Standard 1.4.1

Contaminants and Natural Toxicants

Purpose

This Standard sets out the maximum levels (MLs) of specified metal and non-metal contaminants and natural toxicants in nominated foods. As a general principle, regardless of whether or not a ML exists, the levels of contaminants and natural toxicants in all foods should be kept As Low As Reasonably Achievable (the ALARA principle).

A ML has been established only where it serves an effective risk management function and only for those foods which provide a significant contribution to the total dietary exposure. Food not listed in this Standard may contain low levels of contaminants or natural toxicants. However, MLs have not been assigned to these foods because they present a low public heath risk. The general provisions of the Food Acts relating to the availability of safe foods apply to all foods.

MLs have been set at levels that are consistent with public health and safety and which are reasonably achievable from sound production and natural resource management practices. Consideration has also been given to Australia's and New Zealand's international trade obligations under the World Trade Organization's Sanitary and Phytosanitary Agreement and Technical Barrier to Trade Agreement.

In order to assist both enforcement agencies and industry to maintain contaminant levels at the lowest achievable levels, Generally Expected Levels (GELs), have been established to complement the use of MLs. GELs, while not legally enforceable, provide a benchmark against which to measure contaminant levels in foods. The list of GELS is provided in a separate document to this Standard.

Table of Provisions

Clauses

1 Interpretation

(1) In this Standard –

arsenic is considered to be a metal.

maximum level (ML) means the maximum level of a specified contaminant, or specified natural toxicant, which is permitted to be present in a nominated food expressed, unless otherwise specified, in milligrams of the contaminant or the natural toxicant per kilogram of the food (mg/kg).

(2) Where food contains a metal and any other chemical species of that metal, all chemical species of that metal must be expressed as the metal.

(3) The maximum level must be calculated for the edible content of the food that is ordinarily consumed.

(4) The level for a food which is dried, dehydrated or concentrated is to be calculated on the basis of the mass of the food, or the mass of the ingredients of the food, prior to drying, dehydration or concentration determined from one or more of the following -

(a) the manufacturer's analysis of the food; and
(b) calculation from actual or average quantity in water in the ingredients used; and
(c) generally accepted data.

(5) The level for seaweed (edible kelp) whether dried, dehydrated, concentrated or not is to be calculated with respect to the mass of the seaweed at 85% hydration.

(6) The prescribed formula for the purposes of this Standard is –

Formula

$$ML1 = \frac{MLA \times Total\ A}{Total} + \frac{MLB \times Total\ B}{Total} + CF \times \frac{Total - (Total\ A + Total\ B)}{Total}$$

In this formula –

ML1 = ML which applies to the contaminant or natural toxicant in the mixed food
MLA = ML for contaminant or natural toxicant in food A
MLB = ML for contaminant or natural toxicant in food B
Total = total weight of mixed food
Total A = total weight of food A
Total B = total weight of food B
CF = Background Calculation Factor where, in the case of –

(a) lead, CF = 0.01 mg/kg; and
(b) cadmium, CF = 0.005 mg/kg; and
(c) other contaminants, CF = 0.

Editorial note:

It is recognised both lead and cadmium are ubiquitous in the environment and occur at low levels in foods other than those listed in the Standard. Therefore, in order to assist with the enforcement of MLs in mixed foods which may contain these contaminants, the calculation requires the inclusion of a representative contaminant level for those foods that do not have an allocated ML. In the past, an ML was set for "all other foods". As the category for "all other foods" was discontinued, a representative level is selected for the contaminants cadmium and lead. These levels are set at the limit of quantification (LOQ), and are 0.01 mg/kg for lead and 0.005 mg/kg for cadmium. These LOQs constitute CF in the prescribed formula. These selected LOQs are consistent with those published in the Australian Market Basket Survey (1996).

It is acknowledged that the LOQ may change with time as analytical techniques became more sensitive. The Standard will be reviewed periodically in respect to this issue.

The calculation for mixed food for all other contaminants with an ML will assume that the contributing commodity, eg. peanuts in peanut sauce, contains all of the contaminant.

2 Maximum levels of metal contaminants in food

(1) In this clause -

food means the food or class of foods listed in unbolded type in column 1 of the Table to this clause.

metal contaminant means a substance listed in bold type in column 1 of the Table to this clause and includes compounds of a metal.

(2) The maximum levels for metal contaminants in food are listed in column 2 of the Table to this clause, expressed in mg/kg, unless otherwise specified.

(3) Where a mixed food contains food or class of foods listed in unbolded type in column 1 of the Table to this clause, the proportion of the metal contaminant permitted to be present in the mixed food (ML1) is calculated in accordance with the formula prescribed in subclause 1(6).

Table to clause 2

Column 1	Column 2
Arsenic (total)	
Cereals	1
Arsenic (inorganic)	
Crustacea	2
Fish	2
Molluscs	1
Seaweed (edible kelp)	1
Cadmium	
Chocolate and cocoa products	0.5
Kidney of cattle, sheep and pig	2.5
Leafy vegetables (as specified in Schedule 4 to Standard 1.4.2)	0.1
Liver of cattle, sheep and pig	1.25
Meat of cattle, sheep and pig (excluding offal)	0.05
Molluscs (excluding dredge/bluff oysters and queen scallops)	2
Peanuts	0.1
Rice	0.1
Root and tuber vegetables (as specified in Schedule 4 to Standard 1.4.2)	0.1
Wheat	0.1
Lead	
Brassicas	0.3
Cereals, Pulses and Legumes	0.2
Edible offal of cattle, sheep, pig and poultry	0.5
Fish	0.5
Fruit	0.1
Infant formulae	0.02
Meat of cattle, sheep, pig and poultry (excluding offal)	0.1
Molluscs	2
Vegetables (except brassicas)	0. 1

Table to clause 2 (Continued)

Column 1	Column 2
Mercury	
Crustacea	mean level of 0.5*
Fish (as specified in Schedule 4 to Standard 1.4.2) and fish products, excluding gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark	mean level of 0.5*
Gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark	mean level of 1*
Fish for which insufficient samples are available to analyse in accordance with clause (6)	1
Molluscs	mean level of 0.5*
Tin	
All canned foods	250

* A reference to a mean level in the Table to clause 2 in this Standard is to the mean level of mercury in the prescribed number of sample units as described in clause 6 of this Standard.

3 Maximum levels of non metal contaminants in food

(1) In this clause -

ergot means the sclerotium or dormant winter form of the fungus, *Claviceps purpuria.*

food means the food or class of foods listed in unbolded type in column 1 of the Table to this clause.

MU means the unit of measure described in 'Recommended procedures for examination of seawater and shellfish', Irwin N. (ed.) 4th Ed. 1970, American Public Health Association Inc.

non-metal contaminant means a substance listed in bold type in column 1 of the Table to this clause.

(2) The maximum levels for non metal contaminants in food are listed in column 2 of the Table to this clause, expressed in mg/kg, unless otherwise specified.

(3) Where a mixed food contains food or class of foods listed in unbolded type in column 1 of the Table to this clause, the proportion of the non metal contaminant permitted to be present in the mixed food (ML1) is calculated in accordance with the formula prescribed in subclause 1(6).

Table to clause 3

Column 1	Column 2
Acrylonitrile	
All food	0.02
Aflatoxin	
Peanuts	0.015
Tree nuts (as specified in Schedule 4 to Standard 1.4.2	0.015
Amnesic shellfish poisons (Domoic acid equivalent)	
Bivalve mollusks	20
Diarrhetic shellfish poisons (Okadaic acid equivalent)	
Bivalve mollusks	0.2
Ergot	
Cereal grains	500
Methanol	
Red wine, white wine and fortified wine	3 g of methanol per litre of ethanol
Whisky, Rum, Gin and Vodka	0.4 g of methanol per litre of ethanol
Other spirits, fruit wine, vegetable wine and mead	8 g of methanol per litre of ethanol
Neurotoxic shellfish poisons	
Bivalve mollusc	200 MU/kg
Paralytic shellfish poisons (Saxitoxin equivalent)	
Bivalve molluscs	0.8
Phomopsins	
Lupin seeds and the products of lupin seeds	0.005
Polychlorinated biphenyls, total	
Mammalian fat	0.2
Poultry fat	0.2
Milk and milk products	0.2
Eggs	0.2
Fish	0.5
Vinyl chloride	
All food	0.01

4 Maximum levels of natural toxicants from the addition of flavouring substances to food

food means the food or class of foods listed in unbolded type in column 1 of the Table to this clause.

natural toxicant from the addition of a flavouring substance means a substance listed in bold type in column 1 of the Table to this clause.

(2) The maximum levels for natural toxicants from the addition of a flavouring substance in food are listed in column 2 of the Table to this clause, expressed in mg/kg, unless otherwise specified.

(3) Where a mixed food contains food or class of foods listed in unbolded type in column 1 of the Table to this clause, the proportion of the natural toxicant from the addition of a flavouring substance permitted to be present in the mixed food (ML1) is calculated in accordance with the formula prescribed in subclause 1(6).

Table to clause 4

Column 1	Column 2
Agaric acid	
Food containing mushrooms	100
Alcoholic beverages	100
Aloin	
Alcoholic beverages	50
Berberine	
Alcoholic beverages	10
Coumarin	
Alcoholic beverages	10
Hydrocyanic acid, total	
Confectionery	25
Stone fruit juices	5
Marzipan	50
Alcoholic beverages	1 per 1% alcohol content
Hypericine	
Alcoholic beverages	2
Pulegone	
Confectionery	350
Beverages	250
Quassine	
Alcoholic beverages	50

Table to clause 4 (Continued)

Column 1	Column 2
Safrole	
Food containing mace and nutmeg	15
Meat products	10
Alcoholic beverages	5
Santonin	
Alcoholic beverages	1
Sparteine	
Alcoholic beverages	5
Thujones (alpha and beta)	
Sage stuffing	250
Bitters	35
Sage flavoured foods	25
Alcoholic beverages	10

5 Maximum levels of other natural toxicants in food

(1) In this clause -

food means the food or class of foods listed in unbolded type in column 1 of the Table to this clause.

natural toxicant means a substance listed in bolded type in column 1of the Table to this clause.

(2) The maximum levels for natural toxicants in food are listed in column 2 of the Table to this clause, expressed in mg/kg, unless otherwise specified.

(3) Where a mixed food contains food or class of foods listed in unbolded type in column 1 of the Table to this clause, the proportion of the natural toxicants permitted to be present in the mixed food (ML1) is calculated in accordance with the formula prescribed in subclause 1(6).

Table to clause 5

Column 1	Column 2
Erucic acid	
Edible oils	20 g/kg
Lupin alkaloids	
Lupin flour, lupin kernel flour, lupin kernel meal and lupin hulls	200

6 Sampling plan for mercury in fish, fish products, crustacea and molluscs

(1) The methods specified in this clause are the prescribed methods for the sampling for analysis of mercury in fish, fish products, crustacea and molluscs.

(2) For the purposes of this sampling plan -

(a) A sample must consist of a prescribed number of sample units, and a sample unit must consist of a quantity, taken from the edible portions of the fish, fish products, crustacea or molluscs, sufficient for the purposes of analysis.
(b) In the lot under investigation, the number of random sample units must be as detailed in paragraphs 6(3)(a) or 6(3)(b) of this Standard.
(c) In the case of samplings where the prescribed number of sample units are not available, 5 sample units must be taken.

(3) The number of random sample units to be taken for the purposes of analysis is as follows –

(a) fish, fish products, including packaged fish -

(i) lots up to and including 5 tonnes ... sample units from 10 fish, or 10 packages; or
(ii) lots over 5 tonnes, up to 10 tonnes ... sample units from 15 fish, or 15 packages; or
(iii) lots over 10 tonnes, up to 30 tonnes ... sample units from 20 fish, or 20 packages; or
(iv) lots over 30 tonnes, up to 100 tonnes ... sample units from 25 fish, or 25 packages; or
(v) lots over 100 tonnes, up to 200 tonnes ... sample units from 30 fish, or 30 packages; or
(vi) lots over 200 tonnes ... sample units from 40 fish, or 40 packages.

(b) crustacea, and molluscs, including packaged crustacea and molluscs –

(i) lots up to and including 1 tonne ... 10 sample units, or 10 packages; or
(ii) lots over 1 tonnes, up to 5 tonnes ... 15 sample units, or 15 packages; or
(iii) lots over 5 tonnes, up to 30 tonnes ... 20 sample units, or 20 packages; or
(iv) lots over 30 tonnes, up to 100 tonnes ... 25 sample units, or 25 packages; or
(v) lots over 100 tonnes ... 30 sample units, or 30 packages.

(4) Interpretation of the Analysis -

(a) Samples with 10 or more sample units –

(i) if the concentration of mercury in any of the sample units is greater than 1.0 mg/kg in the case of gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark, or is greater than 0.5 mg/kg in the case of crustacea, molluscs and other fish which can be sampled in accordance with this clause the overall mean of the sample units should be examined; or

(ii) if the overall mean of the lot is less than or equal to 1.0 mg/kg in the case of gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark, or is less than or equal to 0.5 mg/kg in the case of crustacea, molluscs, and other fish which can be sampled in accordance with this clause and there are no individual sample units within the lot having a mercury concentration exceeding 1.5 mg/kg, the lot must be reported as complying with the standard.

(b) Samples with 5 sample units –

(i) if the overall concentration of mercury in the sample is less than or equal to 1.0 mg/kg in the case of gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark, or is less than or equal to 0.5 mg/kg in the case of crustacea, molluscs and other fish which can be sampled in accordance with this clause and minced fish products, the lot must be reported as complying with the standard.

(c) Notwithstanding subclause 1(4), the mercury content of dried or partially dried fish must be calculated on an 80% moisture basis.