

PHILIPPINE NATIONAL STANDARD

**PNS/BAFS 194:2022
ICS 67.040**

General Standard for Contaminants and Toxins in Food and Feed — Product Standard



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS
BPI Compound, Visayas Avenue, Diliman, Quezon City, 1101 Philippines
Trunkline: **(632)8928-8741 to 64 loc 3301-3319**
E-mail: **info.dabafs@gmail.com**
Website: **www.bafs.da.gov.ph**

General Standard for Contaminants and Toxins in Food and Feed — Product Standard
PNS/BAFS 194: 2022
ICS 67.040

Copyright © 2022 by Bureau of Agriculture and Fisheries Standards

All rights reserved. The mention of specific organizations or products, does not mean endorsement or recommendation from the Bureau of Agriculture and Fisheries Standards (BAFS) in preference to other of similar nature that are not included. The BAFS encourages the reproduction and dissemination of the materials upon request. Applications for permissions to reproduce or disseminate these materials and all other queries should be addressed to the publisher.

Published by:
Bureau of Agriculture and Fisheries Standards
BAFS Building, BPI Compound, Visayas Avenue, Diliman, Quezon City
info.dabafs@gmail.com | bafs@da.gov.ph
(+632) 8928 8756 to 65 local 3301 – 3325

ISBN 978-621-455-473-7 (PDF)

www.bafs.da.gov.ph

Foreword

In 2017, the Bureau of Agriculture and Fisheries Standards (BAFS) of the Department of Agriculture (DA) developed the Philippine National Standard (PNS)/BAFS 194:2017 (PNS on the General Standard for Contaminants and Toxins in Food and Feed [GSCTFF]). It was an adoption of the 2016 amendment of the CXS 193-1995 (GSCTFF) with modifications in order to be consistent with the structure and scope of the PNS covered by the DA and to fit the conditions of the Philippines. In 2021, the BAFS-DA requested the DA Food Safety Regulatory Agencies (FSRA) to prioritize their top 10 Codex standards based on their regulatory, trade, and market requirements. Among the list of applicable Codex standards for primary and postharvest foods, they have identified the 2019 amendment of the CXS 193-1995 (GSCTFF) as one of their top priorities.

In response, the BAFS-DA initiated the amendment of the PNS/BAFS 194:2017 with the guidance of a Technical Working Group (TWG) in 2022. This TWG was created under Special Order (SO) No. 103, series of 2022 (Creation of TWG for the development of PNS for agriculture and fishery products, machineries, and infrastructures), SO No. 350, series of 2022 (Addendum to Special Order No. 103), and SO No. 487, series of 2022 (Addendum to Special Order No. 103). The TWG was composed of representatives from the relevant government agencies, academe/research institutions, private sector organizations, and Civil Society Organizations (CSO). The draft PNS underwent a series of TWG meetings and stakeholder consultations conducted physically and via online platforms before its endorsement to the DA Secretary for approval.

This Standard includes the following significant changes compared to its previous version:

- a) Adoption, with modification, of the section on Principles Regarding Contaminants in Food and Feed from the CXS 193-1995 (GSCTFF) as Clause 4 of this PNS;
- b) Adoption of the format of the section on Maximum and Guideline Levels for Contaminants and Toxins in Food and Feed from the CXS 193-1995 (GSCTFF);
- c) Adoption of the new and revised Maximum Levels (ML) of the contaminants within the scope of the PNS based on the 2019 amendment of CXS 193-1995 (GSCTFF) and the Report on the 15th Session of the Codex Committee on Contaminants in Foods (2022); and
- d) Exclusion of non-Codex ML throughout the text.

This PNS cancels and replaces PNS/BAFS 194:2017. This is an adoption of CXS 193-1995, amd. 2019 (GSCTFF). Any modifications from the original Codex document to consider the conditions in the Philippines are written in italicized text for distinction. This document was written in accordance with the formatting and editorial rules of the Standardization Guide No. 1 (Writing the Philippine National Standards) developed by the Standards Development Division (SDD) of the BAFS-DA.

Table of Contents

Foreword	i
1 Scope	1
2 Normative References	1
3 Terms and Definitions	1
4 Principles Regarding Contaminants in <i>Primary and Postharvest</i> Food and Feed	6
4.1 General	6
4.2 Principles for establishing maximum levels in <i>primary and postharvest</i> food and feed	7
4.3 Specific criteria	8
5 Maximum and Guideline Levels for Contaminants and Toxins in Food and Feed	11
5.1 Aflatoxins, Total	11
5.2 Aflatoxin M ₁	13
5.3 Deoxynivalenol (DON)	15
5.4 Fumonisins (B1 + B2)	16
5.5 Ochratoxin A	17
5.6 Arsenic (As)	18
5.7 Cadmium (Cd)	20
5.8 Lead (Pb)	22
5.9 Methylmercury (MeHg)	27
5.10 Radionuclides	28
5.11 Acrylonitrile	30
5.12 Melamine	31
5.13 Vinyl Chloride Monomer	32
6 Methods of analysis and sampling	33
Bibliography	34

1 Scope

This Standard contains the main principles in dealing with the contaminants and toxins in food and feed and the lists of maximum levels (ML) which are recommended by the Codex Alimentarius Commission (CAC) *and adopted by the Philippines to be applied in all primary and postharvest agriculture and fishery commodities applicable in trade.*

This Standard only includes ML of contaminants and natural toxins in feed in cases where the contaminant in feed can be transferred to food of animal origin and can be relevant for public health.

This Standard was adopted from CXS 193-1995, amd. 2019 (General standard for contaminants and toxins in food and feed [GSCTFF]) with modifications to consider the conditions in the Philippines.

2 Normative References

The following documents are referred to in the text in such a way that some or all their contents constitute the requirements of this document. The latest edition of the referenced documents (including any amendments) applies.

Codex Alimentarius Commission (CAC). (2019a). GSCTFF (CXS 193-1995, amd. 2019). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B193-1995%252FCXS_193e.pdf

Codex Committee on Contaminants in Foods (CCCF). (2022). Report on the 15th Session of the CCCF (2022, 9-13 and 24 May). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-15%252FREPORT%252FFINAL%252520REPORT%252FREP22_CF15e.pdf

3 Terms and Definitions

3.1

acute reference dose (ARfD)

estimate of the amount of a substance in food and/or drinking-water, normally expressed on a body-weight basis, which can be ingested in a period of 24 hours or less without appreciable health risk to the consumer on the basis of all known facts at the time of the evaluation (World Health Organization [WHO], 2020)

3.2

benchmark dose

dose of a substance associated with a specified low incidence of risk, generally in the range of 1-10%, of a health effect; the dose associated with a specified measure or change of a biological effect (WHO, 2020)

3.3

benchmark dose lower confidence limit (BMDL)

lower boundary of the confidence interval on the benchmark dose. The BMDL accounts for the uncertainty in the estimate of the dose-response that is due to characteristics of the experimental design, such as sample size. The BMDL can be used as the point of departure for derivation of a health-based guidance value or a margin of exposure (WHO, 2020)

3.4

bulb vegetables

pungent flavorful foods derived from the fleshy scale bulbs, or growth buds of alliums of the lily family (*Liliaceae*). The entire bulb may be consumed following removal of the parchment like skin (e.g., garlic, leeks, onions, and spring onions) (CAC, 2010b)

3.5

contaminant

any substance not intentionally added to food, which is present in such food as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter (CAC, 2019a)

NOTE 1 This standard applies to any substance that meets the terms of the Codex definition for a contaminant, including contaminants in feed for food-producing animals, except:

- a) Contaminants having only food and feed quality significance (e.g., copper), but no public health significance, in the food(s) given that the standards elaborated within the CCCF has the objective to protect public health.
- b) Pesticide residues, as defined by the Codex definition that are within the terms of reference of the Codex Committee on Pesticide Residues (CCPR).
- c) Residues of veterinary drugs, as defined by the Codex definition, and residues of feed additives, that are within the terms of reference of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF). Feed additives are defined in CXC 54-2004 (Code of practice on good animal feeding): “Any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed or animal

products. Residues of feed additives include the parent compounds and/or their metabolites in any edible portion of the animal product and include residues of associated impurities of the feed additive concerned.

- d) Microbial toxins, such as botulinum toxin and staphylococcus enterotoxin, and microorganisms that are within the terms of reference of the Codex Committee on Food Hygiene (CCFH).
- e) Residues of processing aids that are within the terms of reference of the Codex Committee on Food Additives (CCFA). Processing aids are any substance or material, not including apparatus or utensils, and not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or its ingredients, to fulfil a certain technological purpose during treatment or processing and which may result in the non-intentional but unavoidable presence of residues or derivatives in the final product.

NOTE 2 Natural toxins in this standard:

- a) The definition of a contaminant implicitly includes naturally occurring toxicants including toxic metabolites of certain microfungi that are not intentionally added to food and feed (mycotoxins).
- b) Toxins that are produced by algae and that may be accumulated in edible aquatic organisms such as shellfish (phycotoxins) are included in this Standard.
- c) Endogenous natural toxicants (e.g., solanine in potatoes) that are implicit constituents of food and feed resulting from a genus, species or strain ordinarily producing hazardous levels of a toxic metabolite(s) (i.e., phytotoxins), are not generally considered within the scope of the Standard. They are, however, within the terms of reference of CCCF and will be dealt with on a case-by-case basis.

3.6

edible offal

such offal as have been passed as fit for human consumption, but not including lungs, ears, scalp, snout (including lips and muzzle), mucous membranes, sinews, genital system, udders, intestines and urinary bladder (CAC, 2019c)

3.6.1

poultry edible offal

such edible tissues and organs, other than poultry meat and poultry fat, from slaughtered poultry as have been passed fit for human consumption (CAC, 2019c)

3.7**fruiting vegetables**

derived from the immature or mature fruits of various plants, usually annual vines or bushes (CAC, 2010b)

3.7.1**fruiting vegetables – edible peel**

entire fruiting vegetables may be consumed (e.g., cucumber, pepper, eggplant, summer squash, gherkin tomato, okra) (CAC, 2010b)

3.7.2**fruiting vegetables – inedible peel**

edible portion is protected by skin, peel or husk which is removed or discarded before consumption (e.g., cantaloupe, melon, pumpkin, squash, watermelon, winter squash) (CAC, 2010b)

3.8**guideline level (GL)**

maximum level of a substance in a food or feed commodity which is recommended by the Codex Alimentarius Commission to be acceptable for commodities moving in international trade. When the GL is exceeded, the government should decide whether and under what circumstances the food should be distributed within their territory or jurisdiction (CAC, 2019a)

3.9**legume vegetables**

derived from the dried or succulent seeds and immature pods or leguminous plants commonly known as beans and peas. Succulent forms may be consumed as whole pods or as the shelled product (e.g., beans, green beans, Lima beans, soybeans, peas, etc.) (CAC, 2010b)

3.10**maximum level (ML)**

maximum concentration of that substance recommended by the CAC to be legally permitted in that commodity (CAC, 2019a)

3.11**postharvest food**

food obtained from postharvest stages of the food supply chain (Department of Agriculture [DA] & Department of Health [DOH], 2015)

3.12**postharvest stages**

stages in the food supply chain involving minimal transformation of plant and animal foods after primary production such as removal of field heat for fruits, slaughter of animals, sorting, grading, and cutting of fresh plant and animal foods, icing and freezing, and the milling and storage of grain (Food Safety Act [FSA] of 2013, 2013)

3.13**primary food**

food obtained from the primary production stage of the food supply chain (DA & DOH, 2015)

3.14**primary production**

production, rearing or growing of primary products including harvesting, milking and farmed animal production up to slaughter, and the rearing and growing of fish and other seafood in aquaculture ponds. It also includes fishing, and the hunting and catching of wild products (FSA of 2013, 2013)

3.15**Provisional Maximum Tolerable Daily Intake (PMTDI)**

endpoint used for contaminants with no cumulative properties. Its value represents permissible human exposure as a result of the natural occurrence of the substance in food and in drinking-water. In the case of trace elements that are both essential nutrients and unavoidable constituents of food, a range is expressed, the lower value representing the level of essentiality and the upper value the PMTDI (CAC, 2019a)

3.16**Provisional Tolerable Weekly Intake (PTWI)**

endpoint used for food contaminants such as heavy metals with cumulative properties. Its value represents permissible human weekly exposure to those contaminants unavoidably associated with the consumption of otherwise wholesome and nutritious foods (CAC, 2019a)

3.17**Provisional Tolerable Monthly Intake (PTMI)**

endpoint used for a food contaminant with cumulative properties that has a very long half-life in the human body. Its value represents permissible human monthly exposure to a contaminant unavoidably associated with otherwise wholesome and nutritious foods (CAC, 2019a)

3.18**pulses**

dry seeds of leguminous plants which are distinguished from leguminous oil seeds by their low fat content (e.g., beans, lentils, peas, chickpeas, cow peas, field beans) (CAC, 2019b)

3.19**root and tuber vegetables**

starchy foods derived from the enlarged solid roots, tubers, corms or rhizomes, mostly subterranean, of various species of plants (e.g., beets, carrots, celeriac, parsnips, potatoes, radishes, sugar beets, sweet potatoes, turnips, yams) (CAC, 2010b)

3.20**toxicodynamics**

process of interaction of chemical substances with target sites and the subsequent reactions leading to adverse effects (WHO, 2020)

3.21**toxicokinetics**

process of the uptake of potentially toxic substances by the body, the biotransformation they undergo, the distribution of the substances and their metabolites in the tissues, and the elimination of the substances and their metabolites from the body. Both the amounts and the concentrations of the substances and their metabolites are studied (WHO, 2020)

4 Principles Regarding Contaminants in *Primary and Postharvest* Food and Feed**4.1 General**

- 4.1.1** Contamination of *primary and postharvest* foods and feed may pose a risk to human (and/or animal) health. Moreover, in some cases, they may also have a negative impact on the quality of the food or feed. *Primary and postharvest* foods and feed can become contaminated by various causes and processes.
- 4.1.2** Contaminant levels in *primary and postharvest* foods and feed shall be as low as reasonably achievable through best practices such as Good Agricultural Practices (GAP), *Good Animal Husbandry Practices (GAHP)*, *Good Aquaculture Practices (GAqP)*, *Good Hygiene Practices (GHP)*, and *other relevant Codes of Practice (COP)* following an appropriate risk assessment.
- 4.1.3** The following actions may serve to prevent or to reduce contamination of *primary and postharvest* foods and feed:
- 4.1.3.1** Preventing *primary and postharvest* foods and feed contamination at the source (e.g., by reducing the environmental pollution).
- 4.1.3.2** Applying appropriate technology control measure(s) in *primary and postharvest* foods and feed production, preparation, *postharvest* treatment, packing, packaging, transport or holding.
- 4.1.3.3** Applying measures aimed at decontamination of contaminated *primary/postharvest food or feed* and measures to prevent contaminated food or feed to be marketed for consumption.
- 4.1.3.4** In addition, reference is made to the CXC 49-2001 (COP concerning source directed measures to reduce contamination of food with chemicals) and CXC 54-2004 (COP on good animal feeding).

- 4.1.4** To ensure that adequate action is taken to reduce contamination of *primary and postharvest* foods and feed, a COP shall be elaborated comprising source-related measures and GAP as well as *GAHP, GAqP, GHP, and other relevant COP* in relation to the specific contamination problem.
- 4.1.5** The degree of contamination of *primary and postharvest* foods and feed and the effect of actions to reduce contamination shall be assessed by monitoring, survey programs and more specialized research programs, where necessary.
- 4.1.6** When there are indications that health hazards may be involved with consumption of *primary or postharvest* food that is contaminated, it is necessary that a risk assessment should be undertaken. When health concerns can be substantiated, a risk management measure must be applied, based on a thorough evaluation of the situation and consideration of a range of risk management options. Depending on the assessment of the problems and the possible solutions, it may be necessary to establish ML or other measures to control the contamination of *primary and postharvest* foods and feed. In special cases, specific advice on dietary recommendations may also have to be considered to complement other regulatory measures, when the measures are not sufficiently adequate to protect public health and safety.
- 4.1.7** National measures regarding *primary and postharvest* foods and feed contamination should avoid the creation of unnecessary barriers to international trade in food and feed commodities. The purpose of *this Standard* is to provide guidance about possible approaches to eliminate or reduce the contamination problem and to promote international harmonization through recommendations, which in turn may prevent trade barriers and disputes.
- 4.1.8** For all contaminants, which may be present in more than one *primary/postharvest food or feed* item, a broad approach shall be applied, considering all relevant information that is available, for the assessing of risks and for developing recommendations and control measures, including the setting of ML.
- 4.2 Principles for establishing ML in *primary and postharvest* food and feed**
- 4.2.1** ML shall only be set for food in which the contaminant may be found in amounts that are significant for the total exposure of the consumer, taking into consideration the Policy of the CCCF for Exposure Assessment of Contaminants and Toxins in Foods or Food Groups *from the* Section IV (Risk analysis) of the Codex Procedural Manual.
- 4.2.2** The ML shall be set in such a way that the consumer is adequately protected. At the same time the other legitimate factors need to be

considered. This will be performed in accordance with the *Philippine National Standard (PNS)/Bureau of Agriculture and Fisheries Standards (BAFS) 295:2020 (Working principles for risk analysis for food safety for application by governments)*.

4.2.3 The principles of GAP, GAHP, GAqP, GHP, and other relevant COP as defined by *Philippine National Standards and/or Codex* shall be used. ML shall be based on sound scientific principles leading to levels, which are acceptable worldwide, so that there is no unjustified barrier to international trade. ML shall be clearly defined with respect to status and intended use.

4.3 Specific criteria

The following criteria should (not preventing the use of other relevant criteria) be considered when developing ML and/or other measures in connection with the GSCTFF. Further details about these criteria can be found in Annex I (*Criteria for the establishment of ML in food and feed*) of *CXS 193-1995 (GSCTFF)*.

4.3.1 Toxicological information

4.3.1.1 identification of the toxic substance(s);

4.3.1.2 metabolism by humans and animals, as appropriate;

4.3.1.3 toxicokinetics and toxicodynamics including information on possible carry-over of the toxic substance from feed to edible animal tissue/*food*;

4.3.1.4 information about acute and long-term toxicity and other relevant toxicity data; and

4.3.1.5 integrated toxicological expert advice regarding the acceptability and safety of intake levels of contaminants, including information on any population groups which are especially vulnerable.

4.3.2 Analytical data

4.3.2.1 appropriate sampling procedures; and

4.3.2.2 validated qualitative and quantitative data on representative samples.

4.3.3 Intake data

4.3.3.1 presence in *primary/postharvest* food of dietary significance for the contaminant;

4.3.3.2 presence in *primary/postharvest* food that are widely consumed;

4.3.3.3 presence in feed and feed components/ingredients;

- 4.3.3.4 *primary/postharvest* food intake data for average and most exposed/high consumer groups;
- 4.3.3.5 results from total diet studies;
- 4.3.3.6 calculated contaminant intake data from food consumption models;
- 4.3.3.7 data on intake by susceptible groups (i.e., *young children, the elderly, pregnant women, and individuals with illnesses that have weakened their immune systems [WHO, 2020]*); and
- 4.3.3.8 data on intake by food-producing animals.

4.3.4 **Technological considerations**

Information about contamination processes, technological possibilities, production and *postharvest* practices and economic aspects related to contaminant level management and control.

4.3.5 **Risk assessment and risk management considerations (*compare with PNS/BAFS 295:2020 [Working principles for risk analysis for food safety for application by governments]*)**

- 4.3.5.1 risk management options and considerations;
- 4.3.5.2 consideration of possible ML in *primary and postharvest* foods and feed based on the criteria mentioned above; and
- 4.3.5.3 consideration of alternative solutions.

4.4 **Format of the GSCTFF**

The provision for each contaminant shall contain the following elements:

- a) Name of the contaminant
- b) Synonyms: symbols, synonyms (*i.e., other common names*), abbreviations, scientific descriptions shall be mentioned.
- c) Reference to Joint Food and Agriculture Organization (FAO)/WHO Expert Committee on Food Additives or JECFA meetings in which the contaminant was evaluated and the year of that meeting.
- d) PMTDI, PTWI or similar toxicological guidance value: when the situation is complex a short statement and further references may be necessary here.
- e) Contaminant definition: definition of the contaminant as it shall be analyzed and to which the ML or GL applies.
- f) Reference to a source-directed measure or a related COP for the contaminant, if appropriate.

- g) List of Codex ML or GL for that contaminant; this list shall be composed of the following elements, in columns:
- g.1 Food/feed commodity name;
 - g.2 Numerical value of ML or GL and units in which it is expressed;
 - g.3 Portion of the Commodity to which the ML or GL applies; and
 - g.4 Notes/Remarks, including reference to relevant Codex commodity standards and where necessary, definition of the commodity

5 Maximum and Guideline Levels for Contaminants and Toxins in Food and Feed

5.1 Aflatoxins, Total

Table 1 shows the toxicological information and corresponding COP for the control of total aflatoxin.

Table 1. Total aflatoxin toxicological information

Reference to JECFA	31 (1987), 46 (1996), 49 (1997), 68 (2007)
Toxicological guidance value	Carcinogenic potency estimates for aflatoxins B, G, M (1997, Intake should be reduced to levels as low as reasonably possible)
Contaminant definition	Aflatoxins total (B ₁ + B ₂ + G ₁ + G ₂)
Synonyms	Abbreviations: AFB, AFG, with numbers, to designate specific compounds
Related Codex COP	<ul style="list-style-type: none"> a) CXC 55-2004 (COP for the prevention and reduction of aflatoxin contamination in peanuts); b) CXC 59-2005 (COP for the prevention and reduction of aflatoxin contamination in tree nuts¹); c) CXC 45-1997 (COP for the reduction of aflatoxin B₁ in raw materials and supplemental feedingstuffs for milk producing animals); and d) CXC 65-2008 (COP for the prevention and reduction of aflatoxin contamination in dried figs).
Related PNS	<ul style="list-style-type: none"> a) <i>PNS/BAFS 146:2019 (COP for the prevention and reduction of mycotoxin contamination in cereals);</i> b) <i>PNS/BAFPS 44:2009 (COP for the prevention and reduction of aflatoxin contamination in copra²);</i> c) <i>PNS/BAFS 27:2018 (COP for the prevention and reduction of aflatoxin contamination in corn);</i> d) <i>PNS/BAFS 175:2015 (COP for the prevention and reduction of aflatoxin contamination in peanuts); and</i> e) <i>PNS/BAFS 173:2015 (COP for the prevention and reduction of aflatoxin contamination in tree nuts¹).</i>

¹ tree nuts including cashews (*Anacardium occidentale* L.), pili nuts (*Canarium ovatum* Engl.), almonds (*Prunus amygdalus*), walnuts (*Juglans spp.*), hazelnuts (*Corylus spp.*), pecans (*Carya illinoensis*), brazil nuts (*Bertholletia excelsa*), chestnuts (*Castanea spp.*), macadamia nuts (*Macadamia spp.*), bago (*Gnetum gnemon* L.), etc.

² copra is the dried meat (kernel) of a coconut which serves as basic raw material for the extraction of coconut oil.

Table 2 presents the ML of total aflatoxin in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 2. Maximum level (ML) of total aflatoxin per commodity

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Almonds	10	Whole commodity after removal of shell.	The ML applies to almonds “ready-to-eat ¹ ”.
Almonds	15	Whole commodity after removal of shell.	The ML applies to almonds intended for further processing ² .
Brazil nuts	10	Whole commodity	The ML applies to shelled Brazil nuts “ready-to-eat ¹ ”.
Brazil nuts	15	Whole commodity	The ML applies to shelled Brazil nuts intended for further processing ² .
Hazelnuts	10	Whole commodity after removal of shell.	The ML applies to hazelnuts, also known as filberts, “ready-to-eat ¹ ”.
Hazelnuts	15	Whole commodity after removal of shell.	The ML applies to hazelnuts, also known as filberts, intended for further processing ² .
Peanuts	15	Unless specified, seed or kernels, after removal of shell or husk.	The ML applies for peanuts, also known as groundnuts, intended for further processing ² .
Pistachios	10	Whole commodity after removal of shell.	The ML applies to pistachios “ready- to-eat ¹ ”.

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Pistachios	15	Whole commodity after removal of shell.	The ML applies to pistachios intended for further processing ² .
Dried figs	10	Whole commodity	The ML applies to dried figs “ready- to-eat ¹ ”.
Maize grain ^{2,3}	15		<i>The ML applies to maize grain intended for further processing².</i> <i>The ML does not apply to maize destined to animal feed or wet milling.</i>
Rice, husked ³	20		
Rice, polished ³	5		
Sorghum grain ³	10		<i>The ML applies to sorghum grain intended for further processing².</i>
¹ ready-to-eat - not intended to undergo an additional processing/treatment that has proven to reduce levels of aflatoxins before being used as ingredient in foodstuffs, otherwise processed or offered for human consumption ² intended for further processing - intended to undergo an additional processing/treatment that has proven to reduce levels of aflatoxin before being used as an ingredient in foodstuffs, otherwise processed or offered for human consumption ³ CCCF. (2022). Report on the 15 th Session of the CCCF (2022, 9-13 and 24 May). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-15%252FREPORT%252FFINAL%252520REPORT%252FREP22_CF15e.pdf			

5.2 Aflatoxin M₁

Table 3 shows the toxicological information and corresponding COP for the control of aflatoxin M₁.

Table 3. Aflatoxin M₁ toxicological information

Reference to JECFA	56 (2001)
--------------------	-----------

Toxicological guidance value	Cancer potency estimates at specified residue levels (2001, Using worst-case assumptions, the additional risks for liver cancer predicted with use of proposed ML of aflatoxin M ₁ of 0.05 and 0.5 µg/kg are very small. The potency of aflatoxin M ₁ appears to be so low in HBsAg- individuals that a carcinogenic effect of M ₁ intake in those who consume large quantities of milk and milk products in comparison with non-consumers of these products would be impossible to demonstrate. Hepatitis B virus carriers might benefit from a reduction in the aflatoxin concentration in their diet, and the reduction might also offer some protection in hepatitis C virus carriers).
Contaminant definition	Aflatoxin M ₁
Synonyms	AFM ₁
Related COP	CXC 45-1997 (COP for the reduction of aflatoxin B1 in raw materials and supplemental feedingstuffs for milk producing animals)

Table 4 presents the ML of aflatoxin M₁ in milk with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 4. Maximum level (ML) of aflatoxin M₁ per commodity

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Milk	0.50	Whole commodity	Milk is the normal mammary secretion of milking animals obtained from one or more milkings without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing. A concentration factor applies to partially or wholly dehydrated milks.

5.3 Deoxynivalenol (DON)

Table 5 shows the toxicological information and corresponding COP for the control of DON.

Table 5. Deoxynivalenol toxicological information

Reference to JECFA	56 (2001), 72 (2010)
Toxicological guidance value	a) Group PMTDI 0.001 mg/kg bw (2010, for DON and its acetylated derivates) b) Group ARfD 0.008 mg/kg bw (2010, for DON and its acetylated derivates)
Contaminant definition	Deoxynivalenol
Synonyms	Vomitoxin; Abbreviation, DON
Related Codex COP	CXC 51-2003 (COP for the prevention and reduction of mycotoxin contamination in cereals)
Related PNS	PNS/BAFS 146:2019 (COP for the prevention and reduction of mycotoxin contamination in cereals)

Table 6 presents the ML of DON in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 6. Maximum level (ML) of deoxynivalenol (DON) per commodity

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Meal derived from wheat or maize	1,000		
Cereal grains (wheat, maize and barley) destined for further processing	2,000		“Destined for further processing” means intended to undergo an additional processing/treatment that has proven to reduce levels of DON before being used as an

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
			ingredient in foodstuffs, otherwise processed or offered for human consumption.

5.4 Fumonisin (B1 + B2)

Table 7 shows the toxicological information and corresponding COP for the control of fumonisin (B1+B2).

Table 7. Fumonisin (B1 + B2) toxicological information

Reference to JECFA	56 (2001), 74 (2011)
Toxicological guidance value	PMTDI 0.002 mg/kg bw (2001, 2011)
Contaminant definition	Fumonisin (B1+ B2)
Synonyms	Several related compounds have been described, notably fumonisin B1, B2 and B3 (abbreviation: FB1, etc.)
Related Codex COP	CXC 51-2003 (COP for the prevention and reduction of mycotoxin contamination in cereals)
Related PNS	PNS/BAFS 146:2019 (COP for the prevention and reduction of mycotoxin contamination in cereals)

Table 8 presents the ML of fumonisin (B1+B2) in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 8. Maximum level (ML) of fumonisin (B1 + B2) per commodity

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Raw maize grain	4,000	Whole commodity	

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Maize meal	2,000	Whole commodity	

5.5 Ochratoxin A

Table 9 shows the toxicological information and corresponding COP for the control of Ochratoxin A.

Table 9. Ochratoxin A toxicological information

Reference to JECFA	37 (1990), 44 (1995), 56 (2001), 68 (2007)
Toxicological guidance value	PTWI 0.0001 mg/kg bw (2001)
Contaminant definition	Ochratoxin A
Synonyms	(The term “ochratoxins” includes a number of related mycotoxins (A, B, C and their esters and metabolites), the most important one being ochratoxin A)
Related Codex COP	<ul style="list-style-type: none"> a) CXC 51-2003 (COP for the prevention and reduction of mycotoxin contamination in cereals); b) CXC 63-2007 (COP for the prevention and reduction of ochratoxin A contamination in wine); c) CXC 69-2009 (COP for the prevention and reduction of ochratoxin A contamination in coffee); and d) CXC 72-2013 (COP for the prevention and reduction of ochratoxin A contamination in cocoa).
Related PNS	<ul style="list-style-type: none"> a) PNS/BAFS 146:2019 (COP for the prevention and reduction of mycotoxin contamination in cereals); b) PNS/BAFS 170:2015 (COP for the prevention and reduction of ochratoxin A contamination in coffee); c) PNS/BAFPS 130:2014 (COP for the prevention and reduction of ochratoxin A contamination in Philippine cacao beans); and

	d) <i>PNS/BAFPS 131:2014 (COP for the prevention and reduction of ochratoxin A contamination in Philippine tablea).</i>
--	---

Table 10 presents the ML of ochratoxin A in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 10. Maximum level (ML) of ochratoxin A per commodity

Commodity name	ML (µg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Wheat	5	Whole commodity	The ML applies to raw common wheat, raw durum wheat, raw spelt and raw emmer.
Barley	5	Whole commodity	The ML applies to raw barley.
Rye	5	Whole commodity	The ML applies to raw rye.

5.6 Arsenic (As)

Table 11 shows the toxicological information and corresponding COP for the control of arsenic.

Table 11. Arsenic toxicological information

Reference to JECFA	5 (1960), 10 (1967), 27 (1983), 33 (1988), 72 (2010)
Toxicological guidance value	At the 72 nd meeting of JECFA (2010), the inorganic arsenic lower limit on the benchmark dose for a 0.5% increased incidence of lung cancer (BMDL 0.5) was determined from epidemiological studies to be 3.0 µg/kg bw/day (2–7 µg/kg bw/day based on the range of estimated total dietary exposure) using a range of assumptions to estimate total dietary exposure to inorganic arsenic from drinking-water and food. The JECFA noted that the PTWI of 15 µg/kg bw (equivalent to 2.1 µg/kg bw/day) is in the region of the BMDL 0.5 and therefore was no longer appropriate. The JECFA withdrew the previous PTWI.

Contaminant definition	Arsenic: total (As-tot) when not otherwise mentioned; inorganic arsenic (As-in); or other specification
Synonyms	As
Related Codex COP	a) CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals); and b) CXC 77-2017 (COP for the prevention and reduction of arsenic contamination in rice)
Related PNS	PNS/BAFS 141:2019 (Code of GAP for rice)

Table 12 presents the ML of arsenic in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 12. Maximum level (ML) of arsenic per commodity

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Rice, husked	0.35	Whole commodity	The ML is for inorganic arsenic (As-in). Application of the ML for As-in can be done by analyzing total arsenic (As-tot) in rice.
Rice, polished	0.20	Whole commodity	If the As-tot concentration is below the ML for As-in, no further testing is required and the sample is determined to be compliant with the ML. If the As-tot concentration is above the ML for As-in, follow-up testing shall be conducted to determine if the As-in concentration is above the ML.

5.7 Cadmium (Cd)

Table 13 shows the toxicological information and corresponding COP for the control of cadmium.

Table 13. Cadmium toxicological information

Reference to JECFA	16 (1972), 33 (1988), 41 (1993), 55 (2000), 61 (2003), 64 (2005), 73 (2010)
Toxicological guidance value	In view of the long half-life of cadmium, daily ingestion in food has a small or even a negligible effect on overall exposure. In order to assess long- or short-term risks to health due to cadmium exposure, dietary intake should be assessed over months, and tolerable intake should be assessed over a period of at least 1 month. To encourage this view, at the 73 rd meeting (2010) the JECFA decided to express the tolerable intake as a monthly value in the form of a PTMI and established a PTMI of 25 µg/kg bw.
Contaminant definition	Cadmium
Synonyms	Cd
Related Codex COP	CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals)
Related PNS	PNS/BAFS 141:2019 (Code of GAP for rice)

Table 14 presents the ML of cadmium in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 14. Maximum level (ML) of cadmium per commodity

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Brassica vegetables	0.05	Head cabbages and kohlrabi: whole commodity as marketed, after removal of obviously decomposed or withered leaves.	The ML does not apply to Brassica leafy vegetables.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
		Cauliflower and broccoli: flower heads (immature inflorescence only). Brussels sprouts: “buttons” only.	
Bulb vegetables	0.05	Bulb/dry onions and garlic: whole commodity after removal of roots and adhering soil and whatever parchment skin is easily detached.	
Fruiting vegetables	0.05	Whole commodity after removal of stems. Sweet corn and fresh corn: kernels plus cob without husk.	The ML does not apply to tomatoes and edible fungi.
Leafy vegetables	0.20	Whole commodity as usually marketed, after removal of obviously decomposed or withered leaves.	The ML also applies to Brassica leafy vegetables.
Legume vegetables	0.10	Whole commodity as consumed. The succulent forms may be consumed as whole pods or as the shelled product.	
Pulses	0.10	Whole commodity	The ML does not apply to soya bean (dry).
Root and tuber vegetables	0.10	Whole commodity after removing tops. Remove adhering soil (e.g., by rinsing in running water or by gentle brushing of the dry commodity). Potato: peeled potato.	The ML does not apply to celeriac.
Stalk and stem vegetables	0.10	Whole commodity as marketed after removal of obviously decomposed or withered leaves.	

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
		Rhubarb: leaf stems only. Globe artichoke: flower head only. Celery and asparagus: remove adhering soil	
Cereal grains	0.10	Whole commodity	The ML does not apply to buckwheat, cañihua, quinoa, wheat, and rice.
Rice, polished	0.40	Whole commodity	
Wheat	0.20	Whole commodity	The ML applies to common wheat, durum wheat, spelt and emmer.
Marine bivalve molluscs	2.00	Whole commodity after removal of shell.	The ML applies to clams, cockles and mussels but not to oysters and scallops.
Cephalopods	2.00	Whole commodity after removal of shell.	The ML applies to cuttlefishes, octopuses and squids without viscera

5.8 Lead (Pb)

Table 15 shows the toxicological information and corresponding COP for the control of lead.

Table 15. Lead toxicological information

Reference to JECFA	10 (1966), 16 (1972), 22 (1978), 30 (1986), 41 (1993), 53 (1999), 73 (2010)
Toxicological guidance value	Based on the dose–response analyses, at the 73 rd meeting (2010), JECFA estimated that the previously established PTWI of 25 µg/kg bw is associated with a decrease of at

	least 3 intelligence quotient (IQ) points in children and an increase in systolic blood pressure of approximately 3 mmHg (0.4 kPa) in adults. While such effects may be insignificant at the individual level, these changes are important when viewed as a shift in the distribution of IQ or blood pressure within a population. The JECFA therefore concluded that the PTWI could no longer be considered health protective and withdrew it.
Contaminant definition	Lead, total
Synonyms	Pb
Related Codex COP	a) CXC 56-2004 (COP for the prevention and reduction of lead contamination in foods); and b) CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals)

Table 16 presents the ML of lead in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 16. Maximum level (ML) of lead per commodity

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Berries and other small fruits	0.10	Whole commodity after removal of caps and stems.	The ML does not apply to cranberry, currant and elderberry.
Cranberry	0.20	Whole commodity after removal of caps and stems.	
Currants	0.20	Fruit with stem.	
Elderberry	0.20	Whole commodity after removal of caps and stems.	
Fruits	0.10	Whole commodity.	The ML does not apply to cranberry, currant and elderberry.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
		<p>Berries and other small fruits: whole commodity after removal of caps and stems.</p> <p>Pome fruits: whole commodity after removal of stems.</p> <p>Stone fruits, dates and olives: whole commodity after removal of stems and stones, but the level calculated and expressed on the whole commodity without stem.</p> <p>Pineapple: whole commodity after removal of crown.</p> <p>Avocado, mangos and similar fruit with hard seeds: whole commodity after removal of stone but calculated on whole fruit.</p>	
Brassica vegetables	0.10	<p>Head cabbages and kohlrabi: whole commodity as marketed, after removal of obviously decomposed or withered leaves.</p> <p>Cauliflower and broccoli: flower heads (immature inflorescence only).</p> <p>Brussels sprouts: “buttons” only.</p>	The ML does not apply to kale and leafy Brassica vegetables.
Bulb vegetables	0.10	Bulb/dry onions and garlic: whole commodity after removal of roots and adhering soil and whatever parchment skin is easily detached.	

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Fruiting vegetables	0.05	Whole commodity after removal of stems. Sweet corn and fresh corn: kernels plus cob without husk.	The ML does not apply to fungi and mushrooms.
Leafy vegetables	0.30	Whole commodity as usually marketed, after removal of obviously decomposed or withered leaves.	The ML applies to leafy Brassica vegetables but does not apply to spinach.
Legume vegetables	0.10	Whole commodity as consumed. The succulent forms may be consumed as whole pods or as the shelled product.	
Fresh farmed mushrooms (common mushrooms (<i>Agaricus bisporous</i>), shiitake mushrooms (<i>Lentinula edodes</i>), and oyster mushrooms (<i>Pleurotus ostreatus</i>))	0.30	Whole commodity	Relevant Codex commodity standard is CXS 38-1981.
Pulses	0.10	Whole commodity	
Root and tuber vegetables	0.10	Whole commodity after removing tops. Remove adhering soil (e.g. by rinsing in running water or by gentle brushing of the dry commodity). Potato: peeled potato.	

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Cereal grains	0.20	Whole commodity	The ML does not apply to buckwheat cañihua and quinoa.
Fish	0.30	Whole commodity (in general after removing the digestive tract)	
Meat of cattle, pigs and sheep	0.10	Whole commodity (without bones)	The ML also applies to fat from the meat.
Meat and fat of poultry	0.10	Whole commodity (without bones)	
Cattle, edible offal of	0.20	Whole commodity	The ML applies to the following edible offal: Brain, head, heart, kidney, liver, tongue and stomach.
Pig, edible offal of	0.15	Whole commodity	The ML applies to the following edible offal: Blood, heart, kidney, liver and tongue.
Poultry, edible offal of	0.10	Whole commodity	The ML applies to the following edible offal: Heart, kidney, liver, stomach and thymus.
Milk	0.02	Whole commodity	Milk is the normal mammary secretion of milking animals obtained from one or more milkings without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing. A concentration factor applies to partially or wholly dehydrated milks.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Honey ¹	0.10	Whole commodity	
¹ CCCF. (2022). Report on the 15 th Session of the CCCF(2022, 9-13 and 24 May). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-15%252FREPORT%252FFINAL%252520REPORT%252FREP22_CF15e.pdf			

5.9 Methylmercury (MeHg)

Table 17 shows the toxicological information and corresponding COP for the control of methylmercury.

Table 17. Methylmercury toxicological information

Reference to JECFA	22 (1978), 33 (1988), 53 (1999), 61 (2003), 67 (2006)
Toxicological guidance value	PTWI 0.0016 mg/kg bw (2003, confirmed in 2006)
Contaminant definition	Methylmercury
Related Codex COP	CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals)

Table 18 presents the ML of methylmercury in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 18. Maximum level (ML) of methylmercury per commodity.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Tuna	1.20	Whole commodity fresh or frozen (in general after removing the digestive tract)	Countries or importers may decide to use their own screening when applying the ML for methylmercury in fish by analyzing 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. The ML also applies to fresh or frozen fish intended for further processing. Countries should consider developing nationally relevant consumer advice for women of childbearing age and young children to supplement the ML.
Alfonsino	1.50		
Marlin	1.70		
Shark	1.60		
<i>Orange roughy eel</i> ¹	0.80		
<i>Pink cusk-eel</i> ¹	1.00		

¹ CCCF. (2022). Report on the 15th Session of the CCCF (2022, 9-13 and 24 May). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-15%252FREPORT%252FFINAL%252520REPORT%252FREP22_CF15e.pdf

5.10 Radionuclides

The GL for radionuclides in primary and postharvest foods and specifically the values presented in Table 19 are based on the general radiological considerations and experience of application of the existing international and national standards for

control of radionuclides in food presented in Annex 1 (Scientific justification for the guideline levels for radionuclides in foods contaminated following a nuclear or radiological emergency) of CXS 193-1995, amd. 2019.

Table 19. Guideline level (GL) of radionuclides per commodity.

Commodity name	GL (Bq/kg)	Representative radionuclides	Notes / remarks
Foods other than infant foods	10	Pu-238, Pu-239, Pu-240, Am-241	
Foods other than infant foods	100	Sr-90, Ru-106, I-129, I-131, U-235	
Foods other than infant foods	1,000	S-35 ¹ , Co-60, Sr-89, Ru-103, Cs- 134, Cs-137, Ce-144, Ir-192	
Foods other than infant foods	10,000	H-3 ² , C-14, Tc-99	
¹ This represents the value for organically bound sulfur			
² This represents the value for organically bound tritium			

5.10.1 Scope

The GL apply to radionuclides contained in foods destined for human consumption and traded internationally, which have been contaminated following a nuclear or radiological emergency (both accidents and malevolent actions). These GL apply to food after reconstitution or as prepared for consumption, i.e., not to dried or concentrated foods, and are based on an intervention exemption level of 1 mSv in a year.

5.10.2 Application

As far as generic radiological protection of food consumers is concerned, when radionuclide levels in food do not exceed the corresponding GL, the food should be considered as safe for human consumption. When the GL are exceeded, competent authorities shall decide whether and under what circumstances the food should be distributed within their territory or jurisdiction. National governments may wish to adopt different values for internal use within their own territories where the assumptions concerning food distribution that have been made to derive the GL may not apply, e.g., in the case of wide-spread radioactive contamination. For foods that are consumed in small quantities,

such as spices, that represent a small percentage of total diet and hence a small addition to the total dose, the GL may be increased by a factor of 10.

5.10.3 Radionuclides

The GL do not include all radionuclides. Radionuclides included are those important for uptake into the food chain; are usually contained in nuclear installations or used as a radiation source in large enough quantities to be significant potential contributors to levels in foods, and; could be accidentally released into the environment from typical installations or might be employed in malevolent actions. Radionuclides of natural origin are generally excluded from consideration in this document.

In Table 19, the radionuclides are grouped according to the GL rounded logarithmically by orders of magnitude. The GL have been checked against age-dependent ingestion dose coefficients defined as committed effective doses per unit intake for each radionuclide, which are taken from the “International Basic Safety Standards” (FAO *et al.*, 1996). *The mean internal dose of the public, E (mSv), may be estimated to assess the human internal exposure as shown in Annex 2 (Human internal exposure when the guideline levels are applied) of CXS 193-1995 amd. 2019.*

5.10.4 Multiple radionuclides in foods

The GL have been developed with the understanding that there is no need to add contributions from radionuclides in different groups. Each group should be treated independently. However, the activity concentrations of each radionuclide within the same group should be added together. For example, if ^{134}Cs and ^{137}Cs are contaminants in food, the guideline level of 1000 Bq/kg refers to the summed activity of both these radionuclides.

5.11 Acrylonitrile

Table 20 shows the toxicological information and corresponding COP for the control of acrylonitrile.

Table 20. Acrylonitrile toxicological information

Reference to JECFA	28 (1984)
--------------------	-----------

Toxicological guidance value	Provisional Acceptance (1984, the use of food-contact materials from which acrylonitrile may migrate is provisionally accepted on condition that the amount of the substance migrating into food is reduced to the lowest level technologically attainable)
Contaminant definition	acrylonitrile (monomer)
Synonyms	2-Propenenitrile; vinyl cyanide (VCN); cyanoethylene; abbreviations, AN, CAN.
Related Codex COP	CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals)

Table 21 presents the ML of acrylonitrile in various commodities with the portion of the commodity to which the ML applies as defined at the establishment of the ML, unless otherwise specified.

Table 21. Maximum level (ML) of acrylonitrile per commodity.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Food	0.02		

5.12 Melamine

Table 22 shows the toxicological information and corresponding COP for the control of melamine.

Table 22. Melamine toxicological information

Reference to JECFA	FAO/WHO Expert Meeting (2008)
Toxicological guidance value	Tolerable Daily Intake (TDI) 0.2 mg/kg bw (2008)
Contaminant definition	Melamine

Table 23. Maximum level (ML) of melamine per commodity.

Commodity name	ML (mg/kg)	Notes/remarks
Food (other than infant formulae) and feed	2.50	<p>The ML applies to food other than infant formula.</p> <p>The ML applies to levels of melamine resulting from its non-intentional and unavoidable presence in food and feed.</p> <p>The ML does not apply to food and feed for which it can be proven that the level of melamine higher than 2.5 mg/kg is the consequence of:</p> <p>a) Authorized use of cyromazine as insecticide. The melamine level shall not exceed the level of cyromazine.</p> <p>b) Migration from food contact materials taking account of any nationally authorized migration limit.</p> <p>The ML does not apply to melamine that could be present in the following feed ingredients / additives: guanidine acetic acid (GAA), urea and biuret, as a result of normal production processes.</p>

5.13 Vinyl Chloride Monomer

Table 24 shows the toxicological information and corresponding COP for the control of vinyl chloride monomer.

Table 24. Vinyl chloride monomer toxicological information

Reference to JECFA	28 (1984)
Toxicological guidance value	Provisional Acceptance (1984), the use of food-contact materials from which vinyl chloride may migrate is provisionally accepted, on condition that the amount of the substance migrating into food is reduced to the lowest level technologically achievable.
Contaminant definition	Vinyl chloride monomer
Synonyms	Monochloroethene, chloroethylene; abbreviation VC or VCM

Related Codex COP	CXC 49-2001 (COP for source directed measures to reduce contamination of foods with chemicals)
--------------------------	--

Table 25. Maximum level (ML) of vinyl chloride monomer per commodity.

Commodity name	ML (mg/kg)	Portion of the commodity to which the ML applies	Notes/remarks
Food	0.01		The GL in food packaging material is 1.0 mg/kg.

6 Methods of analysis and sampling

The methods of analysis and sampling of contaminants and toxins stated in this Standard per commodity should conform with the provisions recommended by the Codex Alimentarius Commission (CAC) as stated in CXS 193-1995 (*Codex GSCTFF*) or the procedures applicable to the competent authority.

Bibliography

Bureau of Agriculture and Fisheries Product Standards (BAFPS)-Department of Agriculture (DA). (2009). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in copra (PNS/BAFPS 44:2009).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNS-BAFPS%2044-2009-Code%20of%20Practice%20for%20Copra.pdf

Bureau of Agriculture and Fisheries Product Standards (BAFPS)-Department of Agriculture (DA). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in Philippine cacao beans (PNS/BAFPS 130:2014).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNS-BAFPS%20130-2013%20-%20Code%20of%20Practice%20for%20the%20Prevention%20and%20Reduction%20of%20Ochratoxin%20A%20in%20Philippine%20Cacao%20Beans.pdf

Bureau of Agriculture and Fisheries Product Standards (BAFPS)-Department of Agriculture (DA). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in Philippine tablea (PNS/BAFPS 131:2014).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNS-BAFPS%20131-2013%20-%20Code%20of%20Practice%20for%20the%20Prevention%20and%20Reduction%20of%20Ochratoxin%20A%20in%20Philippine%20Tablea.pdf

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2015). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in peanuts (PNS/BAFS 175:2015).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNSBAFS175-2015CodeofPracticeCOPforthePreventionand%20ReductionofAflatoxinContaminationinPeanuts.pdf

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2015). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in tree nuts (PNS/BAFS 173:2015).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNSBAFS173-2015COPforthePreventionandReductionofAflatoxinContaminationinTreeNuts.pdf

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in coffee (PNS/BAFS 170:2015).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/2021-02-24-PNSBAFS170-2015CodeofHygienicPracticeCOPforthePreventionandReductionofOchratoxinAContaminationinCoffee.pdf

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2018). Code of Practice (COP) for the prevention and reduction of aflatoxin

contamination in corn (PNS/BAFS 27:2018).

[https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNS.BAFS.27.2018.Code%20of%20practice%20for%20the%20prevention%20and%20reduction%20of%20aflatoxin%20contamination%20in%20corn%20\(1\).pdf](https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNS.BAFS.27.2018.Code%20of%20practice%20for%20the%20prevention%20and%20reduction%20of%20aflatoxin%20contamination%20in%20corn%20(1).pdf)

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2019). Code of Good Agricultural Practices (GAP) for rice (PNS/BAFS 141:2019).

[https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNSBAFS141_2014%20GAP%20Rice_final_clean%20\(1\).pdf](https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNSBAFS141_2014%20GAP%20Rice_final_clean%20(1).pdf)

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2019). Code of Practice (COP) for the prevention and reduction of mycotoxin contamination in cereals (PNS/BAFS 146:2019).

[https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNS.BAFS.146.2019%20%20COP%20mycotoxin%20in%20cereals%20\(1\).pdf](https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNS.BAFS.146.2019%20%20COP%20mycotoxin%20in%20cereals%20(1).pdf)

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2020). Working principles for risk analysis for food safety application by governments (PNS/BAFS 295:2020).

https://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/PNS.BAFS.295.2020%20Risk%20Analysis%20for%20Food%20Safety%20by%20Governments.pdf

Codex Alimentarius Commission (CAC). (1981). General standard for edible fungi and fungus products (CXS 38-1981). [https://www.fao.org/fao-who-codexalimentarius/sh-](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B38-1981%252FCXS_038e.pdf)

[proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B38-1981%252FCXS_038e.pdf](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B38-1981%252FCXS_038e.pdf)

Codex Alimentarius Commission (CAC). (1997). Code of Practice (COP) for the reduction of aflatoxin B1 in raw materials and supplemental feedingstuffs for milk producing animals (CXC 45-1997). [https://www.fao.org/fao-who-codexalimentarius/sh-](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B45-1997%252FCXP_045e.pdf)

[proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B45-1997%252FCXP_045e.pdf](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B45-1997%252FCXP_045e.pdf)

Codex Alimentarius Commission (CAC). (2001). Code of Practice (COP) for source directed measures to reduce contamination of foods with chemicals (CXC 49-2001). [https://www.fao.org/fao-who-codexalimentarius/sh-](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B49-2001%252FCXP_049e.pdf)

[proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B49-2001%252FCXP_049e.pdf](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B49-2001%252FCXP_049e.pdf)

Codex Alimentarius Commission (CAC). (2004a). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in peanuts (CXC 55-2004).

[https://www.fao.org/fao-who-codexalimentarius/sh-](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B55-2004%252FCXP_055e.pdf)
[proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B55-2004%252FCXP_055e.pdf](https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B55-2004%252FCXP_055e.pdf)

- Codex Alimentarius Commission (CAC). (2004b). Code of Practice (COP) for the prevention and reduction of lead contamination in foods (CXC 56-2004).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B56-2004%252FCXP_056e.pdf
- Codex Alimentarius Commission (CAC). (2007). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in wine (CXC 63-2007).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B63-2007%252FCXP_063e.pdf
- Codex Alimentarius Commission (CAC). (2008a). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in dried figs (CXC 65-2008).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B65-2008%252FCXP_065e.pdf
- Codex Alimentarius Commission (CAC). (2008b). Code on good animal feeding (CXC 54-2004, amd. 2008). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B54-2004%252FCXP_054e.pdf
- Codex Alimentarius Commission (CAC). (2009). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in coffee (CXC 69-2009).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B69-2009%252FCXP_069e.pdf
- Codex Alimentarius Commission (CAC). (2010a). Code of Practice (COP) for the prevention and reduction of aflatoxin contamination in tree nuts (CXC 59-2005, rev. 2010). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B59-2005%252FCXP_059e.pdf
- Codex Alimentarius Commission (CAC). (2010b). Portion of commodities to which maximum residue limits apply and which is analyzed (CXG 41-1993, amd. 2010).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXG%2B41-1993%252FCXG_041e.pdf
- Codex Alimentarius Commission (CAC). (2013). Code of Practice (COP) for the prevention and reduction of ochratoxin A contamination in cocoa (CXC 72-2013).
https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B72-2013%252FCXP_072e.pdf
- Codex Alimentarius Commission (CAC). (2017a). Code of Practice (COP) for the prevention and reduction of arsenic contamination in rice (CXC 77-2017).

https://www.fao.org/fao-who-codexalimentarius/sh-proxy/tr/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B77-2017%252FCXC_077e.pdf

Codex Alimentarius Commission (CAC). (2017b). Code of Practice (COP) for the prevention and reduction of mycotoxin contamination in cereals (CXC 51-2003, amd. 2017). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B51-2003%252FCXC_051e.pdf

Codex Alimentarius Commission (CAC). (2019a). General Standard for Contaminants and Toxins in Food and Feed (GSCTFF) (CXS 193-1995 amd. 2019). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B193-1995%252FCXS_193e.pdf

Codex Alimentarius Commission (CAC). (2019b). Standard for certain pulses (CXS 171-1989, amd. 2019). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/es/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B171-1989%252FCXS_171e.pdf

Codex Alimentarius Commission (CAC). (2019c). Standard for cooked cured chopped meat (CXS 98-1981, amd. 2019). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/pt/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B98-1981%252FCXS_098e.pdf

Codex Committee on Contaminants in Foods (CCCF). (2022). Report on the 15th Session of the Codex Committee on Contaminants in Foods (2022, 9-13 and 24 May). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-15%252FREPORT%252FFINAL%252520REPORT%252FREP22_CF15e.pdf

Department of Agriculture (DA) & Department of Health (DOH). (2015). Implementing Rules and Regulations (IRR) of Republic Act No. 10611. <https://www.officialgazette.gov.ph/2015/02/20/implementing-rules-and-regulations-of-republic-act-no-10611/#:~:text=10611%2C%20%2E2%80%9CAN%20ACT%20TO%20STRENGTHEN,FOOD%20SAFETY%20ACT%20OF%202013.%E2%80%9D>

European Union (EU). (2003). Commission Directive 2003/100/EC of 31 October 2003 amending Annex I to Directive 2002/32/EC of the European Parliament and of the Council on undesirable substances in animal feed. Official Journal of the European Union.

European Union (EU). (2002). Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed. Official Journal of the European Communities.

Food and Agriculture Organization (FAO) of the United Nations (UN) & World Health Organization (WHO). (2019). Codex Alimentarius Commission (CAC) — Procedural manual (27th ed.). <https://www.fao.org/3/ca2329en/CA2329EN.pdf>

Food and Agriculture Organization (FAO) of the United Nations (UN), International Atomic Energy Agency (IAEA), International Labour Office, OECD Nuclear Energy Agency, Pan American Health Organization, World Health Organization (WHO). (1996). International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, IAEA, Vienna.

Food Safety Act (FSA) of 2013. (2013). Republic Act No. 10611.
<https://www.officialgazette.gov.ph/2013/08/23/republic-act-no-10611/>

World Health Organization (WHO). (2020). Environmental Health Criteria 240: Principles for the Risk Assessment of Chemicals in Food. International Programme on Chemical Safety.
https://apps.who.int/iris/bitstream/handle/10665/44065/WHO_EHC_240_eng.pdf

Department of Agriculture (DA)
Bureau of Agriculture and Fisheries Standards (BAFS)

Technical Working Group (TWG) for the Adoption of Priority Codex General Standards as Philippine National Standards (PNS) – Sub-Working Group (SWG) 3

Chairperson

Timario, Lourdes, RCh
National Codex Organization (NCO)-Technical Committee (TC)

Vice-Chairperson

Oblepias, Christmasita
NCO-TC

Members

- | | |
|---|---|
| 1 Joco, Maria Lourdes, DVM
Office of the Assistant Secretary for Regulations (OASR)-DA | 12 Ilaó, Vera Madell
Philippine Coconut Authority (PCA)-DA |
| 2 Tipa, Hernando | 13 Manalo, Emelyn |
| 3 Villahermosa, Mheira, RCh
Bureau of Animal Industry (BAI)-DA | 14 Sumagaysay, Jean Nanette
Sugar Regulatory Administration (SRA)-DA |
| 4 Arvesu, Judith Mae | 15 Baroña, Maria Celeste
Food Development Center (FDC)-DA |
| 5 Romero, Marc Lawrence, PhD | 16 Morales, Amelia |
| 6 Somga, Sonia, DVM
Bureau of Fisheries and Aquatic Resources (BFAR)-DA | 17 Romero, Marissa, PhD
Philippine Rice Research Institute (PhilRice)-DA |
| 7 Mariano, Ivy Carisse
Bureau of Plant Industry (BPI)-DA | 18 Tandas, Charina May
Philippine Association of Food Technologists (PAFT), Inc. |
| 8 Platero, Judith | 19 Mijares, Edna, RCh |
| 9 Rosal, Lennard Bryle
National Dairy Authority (NDA)-DA | 20 Paz, Jonathan, RCh
JEFCOR Laboratories, Inc. |
| 10 Micu, Remedios, RMT | |
| 11 Mundoc, Christine Mae
National Meat Inspection Service (NMIS)-DA | |

BAFS Management Team

Roscom, Karen Kristine, PhD
Aquino, John Gregory
Bautista, Karina Angela

Adviser

Mamaril, Vivencio, PhD



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS

BPI Compound, Visayas Avenue, Diliman, Quezon City, 1101 Philippines

Trunkline: (632)8928-8741 to 64 loc 3301-3319

E-mail: info.dabafs@gmail.com

Website: www.bafs.da.gov.ph