA symposium was held in cooperation with the Comprehensive Nuclear-Test-Ban Treaty Organization, European Commission, Food and Agriculture Organization of the United Nations, International Federation of Red Cross and Red Crescent Societies, International Labour Organization, INTERPOL, Nuclear Energy Agency of the Organisation for Economic Co-operation and Development, the United Nations Office for the Coordination of Humanitarian Affairs and the World Meteorological Organization
9 https://www.iaea.org/sites/default/files/19/01/cn-265-report.pdf

Annex 1

IAEA Proposal for an Electronic Working Group (eWG) on Radioactivity in Food

It is proposed that the CCCF establish an eWG on radioactivity in food in order to produce a discussion paper for the CCCF14 in 2020. The aim is for the eWG to produce a document that will:

- Consider radioactivity of both human-made and natural origin that can be found in food in normal circumstances (i.e. not in an emergency exposure situation following a nuclear or radiological emergency;
- Clearly set out issues relating to radioactivity in food;
- Discuss issues of food safety and trade; and
- Provide conclusions and recommendations for the CCCF to consider at its 14th meeting in 2020.

Expected Output: (1) A discussion paper for consideration at CCCF14 in 2020

Expected Outcomes: (1) Food safety and control organizations having an increased understanding of radioactivity in food and any related issues for food safety and trade. (2) Influencing the outputs of the FAO, IAEA and WHO project to develop principles for harmonized guidance on radionuclide activity concentration values in food and drinking water. (3) Although not immediately envisaged, this may result in future Codex guidance material accessible and relevant to national authorities responsible for food safety and quality.

Notes

There is no intention to specify numerical limits for radioactivity in food in normal circumstances. The CCCF is not being asked to establish guideline levels for natural or human-made radionuclides in foods.

Radioactivity in food in "normal circumstances" means radioactivity due to both radionuclides of natural origin and radionuclides of human-made origin in food in non-emergency situations. This is where the radiation sources are radionuclides that include: (1) those of natural origin, particularly radionuclides in the uranium and thorium decay series and the isotope potassium-40 (^{40}K), all of which are present throughout the environment; (2) radionuclides discharged into the environment by operators of research, medical and industrial facilities, including authorized discharges from licensed nuclear facilities; these are primarily of artificial origin, but may also be of natural origin, particularly in the case of uranium mining and processing activities; (3) fallout from the testing of nuclear weapons, which occurred primarily in the 1950s and 1960s — the main radionuclides of interest being ^{90}Sr and ^{137}Cs; and (4) residual levels of radionuclides in the environment from accidental releases, such as those occurred following the Chernobyl nuclear power plant accident in 1986 and, more recently, the accident at the Fukushima Daiichi nuclear power plant in 2011. While accidental releases normally consist of radionuclides of artificial origin, some of these radionuclides, such as ^{3}H, ^{14}C and ^{210}Po, also occur in nature.

The IAEA will provide technical support to the eWG. Technical Officers can be assigned to assist in developing the information paper and data and information will be shared. For example, IAEA has a database of published values of the main natural radionuclides of importance for food, spanning 20 years of research publications from 1998 to 2017.

This proposal does not intend to produce limits related to radionuclide intakes, nor does it relate to emergency preparedness and response to nuclear or radiological emergencies (i.e. criteria applied in an emergency). There is no intention to propose alterations to the radionuclide Guideline Levels for food following a nuclear or radiological emergency provided in the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995)[1]. These Guideline Levels apply specifically to radionuclides contained in food destined for human consumption and traded internationally which has been contaminated following a nuclear or radiological emergency.

Background

The FAO, IAEA and WHO are working in collaboration to develop technical material on radioactivity in food that is consistent with international guidance relating to radioactivity in drinking water. Countries have asked for assistance in establishing reference levels for radionuclides in food according to international radiation safety standards[2].

[1] www.fao.org/input/download/standards/17/CXS_193e_2015.pdf

[2] Requirement 51 of IAEA Safety Standards Series No. GSR Part 3 https://www.iaea.org/publications/8930/radiation-protection-and-safety-of-radiation-sources-international-basic-safety-standards

The 2017 and 2018 IAEA General Conferences, each passed a resolution requesting the Secretariat "to develop principles for harmonized guidance on radionuclide activity concentration values in food and drinking water, in continued cooperation with relevant international organizations and national authorities."

These resolutions arise in part from a technical document "Criteria for Radionuclide Activity Concentrations for Food and Drinking Water" (TECDOC-1788) published in April 2016 that details the various international recommendations for managing radionuclides in food and drinking water and the circumstances in which they can be used. The document is jointly sponsored by the IAEA, the FAO, through the Joint FAO/IAEA Division, and the World Health Organization (WHO).

While TECDOC-1788 clarifies the existing international recommendations for food and drinking water and the circumstances in which these should be used, it also highlights that, when addressing the management of radionuclides in non-emergency situations, the current international approaches are inconsistent in relation to scope, radiation protection criteria and terminology. These inconsistencies have proven problematic in terms of implementation by Member States.

In response to the General Conference resolution, the IAEA established a project "Radionuclides in Food and Drinking Water in Non-Emergency Situations". The overall objective of this project is to develop a framework and its associated guidance to assist Member States to manage radionuclides in food and drinking water in non-emergency situations. In December 2017 a Steering Group of experts was established, along with a joint Secretariat of FAO, IAEA and WHO.

The first decision of the Steering Group was that the 1 mSv per year reference level established in Requirement 51 of the relevant General Safety Requirements[10] should include the dose contribution from the ingestion of both naturally-occurring and artificially-produced radionuclides jointly, as is the situation for drinking water. It was agreed that such an approach is consistent with the IAEA General Conference resolution in particular with regard to the need to develop harmonized guidance. The Steering Group also underlined the importance of ensuring that any numbers included in future guidance relating to naturally-occurring radionuclides in food should not be interpreted or used as numerical limits.