

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.

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Clauses

1 Interpretation

(1) In this Standard –

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 |
| 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 |

Table to clause 6 (continued)

| Substance | Maximum permitted level (mg/kg) |
|---------------------------|--|
| 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 |
| 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 dimethylaminopro-pylamine | GMP |
| Methyl acrylate-divinylbenzene copolymer containing not less than 3.5% by weight of divinylbenzene, aminolysed with dimethylaminopro-pylamine | 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 |

Table to clause 8 (continued)

| Substance | Maximum permitted level (mg/kg) |
|---|--|
| 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 three years from the gazettal of this Editorial note.

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 |
| 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 |

Table to clause 11 (continued)

| Substance | Maximum permitted level (mg/kg) |
|---|--|
| 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 |
| 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 |
| Ethyl acetate | All foods | 10 |
| Glyceryl triacetate | All foods | GMP |
| Hexanes | All foods | 20 |
| Isobutane | Flavourings | 1 |
| | Other foods | 0.1 |
| Methanol | All foods | 5 |

Table to clause 13 (continued)

| Substance | Food | Maximum permitted level (mg/kg) |
|--------------------|----------------------|---------------------------------|
| 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 |
| Cupric citrate | Removal of sulphide compounds from wine | GMP |
| β-Cyclodextrin | Used to extract cholesterol from eggs | 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 |
| 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 |
| 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 |

Table to clause 14 (continued)

| Substance | Function | Maximum permitted level (mg/kg) |
|--|---|--|
| 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 |
| L-Cysteine (or HCl salt) | Dough conditioner | 75 |
| 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 |
| 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 |

Table to clause 14 (continued)

| Substance | Function | Maximum permitted level (mg/kg) |
|---|--|--|
| 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 <i>Pinus radiata</i> | 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.

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 (<i>Ipomoea batatas</i>) Malted cereals |
| Actinidin EC 3.4.22.14 | Kiwifruit (<i>Actinidia deliciosa</i>) |

Table to clause 16 (continued)

| Enzyme | Source |
|--------------------------|--|
| Bromelain EC 3.4.22.4 | Pineapple stem (<i>Ananas comosus</i>) |
| Ficin EC 3.4.22.3 | <i>Ficus</i> spp. |
| Papain EC 3.4.22.2 | <i>Carica papaya</i> |

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 | <i>Bacillus amyloliquefaciens</i> <i>Bacillus subtilis</i> <i>Bacillus subtilis</i> , containing the gene for α -Acetolactate decarboxylase isolated from <i>Bacillus brevis</i> |
| Aminopeptidase EC 3.4.11.1 | <i>Aspergillus oryzae</i> <i>Lactococcus lactis</i> |
| α -Amylase EC 3.2.1.1 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus licheniformis</i> <i>Bacillus licheniformis</i> , containing the gene for α -Amylase isolated from <i>Geobacillus stearothermophilus</i> <i>Bacillus subtilis</i> <i>Bacillus subtilis</i> , containing the gene for α -Amylase isolated from <i>Geobacillus stearothermophilus</i> <i>Geobacillus stearothermophilus</i> |
| β -Amylase EC 3.2.1.2 | <i>Bacillus amyloliquefaciens</i> <i>Bacillus subtilis</i> |
| α -Arabinofuranosidase EC 3.2.1.55 | <i>Aspergillus niger</i> |
| Asparaginase EC 3.5.1.1 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> |
| Carboxyl proteinase EC 3.4.23.6 | <i>Aspergillus melleus</i> <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Rhizomucor miehei</i> |
| Carboxylesterase EC 3.1.1.1 | <i>Rhizomucor miehei</i> |
| Catalase EC 1.11.1.6 | <i>Aspergillus niger</i> <i>Micrococcus luteus</i> |
| Cellulase EC 3.2.1.4 | <i>Aspergillus niger</i> <i>Penicillium funiculosum</i> <i>Trichoderma reesei</i> <i>Trichoderma viride</i> |

Table to clause 17 (continued)

| Enzyme | Source |
|--|---|
| Chymosin EC 3.4.23.4 | <i>Aspergillus niger</i> <i>Escherichia coli</i> K-12 strain GE81 <i>Kluyveromyces lactis</i> |
| Cyclodextrin glucanotransferase EC 2.4.1.19 | <i>Paenibacillus macerans</i> |
| Dextranase EC 3.2.1.11 | <i>Chaetomium gracile</i> <i>Penicillium lilacinum</i> |
| Endo-arabinase EC 3.2.1.99 | <i>Aspergillus niger</i> |
| α -Galactosidase EC 3.2.1.22 | <i>Aspergillus niger</i> |
| β -Galactosidase EC 3.2.1.23 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Bacillus circulans</i> ATCC 31382 <i>Kluyveromyces marxianus</i> <i>Kluyveromyces lactis</i> |
| Glucan 1,3- β -glucosidase EC 3.2.1.58 | <i>Trichoderma harzianum</i> |
| β -Glucanase EC 3.2.1.6 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus subtilis</i> <i>Disporotrichum dimorphosporum</i> <i>Humicola insolens</i> <i>Talaromyces emersonii</i> <i>Trichoderma reesei</i> |
| Glucoamylase EC 3.2.1.3 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Rhizopus delemar</i> <i>Rhizopus oryzae</i> <i>Rhizopus niveus</i> |
| Glucose oxidase EC 1.1.3.4 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> , containing the gene for glucose oxidase isolated from <i>Aspergillus niger</i> |
| α -Glucosidase EC 3.2.1.20 | <i>Aspergillus oryzae</i> <i>Aspergillus niger</i> |
| β -Glucosidase EC 3.2.1.21 | <i>Aspergillus niger</i> |
| Hemicellulase endo-1,3- β -xylanase EC 3.2.1.32 | <i>Humicola insolens</i> |
| Hemicellulase endo-1,4- β -xylanase EC 3.2.1.8 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Aspergillus oryzae</i> , containing the gene for Endo-1,4- β -xylanase isolated from <i>Aspergillus aculeatus</i> <i>Aspergillus oryzae</i> , containing the gene for Endo-1,4- β -xylanase isolated from <i>Thermomyces lanuginosus</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus subtilis</i> <i>Humicola insolens</i> <i>Trichoderma reesei</i> |
| Hemicellulase multicomponent enzyme EC 3.2.1.78 | <i>Aspergillus niger</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus subtilis</i> <i>Trichoderma reesei</i> |
| Hexose oxidase EC 1.1.3.5 | <i>Hansenula polymorpha</i> , containing the gene for Hexose oxidase isolated from <i>Chondrus crispus</i> |
| Inulinase EC 3.2.1.7 | <i>Aspergillus niger</i> |
| Invertase EC 3.2.1.26 | <i>Saccharomyces cerevisiae</i> |
| Lipase, monoacylglycerol EC 3.1.1.23 | <i>Penicillium camembertii</i> |

Table to clause 17 (continued)

| Enzyme | Source |
|---|---|
| Lipase, triacylglycerol EC 3.1.1.3 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Aspergillus oryzae</i> , containing the gene for Lipase, triacylglycerol isolated from <i>Fusarium oxysporum</i> <i>Aspergillus oryzae</i> , containing the gene for Lipase, triacylglycerol isolated from <i>Humicola lanuginosa</i> <i>Aspergillus oryzae</i> , containing the gene for Lipase, triacylglycerol isolated from <i>Rhizomucor miehei</i> <i>Candida rugosa</i> <i>Hansenula polymorpha</i> , containing the gene for Lipase, triacylglycerol isolated from <i>Fusarium heterosporum</i> <i>Mucor javanicus</i> <i>Penicillium roquefortii</i> <i>Rhizopus arrhizus</i> <i>Rhizomucor miehei</i> <i>Rhizophus niveus</i> <i>Rhizophus oryzae</i> |
| Lipase, triacylglycerol, protein engineered variant EC 3.1.1.3 | <i>Aspergillus niger</i> , containing the gene for lipase, triacylglycerol isolated from <i>Fusarium culmorum</i> |
| Lysophospholipase EC 3.1.1.5 | <i>Aspergillus niger</i> |
| Maltogenic α -amylase EC 3.2.1.133 | <i>Bacillus subtilis</i> containing the gene for maltogenic α -amylase isolated from <i>Geobacillus stearothermophilus</i> |
| Maltotetraohydrolase, protein engineered variant EC 3.2.1.60 | <i>Bacillus licheniformis</i> , containing the gene for maltotetraohydrolase isolated from <i>Pseudomonas stutzeri</i> |
| Metalloproteinase | <i>Aspergillus oryzae</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus coagulans</i> <i>Bacillus subtilis</i> |
| Mucorpepsin EC 3.4.23.23 | <i>Aspergillus oryzae</i> <i>Aspergillus oryzae</i> , containing the gene for Aspartic proteinase isolated from <i>Rhizomucor meihei</i> <i>Rhizomucor meihei</i> <i>Cryphonectria parasitica</i> |
| Pectin lyase EC 4.2.2.10 | <i>Aspergillus niger</i> |
| Pectinesterase EC 3.1.1.11 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> , containing the gene for pectinesterase isolated from <i>Aspergillus aculeatus</i> |
| Phospholipase A ₁ EC 3.1.1.32 | <i>Aspergillus oryzae</i> , containing the gene for phospholipase A ₁ isolated from <i>Fusarium venenatum</i> |
| Phospholipase A ₂ EC 3.1.1.4 | <i>Aspergillus niger</i> , containing the gene isolated from porcine pancreas <i>Streptomyces violaceoruber</i> |
| 3-Phytase EC 3.1.3.8 | <i>Aspergillus niger</i> |
| 4-Phytase EC 3.1.3.26 | <i>Aspergillus oryzae</i> , containing the gene for 4-phytase isolated from <i>Peniophora lycii</i> |
| Polygalacturonase or Pectinase multicomponent enzyme EC 3.2.1.15 | <i>Aspergillus niger</i> <i>Aspergillus oryzae</i> <i>Trichoderma reesei</i> |
| Pullulanase EC 3.2.1.41 | <i>Bacillus acidopullulyticus</i> <i>Bacillus amyloliquefaciens</i> <i>Bacillus licheniformis</i> <i>Bacillus subtilis</i> <i>Bacillus subtilis</i> , containing the gene for pullulanase isolated from <i>Bacillus acidopullulyticus</i> <i>Klebsiella pneumoniae</i> |

Table to clause 17 (continued)

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

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. saitoi* and *A. usarii*.
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 *Streptovercillium 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 |

Table to clause 18 (continued)

| |
|----------------------------|
| Calcium pantothenate |
| Calcium propionate |
| 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 |