



Milk and Milk Products

Second edition



World Health
Organization



Food and Agriculture
Organization of
the United Nations

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WORLD HEALTH ORGANIZATION

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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THE CODEX ALIMENTARIUS COMMISSION

The Codex Alimentarius Commission is an intergovernmental body with over 180 members established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

The **C O D E X A L I M E N T A R I U S** is the main result of the Commission's work: a set of international food standards, guidelines and codes of practice with the goal to protect the health of consumers and ensure fair practices in the food trade.

MILK AND MILK PRODUCTS

Second edition

This compilation contains in one volume all Codex standards and related texts for milk and milk products adopted by the Codex Alimentarius Commission up to 2011.

Further information on these texts, or any other aspect of the Codex Alimentarius Commission, may be obtained from:

Secretariat of the Codex Alimentarius Commission
Joint FAO/WHO Food Standards Programme
Viale delle Terme di Caracalla
00153 Rome, Italy
Fax: +39 06 57054593
E-mail: codex@fao.org
[http:// www.codexalimentarius.org](http://www.codexalimentarius.org)

PREFACE	iii
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Standards for milk products

Milk powders and cream powder (CODEX STAN 207-1999)	1
Fermented milks (CODEX STAN 243-2003)	6
Blend of evaporated skimmed milk and vegetable fat (CODEX STAN 250-2006)	17
Blend of skimmed milk and vegetable fat in powdered form (CODEX STAN 251-2006)	21
Blend of sweetened condensed skimmed milk and vegetable fat (CODEX STAN 252-2006)	25
Dairy fat spreads (CODEX STAN 253-2006)	29
Butter (CODEX STAN 279-1971)	36
Milkfat products (CODEX STAN 280-1973)	38
Evaporated milks (CODEX STAN 281-1971)	41
Sweetened condensed milks (CODEX STAN 282-1971)	45
Cream and prepared creams (CODEX STAN 288-1976)	49
Whey powders (CODEX STAN 289-1995)	56
Edible casein products (CODEX STAN 290-1995)	59

Horizontal cheese standards

Cheeses in brine (CODEX STAN 208-1999)	64
Group standard for unripened cheese including fresh cheese (CODEX STAN 221-2001)	67
Extra hard grating cheese (CODEX STAN 278-1978)	73
General standard for cheese (CODEX STAN 283-1978)	76
Standard for whey cheeses (CODEX STAN 284-1971)	83

Individual cheese standards

Mozzarella (CODEX STAN 262-2006)	86
Cheddar (CODEX STAN 263-1966)	93
Danbo (CODEX STAN 264-1966)	99
Edam (CODEX STAN 265-1966)	104
Gouda (CODEX STAN 266-1966)	109
Havarti (CODEX STAN 267-1966)	115
Samsø (CODEX STAN 268-1966)	120
Emmental (CODEX STAN 269-1967)	125
Tilsiter (CODEX STAN 270-1968)	131
Saint-Paulin (CODEX STAN 271-1968)	136
Provolone (CODEX STAN 272-1968)	142
Cottage cheese (CODEX STAN 273-1968)	148
Coulommiers (CODEX STAN 274-1969)	154
Cream cheese (CODEX STAN 275-1973)	159
Camembert (CODEX STAN 276-1973)	166
Brie (CODEX STAN 277-1973)	171

General texts for milk and milk products

General standard for the use of dairy terms (CODEX STAN 206-1999)	176
Code of hygienic practice for milk and milk products (CAC/RCP 57-2004)	181
Guidelines for the preservation of raw milk by use of the lactoperoxidase system (CAC/GL 13-1991)	233
Model export certificate for milk and milk products (CAC/GL 67-2008)	240

CODEX STANDARD FOR MILK POWDERS AND CREAM POWDER

CODEX STAN 207-1999

1. SCOPE

This Standard applies to milk powders and cream powder, intended for direct consumption or further processing, in conformity with the description in Section 2 of this Standard.

2. DESCRIPTION

Milk powders and cream powder are milk products which can be obtained by the partial removal of water from milk or cream. The fat and/or protein content of the milk or cream may have been adjusted, only to comply with the compositional requirements in Section 3 of this Standard, by the addition and/or withdrawal of milk constituents in such a way as not to alter the whey protein to casein ratio of the milk being adjusted.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw materials

Milk and cream

The following milk products are allowed for protein adjustment purposes:

- Milk retentate Milk retentate is the product obtained by concentrating milk protein by ultrafiltration of milk, partly skimmed milk, or skimmed milk;
- Milk permeate Milk permeate is the product obtained by removing milk proteins and milkfat from milk, partly skimmed milk, or skimmed milk by ultrafiltration; and
- Lactose¹.

3.2 Composition

Cream powder

Minimum milkfat	42% m/m
Maximum water ^(a)	5% m/m
Minimum milk protein in milk solids-not-fat ^(a)	34% m/m

¹ See Standard for Sugars (CODEX STAN 212-1999).

Whole milk powder

Milkfat	Minimum 26% and less than 42% m/m
Maximum water ^(a)	5% m/m
Minimum milk protein in milk solids-not-fat ^(a)	34% m/m

Partly skimmed milk powder

Milkfat	More than 1.5% and less than 26% m/m
Maximum water ^(a)	5% m/m
Minimum milk protein in milk solids-not-fat ^(a)	34% m/m

Skimmed milk powder

Maximum milkfat	1.5% m/m
Maximum water ^(a)	5% m/m
Minimum milk protein in milk solids-not-fat ^(a)	34% m/m

(a) The water content does not include water of crystallization of the lactose; the milk solids-not-fat content includes water of crystallization of the lactose.

4. FOOD ADDITIVES

Only those food additives listed below may be used and only within the limits specified.

INS no.	Name of additive	Maximum level
Stabilizers		
331	Sodium citrates	} 5 000 mg/kg singly or in combination, expressed as anhydrous substances
332	Potassium citrates	
Firming agents		
508	Potassium chloride	Limited by GMP
509	Calcium chloride	Limited by GMP
Acidity regulators		
339	Sodium phosphates	} 5 000 mg/kg singly or in combination expressed as anhydrous substances
340	Potassium phosphates	
450	Diphosphates	
451	Triphosphates	
452	Polyphosphates	
500	Sodium carbonates	
501	Potassium carbonates	
Emulsifiers		
322	Lecithins	Limited by GMP
471	Mono- and diglycerides of fatty acids	2 500 mg/kg

INS no.	Name of additive	Maximum level
Anticaking agents		
170(i)	Calcium carbonate	10 000 mg/kg singly or in combination
341(iii)	Tricalcium phosphate	
343(iii)	Trimagnesium phosphate	
504(i)	Magnesium carbonate	
530	Magnesium oxide	
551	Silicon dioxide, amorphous	
552	Calcium silicate	
553	Magnesium silicates	
554	Sodium aluminosilicate	
556	Calcium aluminium silicate	
559	Aluminium silicate	
Antioxidants		
300	Ascorbic acid, L-	500 mg/kg expressed as ascorbic acid
301	Sodium ascorbate	
304	Ascorbyl palmitate	
320	Butylated hydroxyanisole	100 mg/kg

5. CONTAMINANTS

The products covered by this Standard shall comply with the Maximum Levels for contaminants that are specified for the product in the *General Standard for Contaminants and Toxins in Food and Feed* (CODEX STAN 193-1995).

The milk used in the manufacture of the products covered by this Standard shall comply with the Maximum Levels for contaminants and toxins specified for milk by the *General Standard for Contaminants and Toxins in Food and Feed* (CODEX STAN 193-1995) and with the maximum residue limits for veterinary drug residues and pesticides established for milk by the CAC.

6. HYGIENE

It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CAC/RCP 1-1969), the *Code of Hygienic Practice for Milk and Milk Products* (CAC/RCP 57-2004) and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice. The products should comply with any microbiological criteria established in accordance with the *Principles for the Establishment and Application of Microbiological Criteria for Foods* (CAC/GL 21-1997).

7. LABELLING

In addition to the provisions of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) and the *General Standard for the Use of Dairy Terms* (CODEX STAN 206-1999), the following specific provisions apply:

7.1 Name of the food

The name of the food shall be:

<ul style="list-style-type: none"> Cream powder Whole milk powder Partly skimmed milk powder Skimmed milk powder 	}	<p>according to the composition in Section 3.2</p>
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Partly skimmed milk powder may be designated "Semi-skimmed milk powder" provided that the content of milkfat does not exceed 16% m/m and is not less than 14% m/m.

If allowed by national legislation or otherwise identified to the consumer in the country where the product is sold, "whole milk powder" may be designated "full cream milk powder" and "skimmed milk powder" may be designated "low fat milk powder".

7.2 Declaration of milkfat content

If the consumer would be misled by the omission, the milkfat content shall be declared in a manner found acceptable in the country of sale to the final consumer, either (i) as a percentage by mass, or (ii) in grams per serving as quantified in the label provided that the number of servings is stated.

7.3 Declaration of milk protein

If the consumer would be misled by the omission, the milk protein content shall be declared in a manner acceptable in the country of sale to the final consumer, either as (i) a percentage by mass, or (ii) grams per serving as quantified in the label provided the number of servings is stated.

7.4 List of ingredients

Notwithstanding the provision of Section 4.2.1 of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), milk products used only for protein adjustment need not be declared.

7.5 Labelling of non-retail containers

Information required in Section 7 of this Standard and Sections 4.1 to 4.8 of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), and, if necessary, storage instructions, shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer or packer shall appear on the container. However, lot identification, and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF SAMPLING AND ANALYSIS

See CODEX STAN 234-1999.

APPENDIX – ADDITIONAL INFORMATION

The additional information below does not affect the provisions in the preceding sections which are those that are essential to the product identity, the use of the name of the food and the safety of the food.

Additional quality factors

	Whole milk powder	Partially skimmed milk powder	Skimmed milk powder	Method
Titrateable acidity	max 18.0	max 18.0	max 18.0	See CODEX STAN 234-1999
(ml-0.1 N NaOH/ 10 g-solids-not-fat)				See CODEX STAN 234-1999
Scorched particles	max Disc B	max Disc B	max Disc B	See CODEX STAN 234-1999
Solubility index (ml)	max 1.0	max 1.0	max 1.0	See CODEX STAN 234-1999

CODEX STANDARD FOR FERMENTED MILKS

CODEX STAN 243-2003

1. SCOPE

This standard applies to fermented milks, that is Fermented Milk including, Heat Treated Fermented Milks, Concentrated Fermented Milks and composite milk products based on these products, for direct consumption or further processing in conformity with the definitions in Section 2 of this Standard.

2. DESCRIPTION

2.1 **Fermented Milk** is a milk product obtained by fermentation of milk, which milk may have been manufactured from products obtained from milk with or without compositional modification as limited by the provision in Section 3.3, by the action of suitable microorganisms and resulting in reduction of pH with or without coagulation (iso-electric precipitation). These starter microorganisms shall be viable, active and abundant in the product to the date of minimum durability. If the product is heat-treated after fermentation the requirement for viable microorganisms does not apply.

Certain Fermented Milks are characterized by specific starter culture(s) used for fermentation as follows:

Yoghurt:	Symbiotic cultures of <i>Streptococcus thermophilus</i> and <i>Lactobacillus delbrueckii</i> subsp. <i>bulgaricus</i> .
Alternate Culture Yoghurt:	Cultures of <i>Streptococcus thermophilus</i> and any <i>Lactobacillus</i> species.
Acidophilus Milk:	<i>Lactobacillus acidophilus</i> .
Kefir:	Starter culture prepared from kefir grains, <i>Lactobacillus kefir</i> , species of the genera <i>Leuconostoc</i> , <i>Lactococcus</i> and <i>Acetobacter</i> growing in a strong specific relationship. Kefir grains constitute both lactose fermenting yeasts (<i>Kluyveromyces marxianus</i>) and non-lactose-fermenting yeasts (<i>Saccharomyces unisporus</i> , <i>Saccharomyces cerevisiae</i> and <i>Saccharomyces exiguus</i>).
Kumys:	<i>Lactobacillus delbrueckii</i> subsp. <i>bulgaricus</i> and <i>Kluyveromyces marxianus</i> .

Other microorganisms than those constituting the specific starter culture(s) specified above may be added.

2.2 **Concentrated Fermented Milk** is a Fermented Milk the protein of which has been increased prior to or after fermentation to minimum 5.6%. Concentrated Fermented Milks includes traditional products such as Stragisto (strained yoghurt), Labneh, Ymer and Ylette.

2.3 **Flavoured Fermented Milks** are composite milk products, as defined in Section 2.3 of the *General Standard for the Use of Dairy Terms* (CODEX STAN 206-1999) which contain a maximum of 50% (m/m) of non-dairy ingredients (such as nutritive and non nutritive

sweeteners, fruits and vegetables as well as juices, purees, pulps, preparations and preserves derived therefrom, cereals, honey, chocolate, nuts, coffee, spices and other harmless natural flavouring foods) and/or flavours. The non-dairy ingredients can be mixed in prior to/ or after fermentation.

2.4 **Drinks based on Fermented Milk** are composite milk products, as defined in Section 2.3 of the *General Standard for the Use of Dairy Terms* (CODEX STAN 206-1999), obtained by mixing Fermented Milk as described in Section 2.1 with potable water with or without the addition of other ingredients such as whey, other non-dairy ingredients, and flavourings. Drinks Based on Fermented Milk contain a minimum of 40% (m/m) fermented milk.

Other microorganisms than those constituting the specific starter cultures may be added.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw materials

- Milk and/or products obtained from milk.
- Potable water for the use in reconstitution or recombination.

3.2 Permitted ingredients

- Starter cultures of harmless microorganisms including those specified in Section 2;
- Other suitable and harmless microorganisms (*in products covered by Section 2.4*);
- Sodium chloride;
- Non-dairy ingredients as listed in Section 2.3 (Flavoured Fermented Milks);
- Potable water (*in products covered by Section 2.4*);
- Milk and milk products (*in products covered by Section 2.4*);
- Gelatine and starch in:
 - fermented milks heat-treated after fermentation;
 - flavoured fermented milk;
 - drinks based on fermented milk; and
 - plain fermented milks if permitted by national legislation in the country of sale to the final consumer;

provided they are added only in amounts functionally necessary as governed by Good Manufacturing Practice, taking into account any use of the stabilizers/thickeners listed in section 4. These substances may be added either before or after adding the non-dairy ingredients.

3.3 Composition

	Fermented Milk	Yoghurt, Alternate Culture Yoghurt and Acidophilus milk	Kefir	Kumys
Milk protein ^(a) (% m/m)	min. 2.7%	min. 2.7%	min. 2.7%	
Milk fat (% m/m)	less than 10%	less than 15%	less than 10%	less than 10%
Titration acidity, expressed as % lactic acid (% m/m)	min. 0.3%	min. 0.6%	min. 0.6%	min. 0.7%
Ethanol (% vol./w)				min. 0.5%

	Fermented Milk	Yoghurt, Alternate Culture Yoghurt and Acidophilus milk	Kefir	Kumys
Sum of microorganisms constituting the starter culture defined in section 2.1 (cfu/g, in total)	min. 10 ⁷	min. 10 ⁷	min. 10 ⁷	min. 10 ⁷
Labelled microorganisms ^(b) (cfu/g, total)	min. 10 ⁶	min. 10 ⁶		
Yeasts (cfu/g)			min. 10 ⁴	min. 10 ⁴

(a) Protein content is 6.38 multiplied by the total Kjeldahl nitrogen determined.

(b) Applies where a content claim is made in the labelling that refers to the presence of a specific microorganism (other than those specified in section 2.1 for the product concerned) that has been added as a supplement to the specific starter culture.

In Flavoured Fermented Milks and Drinks based on Fermented Milk the above criteria apply to the fermented milk part. The microbiological criteria (based on the proportion of fermented milk product) are valid up to the date of minimum durability. This requirement does not apply to products heat-treated after fermentation.

Compliance with the microbiological criteria specified above is to be verified through analytical testing of the product through to “the date of minimum durability” after the product has been stored under the storage conditions specified in the labeling.

3.4 Essential manufacturing characteristics

Whey removal after fermentation is not permitted in the manufacture of fermented milks, except for Concentrated Fermented Milk (Section 2.2).

4. FOOD ADDITIVES

Only those additives classes indicated in the table below may be used for the product categories specified. Within each additive class, and where permitted according to the table, only those individual additives listed may be used and only within the limits specified.

In accordance with Section 4.1 of the Preamble to the *General Standard for Food Additives* (CODEX STAN 192-1995), additional additives may be present in the flavoured fermented milks and drinks based on fermented milk as a result of carry-over from non-dairy ingredients.

Additive class	Fermented Milks and Drinks based on Fermented Milk		Fermented Milks Heat Treated After Fermentation and Drinks based on Fermented Milk Heat Treated After Fermentation	
	Plain	Flavoured	Plain	Flavoured
Acidity regulators	–	X	X	X
Carbonating agents	X ^(b)	X ^(b)	X ^(b)	X ^(b)
Colours	–	X	–	X

Additive class	Fermented Milks and Drinks based on Fermented Milk		Fermented Milks Heat Treated After Fermentation and Drinks based on Fermented Milk Heat Treated After Fermentation	
	Plain	Flavoured	Plain	Flavoured
Emulsifiers	–	X	–	X
Flavour enhancers	–	X	–	X
Packaging gases	–	X	X	X
Preservatives	–	–	–	X
Stabilizers	X ^(a)	X	X	X
Sweeteners	–	X	–	X
Thickeners	X ^(a)	X	X	X

- (a) Use is restricted to reconstitution and recombination and if permitted by national legislation in the country of sale to the final consumer.
- (b) Use of carbonating agents is technologically justified in Drinks based on Fermented Milk only.
- X The use of additives belonging to the class is technologically justified. In the case of flavoured products the additives are technologically justified in the dairy portion.
- The use of additives belonging to the class is not technologically justified

Acidity regulators, colours, emulsifiers, packaging gases and preservatives listed in Table 3 of the *General Standard for Food Additives* (CODEX STAN 192-1995) are acceptable for use in fermented milk products categories as specified in the table above.

INS No.	Name of additive	Maximum level
Acidity regulators		
334	Tartaric acid L(+)-	} 2 000 mg/kg as tartaric acid
335(i)	Monosodium tartrate	
335(ii)	Sodium L(+)-tartrate	
336(i)	Monopotassium tartrate	
336(ii)	Dipotassium tartrate	
337	Potassium sodium L(+)-tartrate	} 1 500 mg/kg as adipic acid
355	Adipic acid	
356	Sodium adipate	
357	Potassium adipate	
359	Ammonium adipate	

Carbonating agents

290 Carbon dioxide GMP

Colours

100(i)	Curcumin	100 mg/kg
101(i)	Riboflavin, synthetic	} 300 mg/kg
101(ii)	Riboflavin 5'-phosphate, sodium	
102	Tartrazine	300 mg/kg
104	Quinoline yellow	150 mg/kg
110	Sunset yellow FCF	300 mg/kg
120	Carmines	150 mg/kg

INS No.	Name of additive	Maximum level
122	Azorubine (Carmoisine)	150 mg/kg
124	Ponceau 4R (Cochineal red A)	150 mg/kg
129	Allura red AC	300 mg/kg
132	Indigotine	100 mg/kg
133	Brilliant blue FCF	150 mg/kg
141(i)	Chlorophylls, copper complexes	500 mg/kg
141(ii)	Chlorophyllins, copper complexes, sodium and potassium salts	
143	Fast green FCF	100 mg/kg
150b	Caramel II – sulfite caramel	150 mg/kg
150c	Caramel III – ammonia caramel	2 000 mg/kg
150d	Caramel IV – sulfite ammonia caramel	2 000 mg/kg
151	Brilliant black (Black PN)	150 mg/kg
155	Brown HT	150 mg/kg
160a(i)	Carotene, <i>beta</i> -, synthetic	100 mg/kg
160e	Carotenal, <i>beta</i> -apo-8'-	
160f	Carotenoic acid, methyl or ethyl ester, <i>beta</i> -apo-8'-	
160a(iii)	Carotenes, <i>beta</i> -, <i>Blakeslea trispora</i>	
160a(ii)	Carotenes, <i>beta</i> -, vegetable	600 mg/kg
160b(i)	Annatto extracts, bixin-based	20 mg/kg as bixin
160b(ii)	Annatto extracts, norbixin-based	20 mg/kg as norbixin
160d	Lycopenes	30 mg/kg as pure lycopene
161b(i)	Lutein from <i>Tagetes erecta</i>	150 mg/kg
161h(i)	Zeaxanthin, synthetic	150 mg/kg
163(ii)	Grape skin extract	100 mg/kg
172(i)	Iron oxide, black	100 mg/kg
172(ii)	Iron oxide, red	
172(iii)	Iron oxide, yellow	

Emulsifiers

432	Polyoxyethylene (20) sorbitan monolaurate	3 000 mg/kg
433	Polyoxyethylene (20) sorbitan monooleate	
434	Polyoxyethylene (20) sorbitan monopalmitate	
435	Polyoxyethylene (20) sorbitan monostearate	
436	Polyoxyethylene (20) sorbitan tristearate	
472e	Diacetyltartaric and fatty acid esters of glycerol	10 000 mg/kg
473	Sucrose esters of fatty acids	5 000 mg/kg
474	Sucroglycerides	5 000 mg/kg
475	Polyglycerol esters of fatty acids	2 000 mg/kg
477	Propylene glycol esters of fatty acids	5 000 mg/kg
481(i)	Sodium stearoyl lactylate	10 000 mg/kg
482(i)	Calcium stearoyl lactylate	10 000 mg/kg

INS No.	Name of additive	Maximum level
491	Sorbitan monostearate	5 000 mg/kg
492	Sorbitan tristearate	
493	Sorbitan monolaurate	
494	Sorbitan monooleate	
495	Sorbitan monopalmitate	
900a	Polydimethylsiloxane	50 mg/kg
Flavour enhancers		
580	Magnesium gluconate	GMP
620	Glutamic acid, (L+)-	GMP
621	Monosodium L-glutamate	GMP
622	Monopotassium L-glutamate	GMP
623	Calcium di-L-glutamate	GMP
624	Monoammonium L-glutamate	GMP
625	Magnesium di-L-glutamate	GMP
626	Guanylic acid, 5'-	GMP
627	Disodium 5'-guanylate-	GMP
628	Dipotassium 5'-guanylate-	GMP
629	Calcium 5'-guanylate	GMP
630	Inosinic acid, 5'-	GMP
631	Disodium 5'-inosinate	GMP
632	Dipotassium 5'-inosinate	GMP
633	Calcium 5'-inosinate	GMP
634	Calcium 5'-ribonucleotides-	GMP
635	Disodium 5'-ribonucleotides-	GMP
636	Maltol	GMP
637	Ethyl maltol	GMP
Preservatives		
200	Sorbic acid	1 000 mg/kg as sorbic acid
201	Sodium sorbate	
202	Potassium sorbate	
203	Calcium sorbate	
210	Benzoic acid	300 mg/kg as benzoic acid
211	Sodium benzoate	
212	Potassium benzoate	
213	Calcium benzoate	
234	Nisin	500 mg/kg
Stabilizers and Thickeners		
170(i)	Calcium carbonate	GMP
331(iii)	Trisodium citrate	GMP

INS No.	Name of additive	Maximum level
338	Phosphoric acid	1 000 mg/kg, singly or in combination, as phosphorus
339(i)	Sodium dihydrogen phosphate	
339(ii)	Disodium hydrogen phosphate	
339(iii)	Trisodium phosphate	
340(i)	Potassium dihydrogen phosphate	
340(ii)	Dipotassium hydrogen phosphate	
340(iii)	Tripotassium phosphate	
341(i)	Monocalcium dihydrogen phosphate	
341(ii)	Calcium hydrogen phosphate	
341(iii)	Tricalcium orthophosphate	
342(i)	Ammonium dihydrogen phosphate	
342(ii)	Diammonium hydrogen phosphate	
343(i)	Monomagnesium phosphate	
343(ii)	Magnesium hydrogen phosphate	
343(iii)	Trimagnesium phosphate	
450(i)	Disodium diphosphate	
450(ii)	Trisodium diphosphate	
450(iii)	Tetrasodium diphosphate	
450(v)	Tetrapotassium diphosphate	
450(vi)	Dicalcium diphosphate	
450(vii)	Calcium dihydrogen diphosphate	
451(i)	Pentasodium triphosphate	
451(ii)	Pentapotassium triphosphate	
452(i)	Sodium polyphosphate	
452(ii)	Potassium polyphosphate	
452(iii)	Sodium calcium polyphosphate	
452(iv)	Calcium polyphosphate	
452(v)	Ammonium polyphosphate	
542	Bone phosphate	
400	Alginic acid	GMP
401	Sodium alginate	GMP
402	Potassium alginate	GMP
403	Ammonium alginate	GMP
404	Calcium alginate	GMP
405	Propylene glycol alginate	GMP
406	Agar	GMP
407	Carrageenan	GMP
407a	Processed euchema seaweed (PES)	GMP
410	Carob bean gum	GMP
412	Guar gum	GMP
413	Tragacanth gum	GMP
414	Gum Arabic (Acacia gum)	GMP
415	Xanthan gum	GMP
416	Karaya gum	GMP
417	Tara gum	GMP