

**Profile**

Lutein is a naturally occurring carotenoid that has been investigated for its supposed role in a number of conditions including age-related macular degeneration (p.785), cataracts, cardiovascular disease, and cancer.

Lutein is also used as a colouring agent.

## ◇ References.

- Mares-Perlman JA, *et al.* The body of evidence to support a protective role for lutein and zeaxanthin in delaying chronic disease: overview. *J Nutr* 2002; **132** (suppl): 518S–524S.
- Granado F, *et al.* Nutritional and clinical relevance of lutein in human health. *Br J Nutr* 2003; **90**: 487–502.
- Mozaffarieh M, *et al.* The role of the carotenoids, lutein and zeaxanthin, in protecting against age-related macular degeneration: a review based on controversial evidence. *Nutr J* 2003; **2**: 20.
- Trumbo PR, Ellwood KC. Lutein and zeaxanthin intakes and risk of age-related macular degeneration and cataracts: an evaluation using the Food and Drug Administration's evidence-based review system for health claims. *Am J Clin Nutr* 2006; **84**: 971–4.
- Cho E, *et al.* Prospective study of lutein/zeaxanthin intake and risk of age-related macular degeneration. *Am J Clin Nutr* 2008; **87**: 1837–43.

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Fr.:** Lutebiol.

**Multi-ingredient:** **Indon.:** Eyevit; Lutevision; Lutevision Extra; Lutevit; Matovit Fifty; Nuvision; Oculex; Opha-LL; Optimax; Reticopen; Retivit; Vita-Vision; **Israel:** Opti-safe; Opti-safe AREDS; **Mex.:** Snelvit; **Philipp.:** Nutrolat.

**Lysine** (USAN, rINN)

K; Lisina; Lys; L-Lysine; Lysinum. L-2,6-Diaminohexanoic acid.

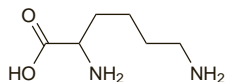
ЛИЗИН

$C_6H_{14}N_2O_2 = 146.2$ .

CAS — 56-87-1.

ATC — B05XB03.

ATC Vet — QB05XB03.



**Pharmacopoeias.** In *Ger.* as the monohydrate.

**Lysine Acetate** (rINNM)

Acetato de lisina; Lizino acetatas; Liziny octan; Lys Acetate; Lysiniasetaatti; Lysinacetat; Lysin-acetát; Lysine, acétate de; L-Lysine Monoacetate; Lysinini acetatas. L-2,6-Diaminohexanoic acid acetate.

ЛИЗИНА Ацетат

$C_8H_{14}N_2O_5 \cdot C_2H_4O_2 = 206.2$ .

CAS — 57282-49-2.

**Pharmacopoeias.** In *Chin., Eur.* (see p.vii), and *US*.

**Ph. Eur. 6.2** (Lysine Acetate). A white or almost white, crystalline powder or colourless crystals. It exhibits polymorphism. Freely soluble in water; very slightly soluble in alcohol. Protect from light.

**USP 31** (Lysine Acetate). White, odourless crystals or crystalline powder. Freely soluble in water.

**Lysine Hydrochloride** (USAN, rINN)

Hidrocloruro de lisina; Lizin-hidroklorid; Lizino hidrokloridas; Lys Hydrochloride; Lysinihydroklorid; Lysine, chlorhydrate de; L-Lysine Monohydrochloride; Lysin-hydrochlorid; Lysinhydroklorid; Lysinini hydrochloridum. L-2,6-Diaminohexanoic acid hydrochloride.

ЛИЗИНА Гидрохлорид

$C_6H_{14}N_2O_2 \cdot HCl = 182.6$ .

CAS — 657-27-2.

**Pharmacopoeias.** In *Chin., Eur.* (see p.vii), *Jpn.* and *US*.

**Ph. Eur. 6.2** (Lysine Hydrochloride). A white or almost white, crystalline powder or colourless crystals. Freely soluble in water; slightly soluble in alcohol. Protect from light.

**USP 31** (Lysine Hydrochloride). A white, odourless powder. Freely soluble in water.

**Profile**

Lysine is a basic amino acid that is an essential constituent of the diet. Lysine acetate and lysine hydrochloride are used as dietary supplements.

**Lysinuric protein intolerance.** For mention of the use of lysine to correct lysine deficiency in lysinuric protein intolerance, see Hyperammonaemia, under Citrulline, p.1935.

The symbol † denotes a preparation no longer actively marketed

**Preparations**

**USP 31:** Lysine Hydrochloride Tablets.

**Proprietary Preparations** (details are given in Part 3)

**Port.:** Incremin†.

**Multi-ingredient:** **Arg.:** Latlas; **Austral.:** Cold Sore Relief†; Vitaline†; **Fr.:** Curasten; Revitalose; **Hong Kong:** Digezym; **India:** Ferrochelate; Logical; Tonoferon; **Indon.:** Champs C with Lysine; **Ital.:** Biocarnil†; Calciofix; **Mex.:** Corpotasin CL; **Singapore:** Champs C with Lysine; **Spain:** Euzymina Lisina I; Euzymina Lisina II; Malandil; Pranzo; **USA:** Klorvess.

**Magnesium Fluoride**

Фторид Магния

$MgF_2 = 62.30$ .

CAS — 7783-40-6.

**Profile**

Magnesium fluoride is used as a fluoride supplement (see Sodium Fluoride, p.1962) for the prevention of dental caries. Magnesium fluoride is also used as a source of magnesium.

**Homoeopathy.** Magnesium fluoride has been used in homoeopathic medicines under the following names: Magnesia Fluorata; Magnesium Fluoratum; Magnesia Fluoricum.

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **Spain:** Magnesium Pyre; Magnogene.

**Maize Oil**

Aceite de maíz; Corn Oil; Huile de Maïs; Kukoricamagolaj; Kukuřičný olej; Kukurūzų aliejus; Maïs, huile de; Maissiöljy; Majsolja; Maydis oleum; Ol. Mayd.; Olej kukurydziany; Oleum Maydis.

**Pharmacopoeias.** In *Chin., Eur.* (see p.vii), and *Jpn.* Also in *USNF*.

**Ph. Eur. 6.2** (Maize Oil, Refined; Maydis Oleum Raffinatum). The refined fatty oil obtained from the seeds of *Zea mays*. A clear, light yellow or yellow oil. Practically insoluble in water and in alcohol; miscible with dichloromethane and with petroleum spirit (b.p.: 40° to 60°). Store at a temperature not exceeding 25°. Protect from light.

**USNF 26** (Corn Oil). The refined fixed oil obtained from the embryos of *Zea mays* (Gramineae). A clear, light yellow, oily liquid having a faint characteristic odour. Slightly soluble in alcohol; miscible with chloroform, with ether, with petroleum spirit, and with benzene. Store in airtight containers at a temperature not exceeding 40°. Protect from light.

**Profile**

Maize oil is a fixed oil with a high content of unsaturated acids, and has been used to replace saturated acids in the diets of patients with familial hypercholesterolaemia. It is also used as an oily vehicle in pharmaceutical formulations.

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Pol.:** Gal-Vit†.

**Multi-ingredient:** **Fr.:** Preservation; **USA:** Lipomul.

**Malt Extract**

Extractum Bynes; Malta, extracto de.

**Profile**

Malt extract contains 50% or more of maltose, with dextrin, glucose, and small amounts of other carbohydrates, and protein. It is prepared from malted grain of barley (*Hordeum distichon*, *H. vulgare*) or a mixture of this with not more than 33% of malted grain of wheat (*Triticum aestivum* or *T. turgidum*).

Malt extract has nutritive properties. It is chiefly used as a vehicle in preparations containing cod-liver oil (p.1935) and halibut-liver oil (p.1948). It is a useful flavouring agent for masking bitter tastes.

A product known as malt soup extract, obtained from barley grains, and containing 73% maltose with 12% other polymeric carbohydrates as well as small amounts of proteins, electrolytes, and vitamins, is sometimes used as a laxative.

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Chile:** Maltin; **USA:** Maltsupex.

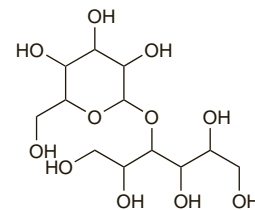
**Multi-ingredient:** **Fr.:** Galactogil; **S.Afr.:** Cough Elixir.

**Maltitol** (BAN)

E965; Hydrogenated Maltose; D-Maltitol; Maltitoli; Maltitolis; Maltitolium. α-D-Glucopyranosyl-1,4-D-glucitol.

$C_{12}H_{24}O_{11} = 344.3$ .

CAS — 585-88-6.



**Pharmacopoeias.** In *Eur.* (see p.vii). Also in *USNF*.

**Ph. Eur. 6.2** (Maltitol). A white or almost white, crystalline powder. Very soluble in water; practically insoluble in dehydrated alcohol.

**USNF 26** (Maltitol). A white, crystalline powder. Very soluble in water; practically insoluble in dehydrated alcohol.

**Maltitol Syrup**

E965; Hydrogenated Glucose Syrup; Hydrogenated High Maltose-glucose Syrup; Liquid Maltitol; Maltitol ciekly; Maltitol, flytande; Maltitol, jarabe de; Maltitol liquide; Maltitol roztok; Maltitol Solution; Maltitoli, nestemäinen; Maltitolium liquidum; Maltit-szirup; Skystasis maltitolis.

**Pharmacopoeias.** In *Eur.* (see p.vii). Also in *USNF*.

**Ph. Eur. 6.2** (Maltitol, Liquid). An aqueous solution of a hydrogenated, part hydrolysed starch, containing not less than 68.0% w/w and not more than 85.0% w/w of anhydrous substance composed of a mixture of mainly D-maltitol with D-sorbitol and hydrogenated oligo- and polysaccharides. It contains not less than 50.0% w/w of D-maltitol and not more than 8.0% w/w of D-sorbitol, both calculated with reference to the anhydrous substance. A clear, colourless, syrupy liquid. Miscible with water and with glycerol.

**USNF 26** (Maltitol Solution). A water solution containing, on the anhydrous basis, not less than 50.0% of D-maltitol (w/w) and not more than 8.0% of D-sorbitol (w/w).

**Nomenclature.** Hydrogenated glucose syrup is a generic term encompassing products of widely varying composition and it was concluded that such products containing up to 90% of maltitol should more properly be called maltitol syrup.<sup>1</sup> This was subsequently amended to include products containing up to 98% maltitol.<sup>2</sup> Preparations containing a minimum of 98% of maltitol were assigned the title maltitol.

1. FAO/WHO. Evaluation of certain food additives and contaminants: thirty-third report of the joint FAO/WHO expert committee on food additives. *WHO Tech Rep Ser* 776 1989.

2. FAO/WHO. Evaluation of certain food additives and contaminants: forty-first report of the joint FAO/WHO expert committee on food additives. *WHO Tech Rep Ser* 837 1993.

**Profile**

Maltitol and maltitol syrup are bulk sweeteners used in foods and pharmaceuticals; they are considered to be less cariogenic than sucrose. The ingestion of large quantities may produce flatulence and diarrhoea.

**Maltodextrin**

Maltodekstriini; Maltodekstrinas; Maltodextrina; Maltodextrine; Maltodextrinum.

CAS — 9050-36-6.

**Pharmacopoeias.** In *Eur.* (see p.vii). Also in *USNF*.

**Ph. Eur. 6.2** (Maltodextrin). A mixture of glucose, disaccharides, and polysaccharides, obtained by the partial hydrolysis of starch. The degree of hydrolysis, expressed as dextrose equivalent (DE) is not more than 20 (nominal value). A white or almost white, slightly hygroscopic powder or granules. Freely soluble in water.

**USNF 26** (Maltodextrin). A nonsweet, nutritive saccharide mixture of polymers that consists of D-glucose units with a dextrose equivalent of less than 20. It is prepared by the partial hydrolysis of food grade starch with suitable acids and/or enzymes. White, hygroscopic powder or granules. Freely soluble or readily dispersible in water; slightly soluble to insoluble in dehydrated alcohol. pH of a 20% solution in water is between 4.0 and 7.0. Store in airtight containers at a temperature not exceeding 30° and a relative humidity not exceeding 50%.

**Profile**

Maltodextrin, a glucose polymer (malto-oligosaccharide), is a source of carbohydrate often used in oral dietary supplements and tube feeding. It rapidly releases glucose in the gastrointestinal tract but because of the high average molecular weight of maltodextrin, solutions have a lower osmolarity than isocaloric solutions of glucose. Additionally, preparations based on maltodextrin and intended for dietary supplementation usually have a low electrolyte content and are free of other sugars such as fructose, galactose, lactose, and sucrose. These properties make such preparations suitable for dietary supplementation in a variety of diseases including certain gastrointestinal disorders where mal-