

codex alimentarius commission



FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD
HEALTH
ORGANIZATION



E

JOINT OFFICE: Viale delle Terme di Caracalla 00153 ROME Tel: 39 06 57051 www.codexalimentarius.net Email: codex@fao.org Facsimile: 39 06 5705 4593

Agenda Item 6(b)

CX/FA 09/41/8
February 2009

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD ADDITIVES

Forty-first Session

Shanghai, China, 16 – 20 March 2009

INVENTORY OF SUBSTANCES USED AS PROCESSING AIDS (IPA), Updated List

Prepared by New Zealand

BACKGROUND

1. The Codex Committee on Food Additives and Contaminants (CCFAC) at its 36th Session recognized that the development of a positive list of processing aids was not a realistic approach at the present time due to a lack of resources. However, the value of the Inventory of Processing Aids (IPA) itself, as a useful reference tool has been recognized and the Committee agreed to maintain the IPA for the time being and decided that New Zealand would prepare updated versions of the IPA for consideration at subsequent sessions of the Committee.

2. At following meetings, including the 40th Session, the Committee accepted the offer of the Delegation of New Zealand to prepare a further updated version of IPA which would also include the proposals made at the current meeting for consideration at the next session of the Committee¹.

3. The IPA includes:

- All substances in the original list in CAC/MISC 3
- Additions to the IPA agreed to by CCFAC up to and including the 40th session in April 2008.

CHANGES INTRODUCED IN THIS UPDATE

The title of the Inventory has been changed to the *Inventory of Substances used as Processing Aids* as discussed at the 40th Session. This is to appropriately recognise that substances used as processing aids may also have other uses including as food additives and food². For convenience and simplicity it is suggested to continue to use the acronym *IPA*. The following new entries are proposed in bold:

Changes proposed by 68th JECFA as agreed to by CCFA 40 (Agenda item 3):

- Acidified sodium chlorite (ASC)
- Asparaginase from *Aspergillus oryzae* expressed in *Aspergillus oryzae*
- Isoamylase from *Pseudomonas amyloclavata*
- Phospholipase A1 from *Fusarium venenatum* produced by *Aspergillus oryzae*

¹ ALINORM 07/30/12 paragraph 134.

² ALINORM 07/30/12 paragraph 133

Enzymes (60) proposed by the Association of Manufacturers and Formulators of Enzyme Products (AMFEP) as presented to the 40th Session of CCFA (2008) in CRD 14. Four corrections to existing entries were also proposed.

The information about JECFA evaluation and specification has been simplified by stating “yes” where these exist for a particular substance. This was agreed to by 40th Session of CCFA as the references were readily available on the JECFA website.

UPDATING ISSUES FOR FUTURE CONSIDERATION

4. New Zealand seeks the Committee’s agreement to continue to provide annual updates of the IPA based on the decisions relating to processing aids at each CCFA Session until the Committee is able to progress a standard for processing aids.

INVENTORY OF SUBSTANCES USED AS PROCESSING AIDS (IPA)

Prepared by New Zealand (March 2009)

BACKGROUND

1. The title of the Inventory has been changed to the *Inventory of Substances used as Processing Aids* to recognise that substances used as processing aids may also have other uses including as food additives and food³. For convenience and simplicity the document continues to use the acronym *IPA*.
2. The IPA is a collection of information submitted by national authorities⁴ to provide a list of those substances whose sole function is that of a processing aid.
3. At its 21st session in 1989, Codex Committee on Food Additives and Contaminants (CCFAC) agreed that the IPA be submitted to the CAC for adoption as a Codex advisory text. It was first published as a Codex advisory text in 1991 and included amendments agreed to at the CCFAC meetings in 1990 and 1991. The 1995 Codex publication (volume 1A, section 5.8) is the same as that published in 1991.
4. On initiation of the list, CCFAC's primary purposes for the IPA were to:
 - a) develop information on substances used as processing aids; and
 - b) determine priorities for the review of processing aids by JECFA.
5. CCFAC agreed that the IPA was not intended to be a positive list of permitted processing aids to be used, for example, by reference in Codex Commodity Standards. Further, CCFAC has not conducted its own risk assessment of the substances on the inventory.
6. CCFAC at its 36th Session recognized that the development of a positive list of processing aids was not a realistic approach at the present time due to a lack of resources. However, the value of the IPA itself, as a useful reference tool has been recognized and agreed to maintain the IPA for the time being and decided that New Zealand would prepare updated versions of the IPA for consideration at sessions of the Committee.
7. At following meetings, including the 40th Session of Codex Committee on Food Additives (CCFA) accepted the offer of the Delegation of New Zealand to prepare a further updated version of IPA which would also include the proposals made at the current meeting for consideration at the next session of the Committee. CCFAC was renamed following the establishment of a new committee for contaminants in food in 2007.

INTRODUCTION

8. The Inventory of Processing Aids is intended to catalogue substances that are used in food solely as processing aids as defined by the Codex Alimentarius Commission (see Section 2 - Definitions).
9. The Committee notes that the Inventory is not intended to be complete or a "positive list" of permitted aids.
10. The Updated IPA includes:

³ ALINORM 07/30/12 paragraph 133

⁴ ALINORM 89/12A, Appendix VIII.

- All substances in the original list in CAC/MISC 3
- Additions to the IPA agreed to by the Committee up to and including the 40th session in April 2008.

11. The policy of the Committee has been to include substances that are used in food solely as processing aids as defined by the Codex Alimentarius Commission. However, more than 50 entries relate to substances that have functions as other food additives. Those substances that can function also as food additives or foods are designated by an asterisk (*).

12. The Inventory is arranged in tabular format for presentation of information that will be necessary for the Committee to select substances for JECFA evaluation. The following information is provided:

- Category - the functional effect classification.
- Processing Aid - the chemical name or description of the substance used as a processing aid.
- Area of Use - the foods or food processing procedures in which the processing aid is utilised.
- Level of Residues - the level of processing aid remaining in food after processing. The levels should be designated with respect to those:
 - (1) directly measured by analysis or
 - (2) estimated by other means. Values are in mg/kg and values at the detection limit of available analytical procedures are reported as "less than" (<).
- Interaction with Food - describes the degree of chemical interaction with food components. Provides data on levels of interaction products in food.
- JECFA Evaluation – “Yes” indicates that the substance has been reviewed or considered by a JECFA. Note that JECFA consideration of a substance does not necessarily mean that JECFA has reviewed the processing aid use(s) of the substance, nor that JECFA assigned an ADI to the substance. Summary information is available on <http://jecfa.ilsa.org/search.cfm>
- JECFA specification – “Yes” indicates that there is a relevant monograph covering the identity and purity of the substance.
- ADI-the latest JECFA ADI in mg/kg body weight or other end point of their safety assessment. Abbreviations used in this column are :
 - NS for ADI “not specified”
 - NL for ADI “not limited”
 - DP for decision postponed
 - PTWI for provisional tolerable weekly intake
 - MTDI for maximum tolerable daily intake
- JECFA comments includes any relevant comments in respect to the ADI or in some cases the specification.
- References - this includes the references from which the original 1989 list was developed (ALINORM 98/12A Appendix VIII) plus a notation when new substances have been added.

13. **Appendix A catalogues substances that are used as processing aids but not included in the main inventory as they have functions also as food additives or foods.**

(Note that substances already covered in the main IPA were formerly listed and annotated as (1.). These have been have been deleted to avoid repetition.)⁵

14. The substances are annotated according to the following system:

2. indicates those materials that are both food additives and processing aids (i.e. the substance functions as a processing aid in one food but may have a different function in another food).
3. indicates those compounds that because of carry-over residues, would seem to usually be considered only as food additives.
4. indicates those materials that might actually have simultaneous function as processing aids and functionality in the finished food.

(Appendix B of the earlier versions of the IPA has been deleted to avoid unnecessary duplication as it reproduces the Microbial Enzyme Preparation Section of the main Inventory.)⁶

15. The Committee recognises that any food additive, even if not included in the inventory or the appendix, may be used as a processing aid and is eligible for addition to the appendix. In some cases, however, the processing aid use of the food additive may require a separate JECFA evaluation.

16. In general the list does not include substances used in the manufacture of food additives (but some substances used as solvents in the manufacture of flavourings and colourings are mentioned in the main list).

⁵ CX/FAC 06/38/13.

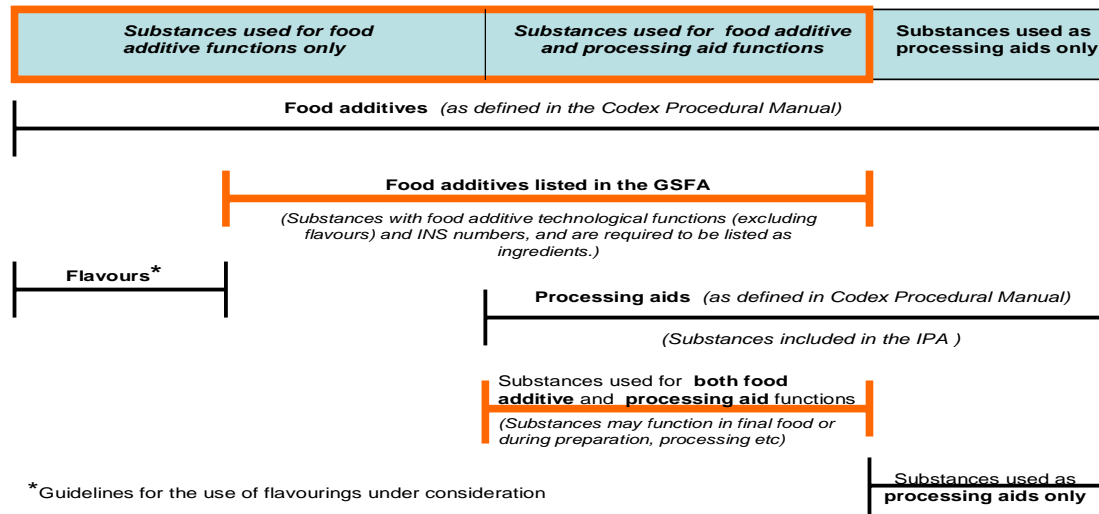
⁶ CX/FAC 06/38/13.

THE RELATIONSHIP BETWEEN FOOD ADDITIVES AND PROCESSING AIDS IN THE CODEX SYSTEM

The diagram below shows the relationship between food additives and substances used as processing aids. The diagram takes into account the *Codex Procedural Manual* definitions and the scope of the *General Standard for Food Additives (GSFA)* and the IPA. It is important to note that the term *food additive* as defined in the *Codex Procedural Manual*, includes substances used as processing aids, and that the GSFA does not include flavours or substances used only as processing aids or any processing aids functions of listed food additives.

Relationship between Food Additives and Processing Aids

(Not to scale)



*Guidelines for the use of flavourings under consideration

INVENTORY OF SUBSTANCES USED AS PROCESSING AIDS (IPA)

Main List (updated for 41th CCFA, March 2009)

IPA CATEGORIES

Antifoam Agents

Boiler water additives

Catalysts

Clarifying agents/ filtration,aids

Contact freezing & cooling agents

Desiccating agent/anticaking agents

Detergents (wetting agents)

Enzyme immobilization agents & supports

Flocculating agents

Ion exchange resins, membranes, and molecular sieves

Lubricants, release and anti stick agents, moulding aids

Micro-organism control agents

Propellant and packaging gases

Solvents, extraction & processing

Washing and Peeling agents

Other processing aids

Enzyme preparations (including immobilized enzymes)*

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Antifoam Agents								
Alkylene oxide adduct	Juice-making							54
*Coconut oil	Juice-making							54
*Polydimethylpolysiloxane	Beer			Yes	Yes	ADI applies only to compounds with 200 – 300 subunits. Evaluated as antifoaming agent, anticaking agent	0-1.5	57 Fats and Oils CCFAC 22
	Fats and oils							
	Vegetable protein							
Ethylene oxide-propylene oxide copolymers	Juice-making							54
Fatty acid methyl ester	Vegetable protein							31
Fatty acid polyalkylene glycol ester (1-5 moles ethylene oxide or propylene oxide)	Vegetable protein							31
Fatty alcohol-glycol ether	Juice-making							54
Fatty alcohols (C8-C30)	Vegetable protein							
Formaldehyde	Sugar beet processing	< 0.05	None					39
	Yeast processing	< 0.05	None					
*Hydrogenated coconut oil	confectionery Vegetable protein	May-15						36, 49
Hydrophilic fatty acyl esters, linked to a neutral carrier	Juice-making							54
Alpha methylglycoside water	Juice-making							54
Mixture of ethylene and propylene oxides, copolymers and esters, castor oil and polyethylene glycol ester	Juice making							54
Mixture of naturally occurring and synthetic fatty acid derivatives, with added emulgators	Juice-making							54

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Non-ionogenic alkylene oxide adduct with emulgator	Juice-making							54
Oxoalcohols C9-C30								31
Polyalkylene oxide, in combination with special fatty alcohols	Juice making							54
Polyethoxylated alcohols, modified	Juice-making							54
Polyglycol copolymer	Juice-making							54
Polyoxyethylene esters of C8-C30 fatty acids	Vegetable protein							31
Polyoxypropylene esters of C8-C30 fatty acids	Vegetable protein							31
Polyoxyethylene esters of C9-C30 oxoalcohols	Vegetable protein							31
Polyoxypropylene esters of C9-C30 oxoalcohols	Vegetable protein							31
Methylglycoside coconut oil ester	Juice making							54
Mixtures of polyoxyethylene and polyoxypropylene esters of C8-C30 fatty acids	Vegetable protein							31
Modified higher alcohol	Juice-making							54
*Mono- and diglycerides of fatty acids from feed fat (E471)	Juice making			Yes	Yes	Mono and diglycerides differ little from food therefore use NL	NL	54
*Mono- and diglycerides of fatty acids from feed fat, esterified with acetic acid, lactic acid and citric acid (E472 a, b, c)	Juice making			Yes	Yes	Sum of glycerol esters of fatty acids and acids	NL	54
Polypropylene-polyethylene block polymer	Juice-making							
Sorbitan-fatty acyl esters and polyoxyethylene-20-sorbitan fatty acyl esters -	Juice-making							54
Surface-active esters with neutral carriers	Juice-making							54
Vegetable fatty acid esters	Juice-making							54
Vegetable fatty acyl (hydrophilic)	Juice-making							54
Boiler water additives								
Acrylamide-sodium acrylate resin	boiler water							

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
*Sodium hexametaphosphate	boiler water			Yes	Yes	Expressed as P from all sources Evaluated as emulsifier, sequestrant, texturizer	MTDI 70	CCFAC 22
Sodium humate	boiler water							CCFAC 22
*Sodium hydroxide	boiler water			Yes	Yes		NL	CCFAC 22
Sodium lignosulfonate	boiler water							CCFAC 22
*Sodium metasilicate	boiler water							CCFAC 22
*Sodium nitrate	boiler water			Yes	Add.3/173 as anti-microbial and colour tentative	Expressed as nitrate ion; (or 0-5 mg/kg bw expressed as sodium nitrate) Evaluated as antimicrobial preservative, colour fixative	0-3.7	CCFAC 22
*Sodium phosphate (mono-, di-, tri-)	boiler water			Yes	Yes. Specification withdrawn for tri form	Expressed as P from all sources	MTDI 70	CCFAC 22
Sodium polyacrylate	boiler water							
*Sodium polyphosphates	boiler water				See sodium hexa-meta phosphate			CCFAC 22
*Sodium silicate	boiler water			Yes	Not prepared		NS	CCFAC 22
*Sodium sulfate	boiler water			Yes	Yes	Evaluated as colour adjuvant	NS	CCFAC 22
*Sodium sulfite	boiler water			Yes	Yes	Group ADI for sulfite ion	0-0.7	CCFAC 22
*Sodium tripolyphosphate	boiler water			Yes	Yes	Expressed as P from all sources	MTDI 70	CCFAC 22
*Starch, unmodified	boiler water							
*Tannin (including quebracho extract)	boiler water			Yes	Yes	Evaluated as a clarifying agent, flavouring agent, flavour adjunct. For use as a filtering aid where GMP ensures it is removed from food after use	NS	CCFAC 22
Tetrasodium diphosphate	boiler water				see Tetrasodium pyrophosphate below			CCFAC 22
Tetra sodium EDTA	boiler water							

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (<= less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
*Tetrasodium pyrophosphate	boiler water			Yes	Yes	Expressed as P from all sources	MTDI 70	CCFAC 22
Catalysts								
Alloys of 2 or more listed metals	Hydrogenated food oils							5,22
Aluminum				Yes	Yes	Evaluated as a contaminant	PTWI 1 mg/kg bw	
Chromium	Hydrogenated food oils	< 0.1						1,22
Copper	Hydrogenated food oils	< 0.1		Yes		Evaluated as a contaminant. Provisional daily requirement/ maximum tolerable daily intake	PTDI 0.5	1, 22
Copper chromate								33
Copper chromite								45
Ferric chloride hexahydrate								CX/FAC 92/7
Manganese	Hydrogenated food oils	<0.4						1, 22
Magnesium oxide	anticaking agent and neutralising agent			Yes	Yes	Evaluated as anticaking agent	NL	14
Molybdenum	Hydrogenated food oils	< 0.1						1, 22
Nickel	Polyols	< 1						1, 36, 55
	Hardened oil manufacturing	< 0.8						6
	Hydrogenated food oils	0.2 to 1						22
Palladium	Hydrogenated food oils	< 0.1						1, 22
Platinum	Hydrogenated food oils	< 0.1						1, 22
Potassium metal	Interesterified food oils	< 1						1, 5, 22

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Glass		Starch hydrolysis						33,49
Diatomaceous earth				Yes	Yes	Evaluated as filter aid	DP	33
Ceramics	Starch hydrolysis							37, 49
Diethylaminoethyl Cellulose								14, 33,
Ion exchange resins								55
Flocculating agents								
Acrylate-acrylamide resin	Sugar	(10 in sugar liquor)						3,24,56
Chitin/Chitosan								CCFAC 22
Complexes of soluble aluminum salt and phosphoric acid	Drinking water							57
								32
Dimethylmine -epichlorohydrin copolymer	Sugar processing	< 5	None					58
Fuller's earth (calcium analogue of sodium montmorillonite)								32
*Isinglass				Yes	Yes	Evaluated as thickener, stabilizer and emulsifier	NL	
*Dried and powdered blood plasma								
Modified acrylamide resin	Sugar, boiler water							3, 24
Polyacrylic acid	Sugar							1,15,17
Polyacrylamide	Sugar (beet)							
Sodium polyacrylate	Sugar (beet)							6, 17
								6
*Trisodium diphosphate				Yes	Withdrawn (2004)	P from all sources Evaluated as stabilizer, leavening agent, emulsifier, nutrient	MTDI 70	28,16,57
*Trisodium orthophosphate				26	Comp /1559	P from all sources Evaluated as buffer, sequestrant, emulsion stabilizer	MTDI 70	28,16,57

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Ion exchange resins, membranes, and molecular sieves.								
Resins:	Enzyme immob. Starch hydrolysis	<. 1 (calculated at Total Organic Carbon)						49
Completely hydrolyzed copolymers of methyl acrylate and divinylbenzene.								3
Completely hydrolyzed terpolymers of methyl acrylate, divi-nylbenzene and acrylonitrile.								3
Cross-linked phenol-formaldehyde activated with one or both -of the following:								3
Triethylenetetramine								
Tetraethylenepentamine								
Cross-linked polystyrene, first chloremethylated then aminated with trimethylamine, dimethylamine, diethylenetriamine or dimethylethanolamine.								3
Diethylenetriamine, triethylenetetramine, tetraethylenapentamine cross-linked with epichlorohydrin								3
Epichlorohydrin cross-linked with ammonia.								3
Epichlorohydrin cross-linked with ammonia and then quaternized with methyl chloride to contain tot more than 18 percent strong base capacity by weight of total exchange capacity	Water used in food processing	None						58
Methacrylic acid-divinylbenzene copolymer.								3
Methacrylic acid-divinylbenzene copolymer with RCOO active groups.								6

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Methyl acrylate-divinylbenzene copolymer containing not less than 2 percent by weight of divinylbenzene, aminolyzed with dimethylaminopropylamine.								3
Methyl acrylate-divinylbenzene copolymer containing not less than 3.5 percent by weight of divinyl benzene, aminolyzed with dimethylaminopropylamine								3
Methyl acrylate-divinylbenzenediethylene glycol divinyl either terpolymer containing not less than 3.5 percent by weight of divinylbenzene and not more than 0.6. percent by weight of diethylene glycol divinyl ether, aminolyzed with dimethylaminopropylamine.								3
Methyl acrylate-divinylbenzene-diethylene glycol divinyl ether terpolymer containing not less than 7 percent by weight of divinylbenzene and not more than 2.3 percent by weight of diethylene glycol divinyl ether, aminolyzed with dimethylaminopropyl-amine and quaternized with methyl chloride.	Sugar processing	0.015 (extractives from resin)	None					58
Polystyrene- divinylbenzene reticulum with trimethylammonium groups.	Sugar, distilled liquors	Migrants from resin <1						17
Reaction resin of formaldehyde, acetone and tetraethylpentamine								3

<p>CATEGORY</p> <p>* These substances may also function as a food additive or foods</p>	<p>Use</p>	<p>Residues (mg/kg) (≤ less than)</p>	<p>Inter-action with food</p>	<p>JECFA Eval.</p>	<p>Specifications</p>	<p>JECFA comments</p>	<p>ADI mg/kg bw</p>	<p>References</p>
<p>Styrene-divinylbenzene cross-linked copolymer, first chlormethylated then animated with dimethylamine and oxidized with hydrogen peroxide whereby the resin contains not mor6 than 15 percent by weight of vinyl N,N-dimethyl-benzylamine-N-oxide,and not more than 6.5 percent by weight of nitrogen.</p>								<p>3</p>
<p>Sulfite-modified cross-linked phenol-formaldehyde, with modification resulting in sulfonic acid groups on side chains</p>								<p>3</p>
<p>Sulfonated anthracite coal meeting the requirements of American society for Testing and Materials D388-38, Class 1, Group 2</p>								
<p>Sulfonated copolymer of styrene and divinylbenzene.</p>								<p>3</p>
<p>Sulfonated terpolymers of styrene, divinylbenzene and acrylonitrile. or methyl acrylate.</p>								<p>3</p>
<p>Sulfonated tetrapolymer of styrene, divinylbenzene, acrylonitrile and methyl acrylate derived from a mixture of monomers containing not more than a total of 2 percent by weight of acrylonitrile and methyl acrylate.</p>								<p>3</p>
<p>Counter ions for resins</p>								<p>3, 36</p>
<p>Aluminum</p>								
<p> Bicarbonate</p>								
<p> Calcium</p>								
<p> Carbonate</p>								
<p> Chloride</p>								
<p> Hydronium</p>								
<p> Hydroxyl</p>								
<p> Magnesium</p>								

<p>CATEGORY</p> <p>* These substances may also function as a food additive or foods</p>	<p>Use</p>	<p>Residues (mg/kg) (≤ less than)</p>	<p>Inter-action with food</p>	<p>JECFA Eval.</p>	<p>Specifications</p>	<p>JECFA comments</p>	<p>ADI mg/kg bw</p>	<p>References</p>
Potassium								
Sodium								
Strontium								
Sulfate								
<p>Membranes: Polyethylene - polystyrene base modified by reaction with chloramethyl ether and subsequent amination with trimethylamine, diethylenetriamine or dimethylethanolamine.</p>								46
<p>Polymers and copolymers containing the following components: cellulosics (such as cellu-lose diacetate, cellulose triacetate, cellulose ethers, cellulose), Polysulfone - sulfonated polyethersulfone, Polyethersulfone - sulfonated polyethersulfone, Fluoropolymers (such as polyvinylidene fluoride, chlorotrifluoroethyl-ene-vinylidene fluoride copolymer, polytetra-fluoroethylene), Polysulfonamides, aliphatic/aromatic polyamide and copolyamides (such as polypiperazineamides, m-phenylene-diamine trimesamide polymer), Polyesters (such as polyethyleneterephalate), Polyolefins (such as polypropylene, polyethylene), Polya-mide - imide polymers, Polyimides, Polyacryl-onitriles, Polyvinylpyrrolidone, Polystyrene-sulonated polystyrene, chitin/chitosan and deri-vatives, polyureas - polyurethanes, Polyethers, and Polyamines.</p>								

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Polymers and copolymers containing the following components: celluloses (such as cellulose diacetate, cellulose triacetate, cellulose ethers, cellulose), Polysulfone - sulfonated polyethersulfone, Polyethersulfone - sulfonated polyethersulfone, Fluoropolymers (such as polyvinylidene fluoride, chlorotrifluoroethylene-vinylidene fluoride copolymer, polytetrafluoroethylene), Polysulfonamides, aliphatic/aromatic polyamide and copolyamides (such as polypiperazineamides, m-phenylenediamine trimesamide polymer), Polyesters (such as polyethyleneterephthalate), Polyolefins (such as polypropylene, polyethylene), Polyamide - imide polymers, Polyimides, Polyacrylonitriles, Polyvinylpyrrolidone, Polystyrene-sulfonated polystyrene, chitin/chitosan and derivatives, polyureas - polyurethanes, Polyethers, and Polyamines.				29	Comp /265	Anticaking agent	NS	28
Sodium aluminosilicate				Yes	Yes	Anticaking agent Group ADI for silicon dioxide and certain silicates.	NS	28
Lubricants, release and anti stick agents, moulding aids								
Bentonite	Confectionery			Yes	Not prepared	Anticaking agent .No significant uses known, no data on impurities	No ADI allocated	2
*Dimethylpolysiloxane				Yes	Yes	ADI only applies to compounds with 200 – 300 subunits	0-1.5	16
Kaolin (Aluminum Silicate)	Confectionery			Yes	Yes	As anticaking agent	NS	2

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Micro-organism control agents								
Acidified sodium chlorite (ASC)	Poultry Meats Vegetables Fruit Seafood	Chloride	None	Yes	Yes	The available toxicological data were sufficient to assess the safety of ASC by setting ADIs for chlorite and chlorate.	0.03 (chlorite) 0.01 (chlorate)	CCFA 40
*Chlorine dioxide #	Flour			Yes	Withdrawn (2000)	Flour treatment agent conditional, 30-75; acceptable level of treatment for flours to be consumed by man		57
*Dimethyl dicarbonate	Wine Beverages	None		Yes	Yes	Acceptable for use as a cold sterilization agent in beverages when used according to good manufacturing practice up to a maximum concentration of 250mg/l	acceptable	58 CCFA 40
Formaldehyde Note: The Working Group at CCFAC 21 recommended chlorine dioxide and formaldehyde not be included. CCFAC agreed with the WG but it appears they were included in the published IPA)	sugar							56
Hydrogen peroxide	Sugar, fruit and vegetable juices			Yes	Yes	Small residues of hydrogen peroxide on food (which has been treated with antimicrobial washing solutions) at the time of consumption would not pose a safety concern.		14,24
Hypochlorite	Food oils							22
Iodophors	Food oils							22
Lactoperoxidase system (lactoperoxidase, glucose oxidase, thiocyanate salt)								47
Peracetic acid								

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Isobutane	Propellant in vegetable oil pan spray (for professional use only)							CCFAC 37
*Nitrous oxide				Yes	Yes	At its twenty-ninth meeting (1985), the Committee concluded that use of nitrous oxide as a propellant for food was acceptable. At its fifty-fifth meeting (2000), the Committee was requested by the CCFAC to evaluate the additional use of nitrous oxide as a packaging gas, but the Committee could not carry out this request because no information on intake of nitrous oxide for such use was available.	Use acceptable as a propellant	1, 6
*Nitrogen				Yes	Yes	Packaging gas; cryogenic freezant, propellant	No ADI necessary	1.3,6
Octafluorocyclobutane								1
Propane				Yes	Not prepared	Evaluated as propellant; extraction solvent	NS	1
Trichlorofluoromethane (F 11)								43.6
Solvents, extraction & processing.								
Acetone (Dimethyl ketone)	Flavourings, colours, food oils	< 30, 2, & 0.1		Yes	Yes	Extraction solvent, flavouring agent	Acceptable	1, 3, 4,17, 22, 14
Amyl acetate	Flavourings, colours			Yes	Yes	As carrier solvent, flavouring agent. Included in ADI for amyl butyrate expressed as isoamyl alcohol	0-3	2,59
Benzyl alcohol	Flavourings, colours, fatty acids			Yes	Yes	As carrier solvent, flavouring. ADI for total benzoate from all sources	0-5	2,59

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
*Butane	Flavourings, food oils	<1, 0.1		Yes	Not prepared	Propellant	Not allocated	1, 4, 17,22,19
Butane-1,3-diol	Flavorings	0-4		23	Comp/ 241	As carrier solvent	0-4	3
Butan-1-ol	Fatty acids	<1000		Yes	Yes	Evaluated as extraction solvent, flavouring agent	Acceptable	2,4,19
	flavourings, colours							
Butan-2-ol	Flavorings	1		Yes	Yes	Extraction solvent, flavour	Not allocated	56
*Butyl acetate				Yes	Yes	Evaluation as flavouring agent.	Acceptable	56
*Carbon dioxide				Yes	Yes	Carbonating agent, propellant, preservative, freezing agent, extraction solvent		56
Cyclohexane	Flavourings, food oils	< 1		Yes	Yes	Extraction solvent	Not allocated	4,17,19
Dibutyl ether	Flavourings	<2						4,19
1,2 Dichloroethane	Decaf. Coffee	< 5		Yes	Not prepared	Evidence of genotoxicity and carcinogenicity; should not be used in food	Not allocated	1, 17
Dichlorodifluoromethane	Flavourings, colour	< 1		Yes	Not prepared	Propellant; Liquid Freezant	0-1.5	2,4,19,59,
Dichloromethane (methylene chloride)	Flavourings, decaf. Coffee, food oils	< 2,5,10		Yes	Yes	Should be limited to current uses (extraction solvent)		2,4,17,22,19
Dichlorotetrafluoroethane	Flavourings	<1						4,19
Diethyl citrate	Flavourings, colours							2
Diethyl ether	Flavourings, colours	<2		Yes	Yes	Extraction solvent	Not allocated	2,4,19
Di- iso propoylketone								2
*Ethanol	Vegetable protein			Yes	Yes	Specification for extraction and carrier solvent	Limited by GMP	56
*Ethyl acetate				Yes	Yes	No safety concerns at current level of intakes when used as a flavouring agent	0-25	56

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Ethyl methyl ketone (butanone)	Fatty acids, fla-vourings, colour-ings. Decaffeina-tion of coffee, tea	< 2		Yes	Yes	Extraction solvent, flavouring agent	Acceptable	2, 4, 19
Glycerol tributyrat	Flavourings, colours							2
Glycerol tripropionate	Flavourings, colours							2,59
Heptane	Flavourings, food oils	< 1		Yes	Yes	Extraction solvent	Limited by GMP	1, 4, 6,22
Hexane	Flavourings. food oils,	< 0.1		Yes	Yes	Extraction solvent JECFA 65 recommended a re-evaluation of hexanes as there was insufficient information to change current specifications	Limited by GMP	1,3,4,
	Chocolate and chocolate products	1						CCFAC 37
*Isobutane	Flavourings	<1						4,19
Isoparaffinic petroleum hydrocarbons	Citric acid							3
Isopropyl myristate	Flavourings colours			Yes	Yes	Carrier solvent. No safety concerns at current level of intakes when used as a flavouring agent	Not allocated	2
Methylene chloride (dichloromethane)	Food oils	< 0.02		Yes	see above in dichlo-romethane			1,22
Methyl acetate	Coffee	20						56
	Decaffeination							
	flavoring							
	Sugar refining							
		1						

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Methyl propanol-I	Flavorings	1						56
Nitrous oxide				Yes	Yes	evaluated as propellant Use acceptable as a propellant	acceptable	45
n-Octyl alcohol	Citric acid							3
Pentane	Flavourings, food oils	< 1						1,4, 22
Petroleum ether (light petroleum)	Flavourings, food oils	< 1		Yes	Yes	Extraction solvent	NS	1,4,6,22,19
*Propane	Flavourings, food oils	< 1, 0.1		Yes	Not prepared	Propellant; Extraction solvent Limited use and residue mean unnecessary to establish ADI	NS	4, 17,22,19
Propane-1,2-diol	Fatty acids flavourings, colours,							2,59
Propane-1-ol	Fatty acids, flavourings, colours			25	Comp/1205	Carrier/extraction solvent/ flavouring. Further tox studies required.	Not allocated	2,59
*Propylene Glycol				Yes	Yes	As solvent, humectant and glazing agent	0-25	CX/FAC 92/7
Tertiary butyl alcohol								38
1,1,2-Trichloroethylene	Flavourings, food oils	< 2		Yes	Withdrawn (2000)	Use as extraction solvent should be limited to ensure levels are as low as practicable	Not allocated	1,4,17,22, 19
Trichlorofluoromethane	Flavourings	<1						4,19,59
Tridodecylamine	Citric acid							3
Toluene	Flavourings	<1		Yes	Yes	Residues of toluene occurring in food when this solvent is used in accordance with GMP would not pose any toxicological problems	NS	4, 19

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Washing and peeling agents								
A mixture of alkene oxide adducts of alkyl alcohol and phosphate esters of alkylene oxide adducts of alkyl alcohols consisting of alpha-alkyl(C12-C18)-omega-hydroxy-poly(oxy-ethylene) (7.5-8.5moles) poly(oxypropylene) block copolymer having an average molecular weight of 810, alpha-alkyl- (C12-C18)-omega-hydroxy-poly(oxyethylene) (3.3-3.7 moles) polymer having an average molecular weight of 380, and subsequently esterified with 1.25 moles phosphoric anhydride; and alpha-alkyl (omega-hydroxy-poly(oxyethylene) (11.9-12.9 moles)/poly(oxypropylene) copolymer having an average molecular weight of 810 and sub-sequently esterified with 1.25 moles phosphoric anhydride	Fruits and vegetables	< 0.001 up to 0.01	None					3, 54
Alkylene oxide adducts of alkyl alcohols and fatty acids	Sugar beets	No Information Available						6,51,54
Aliphatic acid mixture consisting of valeric, caproic, enanthic, caprylic, and pelargonic acids	Fruits and vegetables	0.04-0-11	None					3,54
Alpha-alkyl-omega-hydroxy-poly (oxyethylene)	Sugar beets	0.001in sugar beets, 0 in sugar		None				3,51.54
Ammonium chloride, quaternary	Sugar beets							53
Ammonium orthophosphate	Fruits and vegetables			Yes	Yes	Expressed as P from all sources	MTDI 70	
*Calcium chloride	Fruits and vegetables			Yes	Yes	Firming agent	NL	53
*Calcium hydroxide	Sugar beets			Yes	Yes	Specification for neutralizing agent; buffer; firming agent	NL	53
*Calcium oxide	Sugar beets			Yes	Yes	Specification for Alkali, dough conditioner, yeast food	NL	53

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (<= less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Carbamate	Sugar beets							53
Dialkanolamine	sugar beets	0.001 in sugar beets, 0 in sugar	None					3,54
Diammonium orthophosphate	Fruits and vegetables for canning			Yes	Yes	Expressed as P from all sources	MTDI 70	
Diammonium orthophosphate, (5% aqueous solution)	Fruits and vegetables for canning			Yes	Yes	Expressed as P from all sources	MTDI 70	
Dithiocarbamate	Sugar beets							53
Ethylene dichloride	Sugar beets	0.00001 in sugar beets, 0 in sugar	None	23				3,54
Ethylene glycol monobutyl ether	Sugar beets	0.00003 in sugar beets, 0 in sugar	None					3,54
Hydrogen peroxide		No Information - Available		Yes	Yes	As antimicrobial agent	Acceptable	54
Linear undecylbenzenesulfonic acid	Sugar beets	0.001 in sugar beets 0 in sugar	None					3,54
Monoethanolamine	Fruits and vegetables, sugar beets	100						3,52
Monoethanolamine	Sugar beets	0.0001 in sugar beets, 0 in sugar	None					54
Monoethanolamine (8%)	Fruits and vegetables for canning							56
Organophosphates	Sugar beets							53
Peroxyacid antimicrobial solutions containing 1-hydroxyethylidene-1,1-Diphosphonic acid (HEDP) <i>Containing HEDP and three or more of the following components: peroxyacetic acid, acetic acid, hydrogen peroxide, octanoic acid and peroxyoctanoic acid.</i>				Yes	Yes	The peroxy compounds in these solutions (hydrogen peroxide, peroxyacetic acid and peroxy-octanoic acid) would break down into acetic acid and octanoic acid, and small residual quantities of these acids on foods at the time of consumption would		

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
Acetic acid					Yes	not pose a safety concern. HEDP does not pose a safety concern at the levels of residue that are expected to remain on foods at the time consumption.		
1-Hydroxyethylidene-1,1-diphosphonic acid (HEDP)					Yes			
Hydrogen peroxide					Yes			
Octanoic acid (as food additive)					Yes			
Polyacrylamide	Fruits and vegetables, sugar beets	< 1	None					3,51,54
Potassium bromide	Fruits and vegetables							3,54
Sodium dodecylbenzenesulfonate (alkyl group predominantly C12 and not less than 95 percent C10-C16).	Fruits and vegetables, meat and poultry	< 2		None				3, 6, 54
Sodium 2-ethylhexyl sulphate	Fruits and vegetables	< 20		None				3,54
*Sodium carbonate				Yes	Yes	Alkali	NL	52
*Sodium hydroxide	Fruits and vegetables, sugar beets			Yes	Yes	Alkali	NL	53
Sodium hydroxide (10%, max.)	Fruits and vegetables for canning					See above		52
Sodium hydroxide (2%)	Mackerel for canning					See above		52
Sodium hypochlorite	Fruits and vegetables	No Information Available				No Information Available		3,52.54
Sodium mono- and di-methyl naphthalene-sulfonates (mol. wt. 245-260)	Fruits and vegetables	< 0.2	None					3, 54
Sodium n-alkylbenzenesulfonate (alkyl group predominantly C12 and C13 and not less than 95 percent C10-C16).	Fruits and vegetables	Same as sodium dodecylbenzenesulfonate	None					3, 6, 54
*Sulfuric acid	Locust bean seeds			Yes	Yes	As acid		CCFAC 25

CATEGORY * These substances may also function as a food additive or foods	Use	Residues (mg/kg) (≤ less than)	Inter-action with food	JECFA Eval.	Specifications	JECFA comments	ADI mg/kg bw	References
*Glucono -delta lactone	pre acidification of milk in cheese making			Yes	Yes	As acidifier , raising agent, sequestrant	NS	CCFAC 25
Glycerol ester of adipic acid								32
Hydrogen								
Magnesium tartrate				Yes	Not Prepared		No ADI allocated	
*Phosphoric Acid	Fats and Oils			Yes	Yes	As P from all sources Evaluated as acidulant sequestrant, antioxidant synergist	MTDI 70	CCFAC 25
Polyvinyl polypyrrolidone	Beverages			Yes	Yes	As colour stabilizer, colloidal stabilizer, clarifying agent	NS	13
Potassium gibberellate								
Propyl parahydroxybenzoate				Yes	Withdrawn (2006)	As preservative In view of the adverse effects in male rats, propyl paraben (propyl p-hydroxybenzoate) should be excluded from the group ADI for the parabens used in food.	Withdrawn (2006)	32,58
Sodium								
*Sodium Hydroxide	Fats and Oils			Yes	Yes	As alkali	NL	CCFAC 25
Sodium hypochlorite								
*Sodium silicate				Yes	Not prepared		NS	

ENZYME PREPARATIONS (INCLUDING IMMOBILIZED ENZYMES)

Microbially-derived enzymes from genetically modified organisms are listed with the producing host organism name followed by a d-(name) to identify the source of the donor organism gene.

Note: Due to taxonomic changes of many micro-organisms used to produce enzymes, it would be necessary to mention all the synonyms in each case. This would make the table quite unreadable and require regular updating. Therefore please consult the following list of taxonomic changes for the current correct names of specific micro-organisms that produce enzymes.

- *Aspergillus niger* covers strains known under the names *Aspergillus aculeatus*, *A. awamori*, *A. ficuum*, *A. foetidus*, *A. japonicus*, *A. phoenicis*, *A. saitoi*, *A. usamii* and *A. tubingensis*.
- *Bacillus subtilis* formerly also covered the strain now known under the name *Bacillus amyloliquefaciens*.
- *Humicola lanuginosa* is also known as *Thermomyces lanuginosus*
- *Klebsiella aerogenes* is the former name for *Klebsiella pneumoniae*
- *Micrococcus lysodeicticus* is the former name for *Micrococcus luteus*
- *Mucor miehei* is the former name for *Rhizomucor miehei*
- *Penicillium emersonii* is the former name for *Talaromyces emersonii*. It is also known as *Geosmithia emersonii*
- *Rhizopus arrhizus* is the former name for *Rhizopus oryzae*.
- *Sporotrichum dimorphosporum* is the former name for *Disporotrichum dimorphosporum*
- *Streptoverticillium mobaraense* is the former name for *Streptomyces mobaraense*
- *Trichoderma reesei* is also known as *Trichoderma longibrachiatum*
- *Verticicladiella procera* is the former name for *Leptographium procerum*

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<u>Animal-Derived Enzyme Preparations:</u>				
Alpha amylase (hog or bovine pancreas)				10,23
Catalase (bovine or horse liver)	yes	yes	Use limited by GMP	1
Chymosin (calf or kid or lamb abomasum)				
<u>Chymotrypsin (bovine or porcine pancreas)</u>				
Lipase (bovine stomach) (salivary glands or forestomach of calf, kid, or lamb) (hog or bovine pancreas)	yes	yes	Use limited by GMP	1, 3, 10,13
Lysozyme (egg whites)		yes	Regard as food/preservative	44, 48, 57
Pancreatin (bovine or porcine pancreas)				
Pepsin				
(hog stomach)	yes	yes	Limited by GMP	1
(proventricum of poultry)	yes	yes		41
(porcine pancreas)				55
Phospholipase A (<i>Porcine pancreas</i>)				AMFEP CRD14 2008 CCFA 41
Rennet				
(calf or kid, lamb stomach)	yes	yes	Limited by GMP	1
(goat or sheep stomach)				
(bovine stomach)	yes	yes	Limited by GMP	
Trypsin (porcine or bovine pancreas)	yes	yes	Regard as food	1
<u>Plant-Derived Enzyme Preparations:</u>				
Alpha amylase (malted barley)				
Beta amylase				
(malted or ungerminated barley)				
(soya)				
Bromelain (<i>Ananas comosus</i> ; <i>Ananas bracteatus</i>)	yes	yes	Limited by GMP	1
Chymopapain (<i>Carica papaya</i>)	yes	yes	Limited by GMP	
Ficin (<i>Ficus glabrata</i>)	yes	yes	Nonedible plant derived enzyme preparation. No toxicological data	1, 3
Lipases (origin?)	yes	yes		CCFAC 25/ (1993) Malaysia

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
Lipoxydase (soya)				55
Malt carbohydrases (alpha or beta amylase) (malted barley or barley)	yes	yes	Limited by GMP	1, 6, 40,49,55
Papain (<i>Carica papaya</i>)	yes	yes	Limited by GMP	
Peroxidase (soya)				
Protease (incl. milk clotting enzymes) (<i>Actinidia chinensis</i>)				AMFEP CRD14 2008 CCFA41
<u>Microbiologically derived Enzyme Preparations</u>				
Acetolactate decarboxylase (<i>Bacillus subtilis d-Bacillus brevis</i>)	yes	yes		
Acetolactate decarboxylase (alpha) (<i>Saccharomyces cerevisiae d-Enterobacter sp.</i>)				AMFEP CRD14 2008 CCFA 41
Acid phosphatase (<i>Aspergillus niger</i>)				in CX/FAC 92/7
Alcohol dehydrogenase (<i>Saccharomyces cerevisiae</i>)				15
Alpha amylase				
(<i>Aspergillus niger</i>)	yes	yes	Data required to show strains used do not produce mycotoxins	7
(<i>Aspergillus niger d-Aspergillus niger</i>)				
(<i>Aspergillus oryzae</i>)	yes	yes	Regard as normal constituent of food	7
(<i>Bacillus amyloliquefaciens</i>)				CX/FAC 92/7
(<i>Bacillus amyloliquefaciens d-Bacillus amyloliquefacien</i>)				
(<i>Bacillus licheniformis</i>)				7
(<i>Bacillus licheniformis</i> containing a-modified alpha amylase gene from <i>B. licheniformis</i>)	yes	yes		CCFAC 37
(<i>Bacillus licheniformis d-Bacillus stearothermophilus</i>)				
(<i>Bacillus stearothermophilus</i>)	yes	yes		
(<i>Bacillus subtilis</i>)	yes	yes		7
(<i>Bacillus subtilis d-Bacillus megaterium</i>)	yes	yes		in CX/FAC 92/7
(<i>Bacillus subtilis d-Bacillus stearothermophilus</i>)	yes	yes		in CX/FAC 92/7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Bacillus subtilis d-Bacillus subtilis)</i>				
<i>(Microbacterium imperiale)</i>				
<i>(Rhizopus delemar)</i>				7
<i>(Rhizopus oryzae)</i>				7
<i>(Thermomonospora viridis)</i>				
Alpha galactosidase or Melibiase				7
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	
<i>(Aspergillus oryzae)</i>				
<i>(Aspergillus oryzae d-Aspergillus niger)</i>				
<i>(Mortierella vinacea)</i>				7
<i>(Saccharomyces carlsbergensis)</i>	yes	yes	Evaluated as carbohydrase	7,31
<i>(Saccharomyces cerevisiae d-Guar seed)</i>				
Aminoacylase (<i>Aspergillus melleus</i>)				AMFEP CRD14 2008 CCFA 41
Aminopeptidase				
<i>(Aspergillus niger)</i>				
<i>(Aspergillus oryzae)</i>				
<i>(Lactococcus lactis)</i>				
<i>(Rhizopus oryzae)</i>				
<i>(Trichoderma reesei)</i>				
AMP deaminase (<i>Aspergillus melleus</i>)				
Amylase (alpha) (<i>Bacillus amyloliquefaciens or subtilis d-Thermoactinomyces sp.</i>)				AMFEP CRD14 2008 CCFA 41
Arabinanase (<i>Aspergillus niger</i>)				AMFEP CRD14 2008 CCFA 41
Arabinofuranosidase				AMFEP CRD14 2008 CCFA 41
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	31
<i>(Aspergillus niger d-Aspergillus niger)</i>				
Asparaginase				
<i>(Aspergillus niger d-Aspergillus sp.)</i>	yes	yes		AMFEP CRD14 2008 JECFA 69 CCFA 41

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Aspergillus oryzae d-Aspergillus oryzae)</i>	yes	yes	ADI not specified when used under GMP in dough based and potato products prior to heating	AMFEP CRD14 2008 JECFA 68 CCFA 40
Beta amylase				
<i>(Bacillus cereus)</i>				7
<i>(Bacillus licheniformis)</i>				in CX/FAC 92/7
<i>(Bacillus megaterium)</i>				7, 8
<i>(Bacillus subtilis)</i>	yes	yes	As mixed microbial carbohydrases and proteases	7
Beta glucanase				
<i>(Aspergillus niger)</i>	yes	yes	Temporary acceptance of microbial carbohydrase pending further short term tests	
<i>(Bacillus amyloquefaciens)</i>				in CX/FAC 92/7
<i>(Bacillus amyloquefaciens d- Bacillus amyloquefaciens)</i>				
<i>(Bacillus subtilis)</i>	yes	yes		
<i>(Disporotrichum dimorphosporum)</i>				
<i>(Humicola insolens)</i>				
<i>(Penicillium funiculosum)</i>				
<i>(Penicillium multicolor)</i>				
<i>(Pseudomonas paucimobilis)</i>				
<i>(Talaromyces emersonii)</i>				
<i>(Trichoderma harzianum)</i>	yes	yes		20
<i>(Trichoderma reesei)</i>				in CX/FAC 92/7
<i>(Trichoderma reesei d-Trichoderma reesei)</i>				
Beta d-glucosidase or Cellobiase				
<i>(Aspergillus niger)</i>				7
<i>(Penicillium decumbens)</i>				

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Trichoderma harzianum)</i>	yes	yes	As carbohydrases	
<i>(Trichoderma reesei)</i>				7, 20
<i>(Trichoderma reesei d-Trichoderma reesei)</i>				
Beta xylosidase <i>(Trichoderma reesei)</i>				55
Carbohydrases, mixed (pectinase, cellulases, and hemicellulases) <i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrases	CX/FAC 92/7
Catalase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	71.24,
<i>(Aspergillus niger d-Aspergillus niger)</i>				
<i>(Aspergillus oryzae)</i>				
<i>(Micrococcus luteus)</i>				7
Carboxypeptidase <i>(Aspergillus niger d-Aspergillus niger)</i>				
Cellobiose dehydrogenase (<i>Fusarium venenatum d-Microdochium sp.</i>)				AMFEP CRD14 2008 CCFA 41
Cellulase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	6, 7,55
<i>(Aspergillus oryzae)</i>	ADI not decided	Withdrawn 2000	Evaluated as carbohydrase	7
<i>(Disporotrichum dimorphosporum)</i>				7
<i>(Humicola insolens)</i>				
<i>(Penicillium funiculosum)</i>				
<i>(Rhizopus delemar)</i>				7
<i>(Rhizopus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Streptomyces lividans)</i>				
<i>(Talaromyces emersonii)</i>				
<i>(Thielavia terrestris)</i>				7
<i>(Trichoderma reesei)</i>	yes	yes		
<i>(Trichoderma reesei d-Trichoderma reesei)</i>				
<i>(Trichoderma viride)</i>				
Chymosin A (<i>E coli K-12 d-calf stomach</i>)	yes	yes		CCFAC 23 (1991)
Chymosin B				

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
(<i>Kluyveromyces marxianus</i> var. <i>lactis</i> d-calf stomach)	yes	yes		CCFAC 23 (1991)
(<i>Aspergillus niger</i> var. <i>awamori</i> d-calf stomach)	yes	yes		CCFAC 23 (1991)
Cyclomaltodextrin glucanotransferase (<i>Bacillus licheniformis</i> d- <i>Thermoanaerobacter</i> .)				
Cyclomaltodextrin glucanotransferase (<i>Bacillus macerans</i>)				AMFEP CRD14 2008 CCFA 41
Dextranase				
(<i>Aspergillus</i> ?)				
(<i>Bacillus subtilis</i>)	yes	yes	Evaluated as mixed carbohydrases and proteases	
(<i>Chaetomium erraticum</i>)				
(<i>Chaetomium gracile</i>)				
(<i>Klebsiella pneumoniae</i>)				7
(<i>Penicillium funiculosum</i>)				7
(<i>Penicillium lilacinum</i>)				7
Endo beta glucanase				
(<i>Aspergillus niger</i>)	yes	yes	Evaluated as carbohydrases	7
(<i>Aspergillus oryzae</i>)	yes	yes	Evaluated as carbohydrases	7
(<i>Bacillus circulans</i>)				7
(<i>Bacillus subtilis</i>)	yes	yes	Evaluated as mixed carbohydrases and protease	7
(<i>Disporotrichum dimorphosporum</i>)				56
(<i>Rhizopus delemar</i>)				7
(<i>Rhizopus oryzae</i>)	yes	yes	Evaluated as carbohydrase	7, 30
(<i>Talaromyces emersonii</i>)				7
(<i>Trichoderma reesei</i>)				
Esterase				from CX/FAC 92/7
(<i>Aspergillus niger</i>)				55
(<i>Rhizomucor miehei</i>)				7
(<i>Trichoderma reesei</i>)				55

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
Exo alpha glucosidase (<i>Aspergillus niger</i>)				
Exo-alpha glucosidase (immobilized) (same source as above) no more than 10 mg/kg glutaraldehyde				
Ferulic acid esterase (<i>Streptomyces werraensis</i>)				AMFEP CRD14 2008 CCFA 41
Fructosyl transferase				
(<i>Aspergillus niger</i>)				
Glucanase (endo-1,3(4)-beta) <i>Cellulosimicrobium sp.</i>				AMFEP CRD14 2008 CCFA 41
Glucanase (beta) (<i>Aspergillus oryzae</i> d-<i>Thermoascus sp.</i>)				AMFEP CRD14 2008 CCFA 41
Glucoamylase or amyloglucosidase				
(<i>Aspergillus niger</i>)	yes	yes		7, 9, 16, 49, 50
(<i>Aspergillus niger</i> d- <i>Aspergillus niger</i>)				
(<i>Aspergillus niger</i> d- <i>Talaromyces emersonii</i>)				
(<i>Aspergillus oryzae</i>)	yes	yes	Microbial enzyme preparation	7
(<i>Penicillium funiculosum</i>)				
(<i>Rhizopus delemar</i>)				7
(<i>Rhizopus niveus</i>)				7
(<i>Rhizopus oryzae</i>)	yes	yes	Evaluated as carbohydrase	7
(<i>Trichoderma reesei</i>)				7, 30
Glucose isomerase				
(<i>Actinoplanes missouriensis</i>)	yes	yes	Acceptable for use in food processing when immobilised.	7
(<i>Arthrobacter?</i>)	15		Evaluated as carbohydrase	7
(<i>Bacillus coagulans</i>)	yes	yes	Non immobilised: No info on use No ADI allocated Immobilised: Use acceptable in food	7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Microbacterium arborescens)</i>				
<i>(Streptomyces albus)</i>				7
<i>(Streptomyces lividans)</i>				
<i>(Streptomyces murinus)</i>				
<i>(Streptomyces olivaceus)</i>	yes	yes	acceptable when immobilised	7
<i>(Streptomyces olivochromogenes)</i>	yes	yes	acceptable when immobilised	12, 7
<i>(Streptomyces rubiginosus)</i>	yes	yes	acceptable when immobilised	9,20,21
<i>(Streptomyces ?)</i>			See specific sp. above	17
<i>(Streptomyces violaceoniger)</i>	yes	yes		
Glucose isomerase (immobilized) .(same sources as above) not more than 10 mg/kg glutaraldehyde	yes	yes	See comments above	
<i>(Microbacterium arborescens)</i>				CX/FAC 92/7
<i>(Streptococcus murinus)</i>				CX/FAC 92/7
Glucose oxidase				
<i>(Aspergillus niger)</i>	yes	yes		1, 6, 7
<i>(Aspergillus niger d- Aspergillus niger)</i>				
<i>(Aspergillus oryzae d- Aspergillus niger)</i>				
<i>(Penicillium chrysogenum)</i>				
Glucosidase (exo-1.3-beta) (<i>Penicillium funiculosum</i>)				AMFEP CRD14 2008 CCFA 41
Beta d-glucosidase or Cellobiase <i>Penicillium multicolor</i>				AMFEP CRD14 2008 CCFA 41
Glutaminase (<i>Bacillus subtilis</i>)				
Hemicellulase				
<i>(Aspergillus niger)</i>	yes	yes		
<i>(Aspergillus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Bacillus lentus)</i>				
<i>(Bacillus subtilis)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Bacillus subtilis d-Bacillus ?)</i>				
<i>(Disporotrichum dimorphosporum)</i>				7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Rhizopus delemar)</i>				7
<i>(Rhizopus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Trichoderma reesei)</i>				7,30
Hexose oxidase (<i>Hansenula polymorpha d-Chondrus crispus</i>)	yes	yes		CCFAC 38
Inulinase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	
<i>(Disporotrichum dimorphosporum)</i>				
<i>(Kluyveromyces fragilis)</i>				7
<i>(Streptomyces ?)</i>	yes	yes		
Invertase				7
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	
<i>(Bacillus subtilis)</i>	yes	yes	Evaluated as carbohydrase	
<i>(Kluyveromyces fragilis)</i>				7
<i>(Saccharomyces carlsbergensis)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Saccharomyces cerevisiae)</i>	yes,	yes	Evaluated as carbohydrase	7, 17
<i>(Saccharomyces ?)</i>	yes	yes	Evaluated as carbohydrase	
Isoamylase				7
<i>(Bacillus cereus)</i>				
<i>(Pseudomonas amyloclavata)</i>	yes	yes	ADI not specified when used in applications as specified (starch processing)	CCFA 40
Laccase				
<i>(Aspergillus oryzae d-Myceliophthora thermophila)</i>	yes	yes		CCFAC 37
<i>(Aspergillus oryzae d-Polyporus sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei or longibrachiatum d-Thielavia sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trametes hirsuta)</i>				AMFEP CRD14 2008 CCFA 41

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Trametes versicolour)</i>				AMFEP CRD14 2008 CCFA 41
Lactase or Beta galactosidase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Aspergillus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7,10
<i>(Aspergillus oryzae d-Aspergillus sp)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Bacillus circulans)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Candida pseudotropicalis)</i>				CX/FAC 92/7
<i>(Kluyveromyces fragilis)</i>				
<i>(Kluyveromyces lactis)</i>				
<i>(Kluyveromyces lactis d-Kluyveromyces lactis)</i>				
<i>(Saccharomyces species)</i>	yes	yes	Evaluated as carbohydrase	
Lactoperoxidase (Origin?)	yes	yes	under sodium percarbonate system for milk preservation	47,57
Lipase				
<i>(Aspergillus niger)</i>				7
<i>(Aspergillus niger d-Candida antarctica)</i>				
<i>(Aspergillus oryzae)</i>	yes	Withdrawn 2000		1,7
<i>(Aspergillus oryzae d-Rhizomucor miehei)</i>				
<i>(Aspergillus oryzae d-Humicola lanuginosa)</i>				
<i>(Aspergillus oryzae d-Fusarium oxysporum)</i>				
<i>(Aspergillus oryzae d-Candida antarctica)</i>				
<i>(Brevibacterium lineus)</i>				46
<i>(Candida lipolytica)</i>				7
<i>(Candida rugosa)</i>				
<i>(Mucor javanicus)</i>				7
<i>(Mucor pusillus)</i>				
<i>(Penicillium roqueforti)</i>				
<i>(Penicillium camembertii)</i>				
<i>(Rhizopus delemar)</i>				
<i>(Rhizomucor miehei)</i>				7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Rhizopus nigrican)</i>				7
<i>(Rhizopus niveus)</i>				
<i>(Rhizopus oryzae)</i>				
Lysophos- pholipase				23
<i>(Aspergillus niger)</i>				
<i>(Aspergillus niger d-Aspergillus niger)</i>				
Malic acid decarboxylase (<i>Leuconostoc oenos</i>)				7
Lipase triacylglycerol (<i>Aspergillus oryzae</i> d-<i>Thermomyces</i> sp.)				AMFEP CRD14 2008 CCFA 41
Lipoxygenase (<i>Escherichia coli</i> d-<i>Pea</i>)				AMFEP CRD14 2008 CCFA 41
Maltase or alpha glucosidase				
<i>(Aspergillus niger)</i>	yes	yes		7
<i>(Aspergillus oryzae)</i>	yes	Yes		7
<i>(Rhizopus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Trichoderma reesei)</i>				
Maltogenic amylase (<i>Bacillus subtilis</i> d- <i>Bacillus stearothermophilus</i>)	yes	yes		CX/FAC 92/7
Mannanase (endo-1.4-beta)				
<i>(Aspergillus niger)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei</i> or <i>longibrachiatum</i> d- <i>Trichoderma</i> sp.)				AMFEP CRD14 2008 CCFA 41
Mixed xylanase, beta glucanase enzyme preparation (<i>Humicola insolens</i>)	yes			CCFAC 37
Nitrate reductase (<i>Micrococcus violagabriella</i>)				46
Pectinase				
<i>(Aspergillus niger)</i>	yes	yes		6, 7
<i>(Aspergillus niger d-Aspergillus niger)</i>				
<i>(Aspergillus oryzae)</i>	yes	yes	Evaluated as carbohydrase	6, 7
<i>(Aspergillus oryzae d-Aspergillus niger var. aculeatus)</i>				

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Penicillium funiculosum)</i>				
<i>(Penicillium simplicissium)</i>				7
<i>(Rhizopus oryzae)</i>	yes	yes	Evaluated as carbohydrase	7
<i>(Trichoderma reesei)</i>				7, 30
<i>(Trichoderma reesei d-Aspergillus ?)</i>				
Pectin esterase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	20
<i>(Aspergillus niger d-Aspergillus niger)</i>				
Pectin lyase				
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	20
<i>(Aspergillus niger d-Aspergillus sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Aspergillus sojae)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Penicillium funiculosum)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Rhizopus oryzae or arrhizus)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei or longibrachiatum d-Aspergillus sp.)</i>				AMFEP CRD14 2008 CCFA 41
Pectin methylesterase or Pectinesterase				
<i>(Aspergillus sojae sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Aspergillus niger d-Aspergillus sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Penicillium funiculosum)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Rhizopus oryzae or arrhizus)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei or longibrachiatum d-Aspergillus sp.)</i>				AMFEP CRD14 2008 CCFA 41
Phosphodiesterase				
<i>(Penicillium citrinum)</i>				
<i>(Leptographium procerum)</i>				
Phospholipase A				

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Aspergillus niger d-Aspergillus sp)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei or longibrachiatum d-Aspergillus)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Trichoderma reesei or longibrachiatum d-Thermomyces sp.)</i>				AMFEP CRD14 2008 CCFA 41
Phospholipase A1 (<i>Aspergillus oryzae d-Fusarium venenatum</i>)	yes	yes	ADI not specified when used in applications as specified in accordance with good manufacturing practice)	CCFA 40
Phospholipase A2				
<i>(Aspergillus niger d-porcine pancreas)</i>				
<i>(Streptomyces violaceoruber)</i>				
<i>(Streptomyces chromofuscus)</i>				
Phospholipase B (<i>Trichoderma reesei or longibrachiatum d-Aspergillus sp.</i>)				
Phytase				CX/FAC 92/7
<i>(Aspergillus niger)</i>				
<i>(Aspergillus niger d-Aspergillus niger)</i>				
<i>(Aspergillus oryzae d-Peniophora lycii)</i>				
<i>(Trichoderma reesei d-Aspergillus ?)</i>				
Polygalacturonase	yes	yes	Evaluated as carbohydrase	30
<i>(Aspergillus niger)</i>	yes	yes	Evaluated as carbohydrase	30
<i>(Aspergillus niger d-Aspergillus niger)</i>				
Polygalacturonase or Pectinase (<i>Aspergillus pulverulentus</i>)				AMFEP CRD14 2008 CCFA 41
Protease (including milk clotting enzymes)				
<i>(Aspergillus melleus)</i>				7
<i>(Aspergillus niger)</i>	yes	Not prepared		7
<i>(Aspergillus niger d-Aspergillus niger)</i>				
<i>(Aspergillus oryzae)</i>	yes	yes		7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Aspergillus oryzae d-Rhizomucor miehei)</i>				
<i>(Aspergillus sojae)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Bacillus amyloliquefaciens)</i>				
<i>(Bacillus amyloliquefaciens d-Bacillus amyloliquefaciens)</i>				
<i>(Bacillus cereus)</i>				7
<i>(Bacillus licheniformis)</i>				7
<i>(Bacillus licheniformis d-Bacillus sp.)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Bacillus stearothermophilus)</i>				
<i>(Bacillus subtilis)</i>	yes	yes	Evaluated as mixed carbohydrases and proteases	1,7
<i>(Bacillus subtilis d-Bacillus amyloliquefaciens)</i>				
<i>(Bacillus thermoproteolyticus)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Brevibacterium lineus)</i>				46
<i>(Endothia parasitica)</i> -rennet from	yes	Withdrawn 2000		1,7
<i>(Endothia parasitica d-Endothia parasitica)</i>				
<i>(Lactobacillus casei)</i>				46
<i>(Micrococcus caseolyticus)</i>				56
<i>(Mucor pusillus)</i> -rennet from	yes	yes		1,7
<i>(Penicillium citrinum)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Rhizomucor miehei)</i> -rennet from	yes	yes		1,7
<i>(Rhizopus niveus)</i>				
<i>(Rhizopus oryzae)</i>				
<i>(Streptococcus cremoris)</i>				46
<i>(Streptococcus lactis)</i>				
Protein-glutaminase (<i>Chryseobacterium proteolyticum</i>)				AMFEP CRD14 2008 CCFA 41
Pullulanase				CX/FAC 92/7

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
<i>(Bacillus acidopullulyticus)</i>				30, 20
<i>(Bacillus brevis)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Bacillus circulans)</i>				
<i>(Bacillus licheniformis d-Bacillus deramificans)</i>				
<i>(Bacillus naganoensis)</i>				
<i>(Bacillus subtilis)</i>				48, 49
<i>(Bacillus subtilis d-Bacillus acidopullulyticus)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Bacillus subtilis d-Bacillus naganoensis)</i>				
<i>(Bacillus subtilis d-Bacillus deramificans)</i>				
<i>(Klebsiella aerogenes)</i>	yes	yes		7
<i>(Klebsiella planticola)</i>				AMFEP CRD14 2008 CCFA 41
<i>(Klebsiella planticola d-Bacillus planticola)</i>				
<i>(Trichoderma reesei or longibrachiatum d-Hormoconis sp.)</i>				AMFEP CRD14 2008 CCFA 41
Rhamnosidase				
<i>(Penicillium decumbens)</i>				
<i>(Penicillium multicolor)</i>				AMFEP CRD14 2008 CCFA 41
Serine proteinase				
<i>(Bacillus amyloliqu- efaciens)</i>				CX/FAC 92/7
<i>(Bacillus licheniformis)</i>				
<i>(Bacillus subtilis)</i>				CX/FAC 92/7
<i>(Streptomyces fradiae)</i>			Insufficient toxicological data available	23
Sulphydryl oxidase <i>Bacillus subtilis d-Saccharomyces sp.)</i>				AMFEP CRD14 2008 CCFA 41
Tannase				
<i>(Aspergillus niger)</i>				7
<i>(Aspergillus oryzae)</i>				7
Transglucosidase (<i>Aspergillus niger</i>)				

CATEGORY	JECFA Eval.	Specifications	JECFA comments	References
Transglutaminase (<i>Streptomyces mobaraense</i>)				
Urease (<i>Lactobacillus fermentum</i>)				
Xaa-Pro-dipeptidyl-aminopeptidase (<i>Lactococcus lactis</i>)				AMFEP CRD14 2008 CCFA 41
Xylanase				
(<i>Aspergillus niger</i>)				7
(<i>Aspergillus niger d-Aspergillus niger</i>)				
(<i>Aspergillus oryzae d-Aspergillus niger var. aculeatus</i>)				
(<i>Aspergillus oryzae d-Humicola lanuginosa</i>)				
(<i>Aspergillus oryzae d-Thermomyces sp.</i>)				AMFEP CRD14 2008 CCFA 41
(<i>Bacillus amyloliquefaciens or subtilis</i>)				AMFEP CRD14 2008 CCFA 41
(<i>Bacillus licheniformis d-Bacillus licheniformis</i>)				
(<i>Bacillus subtilis d-Bacillus subtilis</i>)	yes	yes		CCFAC 38
(<i>Bacillus subtilis with modified gene from d-Bacillus subtilis</i>)	yes	yes		CCFAC 38
(<i>Disporotrichum dimorphosporum</i>)				7
(<i>Fusarium venenatum d-Humicola lanuginosa</i>)	61			CCFAC 37
(<i>Humicola insolens</i>)				
(<i>Penicillium funiculosum</i>)				AMFEP CRD14 2008 CCFA 41
(<i>Streptomyces ?</i>)				7
(<i>Trichoderma reesei</i>)				48
(<i>Trichoderma reesei d-Trichoderma reesei</i>)				
(<i>Trichoderma viride</i>)				AMFEP CRD14 2008 CCFA 41

REFERENCES (from main table of the IPA)

1. Appendix VI, ALINORM 79/12-A (Report of the 13th CCFA, List of processing Aids [prepared by Secretariat]).
2. United Kingdom, letter (Hall/Ronk), 7.8.80.
3. USA, letter (Witcher/Feberwee), 14.10.80
4. IOFI, letter (Grundschober/Ronk), 8.7-81.
5. Codex Committee Fats and oils, letter (Burt/Rank), 16.7.81.
6. Hungary, letter (Suto/Ronk), 10.8.81.
7. AMFEP, letter (Noordervliet/Ronk), 20.8.81.
8. INEC, letter (Nittner/Ronk), 1.9.81.
9. Enzyme Technical Association (ETA), letter (Middlekauf/Ronk), 4.9.81.
10. ETA, letter (Middlekauf/Mansor), 10.9.81.
11. European wax Federation, letter (Sayers/Ronk), 25.9.81.
12. UOP, Inc. letter (Moore/Ronk), 28.9.81.
13. (USA law firm), letter (Allera/Ronk), 29.9-81.
14. Corn Refiners Association, letter (Liebenow/Ronk), 30.9.81.
15. Thailand, letter (Sangruji/Ronk), 3.11.81.
16. United Kingdom, letter (Griffiths/Ronk), 12.11.81
- 17- France, letter (Gunzle/Ronk), 30.12.81.
18. Crosfield Chemicals, letter (Burak/Ronk), 25.11.82.
19. IOFI, letter (Grundschober/Ronk), -7.12.82.
20. AMFEP, letter (Noordervliet/Ronk), 28.12.82.
21. ETA, letter (Middlekauf/Ronk), 4.1.83.
22. Codex Committee on Fats and oils, letter (Burt/Ronk), 5.1.83.
23. Netherlands, letter (Goddijn/Ronk), 8.2.83.
24. Australia, letter (Erwin/Ronk), 9.2.83.
25. Sweden, letter (Agren/Ronk), 17.2.83.
26. Thailand, letter (Sooksmarn/Ronk), 28.7.83.
27. van den Bergh en Jurgens, B.V., letter (vanBeers/Prunier), 12.12.83.
28. United Kingdom, letter (Scrutton/Prunier), 20.12.83.
29. France, letter (Rioux/Prunier), 2.1.84
30. AMFEP, letter (Mahler/Prunier), 2.1.84.
31. CEFIC, letter (Bustillo/Prunier), 3.1.84.
32. CPC International, Inc., letter (Feldberg/Ronk), 21.2.84.
33. Anonymous comments at Working Group on Processing Aids, 17th CCFA 4.84.
34. Marinalg International, letter (Piot/Ronk), 24.7.85.
35. AMFEP, letter (Toet/Rank), 28.8.85.
36. Switzerland, letter (Rossier/Ronk), 18.9.85.
37. CPC international, Inc., letter (Feldberg/Modderman), 24.9.85.
38. United Kingdom, letter (Allday/Ronk), 30.9.85.
39. USA, letter (Houston/Ronk), 16.10.85.
40. ETA, letter (Middlekauf/Ronk), 18..10.85.
41. AMFEP comment to Working Group on Processing Aids, 18th CCFA.
42. Report of the 29th meeting of JECFA.
43. France, letter (Martin/Codex Secretariat), 12.2.87.
44. Italy, letter (Pricolo/Ronk), 3.2.87.
45. Italy, comment to Working Group on Processing A-ids, 19th CCFA-
46. CIAA, letter (Mouton/Ronk), 12.3.87.
47. Belgium, letter (Cremer/Ronk), 11.9.87.
48. Finnsugar Group, (Paajanen/Rank), 19.1.87.
- 49- CPC international, Inc. letters (Brooks-Ray/Modderman), 12.2.87 and 18.2.87.
50. AMFEP letter (Toet/Modderman), 24.4.87.
- 51- Finland, letter (Hallikainen & Tuomaala/Ronk), 30.11.87.
- 52- France, letter. (Martin/Ronk), 23.11.87.
53. Italy, letter (Pricolo/Ronk), 2-2.88.

54. Not used.
55. Finland, letter (Hallikainen & Tuomaala/Ronk), 10.10.88.
56. France, letter (Vergnettes/Ronk), 21.10.88.
57. United Kingdom, letter (Allday/Ronk), 15.11.88.
- 58- United States of America, letter (Crawford/Ronk), 9.12.89.
59. IOFI, letter (Grundschober/Ronk), 26.9.88.
60. France, letter (Martin/Ronk), 12.2.87.
61. Thailand, letter (Mekanontchai/Ronk), .3.89.

APPENDIX A**CODEX INVENTORY OF COMPOUNDS USED AS PROCESSING AIDS WHICH ALSO SERVE OTHER FUNCTIONS**

(excludes those substances already covered in the main IPA which were formerly annotated as (1.))

The substances are annotated according to the following system:

2. indicates those materials that are both food additives and processing aids (i.e. the substance functions as a processing aid in one food but may have a different function in another food).
3. indicates those compounds that because of carry-over residues, would seem to usually be considered only as food additives.
4. indicates those materials that might actually have simultaneous function as processing aids and functionality in the finished food.

Antifoam agents

- (2) Aluminum stearate
- (2) Butyl stearate
- (3) Butylated hydroxyanisole (as antioxidant in defoamers)
- (3) Butylated hydroxytoluene (as antioxidant in defoamers)
- (2) Calcium stearate
- (2) Dimethylpolysiloxane
- (2) Fatty acids
- (2) Hydroxylated lecithin
- (2) Magnesium stearate
- (3) Margarine
- (2) Mineral oil
- (2) Mono- and diglycerides of fatty acids
- (2) n-Butoxypolyoxyethylene polyoxypropylene glycol
- (2) Odourless light petroleum hydrocarbons
- (2) Oleic acid from tall oil fatty acids
- (2) Oxystearin
- (2) Petroleum wax
- (2) Petroleum wax (synthetic)
- (2) Petrolatum
- (2) Polyacrylic acid, sodium salt
- (2) Polydimethylpolysiloxane (fruit juices at 10mg/kg CCFAC 37)
- (2) Polyethylene glycol
- (2) Polyethylene glycol (400) dioleate
- (2) Polyethylene glycol (600) dioleate
- (2) Polyglycerol esters of fatty acids
- (2) Polyoxyethylene 40 monostearate
- (2) Polypropylene glycol
- (2) Polysorbate 60
- (2) Polysorbate 65
- (2) Polysorbate 80
- (2) Potassium stearate
- (2) Propylene glycol alginate
- (2) Propylene glycol mono- and di-esters of fats and fatty acids

- (2) Silicon dioxide
- (2) Sorbitan monolaurate
- (2) Sorbitan monostearate
- (2) Soybean oil fatty acids
- (2) Tallow
- (2) Tallow, hydrogenated, oxidized or sulphated
- (2) Tallow alcohol, hydrogenated
- (3) Vegetable oil

Catalysts

- (2) Ammonia
- (2) Ammonium bisulfite
- (2) Calcium chloride
- (2) Ferrous sulfate
- (2) Sodium chloride
- (2) Sodium hydroxide
- (2) Sodium metabisulfite
- (2) Sulfur dioxide

Clarifying agents/filtration aids

- (2) Acacia
- (2) Agar
- (2) Carbon dioxide
- (2) Carrageenan/Furcelleran
- (2) Casein
- (2) Cellulose
- (2) Cellulose powder
- Chloromethylated aminated styrene-divinylbenzene resin
- (2) Citric acid
- (1) Diatomaceous earth
- Divinylbenzene-ethylvinylbenzene copolymer
- Fuller's earth
- (2) Gelatin (edible)
- (2) Phosphoric acid
- Polyacrylamide/polysodium acrylate copolymer
- Polymaleic acid and sodium polymaleate
- (2) Polyvinylpyrrolidone
- (2) Polyvinylpolypyrrolidone
- (2) Potassium ferrocyanide
- (2) Silicon dioxide amorphous - silica hydrogel
- (2) Sodium alginate
- (2) Stabilized aqueous silica sol
- (2) Sulfur dioxide
- (2) Tannic acid
- (2) Wood flour/Sawdust

Colour stabilizers

- (2) Dextrose
- (2) Sodium acid pyrophosphate
- (2) Sulphur dioxide

Contact freezing and cooling agents

- (2) Brine (eg. salt brine)
- (2) Carbon dioxide
Dichlorodifluoromethane
- (2) Glycerol

Desiccating agent/anticaking agents

- Aluminum stearate
- (2) Calcium aluminum silicate
- (2) Calcium silicate
Calcium stearate
- (2) Magnesium carbonate, heavy
- (2) Magnesium carbonate, light
- (2) Magnesium oxide, heavy
- (2) Magnesium oxide, light
- (2) Magnesium silicate, synthetic
Magnesium stearate
- (2) Magnesium trisilicate
- (2) Silicon dioxide
- (2) Silicon dioxide amorphous - silica gel
- (2) Sodium aluminum silicate
Sodium calcium silicoaluminate
- (2) Tricalcium diorthophosphate

Enzyme immobilization agents and supports

- (2) Carrageenan (including Furcelleran)
- (2) Gelatin
- (2) Sodium alginate

Solvents (extraction and processing)

- (2) Ammonia in methanol/ethanol
- (2) Benzyl benzoate
- (2) Butan-2-ol
- (2) Butyl acetate
- (2) Carbon dioxide
- (2) Castor oil
- (2) Diethyl tartrate
- (2) Ethanol
- (2) Ethyl acetate
- (2) Ethyl lactate
- (2) Glycerol
- (2) Glycerol mono- di- and triacetate
Isobutanol (2-methylpropan-1-ol)
- (2) Isopropyl alcohol
- (2) Methanol
- (2) Methyl acetate
Methyl propanol-1
- (2) Nitric acid
- (2) Propane-2-ol (isopropyl alcohol)

Trichlorofluoromethane

(2) Water

Fat crystal modifiers

- (4) Lecithin
- (4) Oxystearin
- (4) Polyglycerol esters of fatty acids
- (4) Polysorbate 60
- (4) Sodium dodecylbenzene sulphonate
- (4) Sodium lauryl sulphate
- (4) Sorbitan monostearate
- (4) Sorbitan tristearate

Flocculating agents

Acrylamide resins

- (2) Aluminum ammonium sulfate
- (2) Aluminum sulfate
- (2) Citric acid
- Dimethylamine-epichlorohydrin copolymer
- (2) Gelatin
- (2) Polyacrylic acid, sodium salt
- (2) Silica
- (2) Sodium alginate

Lubricants, release and anti-stick agents, moulding aids

Acetic acid esters of fatty acid mono- and diglycerides

- (2) Acetylated monoglycerides
- (2) Beeswax
- (2) Butyl stearate
- (2) Carnauba wax
- (2) Calcium aluminum silicate
- (2) Calcium carbonate
- (2) Calcium phosphates
- (2) Calcium silicate
- (2) Calcium stearate
- (2) Castor oil
- (2) Edible bone phosphate
- (2) Ethoxylated mono- and diglycerides
- (2) Fats and waxes of vegetable and animal origin
- (2) Fatty acids of tallow and vegetable oils
- (2) Hydrogenated sperm oil
- (2) Lecithin
- (2) Magnesium carbonate
- (2) Magnesium oxide, light and heavy
- (2) Magnesium trisilicate
- (2) Mineral oil based greases (lubricants for pumps)
- (2) Mineral oil/Paraffin oil
- (2) Mineral oils and waxes
- Mono- and diglycerides of fatty acids
- (2) Oxidatively polymerised soya bean oil

- (2) Paraffin and paraffin oils
- (2) Partially hydrogenated vegetable oil
- (2) Polyglycerol esters of dimerised fatty acids of soya bean oil
- (2) Polyglycerol polylinoleate
- (2) Polyglycerol polyricinoleate
- Shellac
- Silicates (magnesium, potassium, sodium)
- (2) Silicon dioxide
- (2) Sodium aluminum silicate
- (2) Starches
- (2) Stearates (magnesium, calcium, and aluminum)
- Stearates (potassium and sodium)
- (2) Stearic acid
- (2) Stearins
- (2) Talc
- (2) Tetrasodium diphosphate
- (2) Tri-calcium phosphate
- (2) Vegetable triglycerides
- (2) Wax
- (2) Wax coatings

Micro-organism control agents

- (3) Disodium cyanodithioamidocarbonate
- Disodium ethylene bis dithiocarbamate
- Dimethyldicarbonate
- (3) Ethylenediamine
- (3) N-alkyl (C12-C16) dimethyl benzylchloride
- (2) Natamycin
- (2) Nitric acid
- (3) Potassium N-methyldithiocarbamate
- (3) Propylene oxide
- (3) Sodium chlorite
- Sodium dimethyldithiocarbamate
- (2) Sulfur dioxide

Propellant and packaging gases

- (2) Carbon dioxide
- (2) Dichlorodifluoromethane
- (2) Oxygen

Washing and peeling agents

- (2) Ammonium chloride
- Ammonium orthophosphate
- (2) Calcium chloride
- (2) Calcium hydroxide
- (2) Calcium oxide
- Diammonium orthophosphate
- Dithiocarbamate
- (2) Oleic acid
- Organophosphates

- (2) Sodium carbonate
- (2) Sodium hydroxide
- (2) Sodium hydroxide, 10%
- (2) Sodium hydroxide, 2%
- (2) Sodium tripolyphosphate
- (2) Sulfuric acid

Yeast nutrients

- (3) Ammonium chloride
- (3) Ammonium sulphate
- (3) Ammonium phosphates
- (3) B-Complex vitamins
- (3) Biotin
- (3) Calcium carbonate
- (3) Calcium phosphates
- (3) Calcium sulphate
- (3) Cupric sulphate
- (3) Ferrous ammonium sulphate
- (3) Ferrous sulphate
- (3) Inositol
- (3) Magnesium sulfate
- (3) Niacin
- (3) Pantothenic acid
- (3) Potassium carbonate
- (3) Potassium chloride
- (3) Potassium hydrogen carbonate
- (3) Yeast autolysates
- (3) Zinc sulphate

Other processing aids

- (2) Acetic acid
- Acrylic resin with primarily tertiary amino groups
- Alkylene oxide adduct
- (2) Allyl isothiocyanate
- (2) Ammonium bicarbonate
- (2) Amyl acetate
- (2) Benzyl alcohol
- (2) BHA
- (2) BHT
- (2) Calcium carbonate
- (2) Calcium chloride
- (2) Calcium citrate
- (2) Calcium hydroxide
- Calcium oxide
- (2) Calcium phosphates
- (2) Calcium sulfate
- (1) Calcium tartrate
- (2) Caramel flavoring
- Carbon dioxide

- (2) Citric acid
- (2) Coconut oil
- (2) Disodium hydrogen phosphate
- Ethylene oxide-propylene oxide copolymers
- (2) Fatty acids of soybean oil
- Fatty alcohol-glycol ether
- (2) Fractionated soybean oil
- (2) Fumaric acid
- (2) Glycerol tripropionate
- (2) Glycine
- (2) Hydrochloric acid
- (2) Hydrogenated soybean oil
- Hydrophillic fatty acyl esters, linked to a neutral carrier
- (2) Isopropyl alcohol
- (2) Lactic acid
- (2) Lactylated mono esters
- (2) Magnesium chloride
- (2) Magnesium citrate
- Magnesium oxide
- (2) Magnesium sulfate
- (2) Magnesium hydroxide
- (2) Magnesium phosphates
- alpha-Methyl glycoside water
- Methyl glycoside coconut oil ester
- (2) Methyl paraben (Methyl parahydroxybenzoate)
- (2) Mineral oil
- Mixture of ethylene and propylene oxides, copolymers and esters, castor oil and polyethylene glycol ester
- Mixture of naturally occurring and synthetic fatty acyl derivatives, with added emulgators
- Modified higher alcohol
- Mono- and diglycerides of fatty acids from feed fat (E471)
- Mono- and diglycerides of fatty acids from feed fat, esterified with acetic acid, lactic acid and citric acid
- Non-ionogenic alkylene oxide adduct with emulgator
- (2) Oxalic acid
- (2) Paraffin
- (2) Phosphoric acid
- Polyalkylene oxide, in combination with special fatty alcohols
- Polyethoxylated alcohol, modified
- Polyacrylate
- Polyacrylate with carboxyl groups
- Polyethylene glycol
- Polyglycol copolymer
- Polyphosphate
- Polypropylene-polyethylene block polymer
- (2) Polyvinylpyrrolidone
- (2) Potassium carbonate
- (2) Potassium chloride
- (2) Potassium citrate

- (2) Potassium nitrate
- (2) Potassium phosphates
- (2) Potassium sulfate
- (2) Potassium tartrate
- (2) Propyl gallate
- (2) Propan-1-ol
- (2) Propane-1,2-diol
- (2) Shellac
- (2) Sandarac gum
- (2) Sodium chloride
- (2) Sodium aluminosilicate
- (2) Sodium bisulfite
- (2) Sodium bicarbonate
- (2) Sodium carbonate
- (2) Sodium citrate
- (2) Sodium hexametaphosphate
- (2) Sodium hydroxide
- (2) Sodium metabisulfite
- (2) Sodium phosphate monobasic
- (2) Sodium phosphate dibasic
- (2) Sodium phosphate tribasic
- Sodium polyacrylate
- Sodium polyacrylate-acrylamide resin
- (2) Sodium sulfate
- Sodium sulfite
- (2) Sodium tartrate
- Solution of: anhyd. polyphosphate, polycarboxylic acid salt, polyalkylene glycol, sodium hydroxide
- Sorbitan-fatty acyl esters and polyoxyethylene-20-sorbitan fatty acyl esters
- (2) Soy lecithin
- (2) Sulfuric acid
- (2) Sulphur dioxide
- Sulphonated copolymer of styrene and divinylbenzene
- Surface-active esters with neutral carriers
- Tannic acid with quebracho extract
- (2) Tartaric acid
- (2) TBHQ
- Vegetable fatty acid esters
- Vegetable fatty acyl (hydrophillic)
- (2) Xylose