

SUBSIDIARY LEGISLATION 231.30**USE OF COLOURS IN FOODSTUFFS
REGULATIONS**

1st July, 1996

Legal Notice 107 of 1995, as amended by Legal Notice 199 of 1997.

1. The title of these Regulations is Use of Colours in Foodstuffs Regulations. Title.

(2) These regulations shall complement the Additives in Food Regulations. S.L.231.29

2. In these Regulations, unless the context otherwise requires - Interpretation.

"colour" means a substance which adds or restores colour in a food, and includes any natural constituents of foodstuffs and natural sources which are normally not consumed as foodstuffs as such and which are not normally used as characteristic ingredients of food:

Provided that the following substances shall not be considered as colours for the purposes of these regulations:

- (a) foodstuffs, whether dried or in concentrated form and flavourings incorporated during the manufacturing of compound foodstuffs, because of their aromatic, sapid or nutritive properties together with a secondary colouring effect, such as paprika, turmeric and saffron;
- (b) colours used for the colouring of the inedible external parts of foodstuffs, such as cheese coatings and sausage casings:

Provided further that preparations obtained from foodstuffs and other natural source materials obtained by physical and/or chemical extraction resulting in a selective extraction of the pigments relative to the nutritive or aromatic constituents are also colours within the meaning of these regulations;

"compound foodstuff" means a foodstuff in itself composed of two or more foodstuffs;

"EEC" as used in these regulations and in the Schedules thereto means the European Economic Community;

"foodstuffs" has the same meaning as is attributed to "food" in section 2 of the Food, Drugs and Drinking Water Act;

Cap. 231.

"foodstuff for particular nutritional uses" is a foodstuff which, owing to its special composition or manufacturing process, is clearly distinguishable from a foodstuff for normal consumption, which is suitable for its claimed nutritional purposes and which is marketed in such a way as to indicate such suitability. A particular nutritional use shall fulfill the particular nutritional requirements -

- (a) of certain categories of persons whose digestive

processes or metabolism are disturbed; or

(b) of certain categories of persons who are in a special physiological condition and who are therefore able to obtain special benefit from controlled consumption of certain substances in foodstuffs; or

(c) of infants or young children in good health;

"meat product" means a product prepared from or with meat which has undergone treatment such that the cut surface shows that the product no longer has the characteristics of fresh meat:

Provided that the following shall not be regarded as a meat product:

(a) meat which has undergone only cold treatment; such meat shall remain subject to the rules in the Directive referred to hereunder:

- Article 2 (a) of Directive 64/433/EEC
- Article 2 of Directive 71/118/EEC
- Article 2 of Directive 72/461/EEC
- Article 2 of Directive 72/462/EEC
- Article 2 of Directive 88/657/EEC
- Article 2(1) and (2) of Directive 91/495/EEC;

(b) a product subject to Council Directive 88/657/ EEC of 14 December, 1988 laying down the requirements for the production of, and trade in, minced meat, meat in pieces of less than 100 grams and meat preparations and amending Directives 64/433/EEC, 71/118/EEC and 72/462/ EEC;

"unprocessed" means not having undergone any treatment resulting in a substantial change in the original state of the foodstuffs. However, they may have been for example divided, parted, severed, boned, minced, skinned, pared, peeled, ground, cut, cleaned, trimmed, deep-frozen, frozen, chilled, milled or husked, packed or unpacked.

Applicability of these regulations.

3. (1) Only a substance listed in the First Schedule may be used as a colour in foodstuffs.

(2) A colour may be used only in the foodstuffs listed in the Third, Fourth and Fifth Schedules and under the conditions specified therein; a colour may be used in those same foodstuffs when they are intended for particular nutritional uses in accordance with Directive 89/398/EEC of the EEC.

(3) A colour may not be used in the foodstuffs listed in the Second Schedule except where specifically provided for in the Third or Fourth or Fifth Schedule.

(4) Colours permitted for certain uses only are listed in the Fourth Schedule.

(5) Colours permitted in general in foodstuffs and the conditions of use therefor are listed in the Fifth Schedule.

(6) The maximum levels indicated in the Schedules -

- (a) relate to the foodstuffs prepared according to the instructions for use, and which are ready to eat after such preparation;
- (b) refer to the quantities of colouring principle contained in the colouring preparation.

(7) In the Schedules to these regulations *quantum satis* means that no maximum level is specified. However, colours shall be used according to good manufacturing practice at a level not higher than is necessary to achieve the intended purpose and provided that the consumer is not misled.

(8) For the purpose of health marking and other markings required on meat products, only E155 Brown HT, E133 Brilliant Blue FCF or E129 Allura Red AC or an appropriate mixture of E133 Brilliant Blue FCF and E129 Allura Red AC may be used.

(9) Only a colour mentioned in the First Schedule may be used for the stamping or for the decorative colouring of eggshells.

(10) Only a colour listed in the First Schedule, except E123, E127, E128, E154, E160b, E161g, E173 and E180, may be sold directly to consumers.

(11) Without prejudice to any other regulation, the presence of a colour in a foodstuff is permissible -

- (a) either in a compound foodstuff other than one mentioned in the Second Schedule to the extent that the colour is permitted in one of the ingredients of the compound foodstuff,
- (b) or if the foodstuff is destined to be used solely in the preparation of a compound foodstuff and to such an extent that the compound foodstuff conforms to the provisions of these regulations.

4. (1) No person shall for the purpose of a food business other than that of export to a non-European Union Country, import or sell any colour or any food in which or on which there is any colour or any mark of any colour in either case not being a colour matter permitted which complies with the requirements of these regulations.

Sale of food containing colouring matter.

(2) No person shall keep or allow or permit to be kept on any premises used for the preparation, or for the preparation for sale of food, any colour not being a colour which complies with the requirements of these regulations.

5. A colour shall at all times comply with the criteria of purity listed in the Sixth Schedule.

Criteria of purity.

6. The package or container of a permitted colour shall bear a clear, indelible, easily legible label containing the information as prescribed under the Additives in Food Regulations. The provisions of the Labelling, Presentation and Advertising of Foodstuffs Regulations shall apply to any foodstuff containing a colour.

Labelling.
S.L.231.29
S.L.231.27

FIRST SCHEDULE

List of Permitted Food Colours

Note: Aluminium lakes prepared from colours mentioned in this Schedule are authorised.

EC No.	Common Name	Colour index No. ⁽¹⁾ or description
E 100	Curcumin	75300
E 101	(i) Riboflavin (ii) Riboflavin-5'-phosphate	
E 102	Tartrazine	19140
E 104	Quinoline Yellow	47005
E 110	Sunset Yellow FCF Orange Yellow S	15985
E 120	Cochineal, Carminic acid, Carmines	75470
E 122	Azorubine, Carmoisine	14720
E 123	Amaranth	16185
E 124	Ponceau 4R, Cochineal Red A	16255
E 127	Erythrosine	45430
E 128	Red 2G	18050
E 129	Allura Red AC	16035
E 131	Patent Blue V	42051
E 132	Indigotine, Indigo Carmine	73015
E 133	Brilliant Blue FCF	42090
E 140	Chlorophylls and Chlorophyllins:	75810 75815
	(i) chlorophylls	
	(ii) chlorophyllins	
E 141	Copper complexes of chlorophylls and chlorophyllins	75815
	(i) copper complexes of chlorophylls	
	(ii) copper complexes of chlorophyllins	
E 142	Green S	44090
E 150a	Plain caramel ⁽²⁾	
E 150b	Caustic sulphite caramel	
E 150c	Ammonia caramel	
E 150d	Sulphite ammonia caramel	
E 151	Brilliant Black BN, Black PN	28440
E 153	Vegetable Carbon	
E 154	Brown FK	
E 155	Brown HT	20285
E 160a	Carotenes:	
	(i) Mixed carotenes	75130

EC No.	Common Name	Colour index No. ⁽¹⁾ or description
	(ii) Beta-carotene	40800
E 160b	Annatto, bixin, norbixin	75120
E 160c	Paprika extract, capsanthin, capsorubin	
E 160d	Lycopene	
E 160e	Beta-apo-8'-carotenal (C30)	40820
E 160f	Ethylester of Beta-apo-8'-carotenie acid (C30)	40825
E 161b	Lutein	
E 161g	Canthaxanthin	
E 162	Beetroot Red, betanin	
E 163	Anthocyanins	prepared by physical means from fruits and vegetables
E 170	Calcium carbonate	77220
E 171	Titanium dioxide	77891
E 172	Iron oxides and hydroxides	77491 77492 77499
E 173	Aluminium	
E 174	Silver	
E 175	Gold	
E 180	Litholrubine BK.	

(1) Colour index numbers are taken from the third edition 1982 of the Colour Index, volumes 1 to 7, 1315. Also amendments 37 to 40 (125), 41 to 44 (127-50), 45 to 48 (130), 49 to 52 (132-50), 53 to 56 (135).

(2) The term "caramel" relates to products of a more or less intense brown colour which are intended for colouring. It does not correspond to the sugary aromatic product obtained from heating sugars and which is used for flavouring food (e.g. confectionery, pastry, alcoholic drinks).

SECOND SCHEDULE

Foodstuffs which may not contain added colours, except where specifically provided for in the Third, Fourth or Fifth Schedule

(The designations used in the Second Schedule do not prejudice the 'carry over' principle in cases where products contain ingredients with legitimate colouring in their own right)

1. Unprocessed foodstuffs
2. All bottled or packed waters
3. Milk, semi-skimmed and skimmed milk, pasteurised or sterilised (including

-
- UHT sterilization) (unflavoured)
4. Chocolate milk
 5. Fermented milk (unflavoured)
 6. Preserved milk as mentioned in Directive 76/118/EEC
 7. Butter-milk (unflavoured)
 8. Cream and cream powder (unflavoured)
 9. Oils and fats of animal or vegetable origin
 10. Eggs and egg products as defined in Article 2(1) of Directive 89/437/EEC
 11. Flour and other milled products and starches
 12. Bread and similar products
 13. Pasta and gnocchi
 14. Sugar, including all mono- and disaccharides
 15. Tomato paste and canned and bottled tomatoes
 16. Tomato-based sauces
 17. Fruit juice and fruit nectar as mentioned in Directive 75/726/EEC and vegetable juice
 18. Fruit, vegetables (including potatoes) and mushrooms - canned, bottled or dried; processed fruit, vegetables (including potatoes) and mushrooms
 19. Extra Jam, extra Jelly, and chestnut purée as mentioned in Directive 79/693/EEC; creme de pruneaux
 20. Fish, molluscs and crustaceans, meat, poultry and game as well as their preparations, but not including prepared meals containing these ingredients
 21. Cocoa products and chocolate components in chocolate products as mentioned in Directive 73/241/EEC
 22. Roasted coffee, tea, chicory; tea and chicory extracts; tea, plant, fruit and cereal preparations for infusions, as well as mixes and instant mixes of these products
 23. Salt, salt substitutes, spices and mixtures of spices
 24. Wine and other products defined by Regulation (EEC) No. 822/87
 25. *Korn*, *Kornbrand*, fruit spirit drinks, fruit spirits, *Ouzo*, *Grappa*, *Tsikoudia* from Crete, *Tsipouro* from Macedonia, *Tsipouro* from Thessaly, *Tsipouro* from Tyrnavos, *Eau de vie de mare Marque rationale luxembourgeoise*, *Eau de vie de seigle Marque rationale luxembourgeoise*, London gin, as defined in Regulation (EEC) No. 1576/89
 26. *Sambuca*, *Maraschino* and *Mistra* as defined in Regulation (EEC) No. 1180/91
 27. *Sangria*, *Clarea* and *Zurra* as mentioned in Regulation (EEC) No. 1601/91
 28. Wine vinegar
 29. Foods for infants and young children as mentioned in Directive 89/398/EEC including foods for infants and young children not in good health
 30. Honey

31. Malt and malt products
32. Ripened and unripened cheese (unflavoured)
33. Butter from sheep and goats' milk.

THIRD SCHEDULE

Foodstuffs to which only certain permitted colours may be added

Foodstuffs	Permitted colour	Maximum Level
Malt Bread	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
Beer Cidre bouche	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
Butter (including reduced fat butter and concentrated butter)	E 160a Carotenes	<i>quantum satis</i>
Margarine, minarine, other fat emulsions, and fats essentially free from water	E 160a Carotenes E 100 Curcumin E 160b Annatto, Bixin, Norbixin	<i>quantum satis</i> <i>quantum satis</i> 10mg/kg
Sage Derby cheese	E 140 Chlorophylls Chlorophyllins E 141 Copper Complexes of chlorophylls and chlorophyllins	<i>quantum satis</i>
Ripened Orange, Yellow and broken-white cheese; Unflavoured processed cheese	E 160a Carotenes E 160c Paprika extract	<i>quantum satis</i>
Red Leicester cheese	E 160b Annatto, Bixin, Norbixin	15mg/kg
Mimolette cheese	E 160b Annatto, Bixin, Norbixin	50mg/kg
Morbier cheese	E 160b Annatto, Bixin, Norbixin	35mg/kg
Red Marbled Cheese	E 153 Vegetable Carbon	<i>quantum satis</i>
	E 120 Cochineal, Carminic Acid, Carmines	125mg/kg
	E 163 Anthocyanins	<i>quantum satis</i>
Vinegar	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>

Foodstuffs	Permitted colour	Maximum Level
Whisky, Whiskey, grain spirit (other than <i>Korn</i> or <i>Kornbrand</i> or <i>Eau de vie de seigle Marque rationale luxembourgeoise</i>), wine spirit, rum, Brandy, Weinbrand, grape mare, grape mare spirit, (other than <i>Tsikoudia</i> and <i>Tsipouro</i> and <i>Eau de vie de mare Marque rationale luxembourgeoise</i>), <i>Grappa invecchiata</i> , <i>Bagaceira velha</i> as mentioned in Regulation (EEC) No. 1576/89	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
Aromatised wine-based drinks (except Bitter Soda) and aromatised wines as mentioned in Regulation (EEC) No. 1601/91	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
Americano	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel E 163 Anthocyanins	<i>quantum satis</i>
	E 100 Curcumin E 101 (i) Riboflavin (ii) Riboflavin-5'-phosphate E 102 Tartrazine E 104 Quinoline Yellow E 120 Cochineal, Carminic acid, Carmines E 122 Azorubine Carmoisine E 123 Amaranth E 124 Ponceau 4R	100 mg/l (individually or in combination)
Bitter Soda, bitter vino as mentioned in Regulation (EEC) No. 1601/91	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
	E 100 Curcumin E 101 (i) Riboflavin (ii) Riboflavin-5'-phosphate E 102 Tartrazine E 104 Quinoline Yellow E 110 Sunset Yellow FCF Orange Yellow S E 120 Cochineal, Carminic acid, Carmines E 122 Azorubine Carmoisine E 123 Amaranth E 124 Ponceau 4R, Cochineal Red A E 129 Allura Red AC	100 mg/l (individually or in combination)

Foodstuffs	Permitted colour	Maximum Level
Liquor wines and quality liqueur wines produced in specified regions	E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	<i>quantum satis</i>
Vegetables in vinegar, brine or oil (excluding olives)	E 101 (i) Riboflavin (ii) Riboflavin-5'-phosphate E 140 Chlorophylls, Chlorophyllins E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel E 141 Copper complexes of chlorophylls and chlorophyllins E 160a Carotenes: (i) Mixed Carotenes (ii) Beta-Carotene E 162 Beetroot Red, Betanin E 163 Anthocyanins	<i>quantum satis</i>
Extruded, puffed and/or fruit-flavoured breakfast cereals	E 150c Ammonia Caramel E 160a Carotenes E 160b Annatto, Bixin, Norbixin E 160c Paprika extract, Capsanthin, Capsorubin	<i>quantum satis</i> <i>quantum satis</i> 25mg/kg <i>quantum satis</i>
Fruit-flavoured breakfast cereals	E 120 Cochineal, Carminic acid, Carmines E 162 Beetroot Red, Betanin E 163 Anthocyanins	200 mg/kg (individually or in combination)
Jam, jellies and marmalade as mentioned in Directive 79/693/EEC and other similar fruit preparations including low calorie products	E 100 Curcumin E 140 Chlorophylls and Chlorophyllins E 141 Copper complexes of chlorophyll and chlorophyllins E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel E 160a Carotenes (i) Mixed Carotenes (ii) Beta-Carotene E 160c Paprika extract, Capsanthin Capsorubin E 162 Beetroot Red, Betanin E 163 Anthocyanins	<i>quantum satis</i>
	E 104 Quinoline Yellow E 110 Sunset Yellow E 120 Cochineal, Carminic acid, Carmines E 124 Ponceau 4R, Cochineal E 142 Green S E 160d Lycopene E 161b Lutein	100 mg/kg (individually or in combination)
Sausages, pates and terrines	E 100 Curcumin E 120 Cochineal, Carminic acid, Carmines E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel E 160a Carotenes E 160c Paprika extract, Capsanthin, Capsorubin E 162 Beetroot Red, Betanin	20 mg/kg 100mg/kg <i>quantum satis</i> <i>quantum satis</i> <i>quantum satis</i> <i>quantum satis</i> 20mg/kg 10mg/kg <i>quantum satis</i>
Luncheon Meat	E 129 Allura Red	25mg/kg

Foodstuffs	Permitted colour	Maximum Level
Breakfast Sausages with a minimum cereal content of 6%	E 129 Allura Red AC	25mg/kg
Burger meat with a minimum vegetable and/or cereal content of 4%	E 120 Cochineal, Carminic acid Carmines E 150a Plain Caramel E 150b Caustic Sulphite Caramel E 150c Ammonia Caramel E 150d Sulphite Ammonia Caramel	100mg/kg <i>quantum satis</i> <i>quantum satis</i> <i>quantum satis</i> <i>quantum satis</i>
Chorizo sausages: Salchichon	E 120 Cochineal, Carminic acid, Carmines E 124 Ponceau 4R, Cochineal Red A	200mg/kg 250mg/kg
Sobrasada	E 110 Sunset Yellow FCF E 124 Ponceau 4R, Cochineal Red A	135mg/kg 200mg/kg
Pasturmas (edible external coating)	E 100 Curcumin E 101 (i) Riboflavin (ii) Riboflavin-5'-phosphate E 120 Cochineal, Carminic acid, Carmines	<i>quantum satis</i>
Dried potato granules and flakes	E 100 Curcumin	<i>quantum satis</i>
Processed mushy and garden peas (canned)	E 102 Tartrazine E 133 Brilliant Blue E 142 Green S	100mg/kg 20mg/kg 10mg/kg

FOURTH SCHEDULE

Colours permitted for certain uses only

Colour	Foodstuff	Maximum Level
E 123 Amaranth	Aperitif wines, spirit drinks including products with less than 15% alcohol by volume Fish roe	30 mg/l 30 mg/kg
E 127 Erythrosine	Cocktail cherries and candied cherries Bigarreaux cherries in syrup and in cocktails	200mg/kg 150mg/kg
E 128 Red 2G	Breakfast sausages with a minimum cereal content of 6% Burger meat with a minimum vegetable and/or cereal content of 4%	20mg/kg
E 154 Brown FK	Kippers	20mg/kg
E 161g Canthaxanthin	Saucisses de Strasbourg	15mg/kg
E 173 Aluminium	External coating of sugar confectionery for the decoration of cakes and pastries	<i>quantum satis</i>
E 174 Silver	External coating of confectionery Decoration of chocolates Liqueurs	<i>quantum satis</i>
E 175 Gold	External coating of confectionery Decoration of chocolates Liqueurs	<i>quantum satis</i>
E 180 Litholrubine BK	Edible cheese rind	<i>quantum satis</i>

Colour	Foodstuff	Maximum Level
E 160b Annatto, Bixin, Norbixin	Margarine, minarine, other fat emulsions, and fats essentially free from water	10 mg/kg
	Decorations and coatings	20 mg/kg
	Fine bakery wares	10 mg/kg
	Edible ices	20 mg/kg
	Liqueurs, including fortified beverages with less than 15% alcohol by volume	10 mg/l
	Flavoured processed cheese	15 mg/kg
	Ripened Orange, Yellow and brokenwhite cheese	15 mg/kg
	Unflavoured processed cheese	15 mg/kg
	Desserts	10 mg/kg
	"Snacks": dry, savoury potato, cereal or starch-based snack products:	
	- extruded or expanded savoury snack products	20 mg/kg
	- other savoury snack products and savoury coated nuts	10 mg/kg
	Smoked fish	10 mg/kg
	Edible cheese rind and edible casings	20 mg/kg
	Red Leicester cheese	50 mg/kg
	Mimolette cheese	35 mg/kg
Extruded, puffed and/or fruit-flavoured breakfast cereals	25 mg/kg	

FIFTH SCHEDULE

Colours permitted in foodstuffs other than those mentioned in the Second and Third Schedules

Part 1

The following colours may be used in foodstuffs mentioned in the Fifth Schedule Part 2 and in all other foodstuffs other than those listed in the Second and Third Schedules at *quantum satis*.

- E 101 (i) Riboflavin
(ii) Riboflavin-5'-phosphate
- E 140 Chlorophylls and chlorophyllins
- E 141 Copper complexes of chlorophylls and chlorophyllins
- E 150a Plain caramel
- E 150b Caustic sulphite caramel
- E150c Ammonia caramel
- E 150d Sulphite ammonia caramel
- E 153 Vegetable carbon
- E 160a Carotenes
- E 160c Paprika extract, capsanthin, capsorubin
- E162 Beetroot red, betanin
- E163 Anthocyanins
- E170 Calcium carbonate

E 171	Titanium dioxide
E172	Iron oxides and hydroxides

Part 2

The following colours may be used singly or in combination in the following foods up to the maximum level specified in the table. However, for non alcoholic flavoured drinks, edible ices, desserts, fine bakery wares and confectionery, colours may be used up to the limit indicated in the appropriate table but the quantities of each of the colours E 110, E 122, E 124 and E 155 may not exceed 50mg/kg or mg/l.

E100	Curcumin
E102	Tartrazine
E104	Quinoline Yellow
E110	Sunset Yellow FCF/Orange Yellow S
E120	Cochineal, Carminic acid, Carmines
E122	Azorubine, Carmoisine
E124	Ponceau 4R, Cochineal Red A
E129	Allura Red AC
E 131	Patent Blue V
E132	Indigotine, Indigo Carmine
E 133	Brilliant Blue FCF
E142	Green S
E 151	Brilliant Black BM, Black PN
E 155	Brown HT
E 160d	Lycopene
E 160e	Beta-apo-8'-carotenal (C 30)
E 160f	Ethyl ester of Beta-apo-8'-carotenic acid (C 30)
E 161b	Lutein

Foodstuffs	Marimum Level
Non-alcoholic flavoured drinks	100mg/l
Candied fruits and vegetables, Mostarda di Frutta	200mg/kg
Preserves of red fruits	200mg/kg
Confectionery	300mg/kg
Decorations and coatings	500mg/kg
Fine bakery wares (e.g. viennoiserie, biscuits, cakes and wafers)	200mg/kg
Edible ices	150mg/kg
Flavoured processed cheese	100mg/kg
Desserts including flavoured milk products	150mg/kg

Foodstuffs	Maximum Level
Sausages, seasonings (for example, curry powder, Tandoori), pickles, relishes, Chutney and Piccalilli	500mg/kg
Mustard	300mg/kg
Fish paste and crustacean paste	100mg/kg
Pre-cooked crustaceans	250mg/kg
Salmon substitutes	500mg/kg
Surimi	500mg/kg
Fish roe	300mg/kg
Smoked Fish	100mg/kg
"Snacks": dry, savoury potato, cereal or starch-based snack products	
- extruded or expanded savoury snack products	200mg/kg
- other savoury snack products and savoury coated nuts	100mg/kg
Edible cheese rind and edible casings	<i>quantum satis</i>
Complete formulae for weight control intended to replace total daily food intake or an individual meal	50mg/kg
Complete formulae and nutritional supplements for use under medical supervision	50mg/kg
Liquid food supplements/dietary integrators	100mg/l
Solid food supplements/dietary integrators	300mg/kg
Soups	50mg/kg
Meat and fish analogues based on vegetables proteins	100mg/kg
Spirituos beverages (including products less than 15% alcohol by volume), except those mentioned in the Second or Third Schedule	200mg/l
Aromatised wines, aromatised wine-based drinks and aromatised wine products cocktails as mentioned in Regulation (EEC) No. 1601/91 except those mentioned in the Second or Third Schedule	200mg/l
Fruit wines (still or sparkling)	
Cider (except cidre bouche) and perry	
Aromatised fruit wines, cider and perry	200mg/l

Substituted by:
L.N. 199 of 1997.

SIXTH SCHEDULE

Part I - General specifications for aluminium lakes of colours

Definition:	Aluminium lakes are prepared by reacting colours complying with the purity criteria set out in the appropriate specification monograph with alumina under aqueous conditions. The alumina is usually freshly prepared undried material made by reacting aluminium sulfate or chloride with sodium or calcium carbonate or bicarbonate or ammonia. Following lake formation, the product is filtered, washed with water and dried. Unreacted alumina may also be present in the finished product.
HCl insoluble matter	Not more than 0,5%
Ether extractable matter	Not more than 0 2% (under neutral conditions) Specific purity criteria for the corresponding colours are applicable.

Part II - Specific Criteria of Purity

E 100 CURCUMIN

Synonyms	C1 Natural Yellow 3, Turmeric Yellow, Diferoyl Methane
Definition	Curcumin is obtained by solvent extraction of turmeric i.e. the ground rhizomes of natural strains of <i>Curcuma longa</i> L. In order to obtain a concentrated curcumin powder, the extract is purified by crystallization. The product consists essentially of curcumins: i.e. the colouring principle (1,7-bis (4-hydroxy-3-methoxyphenyl) hepta- 1,6-dien-3,5-dione) and its two desmethoxy derivatives in varying proportions. Minor amounts of oils and resins naturally occurring in turmeric may be present. Only the following solvents may be used in the extraction: ethylacetate, acetone, carbon dioxide, dichloromethane, n-butanol, methanol, ethanol, hexane.
Class	Dicinnamoylmethane
Colour Index No	75300
Einecs	207-280-5
Chemical names	I 1,7-Bis(4-hydroxy-3-methoxyphenyl)hepta-1,6-diene-3,5-dione II 1-(4-Hydroxyphenyl)-7-(4-hydroxy-3-methoxy-phenyl)-hepta-1,6diene-3,5-dione III 1,7-Bis(4-hydroxyphenyl)hepta-1,6-diene-3,5-dione
Chemical formula	I $C_{21}H_{20}O_6$ II $C_{20}H_{18}O_5$ III $C_{19}H_{16}O_4$
Molecular weight	I. 368,39 II. 338,39 III. 308,39
Assay	Content not less than 90% total colouring matters $E_{1\%}^{1\text{cm}}$ 1 607 at ca 426 nm in ethanol
Description	Orange-yellow crystalline powder
Identification	
A. Spectrometry	Maximum in ethanol at ca 426 nm
B. Melting Range	179 - 182°C
Purity	
Solvent residues	Ethylacetate Acetone n-butanol Methanol Ethanol Hexane Dichloromethane: not more than 10 mg/kg

} Not more than 50 mg/kg, singly or in combination

Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy Metals (as Pb)	Not more than 40 mg/kg	
E 101 (i)		
RIBOFLAVIN		
Synonyms	Lactoflavin	
Class	Isoalloxazine	
Einecs	201-507-1	
Chemical names	7,8-Dimethyl-10-(D-ribo-2,3,4,5-tetrahydroxypentyl)benzo(g)pteridine 2,4(3H,10H)-dione 7,8-dimethyl-10-(1'-D-ribityl)isoalloxazine	
Chemical formula	$C_{17}H_{20}N_4O_6$	
Molecular weight	376,37	
Assay	Content not less than 98% on the anhydrous basis $E^{1\%}_{1cm}$ 328 at ca 444 nm in aqueous solution	
Description	Yellow to orange-yellow crystalline powder, with slight odour	
Identification		
A. Spectrometry	The ratio A_{375}/A_{267} is between 0,31 and 0,33 The ratio A_{444}/A_{267} is between 0,36 and 0,39	} in aqueous solution
	Maximum in water at ca 375 nm	
B. Specific rotation	$[\alpha]^{20}_D$ between - 115° and - 140° in a 0,05 N sodium hydroxide solution	
Purity		
Loss on drying	not more than 1,5% after drying at 105°C for 4 hrs	
Sulfated ash	Not more than 0.1%	
Primary aromatic amines	Not more than 100 mg/kg (calculated as aniline)	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 101 (ii) RIBOFLAVIN-5'-PHOSPHATE		
Synonyms	Riboflavin-5 -phosphate sodium	
Definition	These specifications apply to riboflavin 5' -phosphate together with minor amounts of free riboflavin and riboflavin diphosphate	
Class	Isoalloxazine	
Einecs	204-988-6	
Chemical names	Monosodium (2R,3R,4S)-5-(3') 10'-dihydro-7',8' -dimethyl-2',4'-dioxo- 10' -benzo [gamma] pteridinyl)- 2,3,4-trihydroxypentyl phosphate; monosodium salt of 5' -monophosphate ester of riboflavin	

Chemical formula	For the dihydrate form: $C_{17}H_{20}N_4NaO_9P \cdot 2H_2O$ For the anhydrous form: $C_{17}H_{20}N_4NaO_9P$
Molecular weight	541,36
Assay	Content not less than 95% total colouring matters calculated as $C_{17}H_{20}N_4NaO_9P \cdot 2H_2O$ $E_{1\%}^{1\text{cm}}_{250}$ at ca 375 nm in aqueous solution
Description	Yellow to orange crystalline hygroscopic powder, with slight odour and a bitter taste
Identification	
A. Spectrometry	The ratio A_{375}/A_{267} is between 0,30 and 0,34 The ratio A_{444}/A_{267} is between 0,35 and 0,40 Maximum in water at ca 375 nm
B. Specific rotation	$[\infty]^{20}_D$ between + 38° and + 42° in a 5 molar HCl solution
Purity	
Loss on drying	Not more than 8% (100°C, 5 hrs in vacuum over P_2O_5) for the dihydrate form
Sulfated ash	Not more than 25%
Inorganic phosphate	Not more than 1,0% (calculated as PO_4 on the anhydrous basis)
Subsidiary colouring matters	Riboflavin (free): Not more than 6% Riboflavine diphosphate: Not more than 6%
Primary aromatic amines	Not more than 70 mg/kg (calculated as aniline)
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
E 102 TARTRAZINE	
Synonyms	C1 Food Yellow 4
Definition	Tartrazine consists essentially of trisodium 5-hydroxy-1-(4-sulfonatophenyl)-4-(sulfonatophenylazo)-H-pyrazole-3-carboxylate and subsidiary colouring matters together with sodium chloride and/or sodium sulphate as the principal incoloured components Tartrazine is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Monoazo
Colour Index No.	19140
Einecs	217-699-5
Chemical names	Trisodium-5-hydroxy-1-(4-sulfonatophenyl)-4-(4-sulfonatophenylazo)-H-pyrazole-3-carboxylate
Chemical formula	$C_{16}H_9N_4Na_3O_9S_2$
Molecular weight	534,37
Assay	Content not less than 85% total colouring matters calculated as the sodium salt $E_{1\%}^{1\text{cm}}_{530}$ at ca 426 nm in aqueous solution
Description	Light orange powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 426 nm

B. Yellow solution in water

Purity

Water insoluble matter Not more than 0.2%

Subsidiary Colouring matters Not more than 1,0%

Organic compounds other than colouring matters:

4-hydrazinobenzene sulphonic acid

4-aminobenzene-1-sulphonic acid

5-oxo-1-(4-sulphophenyl)-2-pyrazoline-3-carboxylic acid

4,4'-diazoaminodi(benzene sulphonic acid)

Tetrahydroxysuccinic acid

}

Total not more than 0,5%

Unsulphonated primary aromatic amines Not more than 0,01% (calculated as aniline)

Ether extractable matter Not more than 0,2% under neutral conditions

Arsenic Not more than 3 mg/kg

Lead Not more than 10 mg/kg

Mercury Not more than 1 mg/kg

Cadmium Not more than 1 mg/kg

Heavy metals (as Pb) Not more than 40 mg/kg

E 104 QUINOLINE YELLOW

Synonyms C1 Food Yellow 13

Definition Quinoline Yellow is prepared by sulfonating 2-(2-quinolylyl) indan-1,3-dione. Quinoline Yellow consists essentially of sodium salts of a mixture of disulfonates (principally), monosulfonates and trisulfonates of the above compound and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Quinoline Yellow is described as the sodium salt. The calcium and the potassium salt are also permitted.

Class Quinophthalone

Colour Index No 47005

Einecs 305-897-5

Chemical name The disodium salts of the disulfonates of 2-(2-quinolylyl) indan-1,3-dione (principal component)

Chemical formula $C_{18}H_9N Na_2O_8S_2$ (principal component)

Molecular weight 477,38 (principal component)

Assay Content not less than 70% total colouring matters calculated as the sodium salt

Quinoline Yellow shall have the following composition:

Of the total colouring matters present:

- not less than 80% shall be disodium 2-(2-quinolylyl) indan-1,3-dionedisulfonates

- not more than 15% shall be sodium 2-(2-quinolylyl) indan-1,3-dionemonosulfonates

- not more than 7,0% shall be trisodium 2-(2-quinolylyl) indan-1,3-dionetrisulfonate

 $E_{1\%}^{1\text{cm}}$ 865 (principal component) at ca 411 nm in aqueous acetic acid solution

Description Yellow powder or granules

Identification

A. Spectrometry	Maximum in aqueous acetic solution of pH 5 at ca 411 nm	
B. Yellow solution in water		
Purity		
Water insoluble matter	Not more than 0,2%	
Subsidiary colouring matters	Not more than 4,0%	
Organic compounds other than colouring matters:		
2-methylquinoline	}	Total not more than 0,5%
2-methylquinoline-sulfonic acid		
Phthalic acid		
2,6-dimethyl quinoline		
2,6-dimethyl quinoline sulfonic acid		
2-(2-quinolyl)indan-1,3-dione	Not more than 4 mg/kg	
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)	
Ether extractable matter	Not more than 0,2% under neutral conditions	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 110		
SUNSET YELLOW		
FCF		
Synonyms	C1 Food Yellow 3, Orange Yellow S	
Definition	Sunset Yellow FCF consists essentially of disodium 2-hydroxy-1-(4-sulfonatophenylazo) naphthalene-6-sulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Sunset Yellow FCF is described as the sodium salt. The calcium and the potassium salt are also permitted.	
Class	Monoazo	
Colour Index No	15985	
Einecs	220-491-7	
Chemical names	Disodium 2-hydroxy-1-(4-sulfonatophenylazo) naphthalene-6-sulfonate	
Chemical formula	C ₁₆ H ₁₀ N ₂ Na ₂ O ₇ S ₂	
Molecular weight	452,37	
Assay	Content not less than 85% total colouring matters calculated as the sodium salt E ^{1%} _{1cm} 555 at ca 485 nm in aqueous solution at pH 7	
Description	Orange-red powder or granules	
Identification		
A. Spectrometry	Maximum in water at ca 485 nm at pH 7	
B. Orange solution in water		

Purity

Water insoluble matter Not more than 0,2%

Subsidiary colouring matters

Organic compounds Not more than 5,0% other than colouring matters:

4-aminobenzene-1-sulfonic acid
 3-hydroxynaphthalene-2,7
 disulfonic acid
 6-hydroxynaphthalene-2-sulfonic
 acid
 7-hydroxynaphthalene-1,3
 disulfonic acid
 4,4'-diazaminodi(benzene
 sulfonic acid)
 6,6'-oxydi(naphthalene-2-sulfonic
 acid)

}

Total not more than 0 5%

Unulfonated primary aromatic amines Not more than 0,01 % (calculated as aniline)

Ether extractable matter Not more than 0,2% under neutral conditions

Arsenic Not more than 3 mg/kg

Lead Not more than 10 mg/kg

Mercury Not more than 1 mg/kg

Cadmium Not more than 1 mg/kg

Heavy metals (as Pb) Not more than 40 mg/kg

E 120 COCHINEAL,
CARMINIC ACID,
CARMINES

Definition

Carmines and carminic acid are obtained from aqueous, aqueous alcoholic or alcoholic extracts from Cochineal, which consists of the dried bodies of the female insect *Dacrylopius coccus* Costa.

The colouring principle is carminic acid.

Aluminium lakes of carminic acid (carmines) can be formed in which aluminium and carminic acid are thought to be present in the molar ratio 1:2.

In commercial products the colouring principle is present in association with ammonium, calcium, potassium or sodium cations, singly or in combination, and these cations may also be present in excess.

Commercial products may also contain proteinaceous material derived from the source insect, and may also contain free carminate or a small residue of unbound aluminium cations.

Class Anthraquinone

Colour Index No 75470

Einesc Cochineal: 215,680-6; carminic acid: 215-023-3; carmines: 215-724-4

Chemical names 7 β -D-glucopyranosyl-3,5,6,8-tetrahydroxy-1-methyl-9,10-dioxoanthracene-2-carboxylic acid (carminic acid); carmine is the hydrated aluminium chelate of this acidChemical formula C₂₂H₂₀O₁₃ (carminic acid)

Molecular weight 492,39 (carminic acid)

Assay Content not less than 2P% carminic acid in the extracts containing carminic acid; not less than 50% carminic acid in the chelates.

Description	Red to dark red, friable, solid or powder. Cochineal extract is generally a dark red liquid but can also be dried as a powder.
Identification	
Spectrometry	Maximum in aqueous ammonia solution at ca 518 nm Maximum in dilute hydrochloric solution at ca 494 nm for carminic acid
Purity	
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

**E 122 AZORUBINE,
CARMOISINE**

Synonyms	C1 Food Red 3	
Definition	Azorubine consists essentially of disodium 4-hydroxy-3-(4-sulfonato-1-naphthylazo) naphthalene-1-sulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Azorubine is described as the sodium salt. The calcium and the potassium salt are also permitted.	
Colour Index No	14720	
Einecs	222-657-4	
Chemical name	Disodium 4-hydroxy-3-(4-sulfonato-1-naphthylazo) naphthalene-1-sulfonate	
Chemical formula	$C_{20}H_{12}N_2Na_2O_7S_2$	
Molecular weight	502,44	
Assay	Content not less than 85% total colouring matters, calculated as the sodium salt $E_{1\%}^{1\text{cm}} 510$ at ca 516 nm in aqueous solution	
Description	Red to maroon powder or granules	
Identification		
A. Spectrometry	Maximum in water at ca 516 nm	
B. Red solution in water		
Purity		
Water insoluble matter	Not more than 0,2%	
Subsidiary colouring matters	Not more than 2,0%	
Organic compounds other than colouring matters:		
4-aminonaphthalene-1-sulfonic acid	}	Total not more than 0,5%
4-hydroxynaphthalene-1-sulfonic acid		
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)	
Ether extractable matter	Not more than 0,2 % under neutral conditions	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	

Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 123 AMARANTH

Synonyms	C1 Food Red 9
Definition	Amaranth consists essentially of trisodium 2-hydroxy-1-(4-sulfonato-1naphthylazo) naphthalene-3,6-disulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Amaranth is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Monoazo
Colour Index No	16185
Einecs	213-022-2
Chemical name	Trisodium 2-hydroxy-1-(4-sulfonato-1-naphthylazo) naphthalene-3,6disulfonate
Chemical formula	$C_{20}H_{11}N_2Na_3O_{10}S_3$
Molecular weight	604,48
Assay	Content not less than 85% total colouring masters' calculated as the sodium salt $E^{1\%}_{1cm}$ 440 at ca 520 nm in aqueous solution
Description	Reddish-brown powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 520 nm
B. Red solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 3,0%
Organic compounds other than colouring matters:	
4-aminonaphthalene-1-sulfonic acid	} Total not more than 0.5%
3-hydroxynaphthalene-2,7 disulfonic acid	
6-hydroxynaphthalene-2-sulfonic acid	
7-hydroxynaphthalene - 1,3 disulfonic acid	
7-hydroxynaphthalene-1,3-6 trisulfonic acid	
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)
Ether extractable matter	Not more than 0,2% under neutral conditions
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 124 PONCEAU 4R.
COCHINEAL RED A

Synonyms	C1 Food Red 7, New Coccine
Definition	Ponceau 4R consists essentially of trisodium 2-hydroxy-1-(4-sulfonato-1-naphthylazo) naphthalene-6,8-disulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Ponceau 4R is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Monoazo
Colour Index No	16255
Einecs	220-036-2
Chemical name	Trisodium 2-hydroxy-1-(4-sulfonato-1-naphthylazo) naphthalene-6,8 disulfonate
Chemical formula	$C_{20}H_{11}N_2Na_3O_{10}S_3$
Molecular weight	604,48
Assay	Content not less than 80% total colouring matters, calculated as the sodium salt $E^{1\%}_{1cm}$ 430 at ca 505 nm in aqueous solution
Description	Reddish powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 505 nm
B. Red solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 1.0%
Organic compounds other than colouring matters:	
4-aminonaphthalene-1-sulfonic acid	} Total not more than 0.5%
7-hydroxynaphthalene-1,3-disulfonic acid	
3-hydroxynaphthalene-2,7-disulfonic acid	
6-hydroxynaphthalene-2-sulfonic acid	
7-hydroxynaphthalene-1,3,6-trisulfonic acid	
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)
Ether extractable matter	Not more than 0,2% under neutral conditions
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 127 ERYTHROSINE

Synonyms	C1 Food Red 14
Definition	Erythrosine consists essentially of disodium 2-(2,4,5,7-tetraiodo-3-oxido-6oxoxanthen-9-yl) benzoate monohydrate and subsidiary colouring matters together with water, sodium chloride and/or sodium sulfate as the principal uncoloured components. Erythrosine is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Xanthene
Colour Index No	45430
Einecs	240-474-8
Chemical name	Disodium 2-(2,4,5,7-tetraiodo-3-oxido-6-oxoxanthen-9-yl) benzoate monohydrate
Chemical formula	$C_{20}H_6I_4Na_2O_5H_2O$
Molecular weight	897,88
Assay	Content not less than 87% total colouring matters, calculated as the anhydrous sodium salt $E^{1\%}_{1cm}$ 1 100 at ca 526 nm in aqueous solution at pH7
Description	Red powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 526 nm at pH7
B. Red solution in water	
Purity	
Inorganic iodides calculated as sodium iodide	Not more than 0,1%
Water insoluble matter	Not more than 0.2%
Subsidiary colouring matters (except flourescein)	Not more than 4,0%
Flourescein	Not more than 20 mg/kg
Organic compounds other than colouring matters:	
Tri-iodoresorcinol	Not more than 0.2%
2-(2,4-dihydroxy-3,5-diodobenzoyl) benzoic acid	Not more than 0,2%
Ether extractable matter	From a solution of pH from 7 through 8, not more than 0,2%
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
Aluminium Lakes	The hydrochloric acid insoluble matter method is not applicable. It is replaced by a sodium hydroxide insoluble matter, at not more than 0,5%, for this colour only
E 128 RED 2G	
Synonyms	CI Food Red 10, Azogeranine

Definition	Red 2G consists essentially of disodium 8-acetamido-1-hydroxy-2-phenylazonaphthalene-3,6-disulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Red 2G is described as the sodium salt. The calcium and the potassium salt are also permitted.	
Class	Monoazo	
Colour Index No	18050	
Einecs	223-098-9	
Chemical name	Disodium 8-acetamido-1-hydroxy-2-phenylazo-naphthalene-3,6-disulfonate	
Chemical formula	$C_{18}H_{13}N_3Na_2O_8S_2$	
Molecular weight	509,43	
Assay	Content not less than 80% total colouring matters, calculated as the sodium salt $E_{1\%}^{1\text{cm}} 620$ at ca 532 nm in aqueous solution	
Description	Red powder or granules	
Identification		
A. Spectrometry	Maximum in water at ca 532 nm	
B. Red solution in water		
Purity		
Water insoluble matter	Not more than 0,2%	
Subsidiary colouring matters	Not more than 2,0%	
Organic compounds other than colouring matters:		
5-acetamido-4-hydroxynaphthalene-2,7-disulfonic acid	}	Total not more than 0,5%
5-amino-4-hydroxynaphthalene 2,7-disulfonic acid		
Un sulfonated primary aromatic amines	Not more than 0,01 % (calculated as aniline)	
Ether extractable matter	Not more than 0,2% under neutral conditions	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 129 ALLURA RED AC		
Synonyms	CI Food Red 17	
Definition	Allura Red AC consists essentially of disodium 2-hydroxy-1-(2-methoxy-5methyl-4-sulfonato-phenylazo) naphthalene-6-sulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Allura Red AC is described as the sodium salt. The calcium and the potassium salt are also permitted.	
Class	Monoazo	
Colour Index No	16035	

Einecs	247-368-0
Chemical name	Disodium 2-hydroxy-1-(2-methoxy-5-methyl-4-sulfonato-phenylazo) naphthalene-6-sulfonate
Chemical formula	C ₁₈ H ₁₄ N ₂ Na ₂ O ₈ S ₂
Molecular weight	496,42
Assay	Content not less than 85% total colouring matters, calculated as the sodium salt E ^{1%} _{1cm} 540 at ca 504 nm in aqueous solution at pH7
Description	Dark red powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 504 nm
B. Red solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 3,0%
Organic compounds other than colouring matters:	
6-hydroxy-2-naphthalene sulfonic acid, sodium salt	Not more than 0,3%
4-amino-5-methoxy-2-methylbenzene sulfonic acid	Not more than 0,2%
6,6-oxybis (2-naphthalene sulfonic acid) disodium salt	Not more than 1,0%
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)
Ether extractable matter	From a solution of pH 7, not more than 0,2%
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
 E 131 PATENT BLUE V	
Synonyms	CI Food Blue 5
Definition	Patent Blue V consists essentially of the calcium or sodium compound of [4-(a-(4-diethylaminophenyl)-5-hydroxy-2,4-disulfophenyl-methylidene) 2,5-cyclohexadien-1-ylidene] diethylammonium hydroxide inner salt and subsidiary colouring matters together with sodium chloride and/or sodium sulfate and/or calcium sulfate as the principal uncoloured components. The potassium salt is also permitted.
Class	Triarylmethane
Colour Index No	42051
Einecs	222-573-8

Chemical names	The calcium or sodium compound of [4-(a-(4-diethylaminophenyl)-5hydroxy-2,4-disulfophenyl-methylidene)2,5-cyclohexadien-1-ylidene] diethyl-ammonium hydroxide inner salt	
Chemical formula	Calcium compound: $C_{27}H_{31}N_2O_7S_2Ca_{12}$ Sodium compound: $C_{27}H_{31}N_2O_7S_2Na_{12}$	
Molecular weight	Calcium compound: 579,72 Sodium compound: 582,67	
Assay	Content not less than 85% total colouring matters, calculated as the sodium salt $E_{1\%}^{1cm}$ 2 000 at ca 638 nm in aqueous solution at pH 5	
Description	Dark-blue powder or granules	
Identification		
A. Spectrometry	Maximum in water at 638 nm at pH 5	
B. Blue solution in water		
Purity		
Water insoluble matter	Not more than 0,2%	
Subsidiary colouring matters	Not more than 2.0%	
Organic compounds other than colouring matters:		
3-hydroxy benzaldehyde	}	Total not more than 0,5 %
3-hydroxy benzoic acid		
3-hydroxy-4-sulfobenzoic acid		
N,N-diethylamino benzene sulfonic acid		
Leuco base	Not more than 4,0%	
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)	
Ether extractable matter	From a solution of pH 5, not more than 0,2%	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 132 INDIGOTINE, INDIGO CARMINE		
Synonyms	CI Food Blue 1	
Definition	Indigotine consists essentially of a mixture of disodium 3,3'-dioxo-2,2'-biindolylidene-5,5'-disulfonate, and disodium 3,3'-dioxo-2,2'-bi-indolylidene-5,7'-disulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Indigotine is described as the sodium salt. The calcium and the potassium salt are also permitted.	
Class	Indigoid	
Colour Index No	73015	
Einecs	212-728-8	
Chemical names	Disodium 3,3'-dioxo-2,2'-bi-indolylidene-5,5'-disulfonate	
Chemical formula	$C_{16}H_8N_2Na_2O_8S_2$	

Molecular weight	466,36
Assay	Content not less than 85% total colouring matters, calculated as the sodium salt disodium 3,3'-dioxo-2,2'-bi-indolylidene-5,7'-disulfonate: not more than 18% $E^{1\%}_{1\text{cm}}$ 480 at ca 610 nm in aqueous solution
Description	Dark-blue powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 610 nm
B. Blue solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Excluding disodium 3,3'-dioxo-2,2'-bi-indolylidene-5,7'-disulfonate: not more than 1,0%
Organic compounds other than colouring matters:	
Isatin-5-sulfonic acid	} Total not more than 0,5%
5-sulfoanthranilic acid	
Anthranilic acid	
Un sulfonated primary aromatic amines	Not more than 0,01 % (calculated as aniline)
Ether extractable matter	Not more than 0,2% under neutral conditions
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 133 BRILLIANT BLUE FCF

Synonyms	CI Food Blue 2
Definition	Brilliant Blue FCF consists essentially of disodium a-(4-(N-ethyl-3-sulfonatobenzylamino) phenyl)-a-(4-N-ethyl-3-sulfonatobenzyl amino) cyclohexa-2,5-dienylidene) toluene-2-sulfonate and its isomers and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Brilliant Blue FCF is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Triarylmethane
Colour Index No	42090
Einecs	223-339-8
Chemical names	Disodium a-(4-(N-ethyl-3-sulfonatobenzylamino) phenyl)-a-(4-N-ethyl-3-sulfonatobenzylamino) cyclohexa-2,5-dienylidene) toluene-2-sulfonate
Chemical formula	$C_{37}H_{34}N_2Na_2O_9S_3$
Molecular weight	792,84
Assay	Content not less than 85% total colouring matters, calculated as the sodium salt $E^{1\%}_{1\text{cm}}$ 630 at ca 630 nm in aqueous solution
Description	Reddish-blue powder or granules

Identification

A. Spectrometry Maximum in water at ca 630 nm

B. Blue solution in water

Purity

Water insoluble matter Not more than 0,2%

Subsidiary colouring matters Not more than 6,0%

Organic compounds other than colouring matters:

Sum of 2-, 3- and 4-formyl benzene sulfonic acids Not more than 1,5%

3-((ethyl)(4-sulfophenyl)amino) methyl benzene sulfonic acid Not more than 0,3%

Leuco base Not more than 5,0%

Unulfonated primary aromatic amines Not more than 0,01% (calculated as aniline)

Ether extractable matter Not more than 0,2% at pH 7

Arsenic Not more than 3 mg/kg

Lead Not more than 10 mg/kg

Mercury Not more than 1 mg/kg

Cadmium Not more than 1 mg/kg

Heavy metals (as Pb) Not more than 40 mg/kg

E 140

(i) CHLOROPHYLLS

Synonyms C1 Natural Green 3, Magnesium Chlorophyll, Magnesium Phaeophytin

Definition Chlorophylls are obtained by solvent extraction of natural strains of edible plant material, grass, lucerne and nettle. During the subsequent removal of solvent, the naturally present co-ordinated magnesium may be wholly or partly removed from the chlorophylls to give the corresponding phaeophytins. The principal colouring matters are the phaeophytins and magnesium chlorophylls. The extracted product, from which the solvent has been removed, contains other pigments such as carotenoids as well as oils, fats and waxes derived from the source material. Only the following solvents may be used for the extraction: acetone, methyl ethyl ketone, dichloromethane, carbon dioxide, methanol, ethanol, propan-2-ol and hexane.

Class Porphyrin

Colour Index No 75810

Einecs Chlorophylls: 215-800-7, chlorophyll a: 207-536-6, Chlorophyll b: 208-2724

Chemical names The major colouring principles are:
Phytyl (13²R,17S,18S)-3-(8-ethyl-13²-methoxycarbonyl-2,7,12,18-tetramethyl-13¹-oxo-3-vinyl-13¹-13²-17,18-tetrahydrocyclopenta [at]porphyrin-17-yl) propionate, (Pheophytin a), or as the magnesium complex (Chlorophyll a)
Phytyl (13²R,17S,18S)-3-(8-ethyl-7-formyl-13²-methoxycarbonyl-2,12,18-trimethyl-13¹-oxo-3-vinyl-13¹-13²-17,18-tetrahydrocyclopenta [at]porphyrin-17-yl) propionate, (Pheophytin b), or as the magnesium complex (Chlorophyll b).

Chemical formula	Chlorophyll a (magnesium complex): $C_{55}H_{72}MgN_4O_5$ Chlorophyll a: $C_{55}H_{74}N_4O_5$ Chlorophyll b (magnesium complex): $C_{55}H_{70}MgN_4O_6$ Chlorophyll b: $C_{55}H_{72}N_4O_6$	
Molecular weight	Chlorophyll a (magnesium complex): 893,51 Chlorophyll a: 871,22 Chlorophyll b (magnesium complex): 907,49 Chlorophyll b: 885,20	
Assay	Content of total combined Chlorophylls and their magnesium complexes is not less than 10% $E_{1\%}^{1\text{cm}}_{700}$ 700 at ca 409 nm in chloroform	
Description	Waxy solid ranging in colour from olive green to dark green depending on the content of co-ordinated magnesium	
Identification		
Spectrometry	Maximum in chloroform at ca 409 nm	
Purity		
Solvent residues	Acetone Methyl ethyl ketone Methanol Ethanol Propan-2-ol Hexane	} Not more than 50 mg/kg singly or in combination
	Dichloromethane:	Not more than 10 mg/kg
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 140 (ii) CHLOROPHYLLS		
Synonyms	C1 Natural Green 5, Sodium Chlorophyllin, Potassium Chlorophyllin	
Definition	<p>The alkali salts of chlorophyllins are obtained by the saponification of a solvent extract of natural strains of edible plant material, grass, lucerne and nettle. The saponification removes the methyl and phytol ester groups and may partially cleave the cyclopentenyl ring. The acid groups are neutralized to form the salts of potassium and/or sodium.</p> <p>Only the following solvents may be used for the extraction: acetone, methyl ethyl ketone, dichloromethane, carbon dioxide, methanol, ethanol, propan-2-ol and hexane.</p>	
Class	Porphyrin	
Colour Index No	75815	
Einecs	287-483-3	
Chemical names	<p>The major colouring principles in their acid forms are:</p> <p>- 3-(10-carboxylato-4-ethyl- 1,3,5,8-tetramethyl-9-oxo-2-vinylporbin-7-yl) propionate (chlorophyllin a) and - 3-(10-carboxylato-4-ethyl-3-formyl- 1,5,8-trimethyl-9-oxo -2 vinylporbin-7-yl) propionate (chlorophyllin b)</p> <p>Depending on the degree of hydrolysis the cyclopentenyl ring may be cleaved with the resultant production of a third carboxyl function. Magnesium complexes may also be present.</p>	

Chemical formula	Chlorophyllin a (acid form): $C_{34}H_{34}N_4O_5$ Chlorophyllin b (acid form): $C_{34}H_{32}N_4O_6$	
Molecular weight	Chlorophyllin a: 578,68 Chlorophyllin b: 592,66 Each may be increased by 18 daltons if the cyclopentenyl ring is cleaved.	
Assay	Content of total chlorophyllins is not less than 95% of the sample dried at ca 100° for 1 hour. $E_{1\%}^{1\text{cm}}$ 700 at ca 405 nm in aqueous solution at pH 9 $E_{1\%}^{1\text{cm}}$ 140 at ca 653 nm in aqueous solution at pH 9	
Description	Dark green to blue/black powder	
Identification		
Spectrometry	Maximum in aqueous phosphate buffer at pH 9 at ca 405 nm and at ca 653 nm	
Purity		
Solvent residues	Acetone Methyl ethyl ketone Methanol Ethanol Propan-2-ol Hexane Dichloromethane:	} Not more than 50 mg/kg, singly or in combination Not more than 10 mg/kg
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	

E 141 (i) COPPER COMPLEXES OF CHLOROPHYLLS

Synonyms	C1 Natural Green 3, Copper Chlorophyll, Copper Phaeophytin
Definition	Copper chlorophylls are obtained by addition of a salt of copper to the substance obtained by solvent extraction of natural strains of edible plant material, grass, lucerne, and nettle. The product, from which the solvent has been removed, contains other pigments such as carotenoids as well as fats and waxes derived from the source material. The principal colouring matters are the copper phaeophytins. Only the following solvents may be used for the extraction: acetone, methyl ethyl ketone, dichloromethane, carbon dioxide, methanol, ethanol, propan-2-ol and hexane.
Class	Porphyrin
Index No	75815
Einecs	Copper chlorophyll a: 239-830-5; copper chlorophyll b: 246-020-5
Chemical names	[Phytyl (13 ² R,17S,18S)-3-(8-ethyl-13 ² -methoxycarbonyl-2,7,12,18-tetramethyl-13'-oxo-3-vinyl-13 ¹ -13 ² -17,18-tetrahydrocyclopenta [at]-porphyrin-17-yl) propionate] copper (II) (Copper chlorophyll a) [Phytyl (13 ² R,17S,18S)-3-(8-ethyl-7-formyl-13 ² -methoxycarbonyl-2,12,18-trimethyl-13'-oxo-3-vinyl-13 ¹ -13 ² -17,18-tetrahydrocyclopenta [at]porphyrin-17-yl) propionate] copper (II) (Copper chlorophyll b)
Chemical formula	Copper chlorophyll a: $C_{55}H_{72}Cu N_4O_5$ Copper chlorophyll b: $C_{55}H_{70}Cu N_4O_6$

Molecular weight	Copper chlorophyll a: 932,75 Copper Chlorophyll b: 946,73	
Assay	Content of total copper Chlorophylls is not less than 10% $E^{1\%}_{1\text{cm}}$ 540 at ca 422 nm in chloroform $E^{1\%}_{1\text{cm}}$ 300 at ca 652 nm in chloroform	
Description	Waxy solid ranging in colour from blue green to dark green depending on the source material	
Identification		
Spectrometry	Maximum in chloroform at ca 422 nm and at ca 652 nm	
Purity		
Solvent residues	Acetone Methyl ethyl ketone Methanol Ethanol Propan-2-ol Hexane	} Not more than 50 mg/kg, singly or in combination
	Dichloromethane:	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Copper ions	Not more than 200 mg/kg	
Total copper	Not more than 8,0% of the total copper phaeophytins	

**E 141 (ii) COPPER
COMPLEXES OF
CHLOROPHYLLINS**

Synonyms	Sodium Copper Chlorophyllin, Potassium Copper Chlorophyllin, CI Natural Green 5
Definition	The alkali salts of copper chlorophyllins are obtained by the addition of copper to the product obtained by the saponification of a solvent extraction of natural strains of edible plant material, grass, lucerne, and nettle; the saponification removes the methyl and phytol ester groups and may partially cleave the cyclopentenyl ring. After addition of copper to the purified chlorophyllins, the acid groups are neutralized to form the salts of potassium and/or sodium. Only the following solvents may be used for the extraction: acetone, methyl ethyl ketone, dichloromethane, carbon dioxide methanol, ethanol, propan2-ol and hexane.
Class	Porphyrin
Colour Index No	75815
Einecs	
Chemical names	The major colouring principles in their acid forms are: 3-(10-Carboxylato-4-ethyl-1,3,5,8-tetramethyl-9-oxo-2-vinylporbin-7yl)propionate, copper complex (Copper chlorophyllin a) and 3-(10-Carboxylato-4-ethyl-3-formyl- 1,5,8-trimethyl-9-oxo-2-vinylporbin7-yl)propionate, copper complex (Copper chlorophyllin b)
Chemical formula	Copper chlorophyllin a (acid form): $C_{34}H_{32}Cu N_4O_5$ Copper chlorophyllin b (acid form): $C_{34}H_{30}Cu N_4O_6$
Molecular weight	Copper chlorophyllin a: 640,20 Copper chlorophyllin b: 654,18 Each may be increased by 18 daltons if the cyclopentenyl ring is cleaved.

Assay	Content of total copper chlorophyllins is not less than 95% of the sample dried at 100°C for 1 h. E ^{1%} / _{1cm} 565 at ca 405 nm in aqueous phosphate buffer at pH 7,5 E ^{1%} / _{1cm} 145 at ca 630 nm in aqueous phosphate buffer at pH 7,5
Description	Dark green to blue/black powder
Identification	
Spectrometry	Maximum in aqueous phosphate buffer at pH 7,5 at ca 405 nm and at 630 nm
Purity	
Solvent residues	Acetone Methyl ethyl ketone Methanol Ethanol Propan-2-ol Hexane
	} Not more than 50 mg/kg, singly or in combination
	Dichloromethane: Not more than 10 mg/kg
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Copper ions	Not more than 200 mg/kg
Total copper	Not more than 8,0% of the total copper chlorophyllins
 E 142 GREEN S	
Synonyms	C1 Food Green 4, Brilliant Green BS
Definition	Green S consists essentially of sodium N-[4-(dimethylamino)phenyl], hydroxy-3,6-disulfo-1-naphthaleny) methylene]-2,5-cyclohexadien-1-ylidene]-N-methylmethanaminium and subsidiary colouring matters together with sodium chloride and/or sodium sulphate as the principal uncoloured compounds. Green S is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Triarylmethane
Colour Index No	44090
Einecs	221 -409-2
Chemical names	Sodium N- [4- [[4-(dimethylamino)phenyl](2-hydroxy-3,6-disulfo-1 naphthalenyl)-methylene]-2,5-cyclohexadien-1-ylidene]-N-methylmethanaminium Sodium 5-[4-dimethylamino-a-(4-dimethyliminocyclohexa-2,5 dienyliidenebenzyl)]-6-hydroxy-7-sulfonato-naphthalene-2-sulfonate (alternative chemical name).
Chemical formula	C ₂₇ H ₂₅ N ₂ NaO ₇ S ₂
Molecular weight	576,63
Assay	Content not less than 80% total colouring matters calculated as the sodium salt E ^{1%} / _{1cm} 1 720 at ca 632 nm in aqueous solution
Description	Dark blue or dark green powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 632 nm
B. Blue or green solution in water	
Purity	

Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 1,0%
Organic compounds other than colouring matters:	
4,4'-bis (dimethyl-amino)benzhydriyl alcohol	Not more than 0,1%
4,4'-bis(dimethyl-amino) benzophenone	Not more than 0,1%
3-hydroxynaphthalene -2, 7-disulfonic acid	Not more than 0,2%
Leuco base	Not more than 5,0%
Unsulphonated primary aromatic amines	Not more than 0,01% (calculated as aniline)
Ether extractable matter	Not more than 0,2% under neutral conditions
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 150a

PLAIN CARAMEL

Definition	Plain caramel is prepared by the controlled heat treatment of carbohydrates (commercially available food grade nutritive sweeteners which are the monomers glucose and fructose and/or polymers thereof, e.g. glucose syrups, sucrose, and/or invert syrups, and dextrose). To promote caramelization, acids, alkalis and salts may be employed, with the exception of ammonium compounds and sulphites.
Einecs	232-435-9
Description	Dark brown to black liquids or solids
Purity	
Colour bound by DEAE cellulose	Not more than 50%
Colour bound by phosphoryl cellulose	Not more than 50%
Colour intensity ⁽¹⁾	0,01 - 0,12
Total nitrogen	Not more than 0,1%
Total sulphur	Not more than 0,2%
Arsenic	Not more than 1 mg/kg
Lead	Not more than 2 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 25 mg/kg

⁽¹⁾ Colour intensity is defined as the absorbance of a 0,1% (w/v) solution of caramel colour solids in water in a 1 cm cell at 610 nm.

**E 150b CAUSTIC
SULPHITE
CAMEL**

Definition	Caustic sulphite caramel is prepared by the controlled heat treatment of carbohydrates (commercially available food grade nutritive sweeteners which are the monomers glucose and fructose and/or polymers thereof, e.g. glucose syrups, sucrose, and/or invert syrups, and dextrose) with or without acids or alkalis, in the presence of sulphite compounds (sulphurous acid, potassium sulphite, potassium bisulphite, sodium sulphite and sodium bisulphite); no ammonium compounds are used.
Einecs	232-435-9
Description	Dark brown to black liquids or solids
Purity	
Colour bound by DEAE cellulose	More than 50%
Colour intensity ⁽¹⁾	0,05 -0,13
Total nitrogen	Not more than 0,3% ⁽²⁾
Sulphur dioxide	Not more than 0,2% ⁽²⁾
Total sulphur	0,3 - 3,5% ⁽²⁾
Sulphur bound by DEAE cellulose	More than 40%
Absorbance ratio of colour bound by DEAE cellulose	19-34
Absorbance ratio (A _{280/560})	Greater than 50
Arsenic	Not more than 1 mg/kg
Lead	Not more than 2 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 25 mg/kg

⁽¹⁾ Colour intensity is defined as the absorbance of a 0,1% (w/v) solution of caramel colour solids in water in a 1 cm cell at 610 nm.

⁽²⁾ Expressed on equivalent colour basis i.e. is expressed in terms of a product having, a colour intensity of 0,1 absorbance units.

**E 150c AMMONIA
CAMEL**

Definition	Ammonia caramel is prepared by the controlled heat treatment of carbohydrates (commercially available food grade nutritive sweeteners which are the monomers glucose and fructose and/or polymers thereof, e.g. glucose syrups, sucrose, and/or invert syrups, and dextrose) with or without acids or alkalis, in the presence of ammonium compounds (ammonium hydroxide, ammonium carbonate, ammonium hydrogen carbonate and ammonium phosphate); no sulphite compounds are used.
Einecs	232-435-9
Description	Dark brown to black liquids or solids
Purity	
Colour bound by DEAE cellulose	Not more than 50%

Colour bound by phosphoryl cellulose	More than 50%
Colour intensity ⁽¹⁾	0,08 - 0,36
Ammoniacal nitrogen	Not more than 0,3% ⁽²⁾
4-methylimidazole	Not more than 250 mg/kg ⁽²⁾
2-acetyl-4-tetrahydroxy-butylimidazole	Not more than 10 mg/kg ⁽²⁾
Total sulphur	Not more than 0,2% ⁽²⁾
Total nitrogen	0,7 - 3,3% ⁽²⁾
Absorbance ratio of colour bound by phosphoryl cellulose	13-35
Arsenic	Not more than 1 mg/kg
Lead	Not more than 2 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 25 mg/kg

⁽¹⁾ Colour intensity is defined as the absorbance of a 0,1% (w/v) solution of caramel colour solids in water in a 1 cm cell at 610 nm.

⁽²⁾ Expressed on equivalent colour basis i.e. is expressed in terms of a product having a colour intensity of 0,1 absorbance units.

E 150d SULPHITE

AMMONIA

CARAMEL

Definition	Sulphite ammonia caramel is prepared by the controlled heat treatment of carbohydrates (commercially available food grade nutritive sweeteners which are the monomers glucose and fructose and/or polymers thereof, (e.g. glucose syrups, sucrose, and/or invert syrups, and dextrose) with or without acids or alkalis in the presence of both sulphite and ammonium compounds (sulphurous acid, potassium sulphite, potassium bisulphite, sodium sulphite, sodium bisulphite, ammonium hydroxide, ammonium carbonate, ammonium hydrogen carbonate, ammonium phosphate, ammonium sulphate, ammonium sulphite and ammonium hydrogen sulphite).
Einecs	232-435-9
Description	Dark brown to black liquids or solids
Purity	
Colour bound by DEAE cellulose	More than 50%
Colour intensity ⁽¹⁾	0,10 - 0,60
Ammoniacal nitrogen	Not more than 0,6% ⁽²⁾
Sulphur dioxide	Not more than 0,2% ⁽²⁾
4-methylimidazole	Not more than 250 mg/kg ⁽²⁾
Total nitrogen	0,3 - 1,7% ⁽²⁾
Total sulphur	0,8-2,5% ⁽²⁾
Nitrogen/sulphur ratio of alcohol precipitate	0,7 - 2,7
Absorbance ratio of alcohol precipitate ⁽³⁾	8 - 14

Absorbance ratio ($A_{280/560}$)	Not more than 50
Arsenic	Not more than 1 mg/kg
Lead	Not more than 2 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 25 mg/kg

⁽¹⁾ Colour intensity is defined as the absorbance of a 0.1% (w/v) solution of caramel colour solids in water in a 1 cm cell at 610 nm.

⁽²⁾ Expressed on equivalent colour basis i.e. is expressed in terms of a product having a colour intensity of 0.1 absorbance units.

⁽³⁾ Absorbance ratio of alcohol precipitate is defined as the absorbance of the precipitate at 280 nm divided by the absorbance at 560 nm (1 cm cell).

E 151 BRILLIANT BLACK BN, BLACK PN

Synonyms	C1 Food Black 1
Definition	Brilliant Black BN consists essentially of tetrasodium-4-acetamido-5-hydroxy-6[7-sulfonato-4-(4-sulfonatophenylazo)-1-naphthylazo] naphthalene-1,7-disulfonate and subsidiary colouring matters together with sodium chloride and/or sodium sulfate as the principal uncoloured components. Brilliant Black BN is described as the sodium salt. The calcium and the potassium salt are also permitted.
Class	Bisazo
Colour Index No	28440
Einecs	219-746-5
Chemical names	Tetrasodium 4-acetamido-5-hydroxy-6[7-sulfonato-4-(4-sulfonatophenylazo)-1-naphthylazo] naphthalene-1,7-disulfonate
Chemical formula	$C_{28}H_{17}N_5Na_4O_{14}S_4$
Molecular weight	867,69
Assay	Content not less than 80% total colouring matters calculated as the sodium salt $E_{1\%}^{1\text{cm}}_{530}$ at ca 570 nm in solution
Description	Black powder or granules
Identification	
A. Spectrometry	Maximum in water at ca 570 nm
B. Black-bluish solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 10% (expressed on the dye content)
Organic compounds other than colouring matters:	

4-acetamido-5-hydroxynaphthalene-1,7-disulfonic acid	}	Total not more than 0,8%
4-amino-5-hydroxynaphthalene-1,7-disulfonic acid		
8-aminonaphthalene-2-sulfonic acid		
4,4 -di azoaminodi-(benzenesulfonic acid)		
Un sulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)	
Ether extractable matter	Not more than 0,2% under neutral conditions	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	

E 153 VEGETABLE CARBON

Synonyms	Vegetable black
Definition	Vegetable carbon is produced by the carbonization of vegetable material such as wood, cellulose residues, peat and coconut and other shells. The raw material is carbonized at high temperatures. It consists essentially of finely divided carbon. It may contain minor amounts of nitrogen, hydrogen and oxygen. Some moisture may be absorbed on the product after manufacture.
Colour Index No	77266
Einecs	215-609-9
Chemical names	Carbon
Chemical formula	C
Molecular weight	12,01
Assay	Content not less than 95% of carbon calculated on an anhydrous and ashfree basis
Description	Black powder, odourless and tasteless
Identification	
A. Solubility	Insoluble in water and organic solvents
B. Burning	When heated to redness it burns slowly without a flame
Purity	
Ash (Total)	Not more than 4,0% (ignition temperature: 625°C)
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
Polyaromatic hydrocarbons	The extract obtained by extraction of 1 g of the product with 10 g pure cyclohexane in a continuous extraction apparatus shall be colourless, and the fluorescence of the extract in ultraviolet light shall not be more intense than that of a solution of 0,100 mg of quinine sulfate in 1 000 ml of 0,01 M sulphuric acid.
Loss on drying	Not more than 12% (120°C, 4 hrs)
Alkali soluble matter	The filtrate obtained by boiling 2 g of the sample with 20 ml N sodium hydroxide and filtering shall be colourless

E 154 BROWN FK

Synonyms	CI Food Brown 1
Definition	<p>Brown FK consists essentially of a mixture of:</p> <p>I sodium 4-(2,4-diaminophenylazo) benzenesulfonate II sodium 4-(4,6-diamino-m-tolylazo) benzenesulfonate III disodium 4,4'-(4,6-diamino- 1,3-phenylenebisazo)di (benzenesulfonate) IV disodium 4,4'-(2,4-diamino- 1,3-phenylenebisazo)di (benzenesulfonate) V disodium 4,4'-(2,4-diamino-5-methyl-1,3-phenylenebisazo) di (benzenesulfonate) VI trisodium 4,4',4''-(2,4-diaminobenzene-1,3,5-trisazo)tri- (benzenesulfonate)</p> <p>and subsidiary colouring matters together with water, sodium chloride and/or sodium sulfate as the principal uncoloured components. Brown FK is described as the sodium salt. The calcium and the potassium salt are also permitted.</p>
Class	Azo (a mixture of mono-, bis- and trisazo colours)
Einecs	
Chemical names	<p>A mixture of:</p> <p>I sodium 4-(9,4-diaminophenylazo) benzenesulfonate II sodium 4-(4,6-diamino-m-tolylazo) benzenesulfonate III disodium 4,4'-(4,6-diamino- 1,3-phenylenebisazo) di (benzenesulfonate) IV disodium 4,4'-(2,4-diamino-1,3-phenylenebisazo) di (benzenesulfonate) V disodium 4,4'-(2,4-diamino-5-methyl-1,3-phenylenebisazo) di (benzenesulfonate) VI trisodium 4,4',4''-(2,4-diaminobenzene-1,3,5-trisazo)tri- (benzenesulfonate)</p>
Chemical formula	<p>I $C_{12}H_{11}N_4NaO_3S$ II $C_{13}H_{13}N_4NaO_3S$ III $C_{18}H_{14}N_6Na_2O_6S_2$ IV $C_{18}H_{14}N_6Na_2O_6S_2$ V $C_{19}H_{16}N_6Na_2O_6S_2$ VI $C_{24}H_{17}N_8Na_3O_9S_3$</p>
Molecular weight	<p>I 314,30 II 328,33 III 520,46 IV 520,46 V 534,47 VI 726,59</p>
Assay	<p>Content not less than 70% total colouring matters Of the total colouring matters present the proportions of the components shall not exceed:</p> <p>I 26% II 17% III 17% IV 16% V 20% VI 16%</p>
Description	Red-brown powder or granules
Identification	Orange to reddish solution
Purity	
Water insoluble matter	Not more than 0,2%

Subsidiary colouring matters	Not more than 3,5%
Organic compounds other than colouring matters:	
4-aminobenzene-1-sulfonic acid	Not more than 0,7%
m-phenylenediamine and 4-methyl-m-phenylenediamine	Not more than 0,35%
Unulfonated primary aromatic amines other than m-phenylene diamine and 4-methyl-m-phenylene diamine	Not more than 0,007% (calculated as aniline)
Ether extractable matter	From a solution of pH7, not more than 0,2%
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 155 BROWN HT

Synonyms	C1 Food Brown 3
Definition	Brown HT consists essentially of disodium 4,4'-(2,4-dihydroxy-5-hydroxymethyl-1,3-phenylene bisazo) di (naphthalene-1-sulfonate) and subsidiary colouring matters together with sodium chloride and/or sulfate as the principal uncoloured components. Brown HT is described as the sodium salt. The calcium and potassium salt are also permitted.
Class	Bisazo
Colour Index No	20285
Einecs	224-924-0
Chemical names	Disodium 4,4'-(2,4-dihydroxy-5-hydroxymethyl-1,3-phenylene bisazo) di (naphthalene-1-sulfonate)
Chemical formula	$C_{27}H_{18}N_4Na_2O_9S_2$
Molecular weight	652,57
Assay	Content not less than 70% total colouring matters calculated as the sodium salt. $E^{1\%}_{1cm}$ 403 at ca 460 nm in aqueous solution at pH 7
Description	Reddish-brown powder or granules
Identification	
A. Spectrometry	Maximum in water of pH 7 at ca 460 nm
B. Brown solution in water	
Purity	
Water insoluble matter	Not more than 0,2%
Subsidiary colouring matters	Not more than 10% (TLC method)

Organic compounds
other than colouring
matters:

4-aminonaphthalene-1-sulfonic acid	Not more than 0,7%
Unulfonated primary aromatic amines	Not more than 0,01% (calculated as aniline)
Ether extractable matter	Not more than 0,2% in a solution of pH 7
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 160a (i) MIXED
CAROTENES

Synonyms C1 Food Orange 5

Definition Mixed carotenes are obtained by solvent extraction of natural strains of edible plants, carrots, vegetable oils, grass, alfalfa (lucerne) and nettle.

The main colouring principle consists of carotenoids of which beta-carotene accounts for the major part. alpha-, gamma-carotene and other pigments may be present. Besides the colour pigments, this substance may contain oils, fats and waxes naturally occurring in the source material.

Only the following solvents may be used in the extraction: acetone, methyl ethyl ketone, methanol, ethanol, propan-2-ol, hexane, dichloromethane and carbon dioxide.

Class	Carotenoid
Colour Index No	75130
Einecs	230-636-6
Chemical names	
Chemical formula	β -Carotene: $C_{40}H_{56}$
Molecular weight	β -Carotene: 536,88
Assay	Content of carotenes (calculated as beta-carotene is not less than 5%. For products obtained by extraction of vegetable oils: not less than 0,2% in edible fats $E_{1\%}^{1\text{cm}} 2500$ at ca 440-457nm in cyclohexane 1cm.
Identification	
Spectrometry	Maximum in cyclohexane at 440 - 457 nm and 470 nm - 486 nm
Purity	
Solvent residues	Acetone Methylethyl ketone Methanol Propan-2-ol Hexane Ethanol Dichloromethane:
	} Not more than 50 mg/kg, singly or in combination
	not more than 10 mg/kg
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 160a	
(ii) BETA-CAROTENE	
Synonyms	C1 Food Orange 5
Definition	These specifications apply predominantly to all trans isomer of β -carotene together with minor amounts of other carotenoids. Diluted and stabilized preparations may have different cis/trans isomer ratios.
Class	Carotenoid
Colour Index No	40800
Einecs	230-636-6
Chemical names	β -Carotene, β , β -Carotene
Chemical formula	$C_{40}H_{56}$
Molecular weight	536,88
Assay	Not less than 96% total colouring matters (expressed as β -carotene) $E^{1\%}_{1cm}$ 2 500 at ca 453 - 456 nm in cyclohexane
Description	Red to brownish-red crystals or crystalline powder
Identification	
Spectrometry	Maximum in cyclohexane at ca 453 - 456 nm
Purity	
Sulphated ash	Not more than 0,2%
Subsidiary colouring matters	Carotinoids other than β -carotene not more than 3,0% of total colouring matters
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
E 160b ANNATTO, BIXIN, NORBIXIN	
Synonyms	C1 Natural Orange 4
Definition	
Class	Carotenoid
Colour Index No	75120
Einecs	Annatto: 215-735-4; annatto seed extract; 289-561-2; bixin: 230-248-7
Chemical names	Bixin: 6'-Methylhydrogen-9'-cis-6,6'-diapocarotene-6,6'-dioate 6'-Methylhydrogen-9'-trans-6,6'-diapocarotene-6,6'-dioate Norbixin: 9'Cis-6,6'-diapocarotene-6,6'-dioic acid 9'-Trans-6,6'-diapocarotene-6,6'-dioic acid
Chemical formula	Bixin: $C_{25}H_{30}O_4$ Norbixin: $C_{24}H_{28}O_4$
Molecular weight	Bixin: 394,51 Norbixin: 380,48
Description	Reddish-brown powder, suspension or solution
Identification	
Spectrometry	Bixin: maximum in chloroform at ca 502 nm Norbixin: maximum in dilute KOH solution at ca 482 nm

(i) Solvent extracted
bixin and norbixin

Definition

Bixin is prepared by the extraction of the outer coating of the seeds of the annatto tree (*Bixa orellana* L.) with one or more of the following solvents: acetone, methanol, hexane or dichloromethane, carbon dioxide followed by the removal of the solvent.

Norbixin is prepared by hydrolysis by aqueous alkali of the extracted bixin.

Bixin and norbixin may contain other materials extracted from the annatto seed.

The bixin powder contains several coloured components, the major single one being bixin, which may be present in both cis- and trans- forms. Thermal degradation products of bixin may also be present.

The norbixin powder contains the hydrolysis product of bixin, in the form of the sodium or potassium salts as the major colouring principle. Both cis- and trans-forms may be present.

Assay

Content of bixin powders not less than 75% total carotenoids calculated as bixin.

Content of norbixin powders not less than 25% total carotenoids calculated as norbixin

Bixin: $E^{1\%}_{1\text{cm}}$ 2 870 at ca 502 nm in chloroform

Norbixin: $E^{1\%}_{1\text{cm}}$ 2 870 at ca 482 nm in KOH solution

Purity

Solvent residues

Acetone
Methanol
Hexane

} not more than
50 mg/kg,
singly or in
combination

Dichloromethane:

not more than 10 mg/kg

Arsenic

Not more than 3 mg/kg

Lead

Not more than 10 mg/kg

Mercury

Not more than 1 mg/kg

Cadmium

Not more than 1 mg/kg

Heavy metals (as Pb)

Not more than 40 mg/kg

(ii) Allculi extracted
annatto

Definition

Water soluble annatto is prepared by extraction with aqueous alkali (sodium or potassium hydroxide) of the outer coating of the seeds of the annatto tree (*Bixa orellana* L.)

Water soluble annatto contains norbixin, the hydrolysis product of bixin, in the form of the sodium or potassium salts, as the major colouring principle. Both cis- and trans- forms may be present.

Assay

Contains not less than 0.1% of total carotenoids expressed as norbixin

Norbixin: $E^{1\%}_{1\text{cm}}$ 2 870 at ca 482 nm in KOH solution

Purity

Arsenic

Not more than 3 mg/kg

Lead

Not more than 10 mg/kg

Mercury

Not more than 1 mg/kg

Cadmium

Not more than 1 mg/kg

Heavy metals (as Pb)

Not more than 40 mg/kg

(iii) Oil extracted
annatto

Definition	Annatto extracts in oil, as solution or suspension, are prepared by extraction of the outer coating of the seeds of the annatto tree (<i>Bixa arellana L.</i>) with edible vegetable oil. Annatto extract in oil contains several coloured components, the major single one being bixin, which may be present in both cis- and trans-forms. Thermal degradation products of bixin may also be present.
Assay	Contains not less than 0,1% of total carotenoids expressed as bixin Bixin: $E^{1\%}_{1\text{cm}} 2\ 870$ at ca 502 nm in chloroform
Purity	
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 160c PAPRIKA
EXTRACT,
CAPSANTHIN,
CAPSORUBIN

Synonyms	Paprika Oleoresin
Definition	Paprika extract is obtained by solvent extraction of the natural strains of paprika, which consists of the ground fruits pods, with or without seeds, of <i>Capsicum annuum L.</i> , and contains the major colouring principles of this spice. The major colouring principles are capsanthin and capsorubin. A wide variety of other coloured compounds is known to be present. Only the following solvents may be used in the extraction: methanol, ethanol, acetone, hexane, dichloromethane, ethyl acetate and carbon dioxide.
Class	Carotenoid
Einecs	Capsanthin: 207-364-1, capsorubin: 207-425-2
Chemical names	Capsanthin: (3R, 3'S, 5'R)-3,3'-dihydroxy- β ,k-carotene-6-one Capsorubin: (3S, 3'S, 5R 5R')-3,3' -dihydroxy-k,k-carotene-6,6'-dione
Chemical formula	Capsanthin: $C_{40}H_{56}O_3$ Capsorubin: $C_{40}H_{56}O_4$
Molecular weight	Capsanthin: 584,85 Capsorubin: 600,85
Assay	Paprika extract: content not less than 7,0% carotenoids Capsanthin/capsorubin: not less than 30% of total carotenoids $E^{1\%}_{1\text{cm}} 2\ 100$ at ca 462 nm in acetone
Description	Dark-red viscous liquid
Identification	
A. Spectrometry	Maximum in acetone at ca 462 nm
B. Colour reaction	A deep blue colour is produced by adding one drop of sulfuric acid to one drop of sample in 2 - 3 drops of chloroform
Purity	
Solvent residues	Ethyl acetate Methanol Ethanol Acetone Hexane
	} Not more than 50 mg/kg, singly or in combination
	Dichloromethane: not more than 10 mg/kg
Capsaicin	Not more than 250 mg/kg

Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg
E 160d LYCOPENE	
Synonyms	Natural Yellow 27
Definition	Lycopene is obtained by solvent extraction of the natural strains of red tomatoes (<i>Lycopersicon esculentum L.</i>) with subsequent removal of the solvent. Only the following solvents may be used: dichloromethane, carbon dioxide, ethyl acetate, acetone, propan-2-ol, methanol, ethanol, hexane. The major colouring principle of tomatoes is lycopene, minor amounts of other carotenoid pigments may be present. Beside the other colour pigments the product may contain oils, fats, waxes, and flavour components naturally occurring in tomatoes.
Class	Carotenoid
Colour Index No.	75125
Chemical names	Lycopene, ψ,ψ -carotene
Chemical formula	$C_{40}H_{56}$
Molecular weight	536,85
Assay	Content not less than 5% total colouring matters $E_{1\%}^{1\text{cm}} 3450$ at ca 472 nm in hexane
Description	Dark red viscous liquid
Identification	
Spectrometry	Maximum in hexane at ca 472 nm
Purity	
Solvent residues	Ethyl acetate Methanol Ethanol Acetone Hexane Propan-2-ol
	} Not more than 50 mg/kg, singly or in combination
	Dichloromethane: not more than 10 mg/kg
Sulphated ash	Not more than 0,1%
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 160c BETA-APO-8'-CAROTENAL (C30)

Synonyms	C1 Food Orange 6
Definition	These specifications apply to predominantly all trans isomer of β -apo-8'-carotenal together with minor amounts of other carotenoids. Diluted and stabilized forms are prepared from β -apo-8'-carotenal meeting these specifications and include solutions or suspensions of β -apo-8'-carotenal in edible fats or oils, emulsions and water dispersible powders. These preparations may have different cis/trans isomer ratios.

Class	Carotenoid
Colour Index No.	40820
Einecs	214-171-6
Chemical names	β -Apo-8' -carotenal, Trans- β -apo-8' carotene-aldehyde
Chemical formula	$C_{30}H_{40}O$
Molecular weight	416,65
Assay	Not less than 96% of total colouring matters $E^{1\%}_{1cm}$ 2 640 at ca 460 - 462 nm in cyclohexane
Description	Dark violet crystals with metallic lustre or crystalline powder
Identification	
Spectrometry	Maximum in cyclohexane at 460 - 462 nm
Purity	
Sulphated ash	Not more than 0,1%
Subsidiary colouring matters	Carotenoids other than β -apo-8' -carotenal: not more than 3,0% of total colouring matters
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 10 mg/kg

E 160f ETHYL ESTER
OF BETA APO-8'-
CAROTENOIC ACID
(C30)

Synonyms	C1 Food Orange 7, β -apo-8' -carotenoic ester
Definition	These specifications apply to predominantly all trans isomer of β -apo-8'carotenoic acid ethyl ester together with minor amounts of other carotenoids. Diluted and stabilized forms are prepared from β -apo-8' -carotenoic acid ethyl ester meeting these specifications and include solutions or suspensions of β -apo-8' -carotenoic acid ethyl ester in edible fats or oils, emulsions and water dispersible powders. These preparations may have different cis/trans isomer ratios.
Class	Carotenoid
Colour Index No.	40825
Einecs	214-173-7
Chemical names	β -Apo-8' -carotenoic acid ethyl ester, ethyl 8 -apo- β -carotene-8 -oate
Chemical formula	$C_{32}H_{44}O_2$
Molecular weight	460,70
Assay	Not less than 96% of total colouring matters $E^{1\%}_{1cm}$ 2 550 at ca 449 nm in cyclohexane
Description	Red to violet-red crystals or crystalline powder
Identification	
Spectrometry	Maximum in cyclohexane at ca 449 nm
Purity	
Sulphated ash	Not more than 0,1%
Subsidiary colouring matters	Carotenoids other than β -apo-8' -carotenoic acid ethyl ester: not more than 3,0% of total colouring matters

Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 161 b LUTEIN

Synonyms	Mixed Carotenoids, Xanthophylls
Definition	Lutein is obtained by solvent extraction of the natural strains of edible fruits and plants, grass, lucerne (alfalfa) and <i>tagetes erecta</i> . The main colouring principle consists of carotenoids of which lutein and its fatty acid esters account for the major part. Variable amounts of carotenes will also be present. Lutein may contain fats, oils and waxes naturally occurring in the plant material. Only the following solvents may be used for the extraction: methanol, ethanol, propan-2-ol, hexane, acetone, methyl ethyl ketone, dichloromethane and carbon dioxide
Class	Carotenoid
Einecs	204-840-0
Chemical names	3,3'-dihydroxy-d-carotene
Chemical formula	$C_{40}H_{56}O_2$
Molecular weight	568,88
Assay	Content of total colouring matter not less than 4% calculated as lutein $E_{1\%}^{1\text{cm}} 2550$ at ca 445 nm in chloroform/ethanol (10 + 90) or in hexane/ethanol/acetone (80 + 10 + 10)
Description	Dark, yellowish brown liquid
Identification	
Spectrometry	Maximum in chloroform/ethanol (10 + 90) at ca 445 nm
Purity	
Solvent residues	Acetone Methyl ethyl ketone Ethanol Propan-2-ol Hexane Dichloromethane: } Not more than 50 mg/kg, singly or in combination not more than 10 mg/kg
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 161g
CANTHAXANTHIN

Synonyms	C1 Food Orange 8
Definition	These specifications apply to predominantly all trans isomers of canthaxanthin together with minor amounts of other carotenoids. Diluted and stabilized forms are prepared from canthaxanthin meeting these specifications and include solutions or suspensions of canthaxanthin in edible fats or oils, emulsions and water dispersible powders. These preparations may have different cis/trans isomer ratios.

Class	Carotenoid
Colour Index No.	40850
Einecs	208-187-2
Chemical names	β -Carotene-4,4'-dione, canthaxanthin,4,4'-dioxo- β -carotene
Chemical formula	$C_{40}H_{52}O_2$
Molecular weight	564,86
Assay	Not less than 96% of total colouring matters (expressed as canthaxanthin) $E^{1\%}_{1cm}$ 2 200 at ca 485 nm in chloroform at 468 - 472 nm in cyclohexane at 464 -467 nm in petroleum ether
Description	Deep violet crystals or crystalline powder
Identification	
Spectrometry	Maximum in chloroform at ca 485 nm Maximum in cyclohexane at 468 - 472 nm Maximum in petroleum ether at 464 - 467 nm
Purity	
Sulphated ash	Not more than 0,1%
Subsidiary colouring matters	Carotenoids other than canthaxanthin: not more than 5,0% of total colouring matters
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 162 BEETROOT RED, BETANIN

Synonyms	Beet Red
Definition	Beet red is obtained from the roots of natural strains of red beets (<i>Beta vulgaris</i> L. var. <i>rubra</i>) by pressing crushed beet as press juice or by aqueous extraction of shredded beet roots and subsequent enrichment in the active principle. The colour is composed of different pigments all belonging to the class betalaine. The main colouring principle consists of betacyanins (red) of which betanin accounts for 75 - 95%. Minor amounts of betaxanthin (yellow) and degradation products of betalaines (light brown) may be present. Besides the colour pigments the juice or extract consists of sugars, salts, and/or proteins naturally occurring in red beets. The solution may be concentrated and some products may be refined in order to remove most of the sugars, salts and proteins.
Class	Betalaine
Einecs	231-628-5
Chemical names	(S-(R',R')-4-(2-(2-Carboxy-5(,8-D-glucopyranosyloxy)-2,3-dihydro-6hydroxy-1 H-indol- 1 -yl)ethenyl)-2,3-dihydro-2,6-pyridine-dicarboxylic acid; 1-(2-(2,6-dicarboxy- 1,2,3,4-tetrahydro-4-pyridylidene)ethylidene)-5- β -D glucopyranosyloxy)-6- hydroxyindolium-2-carboxylate
Chemical formula	Betanin: $C_{24}H_{26}N_2O_{13}$
Molecular weight	550,48
Assay	Content of red colour (expressed as betanine) is not less than 0,4% $E^{1\%}_{1cm}$ 1 120 at ca 535 nm in aqueous solution at pH 5

Description	Red or dark red liquid, paste, powder or solid
Identification	
Spectrometry	Maximum in water of pH 5 at ca 535 nm
Purity	
Nitrate	Not more than 2 g nitrate anion/g of red colour (as calculated from assay).
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg

E 163

ANTHOCYANINS

Definition	Anthocyanins are obtained by extraction with sulphited water, acidified water, carbon dioxide, methanol or ethanol from the natural strains of vegetables and edible fruits. Anthocyanins contain common components of the source material, namely anthocyanine, organic acids, tannins, sugars, minerals etc., but not necessarily in the same proportions as found in the source material.
Class	Anthocyanin
Einecs	208-438-6 (cyanidin); 205-125-6 (peonidin); 208-437-0 (delphinidin); 211-403-8 (malvidin); 205-127-7 (pelargonidin)
Chemical names	3,3',4',5,7-Pentahydroxy-flavylium chloride (cyanidin) 3,4',5,7-Tetrahydroxy-3'-methoxyflavylium chloride (peonidin) 3,4',5,7-Tetrahydroxy-3',5'-dimethoxyflavylium chloride (malvidin) 3,5,7-Trihydroxy-2-(3,4,5, trihydroxyphenyl)-1-benzopyrylium chloride (delphinidin) 3,3',4',5,7-Pentahydroxy-5'-methoxyflavylium chloride (petunidin) 3,5,7-Trihydroxy-2-(4-hydroxyphenyl)-1-benzopyrylium chloride (pelargonidin)
Chemical formula	Cyanidin: $C_{15}H_{11}O_6Cl$ Peonidin: $C_{16}H_{13}O_6Cl$ Malvidin: $C_{17}H_{15}O_7Cl$ Delphinidin: $C_{15}H_{11}O_7Cl$ Petunidin: $C_{16}H_{13}O_7Cl$ Pelargonidin: $C_{15}H_{11}O_5Cl$
Molecular weight	Cyanidin: 322,6 Peonidin: 336,7 Malvidin: 366,7 Delphinidin: 340,6 Petunidin: 352,7 Pelargonidin: 306,7
Assay	$E_{1\%}^{1\text{cm}}$ 300 for the pure pigment at 515-535 nm at pH 3,0
Description	Purplish-red liquid, powder or paste, having a slight characteristic odour
Identification	
Spectrometry	Maximum in methanol with 0,01% conc. HCl Cyanidin: 535 nm Peonidin: 532 nm Malvidin: 542 nm Delphinidin: 546 nm Petunidin: 543 nm Pelargonidin: 530 nm

Purity		
Solvent residues	Methanol Ethanol	} Not more than 50 mg/kg, singly or in combination
Sulfur dioxide	Not more than 1 000 mg/kg per percent pigment	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	
Cadmium	Not more than 1 mg/kg	
Heavy metals (as Pb)	Not more than 40 mg/kg	
E 170 CALCIUM CARBONATE		
Synonyms	C1 Pigment White 18, Chalk	
Definition	Calcium carbonate is the product obtained from ground limestone or by the precipitation of calcium ions with carbonate ions.	
Class	Inorganic	
Colour Index No.	77220	
Einecs	Calcium carbonate: 207-439-9 Limestone: 215-279-6	
Chemical names	Calcium carbonate	
Chemical formula	CaCO ₃	
Molecular weight	100,1	
Assay	Content not less than 98% on the anhydrous basis	
Description	White crystalline or amorphous, odourless and tasteless powder	
Identification		
Solubility	Practically insoluble in water and in alcohol. Dissolves with effervescence in diluted acetic acid, in diluted hydrochloric acid and in diluted nitric acid, and the resulting solutions, after boiling, give positive tests for calcium.	
Purity		
Loss on drying	Not more than 2,0% (200 °C, 4 hours)	
Acid-insoluble substances	Not more than 0,2 %	
Magnesium and alkali salts	Not more than 1,5 %	
Fluoride	Not more than 50 mg/kg	
Antimony (as Sb)	}	Not more than 100 mg/kg, singly or in combination
Copper (as Cu)		
Chromium (as Cr)		
Zinc (as Zn)		
Barium (as Ba)		
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Cadmium	Not more than 1 mg/kg	

E 171 TITANIUM DIOXIDE

Synonyms	C1 Pigment White 6
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Definition	Titanium Dioxide consists essentially of pure anatase titanium dioxide which may be coated with small amounts of alumina and/or silica to improve the technological properties of the product.	
Class	Inorganic	
Colour Index No.	77891	
Einecs	236-675-5	
Chemical names	Titanium dioxide	
Chemical formula	TiO ₂	
Molecular weight	79,88	
Assay	Content not less than 99% on an alumina and silica-free basis	
Description	Amorphous white powder	
Identification		
Solubility	Insoluble in water and organic solvents. Dissolves slowly in hydrofluoric acid and in hot concentrated sulfuric acid.	
Purity		
Loss on drying	Not more than 0,5% (105 °C, 3 hours)	
Loss on ignition	Not more than 1,0% on a volatile matter free basis (800 °C)	
Aluminium oxide and/or silicon dioxide	Total not more than 2,0%	
Matter soluble in 0,5N HCl	Not more than 0,5% on an alumina and silica-free basis and, in addition, for products containing alumina and/or silica, not more than 1,5% on the basis of the product as sold.	
Water soluble matter	Not more than 0,5%	
Cadmium	Not more than 1 mg/kg	
Antimony	Not more than 50 mg/kg by total dissolution	
Arsenic	Not more than 3 mg/kg by total dissolution	
Lead	Not more than 10 mg/kg by total dissolution	
Mercury	Not more than 1 mg/kg by total dissolution	
Zinc	Not more than 50 mg/kg by total dissolution	

E 172 IRON OXIDES AND IRON HYDROXIDES

Synonyms	Iron Oxide Yellow:	CI Pigment Yellow 42 and 43
	Iron Oxide Red:	CI Pigment Red 101 and 102
	Iron Oxide Black:	CI Pigment Black 11
Definition	Iron oxide and iron hydroxides are produced synthetically and consist essentially of anhydrous and/or hydrated iron oxides. The range of hues includes yellows, reds, browns and blacks. Food quality iron oxides are primarily distinguished from technical grades by the comparatively low levels of contamination by other metals. This is achieved by the selection and control of the source of the iron and/or by the extent of chemical purification during the manufacturing process.	
Class	Inorganic	
Colour Index No	Iron Oxide Yellow:	77492
	Iron Oxide Red:	77491
	Iron Oxide Black:	77499
Einecs	Iron Oxide Yellow:	257-098-5
	Iron Oxide Red:	215-168-2
	Iron Oxide Black:	235-442-5

Chemical names	Iron Oxide Yellow:hydrated ferric oxide, hydrated iron (III) oxide Iron Oxide Red: anhydrous ferric oxide, anhydrous iron (III) oxide Iron Oxide Black: ferrous ferric oxide, iron (II, III) oxide	
Chemical formula	Iron Oxide Yellow:FeO(OH).xH ₂ O Iron Oxide Red: Fe ₂ O ₃ Iron Oxide Black: FeO.Fe ₂ O ₃	
Molecular weight	88,85: FeO(OH) 159,70: Fe ₂ O ₃ 231,55: FeO.Fe ₂ O ₃	
Assay	Yellow not less than 60%, red and black not less than 68% total iron, expressed as iron	
Description	Powder; yellow, red, brown or black in hue	
Identification		
Solubility	Insoluble in water and in organic solvent Soluble in concentrated mineral acids	
Purity		
Water soluble matter	Not more than 1,0%	By total dissolution
Arsenic	Not more than 5 mg/kg	
Barium	Not more than 50 mg/kg	
Cadmium	Not more than 5 mg/kg	
Chromium	Not more than 100 mg/kg	
Copper	Not more than 50 mg/kg	
Lead	Not more than 20 mg/kg	
Mercury	Not more than 1 mg/kg	
Nickel	Not more than 200 mg/kg	
Zinc	Not more than 100 mg/kg	
E 173 ALUMINIUM		
Synonyms	C1 Pigment Metal, A1	
Definition	Aluminium powder is composed of finely divided particles of aluminium. The grinding may or may not be carried out in the presence of edible vegetable oils and/or food additive quality fatty acids. It is free from admixture with substances other than edible vegetable oils and/or food additive quality fatty acids.	
Colour Index No.	77000	
Einecs	231-072-3	
Chemical names	Aluminium	
Chemical formula	Al	
Atomic weight	26,98	
Assay	Not less than 99% calculated as Al on an oil-free basis	
Description	A silvery-grey powder or tiny sheets	
Identification		
Solubility	Insoluble in water and in organic solvents. Soluble in dilute hydrochloric acid. The resulting solution gives positive tests for aluminium.	
Purity		
Loss on drying	Not more than 0.5% (105°C, to constant weight)	
Arsenic	Not more than 3 mg/kg	
Lead	Not more than 10 mg/kg	
Mercury	Not more than 1 mg/kg	

Cadmium	Not more than 1 mg/kg		
Heavy metals (as Pb)	Not more than 40 mg/1cg		
E 174 S SILVER			
Synonyms	Argentum, Ag		
Class	Inorganic		
Colour Index No.	77820		
Einecs	231-131-3		
Chemical name	Silver		
Chemical formula	Ag		
Atomic weight	107,87		
Assay	Content not less than 99.5% Ag		
Description	Silver-coloured powder or tiny sheets		
E 175 GOLD			
Synonyms	Pigment Metal 3, Aurum, Au		
Class	Inorganic		
Colour Index No.	77480		
Einecs	231-165-9		
Chemical name	Gold		
Chemical formula	Au		
Atomic weight	197,0		
Assay	Content not less than 90% Au		
Description	Gold-coloured powder or tiny sheets		
Purity			
Silver	Not more than 7%	}	After complete dissolution
Copper	Not more than 4%		
180 LITHOLRUBINE BK			
Synonyms	C1 Pigment Red 57, Rubinpigment, Carmine 6B		
Definition	Lithol Rubine BK consists essentially of calcium 3-hydroxy-4-(4-methyl-2 sulfonatophenylazo) - 2 - naphthalenecarboxylate and subsidiary colouring matters together with water, calcium chloride and/or calcium sulfate as the principal uncoloured components.		
Class	Monoazo		
Colour Index No.	15850:1		
Einecs	226-109-5		
Chemical names	Calcium 3-hydroxy-4-(4-methyl-2-sulfonatophenylazo)-2-naphthalene- carboxylate		
Chemical formula	$C_{18}H_{12}CaN_2O_6S$		
Molecular weight	424,45		
Assay	Content not less than 90% total colouring matters $E_{1\%}^{1\text{cm}}_{200}$ at ca 442 nm in dimethylformamide		
Description	Red powder		
Identification			

A. Spectrometry	Maximum in dimethylformamide at ca 442 nm
Purity	
Subsidiary colouring matters	Not more than 0,5%
Organic compounds other than colouring matters:	
2-Amino-5-methylbenzenesulfonic acid, calcium salt	Not more than 0,2%
3-hydroxy-2-naphthalene carboxylic acid, calcium salt	Not more than 0,4%
Unsulfonylated primary aromatic amines	Not more than 0,01% (expressed as aniline)
Ether extractable matter	From a solution of pH 7, not more than 0,2%
Arsenic	Not more than 3 mg/kg
Lead	Not more than 10 mg/kg
Mercury	Not more than 1 mg/kg
Cadmium	Not more than 1 mg/kg
Heavy metals (as Pb)	Not more than 40 mg/kg.
