STANDARD 1.3.3

PROCESSING AIDS

Purpose

This Standard regulates the use of processing aids in food manufacture, prohibiting their use in food unless there is a specific permission within this Standard.

Standard 1.3.1 regulates the use of food additives.

Table of Provisions

Clauses

1 Interpretation

(1) In this Standard –

approved food for use of phage means food that –

(a) is ordinarily consumed in the same state as that in which it is sold; and
(b) is solid; and
(c) is one of the following –

(i) meat;
(ii) meat product;
(iii) fish;
(iv) fish product;
(v) fruit;
(vi) fruit product;
(vii) vegetable;
(viii) vegetable product;
(ix) cheese; and

(d) is not one of the following –

(i) nuts in the shell and whole;
(ii) raw fruits and vegetables that are intended for hulling, peeling or washing by the consumer.

dairy ingredient means an ingredient that is derived from a dairy source.

EC number (Enzyme Commission number) means the number which the Enzyme Commission uses to classify the principal enzyme activity.

maximum permitted level means the maximum amount of the processing aid which may be present in the food as specified in the Tables to clauses 3 to 18.

processing aid means a substance listed in clauses 3 to 19, where –

(a) the substance is used in the processing of raw materials, foods or ingredients, to fulfil a technological purpose relating to treatment or processing, but does not perform a technological function in the final food; and
(b) the proportion of the processing aid is no more than the maximum level necessary to achieve one or more technological functions under conditions of Good Manufacturing Practice (GMP).

silica or silicates includes sodium calcium polyphosphate silicate, sodium hexafluorosilicate, sodium metasilicate, sodium silicate, silica and modified silica that complies with a monograph specification in clause 2 or clause 3 of Standard 1.3.4.

(2) In this Standard, the letters 'ATCC' followed by a number is a reference to the number which the American Type Culture Collection uses to identify a prokaryote.

2 General prohibition on the use of processing aids

Unless expressly permitted in this Standard, processing aids must not be added to food.

3 Generally permitted processing aids

The following processing aids may be used in the course of manufacture of any food at a level necessary to achieve a function in the processing of that food –

(a) foods, including water; and
(b) food additives listed in Schedule 2 of Standard 1.3.1; and
(c) a processing aid specified in the Table to this clause.

Table to clause 3

Activated carbon
Ammonia
Ammonium hydroxide
Argon
Bone phosphate
Carbon monoxide
Diatomaceous earth
Ethoxylated fatty alcohols
Ethyl alcohol
Fatty acid polyalkylene glycol ester
Furcellaran
Hydrogenated glucose syrups
Isopropyl alcohol
Magnesium hydroxide

Table to clause 3 (continued)

Oleic acid
Oleyl oleate
Oxygen
Perlite
Phospholipids
Phosphoric acid
Polyethylene glycols
Polyglycerol esters of fatty acids
Polyglycerol esters of interesterified ricinoleic acid
Polyoxyethylene 40 stearate
Potassium hydroxide
Propylene glycol alginate
Silica or silicates
Sodium hydroxide
Sodium lauryl sulphate
Sulphuric acid
Tannic acid

4 Permitted antifoam agents

The processing aids listed in the Table to this clause may be used as an antifoam agent in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 4

Substance	Maximum permitted level (mg/kg)
Butanol	10
Oxystearin	GMP
Polydimethylsiloxane	10
Polyethylene glycol dioleate	GMP
Polyethylene/ polypropylene glycol copolymers	GMP
Soap	GMP
Sorbitan monolaurate	1
Sorbitan monooleate	1

5 Permitted catalysts

The processing aids listed in the Table to this clause may be used as a catalyst in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 5

Substance	Maximum permitted level (mg/kg)
Chromium (excluding chromium VI)	0.1
Copper	0.1
Molybdenum	0.1
Nickel	1.0
Peracetic acid	0.7
Potassium ethoxide	1.0
Potassium (metal)	GMP
Sodium (metal)	GMP
Sodium ethoxide	1.0
Sodium methoxide	1.0

6 Permitted decolourants, clarifying, filtration and adsorbent agents

The processing aids listed in the Table to this clause may be used as decolourants, clarifying, filtration and adsorbent agents in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 6

Substance	Maximum permitted level (mg/kg)
Acid clays of montmorillonite	GMP
Chloromethylated aminated styrene-divinylbenzene resin	GMP
Co-extruded polystyrene and polyvinyl polypyrrolidone	GMP
Copper sulphate	GMP
Dimethylamine-epichlorohydrin copolymer	150
Dimethyldialkylammonium chloride	GMP
Divinylbenzene copolymer	GMP
High density polyethylene co-extruded with kaolin	GMP
Iron oxide	GMP
Fish collagen, including Isinglass	GMP
Magnesium oxide	GMP
Modified polyacrylamide resins	GMP
Nylon	GMP
Phytates (including phytic acid, magnesium phytate & calcium phytate)	GMP
Polyester resins, cross-linked	GMP
Polyethylene	GMP
Polypropylene	GMP
Polyvinyl polypyrrolidone	GMP
Potassium ferrocyanide	0.1

7 Permitted desiccating preparations

The processing aids listed in the Table to this clause may be used as desiccating preparations in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 7

Substance	Maximum permitted level (mg/kg)
Aluminium sulphate	GMP
Ethyl esters of fatty acids	GMP
Short chain triglycerides	GMP

8 Permitted ion exchange resins

The processing aids listed in the Table to this clause may be used as an ion exchange resin in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 8

Substance	Maximum permitted level (mg/kg)
Completely hydrolysed copolymers of methyl acrylate and divinylbenzene	GMP
Completely hydrolysed terpolymers of methyl acrylate, divinylbenzene and acrylonitrile	GMP
Cross-linked phenol-formaldehyde activated with one or both of the following: triethylene tetramine and tetraethylenepentamine	GMP

Table to clause 8 (continued)

Substance	Maximum permitted level (mg/kg)
Cross-linked polystyrene, chloromethylated, then aminated with trimethylamine, dimethylamine, diethylenetriamine, or dimethylethanolamine	GMP
Diethylenetriamine, triethylene-tetramine, or tetraethylenepentamin cross-linked with epichlorohydrin	GMP
Divinylbenzene copolymer	GMP
Epichlorohydrin cross-linked with ammonia	GMP
Epichlorohydrin cross-linked with ammonia and then quaternised with methyl chloride to contain not more than 18% strong base capacity by weight of total exchange capacity	GMP
Hydrolysed copolymer of methyl acrylate and divinylbenzene	GMP
Methacrylic acid-divinylbenzene copolymer	GMP
Methyl acrylate-divinylbenzene copolymer containing not less than 2% by weight of divinylbenzene, aminolysed with dimethylaminopropylamine	GMP
Methyl acrylate-divinylbenzene copolymer containing not less than 3.5% by weight of divinylbenzene, aminolysed with dimethylaminopropylamine	GMP
Methyl acrylate-divinylbenzene-diethylene glycol divinyl ether terpolymer containing not less than 3.5% by weight divinylbenzene and not more than 0.6% by weight of diethylene glycol divinyl ether, aminolysed with dimethaminopropylamine	GMP
Methyl acrylate-divinylbenzene-diethylene glycol divinyl ether terpolymer containing not less than 7% by weight divinylbenzene and not more than 2.3% by weight of diethylene glycol divinyl ether, aminolysed with dimethaminopropylamine and quaternised with methyl chloride	GMP
Reaction resin of formaldehyde, acetone, and tetraethylenepentamine	GMP
Regenerated cellulose, cross-linked and alkylated with epichlorohydrin and propylene oxide, then derivatised with carboxymethyl groups whereby the amount of epichlorohydrin plus propylene oxide is no more than 70% of the starting quantity of cellulose	GMP
Regenerated cellulose, cross-linked and alkylated with epichlorohydrin and propylene oxide, then derivatised with tertiary amine groups whereby the amount of epichlorohydrin plus propylene oxide is no more than 70% of the starting quantity of cellulose	GMP
Regenerated cellulose, cross-linked and alkylated with epichlorohydrin and propylene oxide, then derivatised with quaternary amine groups whereby the amount of epichlorohydrin plus propylene oxide is no more than 250% of the starting quantity of cellulose	GMP
Regenerated cellulose, cross-linked and alkylated with epichlorohydrin and propylene oxide, then sulphonated, whereby the amount of epichlorohydrin plus propylene oxide employed is no more than 250% of the starting quantity of cellulose	GMP
Styrene-divinylbenzene cross-linked copolymer, chloromethylated then aminated with dimethylamine and oxidised with hydrogen peroxide whereby the resin contains not more than 15% of vinyl N,N-dimethylbenzylamine-N-oxide and not more than 6.5% of nitrogen	GMP
Sulphite-modified cross-linked phenol-formaldehyde, with modification resulting in sulphonic acid groups on side chains	GMP
Sulphonated anthracite coal	GMP
Sulphonated copolymer of styrene and divinylbenzene	GMP
Sulphonated terpolymers of styrene, divinylbenzene, and acrylonitrile or methyl acrylate	GMP
Sulphonated tetrapolymer of styrene, divinylbenzene, acrylonitrile, and methyl acrylate derived from a mixture of monomers containing not more than a total of 2% by weight of acrylonitrile and methyl acrylate	GMP

9 Permitted lubricants, release and anti-stick agents

The processing aids listed in the Table to this clause may be used as lubricants, release and anti-stick agents in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 9

Substance	Maximum permitted level (mg/kg)
Acetylated mono- and diglycerides	100
Mineral oil based greases	GMP
Thermally oxidised soya-bean oil	320
White mineral oil	GMP

Editorial note:

The Joint FAO/WHO Expert Committee on Food Additives (JECFA) is currently reviewing mineral oils, including white mineral oil. To ensure consistency with the outcomes of this review, FSANZ will review the permission and nomenclature for white mineral oil once the JECFA review is completed.

10 Permitted carriers, solvents and diluents

The processing aids listed in the Table to this clause may be used as carriers, solvents and diluents in the course of manufacture of any food provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 10

Substance	Maximum permitted level (mg/kg)
Benzyl alcohol	500
Croscarmellose sodium	GMP
Ethyl acetate	GMP
Glycerol diacetate	GMP
Glyceryl monoacetate	GMP
Glycine	GMP
Isopropyl alcohol	1000
L-Leucine	GMP
Triethyl citrate	GMP

11 Permitted processing aids used in packaged water and in water used as an ingredient in other foods

Subject to any qualifications in the Table to this clause, the processing aids listed in the Table may be used in the course of manufacture of packaged water and in water used as an ingredient in other foods provided the water contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 11

Substance	Maximum permitted level (mg/kg)
Aluminium sulphate	GMP
Ammonium sulphate	GMP
Calcium hypochlorite	5 (available chlorine)
Calcium sodium polyphosphate	GMP
Chlorine	5 (available chlorine)
Chlorine dioxide	1
Cobalt sulphate	2
Copper sulphate	2
Cross-linked phenol-formaldehyde activated with one or both of triethylenetetramine or tetraethylenepentamine	GMP

Table to clause 11 (continued)

Substance	Maximum permitted level (mg/kg)
Cross-linked polystyrene, first chloromethylated then aminated with trimethylamine, dimethylamine, diethylenetriamine or dimethylethanolamine	GMP
Diethylenetriamine, triethylenetetramine or tetraethylenepentamine cross-linked with epichlorohydrin	GMP
Ferric chloride	GMP
Ferric sulphate	GMP
Ferrous sulphate	GMP
Hydrofluorosilicic acid (fluorosilicic acid) (only in water used as an ingredient in other foods)	1.5 (as fluoride)
Hydrolyzed copolymers of methyl acrylate and divinylbenzene	GMP
Hydrolyzed terpolymers of methyl acrylate, divinylbenzene and acrylonitrile	GMP
Hydrogen peroxide	5
1-Hydroxyethylidene-1,1-diphosphonic acid	GMP
Lignosulphonic acid	GMP
Magnetite	GMP
Maleic acid polymers	GMP
Methyl acrylate-divinylbenzene copolymer containing not less than 2% divinylbenzene aminolysed with dimethylaminopropylamine	GMP
Methacrylic acid-divinylbenzene copolymer	GMP
Methyl acrylate-divinylbenzene-diethylene glycol divinyl ether terpolymer containing not less than 3.5% divinylbenzene and not more than 0.6% diethylene glycol divinyl ether, aminolysed with dimethylaminopropylamine	GMP
Modified polyacrylamide resins	GMP
Monobutyl ethers of polyethylene-polypropylene glycol	GMP
Ozone	GMP
Phosphorous acid	GMP
Polyacrylamide (polyelectrolytes)	0.0002 (as acrylamide monomer)
Polyaluminium chloride	GMP
Polydimethyldiallyl ammonium chloride	GMP
Polyoxypropylene glycol	GMP
Potassium permanganate	GMP
Reaction resin of formaldehyde, acetone and tetraethylenepentamine	GMP
Regenerated cellulose, cross-linked and alkylated with epichlorohydrin and propylene oxide, then sulphonated whereby the amount of epichlorohydrin plus propylene oxide employed is no more than 250% of the starting quantity of cellulose	GMP
Silver ions	0.01
Sodium aluminate	GMP
Sodium fluoride (only in water used as an ingredient in other foods)	1.5 (as fluoride)
Sodium fluorosilicate (Sodium silicofluoride) (only in water used as an ingredient in other foods)	1.5 (as fluoride)
Sodium glucoheptonate	0.08 (measured as cyanide)
Sodium gluconate	GMP
Sodium humate	GMP
Sodium hypochlorite	5 (available chlorine)
Sodium lignosulphonate	GMP
Sodium metabisulphite	GMP
Sodium nitrate	50 (as nitrate)
Sodium polymethacrylate	2.5
Sodium sulphite (neutral or alkaline)	GMP
Styrene-divinylbenzene cross-linked copolymer	0.03 (as styrene)
Sulphonated copolymer of styrene and divinylbenzene	GMP
Sulphonated terpolymers of styrene, divinylbenzene acrylonitrile and methyl acrylate	GMP
Sulphite modified cross-linked phenol-formaldehyde	GMP
Tannin powder extract	GMP
Tetrasodium ethylene diamine tetraacetate	GMP
Zinc sulphate	GMP

Editorial note:

This clause contains the permissions for fluoride to be used in water that is used as an ingredient in other foods, but not in water presented in packaged form. Standard 2.6.2 contains a voluntary permission to add fluoride to water presented in packaged form.

12 Permitted bleaching agents, washing and peeling agents

The processing aids listed in the Table to this clause may be used as bleaching agents, washing and peeling agents in the course of manufacture of the corresponding foods specified in the Table provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 12

Substance	Food	Maximum permitted level (mg/kg)
Benzoyl peroxide	All foods	40 (measured as benzoic acid)
Bromo-chloro-dimethylhydantoin	All foods	1.0 (available chlorine) 1.0 (inorganic bromide) 2.0 (dimethylhydantoin)
Calcium hypochlorite	All foods	1.0 (available chlorine)
Chlorine	All foods	1.0 (available chlorine)
Chlorine dioxide	All foods	1.0 (available chlorine)
Diammonium hydrogen orthophosphate	All foods	GMP
Dibromo-dimethylhydantoin	All foods	2.0 (inorganic bromide) 2.0 (dimethylhydantoin)
2-Ethylhexyl sodium sulphate	All foods	0.7
Hydrogen peroxide	All foods	5
Iodine	Fruits, vegetables and eggs	GMP
Oxides of nitrogen	All foods	GMP
Ozone	All foods	GMP
Peracetic acid	All foods	GMP
Sodium chlorite	All foods	1.0 (available chlorine)
Sodium dodecylbenzene sulphonate	All foods	0.7
Sodium hypochlorite	All foods	1.0 (available chlorine)
Sodium laurate	All foods	GMP
Sodium metabisulphite	Root and tuber vegetables	25
Sodium peroxide	All foods	5
Sodium persulphate	All foods	GMP
Triethanolamine	Dried vine fruit	GMP

Editorial note:

FSANZ will review the extent of the use of Iodine as a processing aid three years from the date of the inclusion of Iodine as a processing aid in the Table to clause 12.

13 Permitted extraction solvents

The processing aids listed in the Table to this clause may be used as extraction solvents in the course of manufacture of the corresponding foods specified in the Table provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Table to clause 13

Substance	Food	Maximum permitted level (mg/kg)
Acetone	Flavourings	2
	Other foods	0.1
Benzyl alcohol	All foods	GMP
Butane	Flavourings	1
	Other foods	0.1
Butanol	All foods	10
Cyclohexane	All foods	1
Dibutyl ether	All foods	2
Diethyl ether	All foods	2
Dimethyl ether	All foods	2
Ethyl acetate	All foods	10
Glyceryl triacetate	All foods	GMP
Thexanes	All foods	20
Isobutane	Flavourings	1
	Other foods	0.1
Methanol	All foods	5
Methylene chloride	Decaffeinated coffee	2
	Decaffeinated tea	2
	Flavourings	2
Methylethyl ketone	All foods	2
Propane	All foods	1
Toluene	All foods	1

14 Permitted processing aids with miscellaneous functions

The processing aids listed in the Table to this clause may be used for the corresponding function specified in the Table, provided the final food contains no more than the corresponding maximum permitted level specified in the Table.

Editorial note:

Where meat has been treated using lactoperoxidase from bovine milk, the mandatory labelling requirements in clause 4 of Standard 1.2.3 apply.

Table to clause 14

Substance	Function	Maximum permitted level (mg/kg)
Agarose ion exchange resin being agarose cross-linked and alkylated with epichlorohydrin and propylene oxide, then derivatised with tertiary amine groups whereby the amount of epichlorohydrin plus propylene oxide does not exceed 250% by weight of the starting quantity of agarose	Removal of specific proteins and polyphenols from beer	GMP
Ammonium persulphate	Yeast washing agent	GMP
Ammonium sulphate	Decalcification agent for edible casings	GMP
Butanol	Suspension agent for sugar crystals	10
Carbonic acid	Bleached tripe washing agent	GMP
Cetyl alcohol	Coating agent on meat carcasses and primal cuts to prevent desiccation	1.0

Table to clause 14 (continued)

Substance	Function	Maximum permitted level (mg/kg)
Colours permitted in Schedules 2, 3 and 4 of Standard 1.3.1	Applied to the outer surface of meat as a brand for the purposes of inspection or identification	GMP
Cupric citrate	Removal of sulphide compounds from wine	GMP
β-Cyclodextrin	Used to extract cholesterol from eggs	GMP
L-Cysteine (or HCl salt)	Dough conditioner	75
Ethyl acetate	Cell disruption of yeast	GMP
Ethylene diamine tetraacetic acid	Metal sequestrant for edible fats and oils and related products	GMP
Gibberellic acid	Barley germination	GMP
Gluteral	Manufacture of edible collagen casings	GMP
Hydrogen peroxide	Inhibiting agent for dried vine fruits, fruit and vegetable juices, sugar, vinegar and yeast autolysate	5
	Removal of glucose from egg products	5
	Removal of sulphur dioxide	5
1-Hydroxyethylidene-1,1-diphosphonic acid	Metal sequestrant for use with anti-microbial agents for meat, fruit and vegetables	GMP
Ice Structuring Protein type III HPLC 12	Manufacture of ice cream and edible ices	100
Indole acetic acid	Barley germination	GMP
Lactoperoxidase from bovine milk EC 1.11.1.7	Reduce the bacterial population or inhibit bacterial growth on meat surfaces	GMP
Listeria phage P100	Listericidal treatment for use on approved food for use of phage	GMP
Morpholine	Solubilising agent for coating mixtures on fruits	GMP
Oak	For use in the manufacture of wine	GMP
Octanoic acid	Anti-microbial agent for meat, fruit and vegetables	GMP
Paraffin	Coatings for cheese and cheese products	GMP
Polyvinyl acetate	Preparation of waxes for use in cheese and cheese products	GMP
Potassium bromate	Germination control in malting	Limit of determination of bromate
Sodium bromate	Germination control in malting	Limit of determination of bromate
Sodium chlorite	Anti-microbial agent for meat, fish, fruit and vegetables	Limit of determination of chlorite, chlorate, chlorous acid and chlorine dioxide
Sodium gluconate	Denuding, bleaching & neutralising tripe	GMP
Sodium glycerophosphate	Cryoprotectant for starter culture	GMP
Sodium metabisulphite	Dough conditioner	60
	Removal of excess chlorine	60
	Softening of corn kernels for starch manufacture	60 (in the starch)
	Treatment of hides for use in gelatine and collagen manufacture	GMP

Table to clause 14 (continued)

Substance	Function	Maximum permitted level (mg/kg)
Sodium sulphide	Treatment of hides for use in gelatine and collagen manufacture	GMP
Sodium sulphite	Dough conditioner	60
Sodium thiocyanate	Reduce and/or inhibit bacterial population on meat surfaces	GMP
Stearyl alcohol	Coating agent on meat carcasses and primal cuts to prevent desiccation	GMP
Sulphur dioxide	Control of nitrosodimethylamine in malting	750
	Treatment of hides for use in gelatine and collagen manufacture	750
Sulphurous acid	Softening of corn kernels	GMP
	Treatment of hides for use in gelatine and collagen manufacture	GMP
Triethanolamine	Solubilising agent for coating mixtures for fruits	GMP
Urea	Manufacture of concentrated gelatine solutions	1.5 times the mass of the gelatine present
	Microbial nutrient and microbial nutrient adjunct for the manufacture of all foods, except alcoholic beverages	GMP
Woodflour from untreated *Pinus radiata*	Gripping agent used in the treatment of hides	GMP

Editorial note:

The limit of determination is the lowest concentration of a chemical that can be qualitatively detected using a laboratory method and/or item of laboratory equipment (that is, its presence can be detected but not quantified).

For Ice Structuring Protein type III HPLC 12 in the Table to clause 14, the manufacturer and patent holder, Unilever, has undertaken to voluntarily label products where the processing aid has been used in the manufacturing process. This labelling will appear on the product as 'ice structuring protein'. Unilever will also have information about ice structuring protein available to consumers.

Editorial note:

If *Listeria* phage P100 has an ongoing technological function it ceases to be a processing aid as defined in subclause 1(1), and operates instead as a food additive. For example, *Listeria* phage P100 may have an ongoing technological function when introduced to liquids. Standard 1.3.1 does not permit the use of *Listeria* phage P100 as a food additive.

15 Permitted enzymes of animal origin

The processing aids listed in the Table to this clause may be used as enzymes in the course of manufacture of any food provided the enzyme is derived from the corresponding source specified in the Table.

Table to clause 15

Enzyme	Source
Lipase, triacylglycerol EC 3.1.1.3	Bovine stomach; salivary glands or forestomach of calf, kid or lamb; porcine or bovine pancreas
Pepsin EC 3.4.23.1	Bovine or porcine stomach
Phospholipase A_2 EC 3.1.1.4	Porcine pancreas
Thrombin EC 3.4.21.5	Bovine or porcine blood
Trypsin EC 3.4.21.4	Porcine or bovine pancreas

16 Permitted enzymes of plant origin

The processing aids listed in the Table to this clause may be used as enzymes in the course of manufacture of any food provided the enzyme is derived from the corresponding source specified in the Table.

Table to clause 16

Enzyme	Source
α–Amylase EC 3.2.1.1	Malted cereals
β-Amylase EC 3.2.1.2	Sweet potato (*Ipomoea batatas)* Malted cereals
Actinidin EC 3.4.22.14	Kiwifruit (*Actinidia deliciosa*)
Ficin EC 3.4.22.3	*Ficus* spp.
Fruit bromelain EC 3.4.22.33	Pineapple fruit (*Ananas comosus*)
Papain EC 3.4.22.2	*Carica papaya*
Stem bromelain EC 3.4.22.32	Pineapple stem (*Ananas comosus*)

17 Permitted enzymes of microbial origin

(1) The processing aids listed in the Table to this clause may be used as enzymes in the course of manufacture of any food provided the enzyme is derived from the corresponding source or sources specified in the Table.

(2) The sources listed in the Table to this clause may contain additional copies of genes from the same organism.

Editorial note:

See Division 2 of Standard 1.5.2 – Food produced using Gene Technology for labelling requirements that apply to processing aids produced using gene technology.

Table to clause 17

Enzyme	Source
α–Acetolactate decarboxylase EC 4.1.1.5	*Bacillus amyloliquefaciens* *Bacillus subtilis* *Bacillus subtilis*, containing the gene for α–Acetolactate decarboxylase isolated from *Bacillus brevis*
Aminopeptidase EC 3.4.11.1	*Aspergillus oryzae* *Lactococcus lactis*
α–Amylase EC 3.2.1.1	*Aspergillus niger* *Aspergillus oryzae* *Bacillus amyloliquefaciens* *Bacillus licheniformis* *Bacillus licheniformis*, containing the gene for α-Amylase isolated from *Geobacillus stearothermophilus* *Bacillus subtilis* *Bacillus subtilis*, containing the gene for α-Amylase isolated from *Geobacillus stearothermophilus* *Geobacillus stearothermophilus*
β-Amylase EC 3.2.1.2	*Bacillus amyloliquefaciens* *Bacillus subtilis*
Amylomaltase EC 2.4.1.25	*Bacillus amyloliquefaciens*, containing the gene for amylomaltase derived from *Thermus thermophilus*
α–Arabinofuranosidase EC 3.2.1.55	*Aspergillus niger*
Asparaginase EC 3.5.1.1	*Aspergillus niger* *Aspergillus oryzae*
Carboxyl proteinase EC 3.4.23.6	*Aspergillus melleus* *Aspergillus niger* *Aspergillus oryzae* *Rhizomucor miehei*
Carboxylesterase EC 3.1.1.1	*Rhizomucor miehei*
Catalase EC 1.11.1.6	*Aspergillus niger* *Micrococcus luteus*
Cellulase EC 3.2.1.4	*Aspergillus niger* *Penicillium funiculosum* *Trichoderma reesei* *Trichoderma viride*
Chymosin EC 3.4.23.4	*Aspergillus niger* *Escherichia coli* K-12 strain GE81 *Kluyveromyces lactis*
Cyclodextrin glucanotransferase EC 2.4.1.19	*Paenibacillus macerans*
Dextranase EC 3.2.1.11	*Chaetomium gracile* *Penicillium lilacinum*
Endo-arabinase EC 3.2.1.99	*Aspergillus niger*
Endo-protease EC 3.4.21.26	*Aspergillus niger*
α-Galactosidase EC 3.2.1.22	*Aspergillus niger*
β-Galactosidase EC 3.2.1.23	*Aspergillus niger* *Aspergillus oryzae* *Bacillus circulans* ATCC 31382 *Kluyveromyces marxianus* *Kluyveromyces lactis*
Glucan 1,3-β-glucosidase EC 3.2.1.58	*Trichoderma harzianum*

Table to clause 17 (continued)

Enzyme	Source
β-Glucanase EC 3.2.1.6	*Aspergillus niger* *Aspergillus oryzae* *Bacillus amyloliquefaciens* *Bacillus subtilis* *Disporotrichum dimorphosporum* *Humicola insolens* *Talaromyces emersonii* *Trichoderma reesei*
Glucoamylase EC 3.2.1.3	*Aspergillus niger* *Aspergillus oryzae* *Rhizopus delemar* *Rhizopus oryzae* *Rhizopus niveus*
Glucose oxidase EC 1.1.3.4	*Aspergillus niger* *Aspergillus oryzae,* containing the gene for glucose oxidase isolated from *Aspergillus niger*
α-Glucosidase EC 3.2.1.20	*Aspergillus oryzae* *Aspergillus niger*
β-Glucosidase EC 3.2.1.21	*Aspergillus niger*
Glycerophospholipid cholesterol acyltransferase, protein engineered variant EC 2.3.1.43	*Bacillus licheniformis,* containing the gene for glycerophospholipid cholesterol acyltransferase isolated from *Aeromonas salmonicida* subsp. *salmonicida*
Hemicellulase endo-1,3-β-xylanase EC 3.2.1.32	*Humicola insolens*
Hemicellulase endo-1,4-β-xylanase EC 3.2.1.8	*Aspergillus niger* *Aspergillus oryzae* *Aspergillus oryzae*, containing the gene for Endo-1,4-β-xylanase isolated from *Aspergillus aculeatus* *Aspergillus oryzae*, containing the gene for Endo-1,4-β-xylanase isolated from *Thermomyces lanuginosus* *Bacillus amyloliquefaciens* *Bacillus subtilis* *Humicola insolens* *Trichoderma reesei*
Hemicellulase multicomponent enzyme EC 3.2.1.78	*Aspergillus niger* *Bacillus amyloliquefaciens* *Bacillus subtilis* *Trichoderma reesei*
Hexose oxidase EC 1.1.3.5	*Hansenula polymorpha,* containing the gene for Hexose oxidase isolated from *Chondrus crispus*
Inulinase EC 3.2.1.7	*Aspergillus niger*
Invertase EC 3.2.1.26	*Saccharomyces cerevisiae*
Lipase, monoacylglycerol EC 3.1.1.23	*Penicillium camembertii*

Table to clause 17 (continued)

Enzyme	Source
Lipase, triacylglycerol EC 3.1.1.3	*Aspergillus niger* *Aspergillus oryzae* *Aspergillus oryzae*, containing the gene for Lipase, triacylglycerol isolated from *Fusarium oxysporum* *Aspergillus oryzae*, containing the gene for Lipase, triacylglycerol isolated from *Humicola lanuginosa* *Aspergillus oryzae*, containing the gene for Lipase, triacylglycerol isolated from *Rhizomucor miehei* *Candida rugosa* *Hansenula polymorpha,* containing the gene for Lipase, triacylglycerol isolated from *Fusarium heterosporum* *Mucor javanicus* *Penicillium roquefortii* *Rhizopus arrhizus* *Rhizomucor miehei* *Rhizopus niveus* *Rhizopus oryzae*
Lipase, triacylglycerol, protein engineered variant EC 3.1.1.3	*Aspergillus niger*, containing the gene for lipase, triacylglycerol isolated from *Fusarium culmorum*
Lysophospholipase EC 3.1.1.5	*Aspergillus niger*
Maltogenic α-amylase EC 3.2.1.133	*Bacillus subtilis* containing the gene for maltogenic α-amylase isolated from *Geobacillus stearothermophilus*
Maltotetraohydrolase, protein engineered variant EC 3.2.1.60	*Bacillus licheniformis*, containing the gene for maltotetraohydrolase isolated from *Pseudomonas stutzeri*
Metalloproteinase	*Aspergillus oryzae* *Bacillus amyloliquefaciens* *Bacillus coagulans* *Bacillus subtilis*
Mucorpepsin EC 3.4.23.23	*Aspergillus oryzae* *Aspergillus oryzae*, containing the gene for Aspartic proteinase isolated from *Rhizomucor meihei* *Rhizomucor meihei* *Cryphonectria parasitica*
Pectin lyase EC 4.2.2.10	*Aspergillus niger*
Pectinesterase EC 3.1.1.11	*Aspergillus niger* *Aspergillus oryzae,* containing the gene for pectinesterase isolated from *Aspergillus aculeatus*
Phospholipase A_1 EC 3.1.1.32	*Aspergillus oryzae,* containing the gene for phospholipase A_1 isolated from *Fusarium venenatum*
Phospholipase A_2 EC 3.1.1.4	*Aspergillus niger*, containing the gene isolated from porcine pancreas *Streptomyces violaceoruber*
3-Phytase EC 3.1.3.8	*Aspergillus niger*
4-Phytase EC 3.1.3.26	*Aspergillus oryzae*, containing the gene for 4-phytase isolated from *Peniophora lycii*
Polygalacturonase or Pectinase multicomponent enzyme EC 3.2.1.15	*Aspergillus niger* *Aspergillus oryzae* *Trichoderma reesei*
Pullulanase EC 3.2.1.41	*Bacillus acidopullulyticus* *Bacillus amyloliquefaciens* *Bacillus licheniformis* *Bacillus subtilis* *Bacillus subtilis,* containing the gene for pullulanase isolated from *Bacillus acidopullulyticus* *Klebsiella pneumoniae*

Table to clause 17 (continued)

Enzyme	Source
Serine proteinase EC 3.4.21.14	*Aspergillus oryzae* *Bacillus amyloliquefaciens* *Bacillus halodurans* *Bacillus licheniformis* *Bacillus subtilis*
Transglucosidase EC 2.4.1.24	*Aspergillus niger*
Transglutaminase EC 2.3.2.13	*Streptomyces mobaraensis*
Urease EC 3.5.1.5	*Lactobacillus fermentum*
Xylose isomerase EC 5.3.1.5	*Actinoplanes missouriensis* *Bacillus coagulans* *Microbacterium arborescens* *Streptomyces olivaceus* *Streptomyces olivochromogenes* *Streptomyces murinus* *Streptomyces rubiginosus*

Editorial note:

Bacillus amyloliquefaciens is a separate species from *Bacillus subtilis*.
Aspergillus niger group covers strains known under the names *Aspergillus aculeatus, A. awamori, A. ficuum, A. foetidus, A. japonicus, A. phoenicis, A. saitor* and *A. usamii*.
Trichoderma reesei also known as *Trichoderma longibrachiatum*.
Kluyveromyces marxianus – former names *Saccharomyces fragilis* and *Kluyveromyces fragilis*.
Kluyveromyces lactis – former name *Saccharomyces lactis*.
Rhizomucor miehei – former name *Mucor miehei*.
Micrococcus luteus – former name *Micrococcus lysodeikticus*.
Paenibacillus macerans – former name *Bacillus macerans*.
Talaromyces emersonii – former name *Penicillium emersonii*.
Klebsiella pneumoniae – former name *Klebsiella aerogenes*.
Streptomyces mobaraensis – former name *Streptoverticillium mobaraensis*.
Humicola lanuginosa also known as *Thermomyces lanuginosus*.
Mucor javanicus also known as *Mucor circinelloides* f. *circinelloides*.
Penicillium roquefortii also known as *Penicillium roqueforti*.
Hansenula polymorpha also known as *Pichia angusta*.
Geobacillus stearothermophilus – former name *Bacillus stearothermophilus*.
4-Phytase also known as 6-phytase.

18 Permitted microbial nutrients and microbial nutrient adjuncts

The processing aids listed in the Table to this clause may be used as microbial nutrients or microbial nutrient adjuncts in the course of manufacture of any food.

Table to clause 18

Adenine
Adonitol
Ammonium sulphate
Ammonium sulphite
Arginine
Asparagine
Aspartic acid
Benzoic acid
Biotin
Calcium pantothenate
Calcium propionate

Table to clause 18 (continued)

Copper sulphate
Cystine
Cysteine monohydrochloride
Dextran
Ferrous sulphate
Glutamic acid
Glycine
Guanine
Histidine
Hydroxyethyl starch
Inosine
Inositol
Manganese chloride
Manganese sulphate
Niacin
Nitric acid
Pantothenic acid
Peptone
Phytates
Polyvinylpyrrolidone
Pyridoxine hydrochloride
Riboflavin
Sodium formate
Sodium molybdate
Sodium tetraborate
Thiamin
Threonine
Uracil
Xanthine
Zinc chloride
Zinc sulphate

19 Dimethyl dicarbonate as a microbial control agent

(1) Dimethyl dicarbonate may be added in the manufacture of a food listed in Column 1 in the Table at a concentration no more than the maximum permitted addition level in Column 2 in the Table.

(2) Dimethyl dicarbonate must not be present in the food as sold.

Table to clause 19

Column 1	Column 2
Food	**Maximum permitted addition level (amount of dimethyl dicarbonate/ amount of food)**
Fruit and vegetable juices and fruit and vegetable juice product	250 mg/kg
Water-based flavoured drinks	250 mg/kg
Formulated beverages	250 mg/kg
Wine, sparkling wine and fortified wine; and fruit wine, vegetable wine and mead (including cider and perry)	200 mg/kg

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