

codex alimentarius commission



FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD
HEALTH
ORGANIZATION



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Agenda Item 13(b)

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FOOD ADDITIVES AND CONTAMINANTS

Thirty-sixth Session
Rotterdam, The Netherlands, 22 – 26 March 2004

CONSIDERATION OF THE CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS (GSCT)

SCHEDULE I OF THE CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS

Governments and international organizations wishing to submit comments on the following subject matter are invited to do so **no later than 16 February 2004** as follows: Netherlands Codex Contact Point, Ministry of Agriculture, Nature and Food Quality, P.O. Box 20401, 2500 E.K., The Hague, The Netherlands (Telefax: +31.70.378.6141; E-mail: info@codexalimentarius.nl, with a copy to the Secretary, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, Viale delle Terme di Caracalla, 00100 Rome, Italy (Telefax: +39.06.5705.4593; E-mail: Codex@fao.org).

INTRODUCTION

This note and the two annexed papers were prepared by the Netherlands, in cooperation with Japan.

Schedule I

As agreed in the 35th session of the CCFAC, a revised version of Schedule I of the Codex General Standard for Contaminants and Toxins in Foods (GSCTF) is presented here. The revision has been performed in such a way that the former draft Schedule I with many aspects for the purpose of serving as a working document for the information of the Committee is now revised into a format which could be prepared for republication as the list of all contaminant MLs and GLs adopted by the CAC. In doing so, the available information was assembled in an Access database format, which will allow more easy maintenance and presentation in various ways.

Discussion points regarding Schedule I:

Schedule I is presented here as 2 separate documents: Schedule I with introductory pages and a substance-based table in two parts; the 1st part being the list of contaminant MLs for substances generally recognized as being a potential risk for health; the 2nd part of this table presents those contaminants for which the MLs can be seen as quality factors. The second document is a commodity-based presentation, mentioned as Schedule IIA, covering only the remaining Commodity Standards which contain provisions for contaminants.

The CCFAC is invited to give its view on the following:

1. General format and structure of Schedule I, and suitability of publishing this as Schedule I of the General Standard for Contaminants and Toxins in Food (CS 193-1995).
2. Maximum levels for copper, iron and zinc

The situation regarding the status of some metals, the MLs of which generally are considered to be more quality parameters than safety related parameters (copper, iron and zinc) is still somewhat complex. Recent revisions of Codex Commodity Standards have reduced the number of MLs for these substances, and some more are in the process of being removed from Commodity Standards. The 35th CCFAC agreed that Schedule I should be carefully reviewed to eliminate substances that were normally considered and classified as quality, as opposed to safety, parameters in foods. In order to present the situation clearly, they have not yet been removed completely from the presentation, but are presented here as part 2 of Schedule I, so that the CCFAC can evaluate the issue and discuss the best way to deal with these existing limits. A possible way forward might be a general decision that the limits for these substances are not safety related and to remove them from Schedule I.

3. Commodity-based presentation, Schedule IIA

The Committee is invited to discuss the general structure of the document, to look for possible inconsistencies and to decide about the possible inclusion of this commodity-based presentation as a separate part annex to Schedule I, for official publication as an annex of the GSCTF. The document is mentioned here as Schedule IIA, because Schedule II as a commodity based presentation of all contaminant MLs is already defined in the GSCTF and this presentation is more limited, covering only the situation regarding the Codex Commodity Standards with provisions for contaminants. The quality parameters copper, iron and zinc could still be mentioned in Schedule IIA with suitable notes about their status. An other option is to include this presentation only in Annex IV, for information purposes

4. Lack of commodity codes for some existing commodities with contaminant MLs

In order to make Schedule I consistent with the requirement in Annex III of the GSCTF (use of classification number of food commodity or food category) and to bring all MLs in a database format, it is necessary to attribute a commodity code to every entry. The present commodity classification is not complete. Specific proposals will be developed in a later stage.

5. Multiple levels for one contaminant in a food commodity.

There are some inconsistencies regarding contaminant provisions developed by the CCFAC and by Commodity Committees, e.g. lead in fruit juices and in meat products. This issue of inconsistency needs further discussion.

Annex IV

The previously mentioned working document for information, which was sent out last year under the heading of Schedule I has been updated and revised and somewhat expanded, and is included here under the name Annex IV of the GSCTF. The reason for this renaming is that possible confusion with Schedule I as presented here should be avoided. Annex IV of the GSCTF as it was adopted by the CAC is an introductory page which requires the establishment of a working document that is meant to serve for the information of the CCFAC and which needs regular updating. By presenting Annex IV in the format given here we fulfil this requirement of the GSCTF. The document mentions proposed MLs, but is not itself a proposal meant to be discussed, being a document for information only.

Comments on the general structure and on inconsistencies and information gaps are welcome; detailed comments are also welcome but should be sent in writing to the Netherlands and probably do not need discussion in the Committee. Further expansion regarding explanatory texts and substances that are included is foreseen.

In the future, Annex IV could be used as working document for considering new proposed maximum levels, because it will be useful to see these in the context of already existing MLs and together with all appropriate notes and remarks. This would mean that updates of Annex IV would need to be made available just prior to a meeting of the CCFAC, because it would be necessary to include all recent proposed draft MLs for contaminants and references to documents.

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS**SCHEDULE I - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN FOODS**

Introduction

Schedule I of the Codex General Standard for Contaminants and Toxins in Foods (GSCTF) is the list of Codex Standards for individual contaminants and toxins in foods and feeds. It contains all the provisions for food and feed contaminants adopted by the Codex Alimentarius Commission. Schedule I is a substance-based presentation and for full understanding of the background can only be read in conjunction with the GSCTF (CODEX STAN 193-1995) and its annexes.

Schedule I has two parts: *Part 1* containing maximum and guideline levels developed by CCFAC and contaminant provisions included in commodity standards; and *Part 2* containing maximum levels developed for copper, iron and zinc which are regarded as quality factors as opposed to safety factors.

Schedule II is intended to provide a product-based presentation of the Codex contaminant standards and could be made available when these data are assembled in a suitable database format. For the time being, a more limited presentation is provided, of the contaminant Standards contained in Commodity Standards, as Schedule IIA, in a separate document.

Information contained

The following information is contained in Schedule I, according to the agreed format (Annex III of the GSCTF).

- Name of the contaminant, Codex number and short monograph (synonym; TDI; ref JECFA; definition)
- In the form of a table:
 - Commodity
 - Product code
 - Maximum or Guideline Level in mg/kg or other appropriate expression
 - Suffix to specify the application of the ML/GL, or note
 - Type of standard (ML or GL)
- Notes and remarks to the table
- An Index of the contaminants in Schedule I is provided in Code order and in alphabetic order.
- Explanatory notes to the terms used.

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
SCHEDULE I - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN FOODS

INDEX OF CONTAMINANTS IN ALPHABETIC ORDER

NAME	CODE No.	PART	PAGE
Acrylonitrile	4.09.1	1	11
Aflatoxins, Total	5.01.1	1	12
Aflatoxin M1	5.01.2	1	13
Arsenic	1.03	1	1
Cadmium	1.06	1	2
Copper	1.09	2	1
Iron	1.10	2	2
Lead	1.11	1	3
Mercury	1.13.1	1	5
Methylmercury	1.13.2	1	6
Patulin	5.06.1	1	14
Radionuclides	8	1	15
Tin	1.16	1	7
Vinylchloride monomer	3.01.5	1	10
Zinc	1.18	2	3

INDEX OF CONTAMINANTS IN SUBSTANCE CODE ORDER

NAME	CODE No.	PART	PAGE
Arsenic	1.03	1	1
Cadmium	1.06	1	2
Copper	1.09	2	1
Iron	1.10	2	2
Lead	1.11	1	3
Mercury	1.13.1	1	5
Methylmercury	1.13.2	1	6
Tin	1.16	1	7
Zinc	1.18	2	3
Vinylchloride monomer	3.01.5	1	10
Acrylonitrile	4.09.1	1	11
Aflatoxins, Total	5.01.1	1	12
Aflatoxin M1	5.01.2	1	13
Patulin	5.06.1	1	14
Radionuclides	8	1	15

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
SCHEDULE I - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN FOODS

EXPLANATORY NOTES

Reference to JECFA:	References to JECFA meeting in which the contaminant was evaluated and the year of that meeting
Toxicological intake recommendations:	Toxicological advice about the maximum acceptable or tolerable intake level of the contaminant for humans, expressed in milligrammes (mg) per kg body weight (bw). The year of recommendations and additional explanation are included.
Residue Definition:	Definition of the contaminant in the form to which the ML applies or which may or should be analysed in commodities.
Synonyms:	Symbols, synonyms, abbreviations, scientific descriptions and identification codes used to define the contaminant.
Code:	The codes for food commodities are according to the food and feed categorization system adopted in the GSCTF, as mentioned in Annex V. The food/feed categorization system also specifies the (part of the) commodity as it should be analysed and to which the ML applies, unless a specific commodity definition is provided annex to the ML. The codes for substances are derived from the coding system mentioned in Annex IV of the GSCTF. For those maximum levels contained in Codex commodity standards, the relevant standard numbers are referred, if the code numbers are not readily available for these commodities.
Suffix:	Note accompanying a ML or GL, used to specify the application or the future revision of the ML. E.g. specific residue definitions can be mentioned by abbreviations here. See also Qualification of MLs.
Type:	Refers to type of maximum level, e.g. ML or GL. See the definitions in the preamble of the GSCTF. The “CS” refers to maximum levels contained in Codex commodity standards.
Step:	Step of the Codex Elaboration Procedure at which each maximum level is (at the time of the publication of this paper). See the Codex Procedural Manual. The term “Adopted” is used for an adopted MLs and Codex Standards.

Qualification of MLs

(*)	At or about the limit of determination
C	In canned products only
F	Fat soluble contaminant (Further provisions about the application of the ML may be necessary)
R	Under review
T	Temporary

CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
SCHEDULE 1 - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN FOODS (Part 1)

1.03 Arsenic

Reference to JECFA: 5 (1960), 10 (1967), 27 (1983), 33 (1988)
 Toxicological intake: PTWI 0.015 mg/kg bw (1988 For inorganic arsenic)
 Residue definition: Arsenic: total (As-tot) when not otherwise mentioned; inorganic arsenic (As-in); or other specification
 Synonyms: As

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
JF 0175	Fruit juices	0.2		CS	Various CS	
NF 0175	Fruit nectars	0.2		CS	Various CS	
CS 19-1981	Edible fats and oils	0.1		CS	CS 19-1981, Rev.2-1999	Edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine & named animal fats)
CS 32-1981	Margarine	0.1		CS	CS 32-1981, Rev.1-1989	
CS 135-1981	Minarine	0.1		CS	CS 135-1981, Rev.1-1989	
CS 211-1999	Named animal fats	0.1		CS	CS 211-1999	
CS 210-1999	Named vegetable oils	0.1		CS	CS 210-1999	Except olive oils (CS 33-1981)
CS 108-1981	Natural mineral water	0.01	mg/l	CS	CS 108-1981, Rev.1-1997	
CS 150-1985	Salt, food grade	0.5		CS	CS 150-1985	

1.06 Cadmium

Reference to JECFA: 16 (1972), 33 (1988), 41 (1993), 55 (2000), 61 (2003)
 Toxicological intake PTWI 0.007 mg/kg bw (1988, maintained in 2000 & 2003)
 Residue definition: Cadmium, total
 Synonyms: Cd

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
VP 0060	Legume vegetables	0.1		ML	CAC/GL 39-2001	
VD 0070	Pulses	0.1		ML	CAC/GL 39-2001	Excluding soya bean (dry)
GC 0081	Cereal grains, except buckwheat, canihua and quinoa	0.1		ML	CAC/GL 39-2001	Excluding wheat and rice; and bran and germ
CS 108-1981	Natural mineral water	0.003	mg/l	CS	CS 108-1981, Rev.1-1997	
CS 150-1985	Salt, food grade	0.5		CS	CS 150-1985	

1.11 Lead

Reference to JECFA: 10 (1966), 16 (1972), 22 (1978), 30 (1986), 41 (1993), 53 (1999)
 Toxicological intake PTWI 0.025 mg/kg bw (1986, maintained in 1993 & 1999)
 Residue definition: Lead, total
 Synonyms: Pb

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
FT 0026	Assorted (sub)tropical fruits, edible peel	0.1		ML	CS 230-2001	
FI 0030	Assorted (sub)tropical fruits, inedible peel	0.1		ML	CS 230-2001	
FB 0018	Berries and other small fruits	0.2		ML	CS 230-2001	
FC 0001	Citrus fruits	0.1		ML	CS 230-2001	
FP 0009	Pome fruits	0.1		ML	CS 230-2001	
FS 0012	Stone fruits	0.1		ML	CS 230-2001	
VB 0040	Brassica vegetables	0.3		ML	CS 230-2001	Including head & flowerhead Brassicas but excluding kale (VB 0480)
VA 0035	Bulb vegetables	0.1		ML	CS 230-2001	
VC 0045	Fruiting vegetables, cucurbits	0.1		ML	CS 230-2001	
VO 0050	Fruiting vegetables, other than cucurbits	0.1		ML	CS 230-2001	
VL 0053	Leafy vegetables	0.3		ML	CS 230-2001	Including Brassica leafy vegetables but excluding spinach (VL 0502)
VP 0060	Legume vegetables	0.2		ML	CS 230-2001	
VD 0070	Pulses	0.2		ML	CS 230-2001	
VR 0075	Root and tuber vegetables	0.1		ML	CS 230-2001	Includes potatoes as peeled potatoes
	Various fruit products	1	C	CS	CS various	Excluding canned stone fruits
	Various vegetable products	1	C	CS	CS various	
JF 0175	Fruit juices	0.05		ML		Ready to drink; includes nectars
JF 0175	Fruit juices	0.3		CS	CS various	
NF 0175	Fruit nectars	0.3		CS	CS various	
GC 0081	Cereal grains, except buckwheat, canihua and quinoa	0.2		ML	CS 230-2001	
MS	Meat and meat products	1		CS	CS various	See List under 1.16, tin.
MM 0097	Meat of cattle, pigs and sheep	0.1		ML	CS 230-2001	
PM 0110	Poultry meat	0.1		ML	CS 230-2001	
MO 0097	Edible offal of cattle, pigs and sheep	0.5		ML	CS 230-2001	
PO 0111	Edible offal of poultry	0.5		ML	CS 230-2001	
CS 19-1981	Edible fats and oils	0.1		CS	CS 19-1981, Rev.2-1999	Edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine & named animal fats)
MF 0097	Fat of cattle, pigs and sheep	0.1		ML	CS 230-2001	
CS 32-1981	Margarine	0.1		CS	CS 32-1981, Rev.1-1989	
CS 135-1981	Minarine	0.1		CS	CS 135-1981, Rev.1-1989	

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
CS 211-1999	Named animal fats	0.1		CS	CS 211-1999	
CS 210-1999	Named vegetable oils	0.1		CS	CS 210-1999	Except olive oils (CS 33-1981)
PF 0111	Poultry fats	0.1		ML	CS 230-2001	
OC 172	Vegetable oils	0.1		ML	CS 230-2001	Does not include cocoa butter
OR 172	Vegetable oils	0.1		ML	CS 230-2001	Does not include cocoa butter
ML 0107	Milk	0.02		ML	CS 230-2001	A concentration factor applies to partially or wholly dehydrated milks
LS 0107	Secondary milk products	0.02		ML	CS 230-2001	As consumed
CS 108-1981	Natural mineral water	0.01	mg/l	CS	CS 108-1981, Rev.1-1997	
	Infant formulae	0.02		ML	CS 230-2001	
CS 150-1985	Salt, food grade	2		CS	CS 150-1985	
FF 0269	Wine	0.2		ML	CS 230-2001	

1.13.1 Mercury

Reference to JECFA: 10 (1966), 14 (1970) , 16 (1972), 22 (1978)
Toxicological intake PTWI 0.005 mg/kg bw (1978)
Residue definition: Mercury, Total
Synonyms: Hg

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
CS 108-1981	Natural mineral water	0.001	mg/l	CS	CS 108-1981, Rev.1-1997	

1.13.2 Methylmercury

Reference to JECFA: 22 (1978), 33 (1988), 53 (1999), 61 (2003)
 Toxicological intake: PTWI 0.0016 mg/kg bw (2003 Pending reduction in uncertainty associated with various aspects of the derivation of the steady-state intake from maternal hair, the uncertainty factor could be refined and possibly reduced.)
 Residue definition: Methylmercury

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
WS 0125	Fish	0.5		GL	CAC/GL 7-1991	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade
WF 0115	Fish	0.5		GL	CAC/GL 7-1991	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade
WD 0120	Fish	0.5		GL	CAC/GL 7-1991	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade
	Other predatory fish	1		GL	CAC/GL 7-91	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.
WF 0865	Pike	1		GL	CAC/GL 7-91	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.
WS 0131	Shark	1		GL	CAC/GL 7-91	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.
	Swordfish	1		GL	CAC/GL 7-91	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.
WS 0132	Tuna	1		GL	CAC/GL 7-91	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.

1.16 Tin

Reference to JECFA: 10 (1966), 14 (1970), 15 (1971), 19 (1975), 22 (1978), 26 (1982), 33 (1988)
 Toxicological intake PTWI 14 mg/kg bw (1988 Expressed as Sn, includes tin from food additive uses)
 Residue definition: Tin, total (Sn-tot) when not otherwise mentioned; inorganic tin (Sn-in); or other specification
 Synonyms: Sn

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
CS 78-1981	Canned fruit cocktail	250	C	CS	CS 78-1981	
CS 15-1981	Canned grapefruit	250	C	CS	CS 15-1981	
CS 68-1981	Canned mandarin oranges	250	C	CS	CS 68-1981	
CS 159-1987	Canned mangoes	250	C	CS	CS 159-1987	
CS 42-1981	Canned pineapple	250	C	CS	CS 42-1981	
CS 60-1981	Canned raspberries	250	C	CS	CS 60-1981	
CS 62-1981	Canned strawberries	250	C	CS	CS 62-1981	
CS 99-1981	Canned tropical fruit salad	250	C	CS	CS 99-1981	
CS 79-1981	Jams (fruit preserves) and jellies	250	C	CS	CS 79-1981	
CS 160-1987	Mango chutney	250	C	CS	CS 160-1987	
CS 56-1981	Canned asparagus	250	C	CS	CS 56-1981	
CS 116-1981	Canned carrots	250	C	CS	CS 116-1981	
CS 16-1981	Canned green and wax beans	250	C	CS	CS 16-1981	
CS 58-1981	Canned green peas	250	C	CS	CS 58-1981	
CS 81-1981	Canned mature processed peas	250	C	CS	CS 81-1981	
CS 55-1981	Canned mushrooms	250	C	CS	CS 55-1981	
CS 144-1985	Canned palmito	250	C	CS	CS 144-1985	
CS 61-1981	Canned pears	250	C	CS	CS 61-1981	
CS 18-1981	Canned sweet corn	250	C	CS	CS 18-1981	
CS 13-1981	Canned tomatoes	250	C	CS	CS 13-1981	
CS 115-1981	Pickled cucumber	250	C	CS	CS 115-1981	
CS 57-1981	Processed tomato concentrates	250	C	CS	CS 57-1981	
JF 0226	Apple juice	150	C	CS	CS 48-1981	Apple juice preserved exclusively by physical means
JF 0175	Apple, grape, blackcurrant, small fruit juices	150	C	CS	CS various	Apple, grape, blackcurrant, small fruit juices preserved exclusively by physical means See specific list of relevant products
CS 44-1981	Apricot, peach and pear nectars	200	C	CS	CS 44-1981	Apricot, peach and pear nectars preserved exclusively by physical means
JF 0226	Black currant juice	150	C	CS	CS 120-81	Blackcurrant juice preserved exclusively by physical means
JF 0175	Fruit juices	200	C	CS	CS 164-1989	Fruit juices preserved exclusively by physical means not covered by individual standards (See specific list of relevant product and note exceptions)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
NF 0175	Fruit nectars	200	C	CS	CS 161-1989	Fruit nectars preserved exclusively by physical means not covered by individual standards (See specific list of relevant products and note exceptions)
JF 0269	Grape juice	150	C	CS	CS 82-1981	Grape juice preserved exclusively by physical means
JF 0203	Grapefruit juice	200	C	CS	CS 46-1981	Grapefruit juice preserved exclusively by physical means
CS 148-1981	Guava nectar	200	C	CS	CS 148-1981	Guava nectar preserved exclusively by physical means
CS 47-1981	Lemon juice	200	C	CS	CS 47-1981	Lemon juice preserved exclusively by physical means
CS 149-1981	Liquid pulpy mango products	200	C	CS	CS 149-1981	Liquid pulpy mango products preserved exclusively by physical means
GL 11-1991	Mixed fruit juices	200	C	CS	GL 11-1991	Mixed fruit juices preserved exclusively by physical means
GL 12-1991	Mixed fruit nectars	200	C	CS	GL 12-1991	Mixed fruit nectars preserved exclusively by physical means
CS 134-1981	Nectars of certain citrus fruits	200	C	CS	CS 134-1981	Nectars of certain citrus fruits preserved exclusively by physical means
CS 101-1981	Non-pulpy blackcurrant nectar	150	C	CS	CS 101-1981	Non-pulpy blackcurrant nectar preserved exclusively by physical means
JF 0004	Orange juice	200	C	CS	CS 45-1981	Orange juice preserved exclusively by physical means
JF 0341	Pineapple juice	200	C	CS	CS 85-1981	Pineapple juice preserved exclusively by physical means
CS 122-1981	Pulpy nectars of certain small fruits	150	C	CS	CS 122-1981	Pulpy nectars of certain small fruits preserved exclusively by physical means
CS 49-1981	Tomato juice	200	C	CS	CS 49-1981	Tomato juice preserved exclusively by physical means
CS 145-1985	Canned chestnuts and chestnut puree	250	C	CS	CS 145-1985	
CS 98-1981	Cooked cured chopped meat	50		CS	CS 98-1981, Rev.1-1991	For products in other containers
CS 98-1981	Cooked cured chopped meat	200	C	CS	CS 98-1981, Rev.1-1991	For products in tinfoil containers
CS 96-1981	Cooked cured ham	50		CS	CS 96-1981, Rev.1-1991	For products in other containers
CS 96-1981	Cooked cured ham	200	C	CS	CS 96-1981, Rev.1-1991	For products in tinfoil containers
CS 97-1981	Cooked cured pork shoulder	200	C	CS	CS 97-1981, Rev.1-1991	For products in tinfoil containers
CS 97-1981	Cooked cured pork shoulder	50		CS	CS 97-1981, Rev.1-1991	For products in other containers
CS 88-1981	Corned beef	200	C	CS	CS 88-1981, Rev.1-1991	For products in tinfoil containers
CS 88-1981	Corned beef	50		CS	CS 88-1981, Rev.1-1991	For products in other containers
CS 89-1981	Luncheon meat	200	C	CS	CS 89-1981	For products in tinfoil containers
CS 89-1981	Luncheon meat	50		CS	CS 89-1981	For products in other containers

3.01.5 Vinyl chloride monomer

Reference to JECFA: 28 (1984)
Toxicological intake: 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 attainable)
Residue definition: Vinylchloride monomer
Synonyms: Monochloroethene, chloroethylene; abbreviation VC or VCM

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
	Food	0.01		GL	CAC/GL 6-1991	The GL in food packaging material is 1.0 mg/kg.

4.09.1 Acrylonitrile

Reference to JECFA: 28 (1984)
Toxicological intake: 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.)
Residue definition: acrylonitrile (monomer)
Synonyms: 2-Propenenitrile; vinyl cyanide (VCN); cyanoethylene; abbreviations, AN, CAN

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
	Food	0.02		GL	CAC/GL 6-1991	

5.01.1 Aflatoxins, Total

Reference to JECFA: 31 (1987), 46 (1996), 49 (1997)
 Toxicological intake Potencies were estimated by JECFA. (1997 Intake should be reduced to levels as low as reasonably possible.)
 Residue definition: Aflatoxins total (B1 +B2 + G1 + G2)
 Synonyms: Abbreviations, AFB, AFG, AFM, with numbers, to designate specific compounds

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
SO 0703	Peanuts, raw	15		ML	CS 209-1999	

5.01.2 Aflatoxin M1

Reference to JECFA: 56 (2001)
 Toxicological intake (2001 Using worst-case assumptions, the additional risks for liver cancer predicted with use of proposed maximum levels of aflatoxin M1 of 0.05 and 0.5 µg/kg are very small. The potency of aflatoxin M1 appears to be so low in HBsAg- individuals that a carcinogenic effect of M1 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.)
 Residue definition: Aflatoxin M1

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
ML 0106	Milk	0.5		ML	CS 232-2001	

5.06.1 Patulin

Reference to JECFA: 35 (1989), 44 (1995)
Toxicological intake PMTDI 0.0004 mg/kg bw (1995)
Residue definition: Patulin

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
JF 0226	Apple juice	50		ML		The ML also covers apple juice as ingredient in other beverages.

8 Radionuclides

Guideline levels for radionuclides in foods following accidental nuclear contamination (CAC/GL 5-1989)
For use in international trade

Dose per unit intake factor in Sv/Bq	Representative radionuclides	Level in Bq/kg
Foods destined for general consumption		
10^{-6}	241-Am, 239-Pu	10
10^{-7}	90-Sr	100
10^{-8}	131-I, 134-Cs, 137-Cs	1000
Milk and infant foods		
10^{-5}	241-Am, 239-Pu	1
10^{-7}	131-I, 90-Sr	100
10^{-8}	134-Cs, 137-Cs	1000

CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
SCHEDULE 1 - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN FOODS (Part 2 Quality Factors)

1.09 Copper

Reference to JECFA: 10 (1966), 14 (1970), 26 (1982)
 Toxicological intake: PMTDI 0.5 mg/kg bw (1982 Provisional daily dietary requirement, 0.05 mg/kg)
 Residue definition: Copper, total
 Synonyms: Cu

Commodity/Product Code	Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
JF 0175	Fruit juices	5		CS	CS 164-1989	ML for sum of copper, zinc and iron: 20 mg/kg.
NF 0175	Fruit nectars	5		CS	CS 161-1989	ML for sum of copper, zinc and iron: 20 mg/kg
OR 0172	Edible fats and oils, refined	0.1		CS	CS 19-1981, Rev.2-1999	Refined edible fats and oils not covered by individual standards (see standards for named vegetable oils, olive oil, margarine, minarine, named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
OC 0172	Edible fats and oils, virgin and cold pressed	0.4		CS	CS 19-1981, Rev.2-1999	Edible fats and oils, virgin and cold pressed, not covered by individual standards (see standards for named vegetable oils, olive oil, margarine, minarine, named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
CS 32-1981	Margarine	0.1		CS	CS 32-1981, Rev.1-1989	
CS 135-1981	Minarine	0.1		CS	CS 135-1981, Rev.1-1989	
CS 211-1999	Named animal fats	0.4		CS	CS 211-1999	This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
OR 0172	Named vegetable oils, refined	0.1		CS	CS 210-1999	Except olive oil (CS 33-1981). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
OC 0172	Named vegetable oils, virgin	0.4		CS	CS 210-1999	Except olive oils (CS 33-1981) This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
CS 108-1981	Natural mineral water	1	mg/l	CS	CS 108-1981, Rev.1-1997	

1.10 Iron

Reference to JECFA: 27 (1983)
 Toxicological intake: PMTDI 0.8 mg/kg bw (1983 Group PMTDI, applies to iron from all sources except for iron oxides; daily dietary requirement 10/20 mg (men/women))
 Residue definition: Iron, total
 Synonyms: Fe

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
JF 0175	Fruit juices	15		CS	CS 164-1989	Fruit juices and nectars preserved exclusively by physical means not covered by individual standards. ML for sum of copper, zinc and iron: 20 mg/kg.
NF 0175	Fruit nectars	15		CS	CS 161-1989	Fruit juices and nectars preserved exclusively by physical means not covered by individual standards. ML for sum of copper, zinc and iron: 20 mg/kg.
CS 19-1981	Edible fats and oils, refined	2.5		CS	CS 19-1981, Rev.2-1999	Refined edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine, & named animal fats) This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
CS 19-1981	Edible fats and oils, virgin and cold pressed	5		CS	CS 19-1981, Rev.2-1999	Edible fats and oils, virgin and cold pressed, not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine, & named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.
CS 32-1981	Margarine	1.5		CS	CS 32-1981, Rev.1-1989	
CS 135-1981	Minarine	1.5		CS	CS 135-1981, Rev.1-1989	

1.18 Zinc

Reference to JECFA: 10 (1966), 26 (1982)
 Toxicological intake: PMTDI 1 mg/kg bw (1982 Provisional daily dietary requirement, 15-22 mg/person)
 Residue definition: Zinc, total
 Synonyms: Zn

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Reference	Notes/remarks
JF 0175	Fruit juices	5		CS	CS 164-1989	ML for the sum of copper, zinc and iron: 20 mg/kg
NF 0175	Fruit nectars	5		CS	CS 161-1989	ML for the sum of copper, zinc and iron: 20 mg/kg

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS**SCHEDULE IIA - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN COMMODITY STANDARDS**

Introduction

Schedule I of the Codex General Standard for Contaminants and Toxins in Food (GSCTF) is the list of Codex Standards for individual contaminants and toxins in foods and feeds. It contains all the provisions for food and feed contaminants adopted by the Codex Alimentarius Commission. Schedule I is a substance-based presentation and for full understanding of the background can only be read in conjunction with the GSCTF (CODEX STAN 193-1995) and its annexes.

Schedule II is intended to provide a product-based presentation of the Codex contaminant standards and could be made available when these data are assembled in a suitable database format.

For the time being, a more limited presentation is provided, called Schedule IIA, of the contaminant Standards contained in Commodity Standards.

Information contained

The following information is contained in Schedule IIA, generally according to the agreed format (Annex III of the GSCTF).

The presentation is based on related groups of Commodity Standards with a common approach of contaminant provisions

- Name of the contaminant, Codex number and short monograph (synonym; TDI; ref JECFA; definition)
- In the form of a table:
 - Commodity
 - Product code, as far as possible with the present code system
 - Maximum or Guideline Level in mg/kg or other appropriate expression for the various contaminants included
 - Suffix to specify the application of the MLs/GLs, or reference to a note
 - Type of standard (ML or GL)
 - Code number of Codex Standard
- Notes and remarks to the table
- An Index of the commodity groups is provided, and of the contaminants which are included
- Explanatory notes to the terms used.

**CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS
IN FOOD**

**SCHEDULE IIA - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND
TOXINS IN COMMODITY STANDARDS**

INDEX OF COMMODITY (GROUP) STANDARDS WITH CONTAMINANT PROVISIONS

COMMODITY GROUP	CONTAMINANTS	PAGE
fruit juices and nectars	As, Cu, Fe, Pb, Sn, Zn	4
non-beverage processed fruit and vegetable commodities	Pb, Sn	5
processed meat products	Pb, Sn	7
edible fats and oils and related products	As, Cu, Fe, Pb	6
food grade salt	As, Cd, Cu, Pb, Hg	8
natural mineral water	As, B, Ba, Cd, CN-, Cr, Cu, F, Hg	8
	Mn, Ni, NO ₂ - NO ₃ , Pb, Sb, Se	8

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS**SCHEDULE IIA - MAXIMUM AND GUIDELINE LEVELS FOR CONTAMINANTS AND TOXINS IN COMMODITY STANDARDS**

EXPLANATORY NOTES

Code no.: The codes for food commodities are according to the food and feed categorization system adopted in the GSCTF, as mentioned in Annex V. The food/feed categorization system also specifies the (part of the) commodity as it should be analysed and to which the ML applies, unless a specific commodity definition is provided annex to the ML

The codes for substances are derived from the coding system mentioned in Annex IV of the GSCTF.

Reference: Reference to the Codex Standard Code number

Suffix: Note accompanying a ML or GL, used to specify the application or the future revision of the ML. E.g. specific residue definitions can be mentioned by abbreviations here.

See also Qualification of MLs.

Type: Refers to type of maximum level, e.g. ML or GL. See the definitions in the preamble of the GSCTF

Qualification of MLs

(*) At or about the limit of determination

C In canned products only

F Fat soluble contaminant (Further provisions about the application of the ML may be necessary)

R Under review

T Temporary

*, # Used for referring to a note under the heading "notes, remarks" in or directly under the table of MLs

CODEX MLs for contaminants in fruit juices and nectars

Contaminant		As	Cu	Fe	Pb	Sn	Zn				
Commodity/Product								Suffix	Type	Reference,	Notes, remarks
Code	Name	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Standard			
	Apricot, peach and pear nectars *	0.2	5	10	0.3	200	5	R C	ML	CS 44-81	1)
	Orange juice*	0.2	5	10	0.3	200	5	R C	ML	CS 45-81	1)
	Grapefruit juice*	0.2	5	10	0.3	200	5	R C	ML	CS 46-81	1)
	Lemon juice*	0.2	5	10	0.3	200	5	R C	ML	CS 47-81	1)
	Apple juice*	0.2	5	10	0.3	150	5	R C	ML	CS 48-81	1)
	Tomato juice*	0.2	5	10	0.3	200	5	R C	ML	CS 49-81	1)
	Grape juice*	0.2	5	10	0.3	150	5	R C	ML	CS 82-81	1)
	Pineapple juice*	0.2	5	10	0.3	200	5	R C	ML	CS 85-81	1)
	Non-pulpy blackcurrant nectar*	0.2	5	10	0.3	150	5	R C	ML	CS 101-81	1)
	Blackcurrant juice*	0.2	5	10	0.3	150	5	R C	ML	CS 120-81	1)
	Pulpy nectars of certain small fruits*	0.2	5	10	0.3	150	5	R C	ML	CS 122-81	1)
	Nectars of certain citrus fruits*	0.2	5	10	0.3	200	5	R C	ML	CS 134-81	1)
	Guava nectar*	0.2	5	10	0.3	200	5	R C	ML	CS 148-81	1)
	Liquid pulpy mango products*	0.2	5	10	0.3	200	5	R C	ML	CS 149-81	1)
	GS for fruit Nectars * #	0.2	5	10	0.3	200	5	R C	ML	CS 161-81	1)
	GS for fruit juices * #	0.2	5	10	0.3	200	5	R C	ML	CS 164-81	1)
	GLs for mixed fruit juices	0.2	5	10	0.3	200	5	R C	ML	GL 11-91	1)
	GLs for mixed fruit nectars	0.2	5	10	0.3	200	5	R C	ML	GL 12-91	1)

* preserved exclusively by physical means

for products not covered by individual standards

1) and ML for the sum of copper, zinc and iron 20 mg/kg

CODEX MLs for contaminants in non beverage processed fruit and vegetable commodities

Contaminant		Pb	Sn	Suffix	Type	Reference, Standard	Notes, remarks
Commodity/Product Code	Name	mg/kg					
	Canned tomatoes	1	250	R C	ML	CS 13-81	
	Canned grapefruit	1	250	R C	ML	CS 15-81	
	Canned green and wax beans	1	250	R C	ML	CS 16-81	
	Canned sweet corn	1	250	R C	ML	CS 18-81	
	Canned pineapple	1	250	R C	ML	CS 42-81	
	Canned mushrooms	1	250	R C	ML	CS 55-81	
	Canned asparagus	1	250	R C	ML	CS 56-81	
	Processed tomato concentrates	1	250	R C	ML	CS 57-81	
	Canned green peas	1	250	R C	ML	CS 58-81	
	Canned raspberries	1	250	R C	ML	CS 60-81	
	Canned pears	1	250	R C	ML	CS 61-81	
	Canned strawberries	1	250	R C	ML	CS 62-81	
	Canned mandarin oranges	1	250	R C	ML	CS 68-81	
	Canned fruit cocktail	1	250	R C	ML	CS 78-81	
	Jams (fruit preserves) and jellies	1	250	R C	ML	CS 79-81	
	Canned pineapple	1	250	R C	ML	CS 42-81	
	Canned mature processed peas	1	250	R C	ML	CS 81-81	
	Canned tropical fruit salad	1	250	R C	ML	CS 99-81	
	Pickled cucumber	1	250	R C	ML	CS 115-81	
	Canned carrots	1	250	R C	ML	CS 116-81	
	Canned palmito	1	250	C	ML	CS 144-85	
	Canned chestnuts and chestnut purée	1	250	R C	ML	CS 145-85	
	Canned mangoes	1	250	R C	ML	CS 159-87	
	Mango chutney	1	250	R C	ML	CS 160-87	

CODEX MLs for contaminants in edible fats and oils and related products

Contaminant		As	Cu	Fe	Pb				
Commodity/Product						Suffix	Type	Reference,	Notes, remarks
Code	Name	mg/kg						Standard	
OC 172 #	Edible fats and oils, vegetable, ## *	0.1	0.4 2)	5.0 2)	0.1		ML	CS 19-1981	1) * not covered by individual standards
OR 172 #	Edible fats and oils, vegetable, refined*	0.1	0.1 2)	2.5 2)	0.1		ML	CS 19-1981	1) * not covered by individual standards
FA 96, 111 #	Edible fats and oils, animal* ###	0.1	0.4 2)	2.5 2)	0.1		ML	CS 19-1981	1) * not covered by individual standards
	142								
FF	Margarine	0.1	0.1	1.5	0.1		ML	CS 32-1981	1)
LF	Minarine	0.1	0.1	1.5	0.1		ML	CS 135-1981	1)
OC 172 #	Named vegetable oils, virgin 3)	0.1	0.4 2)	5.0 2)	0.1		ML	CS 210-1999	1)
OR 172 #	Named vegetable oils, refined 3)	0.1	0.1 2)	1.5 2)	0.1		ML	CS 210-1999	1)
FA 812, 818	Named animal fats	0.1	0.4 2)	1.5 2)	0.1		ML	CS 211-1999	1)
FA 822									

note exceptions and additions, the latter in the case of oils and fats of marine origin

virgin and cold pressed

The text of the Standard mentions edible fats and oils of animal or marine origin.

Notes and remarks

1. The more recently revised Standards for oils and fats contain the following wording for the mentioned contaminant MLs, under the heading heavy metals : *The products covered by the provisions of this Standard shall comply with MLs being established by the CAC but in the meantime the following limits will apply.* The Standards for margarine and minarine (CS 32-1981 and CS 135-1981) contain MLs for Fe, Cu, Pb and As and do not have such a sentence. There is a specific Standard for olive oil, virgin and refined, and for refined olive-pomace-oil (CS 33-1981), which does not contain provisions for contaminants. The named animal fats in CS 211-1999 refer only to fats derived from fatty tissue of swine, bovine animals and sheep. CS 019-1981, Rev.2-1999 for edible fats and oils not covered by individual standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As)
2. This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments
3. The named vegetable oils are the following: arachis (peanut) oil, babassu oil, coconut oil, cottonseed oil, grapeseed oil, maize oil, mustardseed oil, palm kernel oil, palm oil, palm olein, palm stearin, rapeseed oil, idem, low erucic acid, safflowerseed oil, idem, high oleic acid, sesameseed oil, soya bean oil, sunflowerseed oil, idem, high oleic acid.

CODEX MLs for contaminants in processed meat products

Contaminant		Pb	Sn				
Commodity/Product				Suffix	Type	Reference,	Notes, remarks
Code	Name	mg/kg				Standard	
	Corned beef	1	200	C	ML	CS 88-81	packed in tinfoil
	Corned beef	1	50	*	ML	CS 88-81	* for products in other
	Luncheon meat	1	200	C	ML	CS 89-81	packed in tinfoil
	Luncheon meat	1	50	*	ML	CS 89-81	* for products in other
	Cooked cured ham	1	200	C	ML	CS 96-81	packed in tinfoil
	Cooked cured ham	1	50	*	ML	CS 96-81	* for products in other
	Cooked cured pork shoulder	1	200	C	ML	CS 97-81	packed in tinfoil
	Cooked cured pork shoulder	1	50	*	ML	CS 97-81	* for products in other
	Cooked cured chopped meat	1	200	C	ML	CS 98-81	packed in tinfoil
	Cooked cured chopped meat	1	50	*	ML	CS 98-81	* for products in other

CODEX MLs for contaminants in food grade salt

Contaminant		As	Cd	Cu	Pb	Hg				
Commodity/Product							Suffix	Type	Reference,	Notes, remarks
Code	Name	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			Standard	
SW	Food grade salt	0.5	0.5	2	2	0.1		ML	CS 150-1985*	*Rev. 1-1997, Amend.2-2001

CODEX MLs for contaminants in natural mineral waters

Contaminant		Sb	As 1)	Ba	Cd	Cr 2)	Cu				
Commodity/Product								Suffix	Type	Reference,	Notes, remarks
Code	Name	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l			Standard	
SW	natural mineral waters	0.005	0.01	0.7	0.003	0.05	1		ML	CS 150-1985*	*Rev. 1-1997, Amend.2-2001
Contaminant		Pb	Mn	Hg	Ni	B 3)	F				
SW	natural mineral waters	0.01	0.5	0.001	0.02	5	4)		ML	CS 150-1985*	*Rev. 1-1997, Amend.2-2001
Contaminant		Se	Nitrate	Nitrite	Cyanide						
SW	natural mineral waters	0.01	50	0.02	0.07				ML	CS 150-1985*	*Rev. 1-1997, Amend.2-2001

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS

Introduction

Annex IV of the Codex General Standard for Contaminants and Toxins in Food (GSCTF) is the annotated list of contaminants and toxins that are or have been dealt with in the CCFAC or in other Codex Committees. It does not only encompass the contaminants and toxins for which Codex Standards exist or are being developed, but also those for which further information is sought or about which a Codex decision has been taken. It has the purpose of providing an overview of the situation regarding Codex decisions on this subject and to provide adequate background information and references, in order to give guidance about further actions which may be required. It therefore is a working document which needs to be regularly updated. It is not an official Codex Standard and although it contains proposed MLs it is as such not a document subject to adoption procedures, but is provided solely for information.

Annex IV is published in the format for Schedule I as mentioned in Annex III of the Preamble to the GSCTF. Schedule I is (intended to be) the officially published list of adopted Codex Standards for contaminants and toxins in food. Annex IV contains not only the Codex Standards for individual contaminants and toxins in foods and feeds, as published in Schedule I, it contains also references to other relevant provisions for food and feed contaminants adopted by the Codex Alimentarius Commission, such as Codes of Practice. It also contains the proposals for MLs and references to the Codes of Practice which are being discussed in the CCFAC and in other relevant Codex Committees. Notes, remarks and other references are added as far as it is relevant, to provide adequate information in summary form. It is a substance-based presentation and for full understanding of the background can only be read in conjunction with the GSCTF and its other annexes.

Annex IV is thus a working document for the information of the CCFAC, which contains all existing and proposed Codex Standards for contaminants and toxins in foods and feeds, with background information and notes and references regarding relevant Codex decisions and information sources. It is a dynamic document that needs to be updated regularly on the basis of progress in Codex Committees, JECFA evaluations, CAC decisions etc. It shall thus be updated annually and presented to all delegates of the CCFAC prior to a meeting of the Committee.

Annex IV as it is presented here is a third draft which still might be further improved. It is updated and further expanded compared to the previous draft and is expected to give useful and reliable information, but no guarantees can be given regarding the exact validity of the contents. It is hoped that with the aid of suggestions for improved texts by the participants of the CCFAC and other interested parties, it will develop further as a valuable information document for the discussions of the CCFAC.

Information contained

The following information is contained, according to the agreed format (Annex III of the GSCTF).

- Name of the contaminant, Codex number and short monograph (synonym; TDI; ref JECFA; definition)
- In the form of a table:
 - Commodity
 - Product code
 - Maximum or Guideline Level in mg/kg or other appropriate expression
 - Suffix to specify the application of the ML/GL
 - Type of standard (ML or GL)
 - Step or other indication of status (adopted by CAC)
 - Reference to official documents, relevant Codex Committee meetings with decisions etc.
- Notes and remarks to the table, including short summaries of decisions, requests for information etc.
- An Index of contaminants is provided in Code order and in alphabetic order.
- Explanatory notes to the terms used.

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS

INDEX OF CONTAMINANTS IN CODE ORDER

CODE	NAME	CONTENT
1.3	arsenic	annotated, with general text
1.6	cadmium	annotated
1.9	copper	annotated
1.10	iron	annotated
1.11	lead	annotated
1.13.1	mercury	annotated
1.13.2	methylmercury	annotated
1.16	tin	annotated
1.18	zinc	annotated
3.1.5	monochloroethene (vinylchloride)	annotated
3.4	polychlorobiphenyls	annotated, short text
3.8	chlorinated dibenzodioxins and dibenzofurans	annotated, with general text
3.10.1	1,3-dichloro-2-propanol	annotated, with general text
3.10.2	3-chloro-1,2-propanediol	(combined)
4.9.1	acrylonitrile	annotated
4.11.1	ethylcarbamate	annotated, with general text
5.1	aflatoxins	annotated, with general text
5.2	ochratoxins	annotated, with general text
5.3.1	T-2 and HT-2-toxin	annotated, with general text
5.3.8	deoxynivalenol	annotated, with general text
5.4.1	fumonisin	annotated, with general text
5.4.3	zearalenone	annotated, with general text
5.6.1	patulin	annotated, with general text
8.	radionuclides	annotated

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS

ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS

Annex IV has two parts: *Part 1* containing maximum and guideline levels developed by CCFAC and contaminant provisions included in commodity standards; and *Part 2* containing maximum levels developed for copper, iron and zinc which are regarded as quality factors as opposed to safety factors. Although Schedule 1 shall contain only those levels adopted by the Commission and currently valid, Part 1 contains also those levels still at various steps of the Codex elaboration procedure and those already revoked or not valid any more, for the facilitation of consideration of proposed maximum levels by the CCFAC.

INDEX OF CONTAMINANTS IN ALPHABETIC ORDER

NAME	CODE No.	PART	PAGE
Acrylonitrile	4.09.1	1	25
Aflatoxins, Total	5.01.1	1	27
Aflatoxin M1	5.01.2	1	29
Arsenic	1.03	1	1
Cadmium	1.06	1	4
3-Chloro-1,2-propanediol	3.10.2	1	24
Copper	1.09	2	1
1,3-DCP	3.10.1	1	24
Deoxynivalenol	5.03.8	1	32
1,3-Dichloro-2-propanol	3.10.1	1	24
Dioxins	3.08	1	23
Ethylcarbamate	4.11.1	1	26
Fumonisin	5.04.1	1	33
HT-2 toxin	5.03.1	1	31
Iron	1.10	2	4
Lead	1.11	1	7
3-MCPD	3.10.2	1	24
Mercury	1.13.1	1	12
Methylmercury	1.13.2	1	13
Monochloroethene	3.01.5	1	20
3-Monochloropropane-1,2-diol	3.10.2	1	24
Ochratoxin A	5.02.1	1	30
Patulin	5.06.1	1	35
Polychlorinated biphenyls	3.04	1	21
Radionuclides	8	1	36
T-2 toxin	5.03.1	1	31
Tin	1.16	1	16
Vinylchloride monomer	3.01.5	1	20
Zearalenone	5.04.3	1	34
Zinc	1.18	2	6

CODEX ALIMENTARIUS - GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS

ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS

EXPLANATORY NOTES

Reference to JECFA:	References to JECFA meeting in which the contaminant was evaluated and the year of that meeting
Toxicological intake recommendations:	Toxicological advice about the maximum acceptable or tolerable intake level of the contaminant for humans, expressed in milligrammes (mg) per kg body weight (bw). The year of recommendations and additional explanation are included.
Residue Definition:	Definition of the contaminant in the form to which the ML applies or which may or should be analysed in commodities.
Synonyms:	Symbols, synonyms, abbreviations, scientific descriptions and identification codes used to define the contaminant.
Code:	The codes for food commodities are according to the food and feed categorization system adopted in the GSCTF, as mentioned in Annex V. The food/feed categorization system also specifies the (part of the) commodity as it should be analysed and to which the ML applies, unless a specific commodity definition is provided annex to the ML. The codes for substances are derived from the coding system mentioned in Annex IV of the GSCTF. For those maximum levels contained in Codex commodity standards, the relevant standard numbers are referred, if the code numbers are not readily available for these commodities.
Suffix:	Note accompanying a ML or GL, used to specify the application or the future revision of the ML. E.g. specific residue definitions can be mentioned by abbreviations here. See also Qualification of MLs.
Type:	Refers to type of maximum level, e.g. ML or GL. See the definitions in the preamble of the GSCTF. The “CS” refers to maximum levels contained in Codex commodity standards.
Step:	Step of the Codex Elaboration Procedure at which each maximum level is (at the time of the publication of this paper). See the Codex Procedural Manual. The term “Adopted” is used for an adopted MLs and Codex Standards.

Qualification of MLs

(*)	At or about the limit of determination
C	In canned products only
F	Fat soluble contaminant (Further provisions about the application of the ML may be necessary)
R	Under review
T	Temporary

CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS
Part 1

1.03 Arsenic

Reference to JECFA: 5 (1960), 10 (1967), 27 (1983), 33 (1988)
 Toxicological intake: PTWI 0.015 mg/kg bw (1988 For inorganic arsenic)
 Residue definition: Arsenic: total (As-tot) when not otherwise mentioned; inorganic arsenic (As-in); or other specification
 Synonyms: As

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
Provisions developed by other Codex committees									
JF 0175	Fruit juices	0.2		CS	Adopted	Various CS	FVJ		3)
NF 0175	Fruit nectars	0.2		CS	Adopted	Various CS	FVJ		3)
CS 19-1981	Edible fats and oils	0.1	R	CS	Adopted	CS 19-1981, Rev.2-1999	FO	Edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine & named animal fats)	1)
CS 32-1981	Margarine	0.1		CS	Adopted	CS 32-1981, Rev.1-1989	FO-03		2)
CS 135-1981	Minarine	0.1		CS	Adopted	CS 135-1981, Rev.1-1989	FO-03		2)
CS 211-1999	Named animal fats	0.1		CS	Adopted	CS 211-1999	FO		The named animal fats in CS 211-1999 refer only to fats derived from fatty tissue of swine, bovine animals and sheep. CS for edible fats and oils not covered by individual standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As)
CS 210-1999	Named vegetable oils	0.1		CS	Adopted	CS 210-1999	FO-03	Except olive oils (CS 33-1981)	1)
CS 108-1981	Natural mineral water	0.01	mg/l	CS	Adopted	CS 108-1981, Rev.1-1997	NMW-01		Changed from 0.05 mg/l in 2001.
CS 150-1985	Salt, food grade	0.5		CS	Adopted	CS 150-1985	NFSDU-96		
MLs/provisions revoked or discontinued									
	Legumes						CPL 94		Work discontinued
	Pulses						CPL 94		Work discontinued
	Cereals						CPL 94		Work discontinued
[CS 168-1987]	Mayonnaise						EUR		European Standard revoked in 2003. ML was 0.3 mg/kg.

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
[CS 87-1981]	Chocolate (except..)						CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for arsenic; ML was 0.5 mg/kg
[CS 87-1981]	Chocolate, unsweetened					[CS 87-1981]	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for arsenic; ML was 1 mg
CS 86-1985	Cocoa butter					CS 86-1985, Rev.1-2001	CPC		The revised standard no longer contains provisions for arsenic. ML of the previous standard was 0.5 mg/kg.
[CS 147-1985]	Cocoa butter confectionery					[CS 147-1985]	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for arsenic; ML was 0.5 mg/kg
CS 105-1981	Cocoa powders & dry cocoa-sugar mixtures					CS 105-1981, Rev.1-2001	CPC		The revised standard no longer contains provisions for arsenic. ML in the previous standard was 1 mg/kg.
CS141-1983	Cocoa products, other					CS141-1983, Rev.1-2001	CPC	Cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake	The Codex Standards for cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake (CS 141-1983) were revised in 2001 and no longer contains provisions for arsenic. ML in the previous standard was 1 mg/kg.
[CS 142-1983]	Composite and filled chocolate					[CS 142-1983]	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for arsenic; ML was 1 mg
[CS 162-1987]	Vinegar						EUR		European Standard revoked in 2001. ML was 1 mg/kg.

1) The revised Standards for oils and fats contain the following wording for the mentioned contaminant MLs: "The products covered by the provisions of this Standard shall comply with MLs being established by the CAC but in the meantime the following limits will apply." CS for Edible Fats and Oils Not Covered by Individual Standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As).

2) The Standards for margarine and minarine (CS 32-1981 and CS 135-1981) contain MLs for Fe, Cu, Pb and As, but the CCFO is working on a draft Standard for fat spreads and blended spreads, which will contain the same text as in the more recently revised Standards for oils and fats and which will only apply to Pb and As.

3) The 3rd session of the ad hoc Intergovernmental task force on fruit and vegetable juices is developing a proposed draft Codex General Standard for fruit juices and nectars (see ALINORM 03/39A, Appendix II). The 2003 CAC adopted this text and advanced it to step 7, noting that some details needed to be further discussed, but with the expectation that at the next session of the Task Force a single standard could be presented for final adoption by the CAC. This new General Standard does not contain contaminant MLs. See the list of relevant Standards for fruit juices and nectars for 1.16, tin.

Arsenic is a metalloid element which is normally occurring in mineral bound form in the earth's crust and which can become more easily available by natural sources such as volcanic activity and weathering of minerals, and by anthropogenic activity causing emissions in the environment, such as ore smelting, burning of coal and specific uses, such as arsenic-based wood preservatives, pesticides or veterinary or human medicinal drugs. As a result of naturally occurring metabolic processes in the biosphere arsenic occurs as a large number of organic or inorganic chemical forms in food (species). Especially in the marine environment arsenic is often found in high concentrations of organic forms of arsenic, until 50 mg/kg of arsenic (wet weight basis) in some seafoods, including seaweed, fish, shellfish and crustaceans. In fresh water and in the terrestrial environments arsenic is normally found in much lower levels (typically 0-20 ug/kg) in crop plants and in livestock. Higher levels may be found in rice, mushrooms, and sometimes in e.g. poultry which is fed with arsenic containing fish meal. Levels of arsenic in drinking water are of concern in many countries; levels exceeding 200 mg/l have been reported, which can adversely effect the health of consumers. The most toxic forms of arsenic are the inorganic arsenic (III) and (V) compounds; the inorganic arsenic trioxide is well known as a rat poison, which was also sometimes used for homicide. Methylated forms of arsenic have a low acute toxicity; arsenobetaine which is the principal arsenic form in fish and crustaceans is considered non-toxic. In shellfish, molluscs and seaweed dimethylarsinylriboside derivatives occur ("arsenosugars"), the possible toxicity of which is not known in detail. Only a few percent of the total arsenic in fish is present in inorganic form, which is the only form about which a PTWI has been developed by JECFA. The human epidemiological data used for this risk assessment is based on exposure to inorganic arsenic in drinking water. IARC has classified inorganic arsenic as a human carcinogen, and the estimated lifetime risk for arsenic-induced skin cancer which may be caused by drinking water at or in excess of the WHO-GL for arsenic in drinking water is estimated at 6×10^{-4} .

The analysis of total arsenic in food has up to date suffered from difficulties with respect to accuracy and precision. Furthermore, speciated data for arsenic are strongly needed because of the large differences in toxicity to humans of the various forms of arsenic.

The intake of total arsenic in the human diet is usually dominated by organic arsenic derived from seafood. The available data about the possible human exposure to inorganic arsenic (often using the assumption that non-seafood commodities contain only inorganic arsenic) suggest that the PTWI will normally not be exceeded, unless there is a large contribution from drinking water. Further research is needed about the fate of organic arsenicals and the possibility that they might be converted to more toxic inorganic forms of arsenic, whether by processing or by metabolisation in animals or humans.

A position document CX/FAC 99/22 on arsenic was last discussed in the 31st CCFAC (1999) (see ALINORM 99/12A, para. 137). The document noted that several countries have established MLs for arsenic in food commodities and some of these were stringent regarding sea foods, so trade problems might occur. The present range of Codex MLs for arsenic in some commodities do not cover all national MLs. The document concluded however that in general there are no indications that specific Codex MLs for arsenic in food commodities would be necessary. Also, at present there is no sufficient basis to decide about the establishment of Codex MLs for arsenic, due to the uncertainties mentioned about the levels of naturally occurring arsenic species in foods, about their toxicity and about the availability of suitable analytical methods. It was acknowledged that at present especially the ML for arsenic in drinking water and in mineral water is relevant. The CCFAC asked Denmark to finalize the position paper and agreed that the finalized position paper would form the basis for future work until such time as routine methodology became available to determine toxic arsenic compounds in food.

1.06 Cadmium

Reference to JECFA: 16 (1972), 33 (1988), 41 (1993), 55 (2000), 61 (2003)
 Toxicological intake: PTWI 0.007 mg/kg bw (1988, maintained in 2000 & 2003)
 Residue definition: Cadmium, total
 Synonyms: Cd

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
FT 0026	Assorted (sub)tropical fruits, edible peel	0.05		ML	3		FAC 02, 03		1)
FI 0030	Assorted (sub)tropical fruits, inedible peel	0.05		ML	3		FAC 02, 03		1)
FB 0018	Berries and other small fruits	0.05		ML	3		FAC 02, 03		1)
FC 0001	Citrus fruits	0.05		ML	3		FAC 02, 03		1)
FP 0009	Pome fruits	0.05		ML	3		FAC 02, 03		1)
FS 0012	Stone fruits	0.05		ML	3		FAC 02, 03		1)
VB 0040	Brassica vegetables	0.05		ML	3		FAC 02, 03		1)
VA 0035	Bulb vegetables	0.05		ML	3		FAC 02, 03		1)
VR 0578	Celeriac	0.2		ML	3		FAC 02, 03		1)
VC 0045	Fruiting vegetables, cucurbits	0.05		ML	3		FAC 02, 03		1)
VO 0050	Fruiting vegetables, other than cucurbits	0.05		ML	3		FAC 02, 03	Excluding tomatoes	1)
VO 0449	Fungi, edible	0.2		ML	3		FAC 02, 03		1)
VL 0053	Leafy vegetables	0.2		ML	3		FAC 02, 03		1)
VP 0060	Legume vegetables	0.1		ML	Adopted	CAC/GL 39-2001			
VR 0589	Potato	0.1		ML	3		FAC 02, 03	Peeled	1)
VD 0070	Pulses	0.1		ML	Adopted	CAC/GL 39-2001		Excluding soya bean (dry)	
VR 0075	Root and tuber vegetables	0.1		ML	3		FAC 02, 03	Excluding potato and celeriac	1)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
VD 0541	Soybean (dry)	0.2		ML	3		FAC 02, 03		
VS 0078	Stalk and stem vegetables	0.1		ML	3		FAC 02, 03		1)
GC 0081	Cereal grains, except buckwheat, canihua and quinoa	0.1		ML	Adopted	CAC/GL 39-2001		Excluding wheat and rice; and bran and germ	
CM 0649	Rice, polished	0.2		ML	3		FAC 02, 03		
GC 0654	Wheat grain	0.2		ML	3		FAC 02, 03	Including bran and germ	1)
SO 0697	Peanut	0.2		ML	3		FAC 02, 03		
HH 0726	Herbs, fresh	0.2		ML	3		FAC 02, 03		1)
MM 097	Meat of cattle, pigs, sheep	0.05		ML	3		FAC 02		1)
MM 0816	Meat of horse	0.2		ML	3		FAC 02		1)
PM 0110	Meat of poultry	0.05		ML	3		FAC 02		1)
IM 0150	Molluscs, incl. cephalopods	1		ML	3		FAC 02		1)
Provisions developed by other Codex committees									
CS 108-1981	Natural mineral water	0.003	mg/l	CS	Adopted	CS 108-1981, Rev.1-1997	NMW-01		
CS 150-1985	Salt, food grade	0.5		CS	Adopted	CS 150-1985	NFSDU 96		
MLs/provisions revoked or discontinued									
MO 0098	Kidney of cattle, pig, sheep						FAC 02		The work on the proposed ML at 1.0 mg/kg was discontinued as the food group was a minor contributor to exposure from cadmium (proposed by the 34th CCFAC, approved by the 2002 CXEXEC).
	Kidney of poultry						FAC 02		The work on the proposed ML at 1.0 mg/kg was discontinued as the food group was a minor contributor to exposure from cadmium (proposed by the 34th CCFAC, approved by the 2002 CXEXEC).

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MO 0099	Liver of cattle, pig, sheep						FAC 02		The work on the proposed ML at 0.5 mg/kg was discontinued as the food group was a minor contributor to exposure from cadmium (proposed by the 34th CCFAC, approved by the 2002 CXEXEC). The work on the proposed ML at 0.5 mg/kg was discontinued as the food group was a minor contributor to exposure from cadmium (proposed by the 34th CCFAC, approved by the 2002 CXEXEC).
	Liver of poultry						FAC 02		
WC 0143	Crustaceans						FAC 02		The work on the proposed ML for crustaceans at 0.5 mg/kg (excl. lobster & brown meat from crab) was discontinued as the food group was a minor contributor to exposure from cadmium (proposed by the 34th CCFAC, approved by the 2002 CXEXEC).

A position document (CX/FAC 95/19) on cadmium was followed by a discussion document (last version CX/FAC 99/21) in which MLs for cadmium were proposed. Since then the proposed MLs have been discussed in the CCFAC and progress is mentioned in the CCFAC Reports.

1) The 35th CCFAC forwarded these proposed MLs at step 5 to the CAC, and kept the draft MLs for rice (polished, soy bean (dry), molluscs and peanuts at step 3 for a further round of comments. The 2003 CAC returned the proposals from step 5 to step 3, taking into consideration that the 2003 JECFA would evaluate the risks from exposure to cadmium; the CCFAC was asked to accelerate its work to move revised draft MLs to step 8 as soon as practicable.

1.11 Lead

Reference to JECFA: 10 (1966), 16 (1972), 22 (1978), 30 (1986), 41 (1993), 53 (1999)
 Toxicological intake: PTWI 0.025 mg/kg bw (1986, maintained in 1993 & 1999)
 Residue definition: Lead, total
 Synonyms: Pb

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
FT 0026	Assorted (sub)tropical fruits, edible peel	0.1		ML	adopted	CS 230-2001	FAC 00		
FI 0030	Assorted (sub)tropical fruits, inedible peel	0.1		ML	adopted	CS 230-2001	FAC 00		
FB 0018	Berries and other small fruits	0.2		ML	Adopted	CS 230-2001	FAC 00		
FC 0001	Citrus fruits	0.1		ML	adopted	CS 230-2001	FAC 00		
FP 0009	Pome fruits	0.1		ML	Adopted	CS 230-2001	FAC 00		
FS 0012	Stone fruits	0.1		ML	Adopted	CS 230-2001	FAC 00		
VB 0040	Brassica vegetables	0.3		ML	Adopted	CS 230-2001	FAC 00	Including head & flowerhead Brassicas but excluding kale (VB 0480)	
VA 0035	Bulb vegetables	0.1		ML	Adopted	CS 230-2001	FAC 00		
VC 0045	Fruiting vegetables, cucurbits	0.1		ML	Adopted	CS 230-2001	FAC 00		
VO 0050	Fruiting vegetables, other than cucurbits	0.1		ML	Adopted	CS 230-2001	FAC 00		
VL 0053	Leafy vegetables	0.3		ML	Adopted	CS 230-2001	FAC 00	Including Brassica leafy vegetables but excluding spinach (VL 0502)	
VP 0060	Legume vegetables	0.2		ML	Adopted	CS 230-2001	FAC 00		
VD 0070	Pulses	0.2		ML	Adopted	CS 230-2001	FAC 00		
VR 0075	Root and tuber vegetables	0.1		ML	Adopted	CS 230-2001	FAC 00	Includes potatoes as peeled potatoes	
JF 0175	Fruit juices	0.05		ML	Adopted		FAC 01	Ready to drink; includes nectars	Although this ML was adopted by the 2001 CAC, it is not mentioned in CS 230-2001.
GC 0081	Cereal grains, except buckwheat, canihua and quinoa	0.2		ML	Adopted	CS 230-2001	FAC 00		
MM 0097	Meat of cattle, pigs and sheep	0.1		ML	Adopted	CS 230-2001	FAC 00		
PM 0110	Poultry meat	0.1		ML	adopted	CS 230-2001	FAC 00		
MO 0097	Edible offal of cattle, pigs and sheep	0.5		ML	Adopted	CS 230-2001	FAC 00		
PO 0111	Edible offal of poultry	0.5		ML	Adopted	CS 230-2001	FAC 00		

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
WD 0120	Diadromous fish	0.2		ML	6		FAC 02-03	As fish muscle	4)
WF 0115	Freshwater fish	0.2		ML	6		FAC 02-03	As fish muscle	4)
WS 0125	Marine fish	0.2		ML	6		FAC 02-03	As fish muscle	4)
MF 0097	Fat of cattle, pigs and sheep	0.1		ML	adopted	CS 230-2001	FAC 00		
PF 0111	Poultry fats	0.1		ML	adopted	CS 230-2001	FAC 00		
OC 172	Vegetable oils	0.1		ML	adopted	CS 230-2001	FAC 00	Does not include cocoa butter	
OR 172	Vegetable oils	0.1		ML	adopted	CS 230-2001	FAC 00	Does not include cocoa butter	
ML 0107	Milk	0.02		ML	adopted	CS 230-2001	FAC 00-03	A concentration factor applies to partially or wholly dehydrated milks	The previous footnote "For dairy products, an appropriate concentration factor should apply", was changed to "a concentration factor applies to partially or wholly dehydrated milk" by the 35th CCFAC.
LS 0107	Secondary milk products	0.02		ML	adopted	CS 230-2001	FAC 00-03	As consumed	6)
	Infant formulae	0.02		ML	adopted	CS 230-2001	FAC 00		
FF 0269	Wine	0.2		ML	Adopted	CS 230-2001	FAC 00		The OIV requested special consideration to be given to levels of lead in wines that had been stored for long periods of time (ALINORM 01/41).
Provisions developed by other Codex committees									
	Various fruit products	1	C R	CS	Adopted	CS various	PFV-02	Excluding canned stone fruits	1)
	Various vegetable products	1	C R	CS	Adopted	CS various	PFV-02		1)
JF 0175	Fruit juices	0.3	R	CS	Adopted	CS various	FVJ-03		2)
NF 0175	Fruit nectars	0.3	R	CS	Adopted	CS various	FVJ-03		2)
MS	Meat and meat products	1		CS	Adopted	CS various		See List under 1.16, tin.	
CS 19-1981	Edible fats and oils	0.1	R	CS	Adopted	CS 19-1981, Rev.2-1999	FO	Edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine, & named animal fats)	4)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
CS 32-1981	Margarine	0.1	R	CS	Adopted	CS 32-1981, Rev.1-1989	FO-03		The Standards for margarine and minarine (CS 32-1981 and CS 135-1981) contain MLs for Fe, Cu, Pb and As, but the CCFO is working on a draft Standard for fat spreads and blended spreads, which will contain the same text as in the more recently revised Standards for oils and fats and which will only apply to Pb and As.
CS 135-1981	Minarine	0.1	R	CS	Adopted	CS 135-1981, Rev.1-1989	FO-03		The Standards for margarine and minarine (CS 32-1981 and CS 135-1981) contain MLs for Fe, Cu, Pb and As, but the CCFO is working on a draft Standard for fat spreads and blended spreads, which will contain the same text as in the more recently revised Standards for oils and fats and which will only apply to Pb and As.
CS 211-1999	Named animal fats	0.1	R	CS	Adopted	CS 211-1999	FO		The named animal fats in CS 211-1999 refer only to fats derived from fatty tissue of swine, bovine animals and sheep. CS for edible fats and oils not covered by individual standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As)
CS 210-1999	Named vegetable oils	0.1	R	CS	Adopted	CS 210-1999	FO-03	Except olive oils (CS 33-1981)	4)
CS 108-1981	Natural mineral water	0.01	mg/l	CS	Adopted	CS 108-1981, Rev.1-1997	NMW-01		
CS 150-1985	Salt, food grade	2		CS	Adopted	CS 150-1985	NFSDU-96		
MLs/provisions revoked or discontinued									
JV 0172	Vegetable juices					[CS 179-1991]	FVJ-03		CS revoked in 2003. ML was 0.3 mg/kg.
WC 0143	Crustaceans						FAC 02		The 34th CCFAC decided to discontinue the elaboration of MLs for lead in crustaceans and bivalve molluscs (previously proposed to be 0.5 resp. 1.0 mg/kg) because they did not significantly contribute to the total dietary lead exposure.

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
IM 0151	Molluscs						FAC 02		The 34th CCFAC decided to discontinue the elaboration of MLs for lead in crustaceans and bivalve molluscs (previously proposed to be 0.5 resp. 1.0 mg/kg) because they did not significantly contribute to the total dietary lead exposure.
[CS 168-1987]	Mayonnaise						EUR		European Standard was revoked in 2003. ML was 0.3 mg/kg.
FM 0183	Milk fats					CS 230-2001	FAC 00-03		The 34th CCFAC (2002) decided that the ML of 0.05 mg/kg in butter (as contained in CS A-1-1971, Rev.1-1999) should be deleted.
[CS 87-1981]	Chocolate (except..)					[CS 87-1981]	CPC		6) CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for lead; ML was 1 mg/kg
[CS 87-1981]	Chocolate, unsweetened					[CS 87-1981]	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for lead; ML was 2 mg/kg
CS 86-1985	Cocoa butter					CS 86-1985, Rev.1-2001	CPC		The revised standard no longer contains provisions for lead. ML of the previous standard was 0.5 mg/kg.
[CS 147-1985]	Cocoa butter confectionery					CS 147-1985	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for lead; ML was 0.5 mg/kg
CS 105-1981	Cocoa powders & dry cocoa-sugar mixtures					CS 105-1981, Rev.1-2001	CPC		The revised standard no longer contains provisions for lead. ML in the previous standard was 2 mg/kg.
CS 141-1983	Cocoa products, other					CS141-1983, Rev.1-2001	CPC	Cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake	The Codex Standards for cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake (CS 141-1983) were revised in 2001 and no longer contains provisions for lead. ML in the previous standard was 2 mg/kg.
[CS 142-1983]	Composite and filled chocolate					[CS142-1983]	CPC		CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for lead; ML was 1 mg/kg
[CS 117-1981]	Bouillons and consommés					[CS 117-1981, Rev.2-2001]			CS revoked in 2003. No ML for lead after Rev.2. ML before Rev.2 was 1 mg/kg in dry products, as sold; 0.5 mg/kg in canned products

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
[CS 162-1987]	Vinegar						EUR		European Standard was revoked in 2001. ML was 1 mg/kg.

1) The 21st session of the Codex Committee on Processed Fruits and Vegetables retained the draft CS for Pickled Products at step 6 for redrafting etc., and returned the proposed draft CSs for canned citrus fruits; jams, jellies and marmalades; soy sauce; canned tomatoes; processed tomato concentrates; canned vegetables, to Step 2 for redrafting etc. See ALINORM 03/27. The CS for Canned Stone Fruits was adopted by the 26th CAC, and therefore the existing Standards for peaches, plums and apricots were revoked. The new CS does not contain specific MLs for contaminants; this means that the previously existing Codex MLs of 1 mg/kg for lead in these commodities are no longer valid. See the list of standards for processed fruit and vegetable products in 1.16, tin.

2) The 3rd session of the ad hoc Intergovernmental task force on fruit and vegetable juices is developing a proposed draft Codex General Standard for fruit juices and nectars (see ALINORM 03/39A, Appendix II). The 2003 CAC adopted this text and advanced it to step 7, noting that some details needed to be further discussed, but with the expectation that at the next session of the Task Force a single standard could be presented for final adoption by the CAC. This new General Standard does not contain contaminant MLs. See the list of relevant Standards for fruit juices and nectars in 1.16, tin.

3) The 2001 CAC requested reevaluation of the lead MLs in milk and milk fat (ALINORM 01/41, para. 121); see also ALINORM 03/12 para. 135-137. The 35th CCFAC discussed the issue of the necessity of a ML for milk, as milk was not a major contributor to the intake of lead. However, in view of opinions that milk is a major contributor to the exposure of infants and young children, the ML for milk was maintained. The Committee decided to inform the CAC that the current level for lead in milk fat (0.1 mg/kg) should be revoked (no documentation of such a decision is found in the CAC 2003 report however).

4) The 34th and the 35th CCFAC discussed various options for establishing ML(s) for lead in fish. Also analytical problems and economic aspects were highlighted. The 35th CCFAC decided to maintain the proposed ML in step 6 and to request a statistical analysis of the data available and of the comments submitted, using different levels of concern (e.g. 0.2, 0.4 and 0.5 mg/kg) in order to have a basis for decisions on whether or not to adopt a tiered approach. The need for more data (in GEMS Food format) and relevant information was stressed. See ALINORM 03/12A, paras 137-142.

4) The revised Standards for oils and fats contain the following wording for the mentioned contaminant MLs: "The products covered by the provisions of this Standard shall comply with MLs being established by the CAC but in the meantime the following limits will apply." CS for Edible Fats and Oils Not Covered by Individual Standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As).

Further notes and MLs to be incorporated (e.g. situation regarding lead MLs in commodity standards not fully covered here yet)

The CAC agreed (ALINORM 01/41, para. 124) that the CCFAC should develop a Code of Practice on the prevention and reduction of lead contamination in food and recommended that the FAO Guidelines on lead-soldered cans could be useful in this regard. A first draft of this Code of Practice (CX/FAC 03/28) was discussed by the 2003 CCFAC (ALINORM 03/12A, paras 150-152) and was forwarded to the CAC. The CAC adopted this Code of Practice at step 5; the CCFAC will discuss a revised version in its 2004 session.

1.13.1 Mercury

Reference to JECFA: 10 (1966), 14 (1970) , 16 (1972), 22 (1978)
 Toxicological intake: PTWI 0.005 mg/kg bw (1978)
 Residue definition: Mercury, Total
 Synonyms: Hg

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
Provisions developed by other Codex committees									
CS 108-1981	Natural mineral water	0.001	mg/l	CS	Adopted	CS 108-1981, Rev.1-1997	CCNMW		

Mercury is a naturally occurring metallic element which can be present in foodstuffs by natural causes; elevated levels can also occur due to e.g. environmental contamination by industrial or other uses of mercury (4). Methylmercury and also total mercury levels in terrestrial animals and plants are usually very low; the use of fish meal as animal feed can however also lead to higher methyl mercury levels in other animal products. No CCFAC position document is available about mercury.

The draft Code of Practice for Source Directed Measures to Reduce Contamination of Food with Chemicals (ALINORM 01/12A, Appendix XIII) was adopted by the 24th CAC (2001), with an amendment to paragraph 3 of the introduction.

1.13.2 Methylmercury

Reference to JECFA: 22 (1978), 33 (1988), 53 (1999), 61 (2003)
 Toxicological intake: PTWI 0.0016 mg/kg bw (2003 Pending reduction in uncertainty associated with various aspects of the derivation of the steady-state intake from maternal hair, the uncertainty factor could be refined and possibly reduced.)
 Residue definition: Methylmercury

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
WD 0120	Fish	0.5		GL	Adopted	CAC/GL 7-1991	CCFAC 92, 94. 00	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade	1)
WS 0125	Fish	0.5		GL	Adopted	CAC/GL 7-1991	CCFAC	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade	
WF 0115	Fish	0.5		GL	Adopted	CAC/GL 7-1991	CCFAC	Except predatory fish The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade	
	Other predatory fish	1		GL	Adopted	CAC/GL 7-91	CCFFP	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.	The CGLs for methylmercury in fish were adopted by the CAC-19 in 1991, on the understanding that the levels would be kept under review by the CCFAC as well as the CCFFP, especially as to the identification of predatory species of fish to which the higher GL applies. 1)
WF 0865	Pike	1		GL	Adopted	CAC/GL 7-91	CCFFP	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.	The CGLs for methylmercury in fish were adopted by the CAC-19 in 1991, on the understanding that the levels would be kept under review by the CCFAC as well as the CCFFP, especially as to the identification of predatory species of fish to which the higher GL applies. 1)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
WS 0131	Shark	1		GL	Adopted	CAC/GL 7-91	CCFFP	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade	The CGLs for methylmercury in fish were adopted by the CAC-19 in 1991, on the understanding that the levels would be kept under review by the CCFAC as well as the CCFFP, especially as to the identification of predatory species of fish to which the higher GL applies. 1)
	Swordfish	1		GL	Adopted	CAC/GL 7-91	CCFFP	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.	The CGLs for methylmercury in fish were adopted by the CAC-19 in 1991, on the understanding that the levels would be kept under review by the CCFAC as well as the CCFFP, especially as to the identification of predatory species of fish to which the higher GL applies. 1)
WS 0132	Tuna	1		GL	Adopted	CAC/GL 7-91	CCFFP	The Guideline levels are intended for methylmercury in fresh or processed fish and fish products moving in international trade.	The CGLs for methylmercury in fish were adopted by the CAC-19 in 1991, on the understanding that the levels would be kept under review by the CCFAC as well as the CCFFP, especially as to the identification of predatory species of fish to which the higher GL applies. 1)

1) The 1992 CCFAC informed the CAC and the CCFFP that the recommended GLs for mercury in fish referred to total mercury rather than methylmercury.

The 20th CAC (1993) decided to maintain the GLs for methylmercury in fish as previously adopted, while recommending that the establishment of corresponding GLs for total mercury in fish be considered by the CCFAC at its next meeting. The 26th CCFAC (1994) noted that analysis of total mercury was generally adequate to ensure that GLs for methylmercury were not exceeded and decided that the establishment of GLs for total mercury in fish was not necessary. The 29th CCFAC noted that the 43rd CXEXEC had recommended that the CCFAC initiate a new risk analysis on mm. It was decided to defer any decision on the question of GLs based on mm or tm until JECFA had performed the risk assessment. The 53rd JECFA (1999) maintained the existing PTWI for mm and recommended that mm be re-evaluated in 2002 when a new information on the cohort in one of the studies could be assessed and possibly other new relevant data could be available. The 53rd JECFA also recommended that the nutritional benefits of fish consumption are weighed against the possibility of harm when limits on mm concentrations in fish or on fish consumption are being considered. The 32nd CCFAC (2000) took note of these recommendations.

Methylmercury is the most toxic form of mercury and is formed in aquatic environments. Methylmercury therefore is found mainly in aquatic organisms. It can accumulate in the food chain; the levels in large predatory fish species are therefore higher than in other species and fish is the predominant source of human exposure to methylmercury. Methylmercury and also total mercury levels in terrestrial animals and plants are usually very low; the use of fish meal as animal feed can however also lead to higher methyl mercury levels in other animal products. The 53rd JECFA calculated the human exposure to methylmercury in regional diets to range from 0.3-1.5 mcg/kg bw/week. Nationally reported dietary exposures are in the range 0.1 –2.0 mcg/kg bw/week.

The draft Code of Practice for Source Directed Measures to Reduce Contamination of Food with Chemicals (ALINORM 01/12A, Appendix XIII) was adopted by the 24th CAC (2001), with an amendment to paragraph 3 of the introduction.

Previous PTWI: 0.0033 mg/kg bw as methylmercury.

1.16 Tin

Reference to JECFA: 10(1966), 14(1970), 15(1971), 19(1975), 22(1978), 26(1982), 33(1988)
 Toxicological intake: PTWI 14 mg/kg bw (1988 Expressed as Sn, includes tin from food additive uses)
 Residue definition: Tin, total (Sn-tot) when not otherwise mentioned; inorganic tin (Sn-in); or other specification
 Synonyms: Sn

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
BE	Canned beverages	200	C	ML	3		FAC 99-03		2)
NE	Canned foods other than beverages	250	C	ML	3		FAC 99-03		2)
Provisions developed by other Codex committees									
CS 78-1981	Canned fruit cocktail	250	C R	CS	Adopted	CS 78-1981			
CS 15-1981	Canned grapefruit	250	C R	CS	Adopted	CS 15-1981			
CS 68-1981	Canned mandarin oranges	250	C R	CS	Adopted	CS 68-1981			
CS 159-1987	Canned mangoes	250	C R	CS	Adopted	CS 159-1987			
CS 42-1981	Canned pineapple	250	C R	CS	Adopted	CS 42-1981			
CS 60-1981	Canned raspberries	250	C R	CS	Adopted	CS 60-1981			
CS 62-1981	Canned strawberries	250	C R	CS	Adopted	CS 62-1981			
CS 99-1981	Canned tropical fruit salad	250	C R	CS	Adopted	CS 99-1981			
CS 79-1981	Jams (fruit preserves) and jellies	250	C R	CS	Adopted	CS 79-1981			
CS 160-1987	Mango chutney	250	C R	CS	Adopted	CS 160-1987			
CS 56-1981	Canned asparagus	250	C R	CS	Adopted	CS 56-1981			
CS 116-1981	Canned carrots	250	C R	CS	Adopted	CS 116-1981			
CS 16-1981	Canned green and wax beans	250	C R	CS	Adopted	CS 16-1981			
CS 58-1981	Canned green peas	250	C R	CS	Adopted	CS 58-1981			
CS 81-1981	Canned mature processed peas	250	C R	CS	Adopted	CS 81-1981			
CS 55-1981	Canned mushrooms	250	C R	CS	Adopted	CS 55-1981			
CS 144-1985	Canned palmito	250	C	CS	Adopted	CS 144-1985			
CS 61-1981	Canned pears	250	C R	CS	Adopted	CS 61-1981			
CS 18-1981	Canned sweet corn	250	C R	CS	Adopted	CS 18-1981			
CS 13-1981	Canned tomatoes	250	C R	CS	Adopted	CS 13-1981			
CS 115-1981	Pickled cucumber	250	C R	CS	Adopted	CS 115-1981			
CS 57-1981	Processed tomato concentrates	250	C R	CS	Adopted	CS 57-1981			
JF 0226	Apple juice	150	C R	CS	Adopted	CS 48-1981		Apple juice preserved exclusively by physical means	1)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
JF 0175	Apple, grape, blackcurrant, small fruit juices	150	C R	CS	Adopted	CS various		Apple, grape, blackcurrant, small fruit juices preserved exclusively by physical means (See specific list of relevant products and note exceptions)	1)
CS 44-1981	Apricot, peach and pear nectars	200	C R	CS	Adopted	CS 44-1981		Apricot, peach and pear nectars preserved exclusively by physical means	1)
JF 0226	Black currant juice	150	C R	CS	Adopted	CS 120-81		Blackcurrant juice preserved exclusively by physical means	1)
JF 0175	Fruit juices	200	C R	CS	Adopted	CS 164-1989		Fruit juices preserved exclusively by physical means not covered by individual standards (See specific list of relevant product and note exceptions)	1)
NF 0175	Fruit nectars	200	C R	CS	Adopted	CS 161-1989		Fruit nectars preserved exclusively by physical means not covered by individual standards (See specific list of relevant product and note exceptions)	1)
JF 0269	Grape juice	150	C R	CS	Adopted	CS 82-1981		Grape juice preserved exclusively by physical means	1)
JF 0203	Grapefruit juice	200	C R	CS	Adopted	CS 46-1981		Grapefruit juice preserved exclusively by physical means	1)
CS 148-1981	Guava nectar	200	C R	CS	Adopted	CS 148-1981		Guava nectar preserved exclusively by physical means	1)
CS 47-1981	Lemon juice	200	C R	CS	Adopted	CS 47-1981		Lemon juice preserved exclusively by physical means	1)
CS 149-1981	Liquid pulpy mango products	200	C R	CS	Adopted	CS 149-1981		Liquid pulpy mango products preserved exclusively by physical means	1)
GL 11-1991	Mixed fruit juices	200	C R	CS	Adopted	GL 11-1991		Mixed fruit juices preserved exclusively by physical means	1)
GL 12-1991	Mixed fruit nectars	200	C R	CS	Adopted	GL 12-1991		Mixed fruit nectars preserved exclusively by physical means	1)
CS 134-1981	Nectars of certain citrus fruits	200	C R	CS	Adopted	CS 134-1981		Nectars of certain citrus fruits preserved exclusively by physical means	1)
CS 101-1981	Non-pulpy blackcurrant nectar	150	C R	CS	Adopted	CS 101-1981		Non-pulpy blackcurrant nectar preserved exclusively by physical means	1)
JF 0004	Orange juice	200	C R	CS	Adopted	CS 45-1981		Orange juice preserved exclusively by physical means	1)
JF 0341	Pineapple juice	200	C R	CS	Adopted	CS 85-1981		Pineapple juice preserved exclusively by physical means	1)
CS 122-1981	Pulpy nectars of certain small fruits	150	C R	CS	Adopted	CS 122-1981		Pulpy nectars of certain small fruits preserved exclusively by physical means	1)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
CS 49-1981	Tomato juice	200	C R	CS	Adopted	CS 49-1981		Tomato juice preserved exclusively by physical means	1)
CS 145-1985	Canned chestnuts and chestnut puree	250	C R	CS	Adopted	CS 145-1985			
CS 98-1981	Cooked cured chopped meat	200	C	CS	Adopted	CS 98-1981, Rev.1-1991		For products in tinfoil containers	
CS 98-1981	Cooked cured chopped meat	50		CS	Adopted	CS 98-1981, Rev.1-1991		For products in other containers	
CS 96-1981	Cooked cured ham	50		CS	Adopted	CS 96-1981, Rev.1-1991		For products in other containers	
CS 96-1981	Cooked cured ham	200	C	CS	Adopted	CS 96-1981, Rev.1-1991		For products in tinfoil containers	
CS 97-1981	Cooked cured pork shoulder	50		CS	Adopted	CS 97-1981, Rev.1-1991		For products in other containers	
CS 97-1981	Cooked cured pork shoulder	200	C	CS	Adopted	CS 97-1981, Rev.1-1991		For products in tinfoil containers	
CS 88-1981	Corned beef	50		CS	Adopted	CS 88-1981, Rev.1-1991		For products in other containers	
CS 88-1981	Corned beef	200	C	CS	Adopted	CS 88-1981, Rev.1-1991		For products in tinfoil containers	
CS 89-1981	Luncheon meat	50		CS	Adopted	CS 89-1981		For products in other containers	
CS 89-1981	Luncheon meat	200	C	CS	Adopted	CS 89-1981		For products in tinfoil containers	
MLs/provisions revoked or discontinued									
[CS 129-1981]	Canned apricots					[CS 129-1981]			Replaced by a new CS for stone fruits which does not include provisions for tin
[CS 14-1981]	Canned peaches					[CS 14-1981]			Replaced by a new CS for stone fruits which does not include provisions for tin
[CS 59-1981]	Canned plums					[CS 59-1981]			Replaced by a new CS for stone fruits which does not include provisions for tin
[CS 179-1981]	Vegetable juices								CS revoked in 2003. ML was 200 mg/kg. 1)

1) The 3rd session of the ad hoc Intergovernmental task force on fruit and vegetable juices is developing a proposed draft Codex General Standard for fruit juices and nectars (see ALINORM 03/39A, Appendix II). The 2003 CAC adopted this text and advanced it to step 7, noting that some details needed to be further discussed, but with the expectation that at the next session of the Task Force a single standard could be presented for final adoption by the CAC. This new General Standard does not contain contaminant MLs.

2) The 55th JECFA (2000) maintained the existing PTWI and reiterated that limited human data available indicate that concentrations of 150 mg/kg tin in canned beverages and 250 mg/kg in other canned foods may produce acute manifestations of gastric irritation in certain individuals. This is considered to be a reversible effect however, which may occur in a limited number of sensitive subject only. Following the discussions in the 34th CCFAC (2002) and in the 35th CCFAC (2003), the proposed MLs were repeatedly returned to step 3. The 35th CCFAC changed the terminology of the commodities to which the proposed draft MLs apply, which previously was liquid canned foods resp. solid foods h, to canned beverages h and canned foods other than beverages h. The Committee decided to ask JECFA to evaluate current tin levels in canned foods and to determine an acute reference dose; it was noted that new data would become available

The acute toxicity was assessed at the 55th JECFA but data were insufficient for establishing an acute reference dose. The 55th JECFA reiterated that tin concentrations as low as 150 mg/kg in canned beverages and 250 mg/kg in other canned foods may produce acute manifestations of gastric irritation in certain individuals.

A discussion paper on tin (last version CX/FAC 03/29) is a revision of the position paper first discussed in CCFAC 1997 and contains all relevant information and references. The 35th CCFAC decide to discontinue its future consideration. The 35th CCFAC agreed that a Code of Practice for the Prevention and Reduction of Tin should be elaborated, for consideration at its next session.

3.01.5 Vinyl chloride monomer

Reference to JECFA:	28 (1984)
Toxicological intake:	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 attainable)
Residue definition:	Vinylchloride monomer
Synonyms:	Monochloroethene, chloroethylene; abbreviation VC or VCM

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
	Food	0.01		GL	Adopted	CAC/GL 6-1991	FAC 86-91	The GL in food packaging material is 1.0 mg/kg.	

Vinylchloride monomer is the main starting substance for the manufacture of polymers which are used as resins, o.a. as packaging material for o.a. foods. Vinyl chloride is not known to occur as a natural product. Residues of VCM may be still present in the polymer. Vinyl chloride is considered by IARC to be a human carcinogen (as has been shown in occupational exposure situations). Migration of possibly harmful substances from food contact materials has been discussed in the CCFA/CCFAC in the period 1986-1991.

Guideline levels for vinyl chloride monomer and acrylonitrile in food and packaging material were adopted by the CAC at its 19th session (1991) on the understanding that the AOAC and the ISO would develop appropriate sampling plans and methods of analysis.

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3.04 Polychlorinated biphenyls

Reference to JECFA: 35 (1989)
 Toxicological intake: Not established
 Residue definition:
 Synonyms: Abbreviations, PCBs

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

PCBs are a class of stable chlorinated aromatic hydrocarbons which (mostly prior to the 1970s) have been produced since 1930 and used extensively in a wide range of industrial applications. One of the main uses which still persists is as dielectric and heat exchange fluids. Despite increasing withdrawal of the use and restrictions on the production, large amounts of PCBs continue to be present in the environment, either in use in existing industrial systems, or in waste materials, or dispersed as persistent pollutants. PCBs are mixtures of related chemicals which are formed by the chlorination of biphenyl. Theoretically, 209 congeners are possible; in practice about 130 are likely to occur in commercial products. Also related by-products are formed, such as polychlorobenzofurans (PCDFs), and may be found in technical PCB-mixtures. Some of the trade names for technical PCB-mixtures as they were produced are Aroclor, Clophen, Kanechlor. The different congeners in PCB-mixtures can be designated by their IUPAC number, and different PCB-mixtures can be characterized by their composition in terms of the relative percentages of the congeners.

Degradation of PCBs in the environment depends on the degree of chlorination (higher chlorinated compounds are generally more persistent against photolytic, microbial and animal metabolic degradation) and on the position of the chlorine atoms in the molecule. All congeners are lipophilic and accumulate in the food chain.

PCBs were discussed by the 35th JECFA (1989); it was difficult to come to clear conclusions about the toxicity of PCBs as such because impurities such as dioxins and related compounds probably were present in the PCB-mixtures used for the animal studies. The Committee concluded that 0.04 mg/kg bw was the NOEL in monkey studies. However, because of the limitations of the data and the ill-defined nature of the materials used in the study, no tolerable intake for humans could be established. One of the complications is that humans are exposed to biologically filtered mixtures of congeners, which are rather different from the industrial PCB-mixtures that were used for the studies. No toxicological monograph was prepared (see however EHC 140).

PCBs were evaluated by IARC in 1978 and 1987. The conclusion was that PCBs are carcinogenic for laboratory animals and are probably carcinogenic for humans (IARC, 1987). Extensive documentation about PCBs is gathered in EHC 140 (WHO, 1993).

The major foods in which contamination with PCBs can be significant are fish, milk and dairy products, meat and eggs. Because PCBs bioaccumulate, the levels will usually be higher in animals which are higher in the food chain, but local pollution and feed composition may have major influence on the levels in animal products. Humans with a considerable intake of animal fats also may accumulate high levels of PCBs and as a consequence also PCB-levels in breast milk and in human adipose fat may be high. The JECFA however considered that the advantages to the infant of breast-feeding outweigh any potential hazards due to the PCB-content of breast milk. The JECFA recommended that PCB-levels in foods are monitored, preferably by quantifying the most important individual congeners. Safety studies should be carried out on the toxicological potential of the PCB-congeners which are predominantly present in foods. It is evident that in relation to the persistent nature of PCBs and ongoing environmental contamination, it is still valid to pay due attention to PCBs.

The average dietary intake of PCBs for adults was estimated at maximally ca 14 ug/day, which is equivalent to 0.2 ug/kg bw (WHO/EURO, 1988).

PCBs are related to other chlorinated hydrocarbons, such as polybrominated biphenyls (PBBs), polychlorinated terphenyls (PCTs), tetrachlorobenzyltoluenes, polychlorinated dibenzodioxins and dibenzofurans.

Some specific PCBs are integrated in the Codex approach to dioxins, but it has to be borne in mind that the toxicological effects of PCBs are broader than the dioxin-related effects. The CCFAC discussed PCBs from 1990 to 1994 on the basis of CX/FAC-90/20-Add.1 and further related documents. It was noted that several countries have established MLs for PCBs in food, so that trade issues might arise. Some of these countries have introduced MLs for the sum of some specific PCB-congeners, which is probably the best defined way of analysing and reporting PCBs. The most important congeners for analysis of the general content of PCBs in foods are usually considered to be IUPAC numbers 28, 52, 101, 118, 138, 153 and 180.

The CCFAC also acknowledged that source-directed measures were most important to reduce contamination with PCBs. The Committee agreed in 1992 that it was premature to set (maximum) levels for these contaminants at this stage. The discussions later were focussed on dioxin and the dioxin-related PCBs.

The PCB-congeners that most easily adopt a co-planar configuration (the non-ortho substituted PCBs, numbers 77, 126 and 169) are potent Ah receptor agonists. Mono-ortho substituted PCBs are less potent but are included with a TEQ-factor for dioxin-like activity (nos 105, 114, 118, 123, 156, 157, 167, 189). Sometimes also PCB 81 and two di-ortho substituted PCBs (170 and 180) were included in the discussion about the TEF-approach for dioxins because of their ability to induce P4501A1 enzymes and their occurrence and persistence in the environment; they however were not incorporated in the WHO-recommendation about the TEF-approach for dioxin-related compounds (1998). The PCBs with a TEF for dioxins form usually only a few percent of the total PCBs, but are relevant because of this specific toxicity, which can form an important contribution to the total TEQ for dioxins in a sample of food and in the human diet.

3.08 Dioxins

Reference to JECFA:	57 (2001)
Toxicological intake:	PTMI 70 pg TEQ/kg bw (2001: Including coplanar PCBs)
Residue definition:	
Synonyms:	Polychlorinated dibenzo-dioxins and -furans

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

The term dioxins refers to a group of polychlorinated planar aromatic compounds which differ from each other in the amount and the position of the chlorine atoms. The group consists of 75 dibenzo-p-dioxins (PCDD) and 135 dibenzofurans (PCDF). The most studied and toxic dioxins are 17 congeners with a 2,3,7,8-chlorosubstitution pattern, of which 2,3,7,8-tetra-CDD (TCDD) is the most toxic and most studied congener. Dioxins are ubiquitously present as contaminants in the environment and in food, be it in minute amounts. Dioxins are lipophilic compounds which bind to sediment and organic matter in the environment and tend to be absorbed in animal and human fatty tissue. They are extremely resistant towards chemical and biological transformation processes and are consequently persistent in the environment and accumulate in the food chain. Dioxins are formed as unwanted by-products in combustion processes or industrial processes. Most of the dioxins enter the environment by emission to air. The Ah receptor is an important factor in the toxicological effects of dioxins. Activation of this receptor can result in endocrine and paracrine disturbances and alterations in cell functions including growth and differentiation.

Developmental neurobehavioral (cognitive) and reproductive effects and immunotoxic effects belong to the most sensitive endpoints of dioxin toxicology. TCDD has been shown to be carcinogenic in several animal species at multiple sites, but TCDD is not an initiator of carcinogenesis and the tumour promotion in animal studies indicated a non-genotoxic mechanism.

The toxic equivalency concept has been developed for application to dioxins in order to assess the toxicity of a mixture of congeners as it exists in practice. Toxic Equivalency Factors (TEFs) have been established in relation to TCDD and the individual toxic effects of the congeners in a mixture can thus be calculated to common toxic equivalents (TEQs) and are added to obtain the total toxic dioxin potency of a mixture. It has been shown that also some PCB-congeners (those with a planar dioxin-like structure) have effects on the Ah receptor and thus they are given TEFs and can be combined with the dioxins for the calculation of total TEQ of a sample.

The situation regarding dioxins has been reviewed in a discussion paper (last version CX/FAC 00/26). The 32nd CCFAC requested an additional position paper in which recent intake assessments and national regulations regarding dioxins are assembled. This was presented to the 34th CCFAC. A revision of this document was requested, with also data on dioxin levels in food and feed; the latest version is CX/FAC 03/32.. The 34th CCFAC agreed that it should not draft MLs for dioxins at the time. The 35th CCFAC requested a revision of the position paper, including the insertion of a new section to cover ranges of data on background levels of dioxins and dioxin-like PCBs.

A proposed draft Code of Practice for source directed measures to reduce dioxin and dioxin like PCB contamination of foods has been prepared (latest version CX/FAC 03/33, to be discussed by the 2003 CCFAC).

The 35th CCFAC agreed that a revised draft should be elaborated, taking into account the comments submitted and, in particular, Annex C of the Stockholm Convention on Persistent Organic Pollutants.

3.10 Chloropropanols

Reference to JECFA: 41 (1993; for 1,3-dichloro-2-propanol only) 57 (2001)

Toxicological intake: PMTDI 0.002 mg/kg bw (2001 For 3-chloro-1,2-propanediol. Establishment of tolerable intake was considered to be inappropriate for 1,3-dichloro-2-propanol because of the nature of the toxicity (tumorigenic in various organs in rats and the contaminant can interact with chromosomes and/or DNA))

Residue definition:

Synonyms: Two substances are the most important members of this group: 3-monochloropropane-1,2-diol (3-MCPD) and 1,3-dichloro-2-propanol (1,3-DCP)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

Chloropropanols can be formed in foods as a result of specific processing and storage conditions. The main source is acid hydrolysis of vegetable proteins for the production of savoury food ingredients. In this process the use of hydrochloric acid can result in high temperature chlorination of lipids present in the protein starting materials. 3-MCPD has been shown to be a precursor for 1,3-DCP-formation and control of the levels of 3-MCPD is expected to obviate the need for specific control on 1,3-DCP. High levels of chloropropanols (up to 100 mg/kg and more) have especially been found in products like non-traditionally fermented soy sauces and hydrolysed vegetable proteins (HVP).

There is an obvious connection with the conditions of the production method and the levels of chloropropanols in these products are shown to be declining in the last decade since the problem was noticed and measures have been taken to reduce the formation of chloropropanols. These compounds have also been found however in many other foods, including baked goods, bread, cooked/cured meat/fish and malt ingredients. There are (inconclusive) indications that cooking (grilling) could result in some formation of 3-MCPD. Also packaging materials and paper used for processing of food may contain 3-MCPD and could contribute to exposure via food, but this has led to the development of resins with significantly lower levels of 3-MCPD. Further information is required on the levels of chloropropanols in foods and food ingredients, on the dietary exposure to these compounds, on the origin and formation and on production methods which can be utilised to avoid chloropropanol contamination of foodstuffs.

A position paper has been written, the last version of this paper is CX/FAC 03/34; the 35th CCFAC agreed that the paper should be revised on the basis of the discussions and of submitted comments.

Several countries have established MLs for chloropropanols in hydrolysed protein products. The setting of MLs for chloropropanols in foodstuffs was asked to be considered at the 35th session of the CCFAC. The CCFAC could not reach a consensus on a ML of 1 mg/kg for acid-HVP soy sauce as proposed, and deferred the elaboration of MLs in different foodstuffs until its next session; the revised position paper should include proposals for the elaboration of MLs for chloropropanols in relevant foods (ALINORM 03/12A, paras 173-179).

4.09.1 Acrylonitrile

Reference to JECFA: 28 (1984)

Toxicological intake: 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.)

Residue definition: acrylonitrile (monomer)

Synonyms: 2-Propenenitrile; vinyl cyanide (VCN); cyanoethylene; abbreviations, AN, CAN.

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
	Food	0.02		GL	Adopted	CAC/GL 6-1991	FAC 86-91		

Acrylonitrile monomer is the starting substance for the manufacture of polymers which are used as fibres, resins, rubbers and also as packaging material for o.a. foods. Acrylonitrile is not known to occur as a natural product. Acrylonitrile is classified by IARC as possibly carcinogenic to humans (Group 2B). Polymers derived from acrylonitrile may still contain small amounts of free monomer. Migration of possibly harmful substances from food contact materials has been discussed in the CCFA/CCFAC in the period 1986-1991.

Guideline levels for vinyl chloride monomer and acrylonitrile in food and packaging material were adopted by the CAC at its 19th session (1991) on the understanding that the AOAC and the ISO would develop appropriate sampling plans and methods of analysis.

IARC Vol. 71, 43-108.

4.11.1 Ethyl carbamate

Reference to JECFA: [2004]
 Toxicological intake:
 Residue definition:
 Synonyms: Urethane; abbreviation, EC

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

Ethyl carbamate (also called urethane) is used in the chemical industry as an intermediate in the synthesis of some other chemicals. It is also a contaminant in food which may be produced during fermentation and other processing of food. High levels (up to several thousand ug/l) may be found in some spirits such as stone fruit brandies, cognac and whiskies, while lower levels (in the order of a few ug/kg) are found in fermented drinks like wine and beer, and to some extent also in fermented foods like bread, soy sauce, yogurt and olives. Levels may vary considerably from batch to batch. Following discovery of the problem in the 1980's efforts were taken by public health officials and the industry to reduce or eliminate the formation of this compound during the relevant food production processes. The major formation pathway is that arginine, an amino acid which occurs naturally e.g. in grape juice, is metabolized by yeast yielding urea. When this occurs in excess amounts, urea may be released from the yeast cells during and at the end of the fermentation. Urea can react spontaneously with ethanol (the main fermentation product) to form ethyl carbamate (EC). Citrulline, another amino acid and a precursor of arginine, can serve as an EC precursor.

Acute exposure to high levels of EC may induce vomiting, coma or hemorrhages and result in injury to the kidneys and liver. No information is available on the chronic, reproductive or developmental effects of EC in humans. An increased incidence of lung tumors was observed in rodents exposed by oral or inhalation route; IARC classified EC in Group 2B, possibly carcinogenic to humans.

JECFA has not evaluated EC until now, but it is placed high on the priority list (probably in 2004). When EC was discussed in the CCFAC in 1991, a Danish national TDI of 0.2 ug/kg bw was reported. The intake of a person consuming some of the higher contaminated food products was estimated to be more than 50% of this TDI. Therefore measures aimed at reducing the EC formation were seen as necessary. No specific health effects by EC in humans related to dietary exposure are reported however.

Some countries mentioned national GLs for EC. No trade problems are reported however. The 27th CCFAC (1995) decided that no further action was needed at present.

5.01.1 Aflatoxins, Total

Reference to JECFA:	31 (1987), 46 (1996), 49 (1997)
Toxicological intake:	Potencies were estimated by JECFA. (1997 Intake should be reduced to levels as low as reasonably possible)
Residue definition:	Aflatoxins total (B1 +B2 + G1 + G2)
Synonyms:	Abbreviations, AFB, AFG, AFM, with numbers, to designate specific compounds

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
SO 0703	Peanuts, raw	15		ML	Adopted	CS 209-1999	FAC 88-98		1)

1) The 1994 CCCPL decided not to proceed with the proposed GL for processed peanuts and to advance the proposed GL for raw peanuts (intended for further processing), associated with a specific sampling plan because the contamination is usually very inhomogeneous in a lot. It is assumed that raw peanuts are the major commodity in international trade. The 49th JECFA (1997) evaluated hypothetical standards of 10 and 20 mcg/kg AFB in peanuts and concluded that the higher standard would not result in any observable difference in rates of liver cancer. As a result of this evaluation, the 1998 CCFAC (discussing options of 10 and 15 mcg/kg as a ML for AF-total in peanuts), decided to propose 15 mcg/kg as ML. The resulting CS 209-1999 contains a sampling plan. A discussion paper on the development of a Code of Practice for the reduction of aflatoxin contamination in peanuts (CX/FAC 03/25) was considered by the 2003 CCFAC. The CCFAC forwarded the proposed draft Code of Practice to the 26th CAC for adoption at step 5. The 2003 CAC adopted this proposal, so the draft Code of Practice will be on the agenda of the 2004 CCFAC at step 6.

Aflatoxins are a group of highly toxic mycotoxins produced by fungi of the genus *Aspergillus*. The four main aflatoxins found in contaminated plant products are B1, B2, G1 and G2 and are a group of structurally related difuranocoumarin derivatives that usually occur together in varying ratios, AFB1 usually being the most important one. These compounds pose a substantial hazard to human and animal health. IARC (1992) classified aflatoxin B1 in Group 1 (human carcinogen) and AFM in Group 2B (probable human carcinogen). The liver is the primary target organ. A wide range of foods may be contaminated with aflatoxins; they are most commonly found in groundnuts (peanuts), dried fruit, tree nuts (such as almonds, pecans, walnuts, pistachio and brazil nuts), spices, figs, crude vegetable oils, cocoa beans, maize, rice, cottonseed and copra. AFB1 present in animal feed can partly be transferred to milk in the form of the metabolite AFM1 (mostly 1-2%, but higher percentages are found at low contamination levels in high producing animals.)

Aflatoxin contamination is responsible for considerable economic losses and efforts are being made to reduce contamination of food and feedingstuffs.

The 23rd CCFAC (1991) decided to discontinue the development of a ML for aflatoxins in foods in general, and to discuss the problems on a commodity basis.

It is acknowledged that for primary plant products the aflatoxin contamination is often not homogeneous and a sampling plan is necessary to assure reasonable application of MLs. A general position paper on aflatoxins in food and feeds (CX/FAC 97/16) was presented to the 1997 CCFAC.

- A discussion Paper on aflatoxins in tree nuts (last published version CX/FAC 03/23) was discussed by the 2003 CCFAC; the CCFAC agreed that it would be revised for consideration at its next meeting. Additional information is requested on aflatoxin contamination in tree nuts other than almonds, hazelnuts and pistachios. The Committee agreed to the elaboration of MLs for aflatoxins in almonds, hazelnuts and pistachios, based on the ALARA principle and with the understanding that related sampling plans need to be established. This activity was approved by the 2003 CAC as new work. A Code of Practice for the reduction of aflatoxin contamination in tree nuts is being developed (last published version CX/FAC 03/24). This activity was approved by the 2002 CXEXEC as new work. The draft is to be revised for consideration at the next meeting of the CCFAC.

- Corn was included in a Technical Consultation on sampling plans for aflatoxins in commodities. See FAO Food and nutrition Paper 55 (Rome, 1993).

- The 1994 CCFAC decided to discontinue the establishment of GLs for AFB1 in supplementary feedingstuffs for milk-producing animals (previously proposed at the level of 5 mcg/kg), based on the assumption that the relationship between aflatoxins in milk and feeds is not (completely) clear and that there is not much international trade in (composite) supplementary feedingstuffs. International trade mostly is in the form of individual commodities which can be used as feed components in various quantities, directed to other feed uses than milk producing animals, or to other uses in general, or be decontaminated etc. Therefore, a Code of Practice for the reduction of aflatoxin B1 in raw materials and supplemental feedingstuffs for milk-producing animals was developed and adopted as RCP 045-1997.

5.01.2 Aflatoxin M1

Reference to JECFA: 56 (2001)
 Toxicological intake: (2001 Using worst-case assumptions, the additional risks for liver cancer predicted with use of proposed maximum levels of aflatoxin M1 of 0.05 and 0.5 µg/kg are very small. The potency of aflatoxin M1 appears to be so low in HBsAg- individuals that a carcinogenic effect of M1 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.)
 Residue definition: Aflatoxin M1

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
ML 0106	Milk	0.5		ML	Adopted	CS 232-2001	FAC 88-01		

The 24th CCFAC (1993) decided to stop the development of a specific standard for AFM1 in milk destined for use in baby foods.

The CCFAC has discussed 2 options for a standard for AFM1 in milk: 0.05 mcg/kg and 0.5 mcg/kg. At the request of the 32nd CCFAC (2000), the 56th JECFA (2001) evaluated the exposures and cancer risks associated with these 2 options and concluded that the additional risks for liver cancer for the higher ML are very small. As a result, 0.5 mcg/kg was forwarded as proposed ML at step 8 by the 2001 CCFAC. The 2001 CAC adopted this proposed draft ML, noting that data supporting the lower level, if and when available, could be examined by the CCFAC at a future meeting when necessary.

It is acknowledged that the AFM1 level in milk is related to the AFB1 level in the animal feed. See note under Aflatoxins, total.

5.02.1 Ochratoxin A

Reference to JECFA: 37 (1990), 44 (1995), 56 (2001)

Toxicological intake: PTWI 0.0001mg/kg bw (2001)

Residue definition: Ochratoxin A

Synonyms: Ochratoxins include a number of related mycotoxins (A, B, C and their esters and metabolites), the most important one being ochratoxin A

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
GC 0650	Barley	5		ML	6		FAC 91-02	Includes derived products	1)
GC 0654	Rye	5		ML	6		FAC 91-02	Includes derived products	1)
GC 0640	Wheat	5		ML	6		FAC 91-02	Includes derived products	1)

1) The draft ML of 5 mcg/kg for OTA was forwarded for adoption at step 8 by the 2002 CCFAC (ALINORM 03/12, para 111-114), on the basis of the assumption that this level was ALARA. The 26th CAC (2003) discussed this proposal (ALINORM 03/41, PARAS 45-47). Many delegations were of the opinion that this proposed ML was too low and, taking account of the evaluation of the 56th JECFA, noted that a ML of 20 mcg/kg could be adequate in terms of public health and safety. The CAC concluded that there was a lack of consensus both regarding the appropriate ML and regarding the reference to derived products and returned the standard to step 6 for further work by the CCFAC.

Ochratoxin A (OTA) is the major compound of a group of chemically related mycotoxins produced by species of the genera *Aspergillus* and *Penicillium*. OTA contamination is commonly found in various cereals, some pulses, coffee, cocoa, figs, grapes, wine, nuts and coconut products. It can also be transferred through the feed to animal products and concentrates especially in the kidney, but may also be found in meat and milk. Most OTA is however converted to the less harmful ochratoxin-? in the rumen of ruminants.

OTA is a nephrotoxic mycotoxin, which is carcinogenic to rodents and has also teratogenic, immunotoxic and possibly neurotoxic properties. It has been associated with Balkan Endemic Nephropathy.

The situation regarding ochratoxins has been reviewed in a position paper (last version CX/FAC 99/14).

OTA is incorporated with a specific Annex in the Code of Practice for the prevention of mycotoxin contamination in cereals, which was adopted by the 2003 CAC (last published version in Appendix X of ALINORM 03/12A).

5.03.1 T-2 and HT-2 toxin

Reference to JECFA: 56 (2001)
 Toxicological intake: PMTDI 0.00006 mg/kg bw (Group PMTDI for T-2 and HT-2 toxins, alone or in combination)
 Residue definition:
 Synonyms:

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

T-2 and HT-2 toxin are closely related compounds belonging to a group of chemically related mycotoxins called type A trichothecenes (which are epoxy-sesquiterpenoid compounds) and are produced by certain *Fusarium* species, which are pathogens of several cereal grains. The most important producer is *F. sporotrichioides*, a saprophyte which only will grow at high water activities. As a consequence, T-2 and HT-2 toxins are not normally found in grain at harvest, but result from water damage when it remains wet for longer periods in the field or after harvest. T-2 and HT-2 toxin undergo rapid metabolism and elimination in livestock species and the transfer from feed to animal products is probably negligible. Maximum levels in feed are not needed to protect public health, but are useful for the protection of animal health and productivity. Especially pigs are vulnerable. In animals, decreased feed consumption, diarrhoea and vomiting have been observed as acute effects.

T-2 toxin is a potent inhibitor of protein synthesis, both in vivo and in vitro. T-2 toxin is linked to outbreaks of acute poisoning of humans, in which the adverse effects reported include nausea, vomiting, pharyngeal irritation, abdominal pain, diarrhoea, bloody stool, dizziness and chills. Co-occurrence of T-2 toxin with other trichothecenes in these cases is likely. T-2 toxin is also associated with food-related poisoning incidents in 1931- 1947 referred to as alimentary toxic aleukia, in the former Soviet Union. The PMTDI is based on a 3-week dietary study with pigs, applying a safety factor of 500 to a LOEL for changes in white and red cell counts. The average intake of T-2 and HT-2 toxin via the human diet was estimated by JECFA as 8 resp. 9 ng/kg bw, which is lower than the group PMTDI. An intake at the level of the PMTDI is not expected to result in effects of T-2 and HT-2 toxin on the immune system and to haematotoxicity, which are considered critical effects after short-term intake. JECFA recommended that toxic equivalency factors relative to DON be developed for the other trichothecenes commonly occurring in cereal grains, if sufficient data become available.

T-2 and HT-2-toxin are incorporated with a specific Annex for trichothecenes in the Code of Practice for the prevention of mycotoxin contamination in cereals, which was adopted by the 2003 CAC (last published version in Appendix X of ALINORM 03/12A).

No further action on T-2 and HT-2 toxin has been recommended by the 2001 CCFAC, probably based on the understanding that the (limited) information available suggested that intakes would not exceed the PMTDI (ALINORM 01/12A, para. 16).

5.03.8 Deoxynivalenol

Reference to JECFA: 56 (2001)
 Toxicological intake: PMTDI 0.001 mg/kg bw (2001)
 Residue definition:
 Synonyms: Vomitoxin; Abbreviation, DON

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

Deoxynivalenol (DON) is the major compound of a group of chemically related mycotoxins called type B trichothecenes (which are epoxy-sesquiterpenoid compounds) and is produced by certain *Fusarium* species, which are pathogens of several cereal grains. Closely related compounds are e.g. nivalenol and several acetyl-DON derivatives. DON is water-soluble and chemically very stable under most normal food processing conditions. DON contamination is commonly found in various cereals and cereal products. It undergoes rapid metabolism and elimination in livestock species and the transfer from feed to animal products is probably negligible. Maximum levels in feed are not needed to protect public health, but are useful for the protection of animal health and productivity. Especially pigs are vulnerable.

In animals, decreased feed consumption, diarrhoea and vomiting have been observed as acute effects. JECFA recognized that DON can lead to outbreaks of acute illness in humans. The available data did not permit to set an acute reference dose however. The PMTDI is based on a chronic dietary study with mice, applying a safety factor of 100. An intake at the level of the PMTDI is not expected to result in effects of DON on the immune system, growth or reproduction, which are the most critical effects. JECFA recommended that toxic equivalency factors relative to DON be developed for the other trichothecenes commonly occurring in cereal grains, if sufficient data become available.

The JECFA estimated that the PMTDI for DON could be exceeded in 4 out of 5 regional diets.

The situation regarding deoxynivalenol has been reviewed in a discussion paper (last version CX/FAC 03/35); the 35th CCFAC discontinued the consideration of this discussion paper and agreed to commence work on the elaboration of MLs for DON (ALINORM 03/12A, paras 180-182).

The CAC in 2003 approved the development of maximum levels for DON as new work.

DON is incorporated with a specific Annex for trichothecenes in the Code of Practice for the prevention of mycotoxin contamination in cereals, which was adopted by the 2003 CAC (last published version in Appendix X of ALINORM 03/12A).

5.04.1 Fumonisin

Reference to JECFA:	56 (2001)
Toxicological intake	PMTDI 0.002 mg/kg bw (2001 Group PMTDI for fumonisins B1, B2 and B3, alone or in combination)
Residue definition:	
Synonyms:	Several related compounds have been described, notably fumonisin B1, B2 and B3 (abbreviation: FB1 etc.)

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

Fumonisin are a class of recently identified mycotoxins that are produced mainly by certain *Fusarium* species, especially *F. moniliforme* which is a pathogen of corn (*Zea mays*). Fumonisin are a structurally related group of diesters of propane-1, 2, 3-tricarboxylic acid and various 2-amino-12, 16-dimethylpolyhydroxyeicosanes. There are at least 12 fumonisin analogues identified, classified into series A, B, F and P. The B-series, consisting mainly of FB1 and FB2, are believed to be the most abundant and most toxic compounds. A typical ratio between these analogues is B1:B2:B3 as 10:3:1. The worldwide occurrence of fumonisins in corn and corn-based products is well documented; sporadic natural occurrence in sorghum, rice and navy beans has been reported. Fumonisin are heat-stable, so cooking and other heat processes do not substantially reduce their levels in foods. Processing involving treatment of wet milling fractions may however lead to elimination of most fumonisin. The human exposure via food can vary to a large extent, because of the large range of fumonisin contents which have been found in practice. Fumonisin undergo rapid metabolism and elimination in livestock species and the transfer from feed to animal products is probably negligible. Maximum levels in feed are not needed to protect public health, but are useful for the protection of animal health and productivity.

In animals, various adverse effects have been observed. The horse appears to be the most sensitive species, and equine leukoencephalomalacia (ELEM) is the most frequently encountered disease. Fumonisin are also associated with liver damage, often also kidney lesions and changes in certain lipid classes, especially sphingolipids, in all animals studied. Carcinogenic effects have been observed in animals exposed to high dietary levels.

Nephrotoxicity, observed in several strains of rat, was considered by JECFA to be the most sensitive toxic effect. On the basis of the NOEL for renal toxicity and a safety factor of 100, the PMTDI was established.

National estimates for the mean or median intake were generally much lower than the PMTDI (the highest being 0.2 mcg/kg bw).

A position paper has been prepared for fumonisins (last version CX/PR 00/22). The 2000 CCFAC asked the US to finalise the position paper as a potential basis for future work (ALINORM 01/12 para. 106-109).

Fumonisin are incorporated with a specific Annex in the Code of Practice for the prevention of mycotoxin contamination in cereals, which was adopted by the 2003 CAC (last published version in Appendix X of ALINORM 03/12A).

5.04.3 Zearalenone

Reference to JECFA:	53 (1999)
Toxicological intake	PMTDI 0.0005 mg/kg bw (1999 The total intake of zearalenone and its metabolites (including f_{ζ} -zearalanol (zeranol)) should not exceed the PMTDI.)
Residue definition:	
Synonyms:	Zearalenone is the most important of a group of related mycotoxins and relevant metabolites. Abbreviation, ZEN. Its metabolite, alpha-zearalanol (zeranol) is used as veterinary drug.

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
No ML									

Zearalenone (ZEN) is the most important of a group of resorcyclic acid lactone mycotoxins, produced by several species of *Fusarium* moulds.

It is found worldwide in a number of cereal crops and also in derived products like beer. It has been implicated in numerous incidents of mycotoxicosis in farm animals, especially pigs. ZEN is rapidly metabolized and excreted in animals; residues of this mycotoxin in animal products are probably not significant from a health point of view. A metabolite of ZEN, alpha-zearalanol (zeranol, abbreviated here as ZAL) is however relevant relating to its potential use as a veterinary drug. Also β -zearalanol (taleranol) has hormonal activity. Besides these substances which can be used as anabolic growth promoters, also alpha- and beta-zearalenol (ZEL) and zearalanone (ZAN) are mentioned as possibly occurring metabolites of or co-occurring substances with ZEN.

The PMTDI for ZEN was set by applying a safety factor of 100 from the lowest NOAEL, related to the estrogenic effect in pigs.

ZAL has an ADI of 0,5 mcg/kg bw (ref. JECFA 26, 27 and 32)

The situation regarding ZEN has been reviewed in a position paper (last version CX/FAC 00/19). Preliminary intake calculations indicate values well below the PMTDI. It is mentioned however that further action seems required to reduce the levels of ZEN in risk products (especially maize containing products) for especially children with a high intake of these products. The 31st CCFAC (1999) agreed that, recognizing that there were no identified trade problems with ZEN, Codex MLs were not necessary for the time being. The standards mentioned here for ZAL in cattle liver and cattle muscle have been established by the CCRVDF because of recognized use of zeranol in cattle; they are relevant for the CCFAC in so far that feed contamination with ZEN can lead to residues of both ZEN and ZAL (and other metabolites) in cattle liver and muscle.

ZEN is incorporated with a specific Annex in the Code of Practice for the prevention of mycotoxin contamination in cereals, which was adopted by the 2003 CAC (last published version in Appendix X of ALINORM 03/12A).

Residues of ZEN and ZAL together in an animal product may be regarded as evidence that the animal feed was contaminated with ZEN. In order to distinguish between contamination of the feed with mycotoxins of the ZEN group or use of ZAL as veterinary drug, it may be necessary to determine the relative proportions of the different residues, e.g. as ZEN + alpha- and beta-ZEL against ZAL. A ratio of 5 or more probably indicates only contamination by mycotoxins.

5.06.1 Patulin

Reference to JECFA: 35 (1989), 44 (1995)
 Toxicological intake: PMTDI 0.0004 mg/kg bw (1995)
 Residue definition: patulin

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
MLs/GLs developed by CCFAC									
JF 0226	Apple juice	50		ML	Adopted		FAC 97-02	The ML also covers apple juice as ingredient in other beverages.	A Code of Practice for the prevention of patulin contamination in apple juice and apple juice ingredients in other beverages was adopted by the 2003 CAC (Appendix IX, ALINORM 03/12A). The 26th CAC in 2003 adopted this ML. The possible reduction of the ML from 50 to 25 mcg/kg will be reconsidered by the CCFAC once the Code of Practice has been implemented (i.e., after 4 years). More data are requested on the level of patulin in apple juice and apple juice ingredients for other beverages.

Patulin is a low molecular weight hemiacetal lactone mycotoxin produced by species of the genera *Aspergillus*, *Penicillium* and *Byssoschlamys*. The major sources of patulin contamination are apples with brown rot and blue mould. Because patulin does not spread much from spoilt tissue, the main human exposure can be expected from processed products, like apple juice and apple sauce, in which the contamination is not visible. Because fermentation destroys patulin, it is not normally present in cider and perry, unless unfermented apple juice has been added after fermentation. Patulin may also be a contaminant of soft fruits, some vegetables, barley, wheat and corn.

The PMTDI was set by applying a safety factor of 100 from the lowest NOAEL of 43 mcg/kg bw/day in rats. Potential health problems related to patulin are connected to cytotoxic, immunotoxic, neurotoxic, gastrointestinal and other effects observed in animals. Patulin is mostly eliminated within a few days after ingestion.

The situation regarding patulin was reviewed in a position paper (last version CX/FAC 99/16).

8 Radionuclides

Guideline levels for radionuclides in foods following accidental nuclear contamination (CAC/GL 5-1989)
For use in international trade

Dose per unit intake factor in Sv/Bq	Representative radionuclides	Level in Bq/kg
MLs/GLs developed by CCFAC		
Foods destined for general consumption		
10 ⁻⁶	241-Am, 239-Pu	10
10 ⁻⁷	90-Sr	100
10 ⁻⁸	131-I, 134-Cs, 137-Cs	1000
Milk and infant foods		
10 ⁻⁵	241-Am, 239-Pu	1
10 ⁻⁷	131-I, 90-Sr	100
10 ⁻⁸	134-Cs, 137-Cs	1000

The 35th CCFAC agreed to request the IAEA to prepare a revised version of the Codex Guideline Levels for Radionuclides in Foods (etc.) , for consideration at its next session, on the basis of document CX/FAC 03/13 and its discussion (see ALINORM 03/12A, paras 79-84). The 26th CAC approved this proposal as new work.

CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOODS
ANNEX IV: ANNOTATED LIST OF CONTAMINANTS AND TOXINS IN FOODS
Part 2 Quality Factors

1.09 Copper

Reference to JECFA: 10 (1966), 14 (1970), 26 (1982)
 Toxicological intake: PMTDI 0.5 mg/kg bw (1982 Provisional daily dietary requirement, 0.05 mg/kg)
 Residue definition: Copper, total
 Synonyms: Cu

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
Provisions developed by other Codex committees									
JF 0175	Fruit juices	5		CS	Adopted	CS 164-1989		ML for sum of copper, zinc and iron: 20 mg/kg.	2)
NF 0175	Fruit nectars	5		CS	Adopted	CS 161-1989		ML for sum of copper, zinc and iron: 20 mg/kg	2)
OR 0172	Edible fats and oils, refined	0.1		CS	Adopted	CS 19-1981, Rev.2-1999		Refined edible fats and oils not covered by individual standards (see standards for named vegetable oils, olive oil, margarine, minarine, named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
OC 0172	Edible fats and oils, virgin and cold pressed	0.4		CS	Adopted	CS 19-1981, Rev.2-1999		Edible fats and oils, virgin and cold pressed, not covered by individual standards (see standards for named vegetable oils, olive oil, margarine, minarine, named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
CS 32-1981	Margarine	0.1		CS	Adopted	CS 32-1981, Rev.1-1989			
CS 135-1981	Minarine	0.1		CS	Adopted	CS 135-1981, Rev.1-1989			
CS 211-1999	Named animal fats	0.4		CS	Adopted	CS 211-1999	FO	This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for	The named animal fats in CS 211-1999 refer only to fats derived from fatty tissue of swine, bovine

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
								application by governments.	animals and sheep. CS for edible fats and oils not covered by individual standards contains the same contaminant provisions as the other recent Standards for oils and fats (only applying to Pb and As) 1)
OR 0172	Named vegetable oils, refined	0.1		CS	Adopted	CS 210-1999	FO-03	Except olive oil (CS 33-1981). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
OC 0172	Named vegetable oils, virgin	0.4		CS	Adopted	CS 210-1999	FO-03	Except olive oils (CS 33-1981) This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
CS 108-1981	Natural mineral water	1	mg/l	CS	Adopted	CS 108-1981, Rev.1-1997			
MLs/provisions revoked or discontinued									
JV 0172	Vegetable juices					[CS 179-1991]			CS revoked in 2003. 2)
[CS 168-1987]	Mayonnaise							European Standard was revoked in 2003. ML was 2.0 mg/kg for copper.	
[CS 87-1981]	Chocolate (except..)					[CS 87-1981]			CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for copper; ML was 15 mg
[CS 87-1981]	Chocolate, unsweetened					[CS 87-1981]			CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for copper; ML was 30 mg
CS 86-1981	Cocoa butter					CS 86-1981, Rev.1-2001			The revised standard no longer contains provisions for copper. ML of the previous standard was 0.4 mg/kg.
CS 105-1981	Cocoa powders & dry cocoa-sugar mixtures					CS 105-1981, Rev.1-2001			The revised standard no longer contains provisions for copper. ML was 50 mg/kg.
CS141-1983	Cocoa products, other					CS141-1983, Rev.1-2001		Cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake	The Codex Standards for cocoa (cacao) mass (cocoa/chocolate liquor) and cocoa cake (CS 141-1983) were revised in 2001 and no longer contains provisions for copper. MLs in the previous

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
[CS 142-1983]	Composite and filled chocolate					[CS142-1983]			standard were 30-50 mg/kg. CS replaced in 2003 by a new CS for chocolate and chocolate products which does not contain provisions for copper; ML was 20 mg
[CS 162-1987]	Vinegar							European. Standard was revoked in 2001. ML was 10 mg/kg for the sum of copper and zinc.	

) The revised Standards for oils and fats contain the following wording for the mentioned contaminant MLs: "The products covered by the provisions of this Standard shall comply with MLs being established by the CAC but in the meantime the following limits will apply."

2) The 3rd session of the ad hoc Intergovernmental task force on fruit and vegetable juices is developing a proposed draft Codex General Standard for fruit juices and nectars (see ALINORM 03/39A, Appendix II). The 2003 CAC adopted this text and advanced it to step 7, noting that some details needed to be further discussed, but with the expectation that at the next session of the Task Force a single standard could be presented for final adoption by the CAC. This new General Standard does not contain contaminant MLs. See the list of relevant Standards for fruit juices and nectars in 1.16, tin.

Copper is a naturally occurring element, which sometimes is naturally found in its metallic form, but usually in the form of insoluble or soluble salts. In the soil and in plants and animal tissues it is normally always present in small quantities. Copper is an essential element, but toxic concentrations could be reached by environmental contamination or by specific conditions in connection with uses of copper compounds.

The 26th CCFAC (1994) expressed the view that the MLs for copper in fats and oils, as contained in document CX/FAC 94/11, were not related to safety, but were proposed as quality characteristics to prevent lipid oxidation. These MLs should therefore not be considered as contaminant MLs in the context of the activities of the CCFAC. The CCFAC decided to leave the establishment of such levels to the CCFO (ALINORM 95/12, para. 86-91). The MLs have accordingly been characterised as quality characteristics in CS 19-1981. This notion however has not yet been expressed in all relevant commodity standards in which MLs for copper are established.

1.10 Iron

Reference to JECFA:	27 (1983)
Toxicological intake	PMTDI 0.8 mg/kg bw (1983 Group PMTDI, applies to iron from all sources except for iron oxides; daily dietary requirement 10/20 mg (men/women))
Residue definition:	Iron, total
Synonyms:	Fe

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
Provisions developed by other Codex committees									
JF 0175	Fruit juices	15		CS	Adopted	CS 164-1989		Fruit juices and nectars preserved exclusively by physical means not covered by individual standards. ML for sum of copper, zinc and iron: 20 mg/kg.	
NF 0175	Fruit nectars	15		CS	Adopted	CS 161-1989		Fruit juices and nectars preserved exclusively by physical means not covered by individual standards. ML for sum of copper, zinc and iron: 20 mg/kg.	
CS 19-1981	Edible fats and oils, refined	2.5		CS	Adopted	CS 19-1981, Rev.2-1999		Refined edible fats and oils not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine, & named animal fats) This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
CS 19-1981	Edible fats and oils, virgin and cold pressed	5		CS	Adopted	CS 19-1981, Rev.2-1999		Edible fats and oils, virgin and cold pressed, not covered by individual standards (See Standards for named vegetable oils, olive oil, margarine, minarine, & named animal fats). This ML is mentioned to be a quality characteristic, for voluntary application by commercial partners and not for application by governments.	
CS 32-1981	Margarine	1.5		CS	Adopted	CS 32-1981, Rev.1-1989			
CS 135-1981	Minarine	1.5		CS	Adopted	CS 135-1981, Rev.1-1989			

MLs/provisions revoked or discontinued

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
JV 0172	Vegetable juices					[CS 179-1991]			CS revoked in 2003. ML was 5 mg/kg. ML for sum of copper, zinc and iron was 20 mg/kg.
CS 86-1981	Cocoa butter					CS 86-1981, Rev.1-2001			The revised standard no longer contains provisions for contaminants. ML in the previous standard was 2.0 mg/kg.
[CS 162-1987]	Vinegar								European Standard was revoked in 2001. ML was 10 mg/kg for the sum of copper and zinc.

Iron is a naturally occurring element, which is not naturally found in its metallic form, but usually in the form of insoluble or soluble salts. In the soil and in plants and animal tissues it is normally always present in small quantities. Iron is an essential element, but toxic concentrations could be reached by environmental contamination or by specific conditions in connection with uses of iron compounds.

The 26th CCFAC (1994) expressed the view that the MLs for iron in fats and oils, as contained in document CX/FAC 94/11, were not related to safety, but were proposed as quality characteristics to prevent lipid oxidation. These MLs should therefore not be considered as contaminant MLs in the context of the activities of the CCFAC. The CCFAC decided to leave the establishment of such levels to the CCFO (ALINORM 95/12, para. 86-91). The MLs have accordingly been characterised as quality characteristics in CS 19-1981. This notion however has not yet been expressed in all relevant commodity standards in which MLs for iron are established.

1.18 Zinc

Reference to JECFA: 10 (1966), 26 (1982)
 Toxicological intake: PMTDI 1 mg/kg bw (1982 Provisional daily dietary requirement, 15-22 mg/person)
 Residue definition: Zinc, total
 Synonyms: Zn

Commodity/Product Code	Product Name	Level mg/kg	Suffix	Type	Step	Reference	Ref to CC	Notes/Remarks for Codex Alimentarius	Notes for CCFAC
Provisions developed by other Codex committees									
JF 0175	Fruit juices	5		CS	Adopted	CS 164-1989		ML for the sum of copper, zinc and iron: 20 mg/kg	
NF 0175	Fruit nectars	5		CS	Adopted	CS 161-1989		ML for the sum of copper, zinc and iron: 20 mg/kg	
MLs/provisions revoked or discontinued									
JV 0172	Vegetable juices					[CS 179-1991]			CS revoked in 2003. ML was 5 mg/kg. ML for the sum of copper, zinc and iron was 20 mg/kg.
[CS 162-1987]	Vinegar								European Standard was revoked in 2001. ML was 10 mg/kg for the sum of copper and zinc.

Zinc is a naturally occurring element, which naturally is never found in its metallic form, but which occurs usually in the form of insoluble or soluble salts. In the soil and in plants and animal tissues it is normally always present in small quantities. Zinc is an essential element, but toxic concentrations could be reached by environmental contamination or by specific conditions in connection with uses of zinc compounds.

The MLs for zinc should probably not be considered as contaminant MLs in the context of the activities of the CCFAC. The MLs should accordingly be characterised as quality characteristics. This notion however has not yet been expressed in the commodity standards in which MLs for zinc are established.