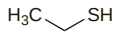
Ethanethiol

Ethyl Mercaptan Thioethyl Alcohol; Ethylmercaptan; I-Ethanethiol.

Этантиол; Этил Меркаптан

C_2H_6S = 62.13.
CAS — 75-08-1.



Profile

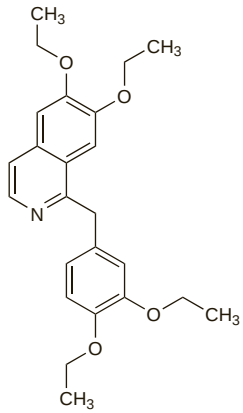
Mercaptans such as ethanethiol have an extremely disagreeable odour that is detectable by humans at very low concentrations and therefore they are added as a safety measure to odourless gases such as natural gas. Inhalation of high concentrations of ethanethiol can cause dizziness, headache, nausea, vomiting, and unconsciousness.

Ethaverine Hydrochloride *(rINNM)*

Éthavérine, Chlorhydrate d'; Ethaverini Hydrochloridum; Hidrocloruro de etaverina. 6,7-Diethoxy-1-(3,4-diethoxybenzyl)isoquinoline hydrochloride.

Этаверина Гидрохлорид

$C_{24}H_{29}NO_4$,HCl = 432.0.
CAS — 486-47-5 (ethaverine); 985-13-7 (ethaverine hydrochloride).



(ethaverine)

Profile

Ethaverine is the tetraethoxy analogue of papaverine (p.2191) and has been used as the hydrochloride as an antispasmodic in respiratory-tract, biliary, gastrointestinal, and genito-urinary disorders. It has also been used in migraine, vascular disorders and as an antiarrhythmic.

Ethaverine sulfamate has also been used.

Preparations

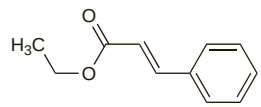
Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Austria:*** Asthma Efeum; Gastripan; Oddispasmol; ***Braz.:*** Euferm†; ***Thai.:*** Elzym†.

Ethyl Cinnamate

Cinamato de etilo. Ethyl (*E*)-3-phenylprop-2-enoate.

$C_{11}H_{12}O_2$ = 176.2.
CAS — 103-36-6.



Pharmacopoeias. In *Br.*

BP 2008 (Ethyl Cinnamate). A clear, colourless or almost colourless liquid with a fruity, balsamic odour. Practically insoluble in water; miscible with most organic solvents.

Profile

Ethyl cinnamate is used as a flavour and perfume; it is an ingredient of Tolu-flavour Solution (BP 2008).

Preparations

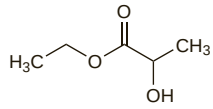
BP 2008: Tolu-flavour Solution.

Ethyl Lactate

Etilo, lactato de.

Этилактат

$C_5H_{10}O_3$ = 118.1.
CAS — 97-64-3.



Profile

Ethyl lactate has been applied topically in the treatment of acne vulgaris. It is reported to lower the pH within the skin thereby exerting a bactericidal effect.

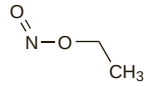
Ethyl lactate is also used in the flavouring of foods.

Ethyl Nitrite

Nitrous Acid Ethyl Ester; Nitrous Ether.

Этилнитрит

$C_2H_5NO_2$ = 75.07.
CAS — 109-95-5.



NOTE. Do not confuse with *O*-nitrosoethanol, a substance that has been referred to in the literature as 'ethyl nitrite gas'.

Profile

Ethyl nitrite has vasodilator effects similar to other volatile nitrites (see Amyl Nitrite, p.1437). Alcoholic solutions of ethyl nitrite (Ethyl Nitrite Spirit; Nitrous Ether Spirit; Sweet Nitre Spirit; Sp. Aether. Nitros.) have been used as a diaphoretic in the treatment of colds and fevers.

◊ Methaemoglobinaemia occurred in 2 infants given a folk remedy containing ethyl nitrite. Despite treatment with methylthionium chloride 1 infant died.[1]

1. Chilcote RR, *et al.* Sudden death in an infant from methemoglobinemia after administration of "sweet spirits of nitre". *Pediatrics* 1977; **59:** 280–2.

Preparations

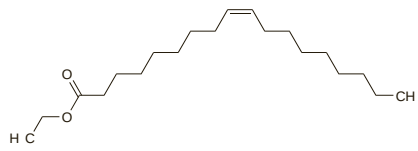
Proprietary Preparations (details are given in Part 3)

S.Afr.: Witdulsies.

Ethyl Oleate

Aethylis Oleas; Éthyle, oléate d'; Ethylis oleas; Ethyl-oleát; Etil-oleát; Etiloleatas; Etyloleat; Etyylioleaatti; Oleato de etilo.

$C_{20}H_{38}O_2$ = 310.5.
CAS — 111-62-6.



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

Ph. Eur. 6.2 (Ethyl Oleate). A clear, pale yellow or colourless liquid. It consists of the ethyl esters of fatty acids, mainly oleic acid. It may contain a suitable antioxidant. Practically insoluble in water; miscible with alcohol, with dichloromethane, and with petroleum spirit (40° to 60°). Protect from light.

USNF 26 (Ethyl Oleate). It consists of esters of ethyl alcohol and high-molecular-weight fatty acids, principally oleic acid. A mobile, practically colourless liquid. Insoluble in water; miscible with alcohol, with vegetable oils, with liquid paraffin, and with most organic solvents. Store in airtight containers. Protect from light.

Incompatibility. Ethyl oleate dissolves some types of rubber and causes others to swell.

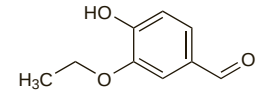
Profile

Ethyl oleate is used as an oily vehicle.

Ethyl Vanillin

Etilvanilina. 3-Ethoxy-4-hydroxybenzaldehyde.

$C_9H_{10}O_3$ = 166.2.
CAS — 121-32-4.



Pharmacopoeias. In *USNF.*

USNF 26 (Ethyl Vanillin). Fine, white or slightly yellowish crystals with a vanilla-like odour. M.p. is between 76° and 78°. Soluble 1 in 100 of water at 50° and 1 in 2 of alcohol; freely soluble in chloroform, in ether, and in solutions of alkali hydroxides. Its solutions are acid to litmus. Store in airtight containers. Protect from light.

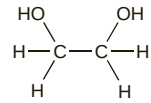
Profile

Ethyl vanillin is used as a flavour and in perfumery to impart the odour and taste of vanilla.

Ethylene Glycol

Ethylene Alcohol; Etilen Glikol; Etilenglicol; Glikol etylenowy; Glycol. Ethane-1,2-diol.

$C_2H_6O_2$ = 62.07.
CAS — 107-21-1.



Adverse Effects

Toxic effects arising from ingestion of ethylene glycol result from its major metabolites: aldehydes, glycolate, lactate, and oxalate. Clinical features may be divided into three stages depending on the time elapsed since ingestion. In the first 12 hours, the patient may show signs of drunkenness and experience nausea and vomiting. Convulsions and neurological defects may occur. From 12 to 24 hours, there may be tachycardia, mild hypertension, pulmonary oedema, and heart failure. Between 24 and 72 hours, patients with severe ethylene glycol poisoning may experience flank pain and renal involvement with associated decreased plasma concentrations of calcium and bicarbonate, metabolic acidosis, deposition of oxalate in tissues and kidney tubules, proteinuria, oxaluria, haematuria, and renal failure. There may be respiratory failure, cardiovascular collapse, and sometimes coma and death. The fatal dose is reported to be about 100 mL.

Skin irritation and penetration have been reported after topical application.

Diethylene glycol produces similar toxicity, except that there is no conversion to oxalate and there is greater nephrotoxicity. Poisoning has followed adulteration of medicinal products with diethylene glycol.

◊ References.

1. Anonymous. Some wine to break the ice. *Lancet* 1985; **ii:** 254.
2. Vale JA, Buckley BM. Metabolic acidosis in diethylene glycol poisoning. *Lancet* 1985; **ii:** 394.
3. Buckley BM, Vale JA. Poisoning by alcohols and ethylene glycol. *Prescribers' J* 1986; **26:** 110–15.
4. Hanif M, *et al.* Fatal renal failure caused by diethylene glycol in paracetamol elixir: the Bangladesh epidemic. *BMJ* 1995; **311:** 88–91.
5. Lewis LD, *et al.* Delayed sequelae after acute overdoses or poisonings: cranial neuropathy related to ethylene glycol ingestion. *Clin Pharmacol Ther* 1997; **61:** 692–9.
6. O'Brien KL, *et al.* Epidemic of pediatric deaths from acute renal failure caused by diethylene glycol poisoning. *JAMA* 1998; **279:** 1175–80.
7. Singh J, *et al.* Diethylene glycol poisoning in Gurgaon, India, 1998. *Bull WHO* 2001; **79:** 88–95.
8. Hasbani MJ, *et al.* Encephalopathy and peripheral neuropathy following diethylene glycol ingestion. *Neurology* 2005; **64:** 1273–5.

Treatment of Adverse Effects

The stomach should be emptied by lavage if ingestion of ethylene glycol was within the preceding hour. Severe metabolic acidosis should be corrected. Hypocalcaemia may require correction with calcium gluconate in severe cases, although this is not usually done routinely because it may increase the formation of calcium oxalate crystals. Haemodialysis may be of value. Alcohol may be given by mouth or intravenously as it is a competitor of the metabolism of ethylene glycol. Alternatively fomepizole (p.1446), an alcohol-dehydrogenase inhibitor, may be used for the treatment of ethylene glycol poisoning.

◊ References.

1. Harry P, *et al.* Ethylene glycol poisoning in a child treated with 4-methylpyrazole. *Pediatrics* 1998; **102:** E31.

2. Barceloux DG, *et al*. American Academy of Clinical Toxicology practice guidelines on the treatment of ethylene glycol poisoning. *Clin Toxicol* 1999; **37:** 537–60.
3. Brent J, *et al*. Fomepizole for the treatment of ethylene glycol poisoning. *N Engl J Med* 1999; **340:** 832–8.
4. Borron SW, *et al*. Fomepizole in treatment of uncomplicated ethylene glycol poisoning. *Lancet* 1999; **354:** 831.
5. Baum CR, *et al*. Fomepizole treatment of ethylene glycol poisoning in an infant. *Pediatrics* 2000; **106:** 1489–91.
6. Brent J. Current management of ethylene glycol poisoning. *Drugs* 2001; **61:** 979–88.
7. Battistella M. Fomepizole as an antidote for ethylene glycol poisoning. *Ann Pharmacother* 2002; **36:** 1085–9.

Pharmacokinetics
Ethylene glycol is absorbed from the gastrointestinal tract and is metabolised, chiefly in the liver, by alcohol dehydrogenase. Its breakdown products account for its toxicity and include aldehydes, glycolate, lactate, and oxalate.

◊ References.

1. Sivilotti ML, *et al*. Toxicokinetics of ethylene glycol during fomepizole therapy: implications for management. *Ann Emerg Med* 2000; **36:** 114–25.

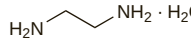
Uses
Ethylene glycol is commonly encountered in antifreeze solutions and has been used illicitly to sweeten some wines. Diethylene glycol has been used similarly.

Ethylenediamine

Edamine *(USAN, pINN)*; Edamina; Édamine; Edaminum; Ethylendiamin; Ethylendiaminum; Éthylènediamine; Ethylenediaminum; Etilén-diamin; Etilendiaminas; Etyleenidiamiini; Etylendiamin; Etylenodiamina.

Эдамин

$C_2H_8N_2$ = 60.10.
CAS — 107-15-3 (anhydrous ethylenediamine); 6780-13-8 (ethylenediamine monohydrate).



(ethylenediamine hydrate)

Pharmacopoeias. In *Eur.* (see p.vii), *Jpn*, and *US*.
Ph. Eur. 6.2 (Ethylenediamine). A clear, colourless or slightly yellow, hygroscopic liquid. On exposure to air, white fumes are evolved. On heating it evaporates completely. Miscible with water and with alcohol. Store in airtight containers. Protect from light.
USP 31 (Ethylenediamine). A clear, colourless or only slightly yellow liquid having an ammonia-like odour. It is strongly alkaline and may readily absorb carbon dioxide from the air to form a non-volatile carbonate. Miscible with water and with alcohol. Store in well-filled, airtight, glass containers.

Adverse Effects
Ethylenediamine is irritant to the skin and to mucous membranes. Severe exfoliative dermatitis has been reported after systemic use of preparations containing ethylenediamine. Hypersensitivity reactions are common. Concentrated solutions cause skin burns. Headache, dizziness, shortness of breath, nausea, and vomiting have also been reported after exposure to fumes. Ethylenediamine splashed onto the skin or eyes should be removed by flooding with water for a prolonged period.

Hypersensitivity. A review of allergy to ethylenediamine and aminophylline.[1]

1. Anonymous. Allergy to aminophylline. *Lancet* 1984; **ii :** 1192–3.

Precautions
Skin reactions may occur in patients given aminophylline after they have become sensitised to ethylenediamine. Cross-sensitivity with edetic acid and with some antihistamines has been reported.

Cross-sensitivity. It was reported that some topical corticosteroid creams, including *Tri-Adcortyl* in the UK,[1] and *Kenacomb*, *Halcicomb*, and *Viaderm* in Canada,[2] contained ethylenediamine and could cause unexpected cross-sensitivity reactions with piperazine[1] or aminophylline.[2]

1. Wright S, Harman RRM. Ethylenediamine and piperazine sensitivity. *BMJ* 1983; **287**: 463–4.
2. Hogan DJ. Excipients in topical corticosteroid preparations in Canada. *Can Med Assoc J* 1989; **141**: 1032.

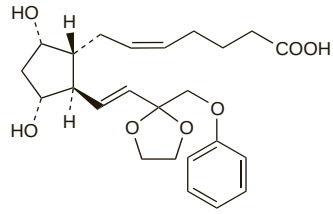
Uses and Administration
Ethylenediamine or ethylenediamine hydrate forms a stable mixture with theophylline to produce aminophylline or aminophylline hydrate. Ethylenediamine is widely used in the chemical and pharmaceutical industries and as an ingredient of some topical creams.

Etiproston Trometamol *(rINNM)*

Etiprostón trometamol; Etiproston Tromethamine; Étiprostone Trométamol; Etiprostonum Trometamolum. Trometamol salt of (*Z*)-7-[(1*R*,2*R*,3*R*,5*S*)-3,5-dihydroxy-2-[(*E*)-2-[2-(phenoxymethyl)-1,3-dioxolan-2-yl]vinyl]cyclopentyl]-5-heptenoic acid.

Этипростон Трометамол

$C_{24}H_{32}O_7.C_4H_{11}NO_3$ = 553.6.
CAS — 59619-81-7 (etiproston).



(etiproston)

Profile
Etiproston trometamol is a synthetic analogue of dinoprost (prostaglandin F_2). It is used as a luteolytic in veterinary medicine.

Eucalyptus Leaf

Blahovičníkový list; Eucalypti folium; Eucalyptus, feuille d'; Eucalyptusblätter; Eukaliptų lapai; Eukaliptuszlevél; Eukalyptuksenlehti; Eukalyptusblad.

Pharmacopoeias. In *Eur.* (see p.vii).
Ph. Eur. (Eucalyptus Leaf). It consists of the whole or cut dried leaves of older branches of *Eucalyptus globulus*. The whole drug contains not less than 2% v/w of essential oil and the cut drug not less than 1.5% v/w of essential oil, both calculated with reference to the anhydrous drug. It has an aromatic odour of cineole. Protect from light.

Profile
Eucalyptus leaf has been used in oral preparations for coughs and associated respiratory-tract disorders. It is also used as a flavour. It is a source of eucalyptus oil (see below).

Preparations
Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Arg.:*** Pre Calent; ***Austria:*** Euka; ***Braz.:*** Broncol; Tussifen†; ***Canad.:*** Beech Nut Cough Drops†; ***Chile:*** Codetol PM; Paltomiel; Paltomiel Plus; Pulmosina; ***Fr.:*** Balsofumine; Balsofumine Mentholee; ***Ger.:*** Em-medical†; Hevertopect N†; ***Israel:*** Gingisan; ***Ital.:*** Altuss; Fosfoguaiacol; ***NZ:*** Otrivine Menthol; ***Rus.:*** Insti (Инсти); ***S.Afr.:*** Bolus Eucalypti Comp; ***Spain:*** Bronpul†; Diabesor†; Llantusil†; Natusor Broncopul†; Natusor Gripotul†; Pastillas Antisep Garg M; Vapores Pyt; ***UK:*** Calrub; Collins Elixir Decongesant Pasilles; No-Sor Nose Balm; PainEaze; Revitonil; Sinose; Sudarub; ***Venez.:*** Gamasol†; Mixagel†.

Eucalyptus Oil

Blahovičníková silice; Esencia de Eucalipto; Essence d'Eucalyptus Rectifiée; Eucalipto, aceite esencial de; Eucalypti aetheroleum; Eucalypti Etheroleum; Eucalyptus, huile essentielle d'; Eukaliptų eterinis aliejus; Eukaliptuszolaj; Eukalyptusolja; Eukalyptusöljy; Ökaliptüs Yağı; Olejek eukaliptusowy; Oleum Eucalypti.

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), and *Jpn*.
Ph. Eur. 6.2 (Eucalyptus Oil). A colourless or pale yellow liquid with a characteristic aromatic camphoraceous odour and a pungent camphoraceous taste. It is obtained by steam distillation and rectification from the fresh leaves or terminal branches of various species of *Eucalyptus* rich in cineole. The species mainly used are *E. globulus*, *E. polybractea*, and *E. smithii*. It contains not less than 70% w/w of cineole. Relative density 0.906 to 0.927. Soluble 1 in 5 of alcohol (70%). Store in well-filled airtight containers at a temperature not exceeding 25°. Protect from light.

Adverse Effects and Precautions
The symptoms of poisoning with eucalyptus oil include gastrointestinal symptoms such as epigastric burning, nausea and vomiting, and CNS depression, including coma. Cyanosis, ataxia, miosis, pulmonary damage, delirium, and convulsions may occur. Deaths have been reported.

Oily solutions of eucalyptus oil were formerly used in nasal preparations, but this use is now considered unsuitable as the vehicle inhibits ciliary movements and may cause lipoid pneumonia.

◊ References.

1. Patel S, Wiggins J. Eucalyptus oil poisoning. *Arch Dis Child* 1980; **55:** 405.
2. Spoerke DG, *et al*. Eucalyptus oil: 14 cases of exposure. *Vet Hum Toxicol* 1989; **31:** 166–8.
3. Webb NJA, Pitt WR. Eucalyptus oil poisoning in childhood: 41 cases in south-east Queensland. *J Paediatr Child Health* 1993; **29:** 368–71.
4. Tibballs J. Clinical effects and management of eucalyptus oil ingestion in infants and young children. *Med J Aust* 1995; **163:** 177–80.
5. Anpalahan M, Le Couteur DG. Deliberate self-poisoning with eucalyptus oil in an elderly woman. *Aust N Z J Med* 1998; **28:** 58.
6. Darben T, *et al*. Topical eucalyptus oil poisoning. *Australas J Dermatol* 1998; **39:** 265–7.

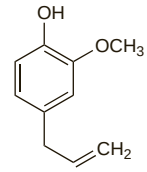
Uses and Administration
Eucalyptus oil has been taken orally for catarrh and coughs and is an ingredient of many preparations. It has been used as an inhalation often in combination with other volatile substances. Eucalyptus oil has also been applied as a rubefacient and is used as a flavour. It is also used in aromatherapy.

Preparations
Proprietary Preparations (details are given in Part 3)
Austral.: Bosisto's Eucalyptus Spray; ***Ger.:*** Aspecton Eukaps; Broncho-Truw Erkaltungsbalsam; Eucotol†; Exeu; Gelodurat†; Pinimenthol Erkaltungsbad fur Kinder; Pinimenthol Erkaltungskapseln†; Pulmotin Inhalat; Schnupfen Kapseln; Tussidermil N; ***Pol.:*** Migrenol; ***Port.:*** Vicks Vaporub; ***Switz.:*** Nicobrevin N†.

Multi-ingredient: numerous preparations are listed in Part 3.

Eugenol

4-Allylguaiacol; Eugen.; Eugenic Acid; Eugénol; Eugenoli; Eugenolis; Eugenolum. 4-Allyl-2-methoxyphenol.
$C_{10}H_{12}O_2$ = 164.2.
CAS — 97-53-0.



Pharmacopoeias. In *Eur.* (see p.vii), *US*, and *Viet.*
Ph. Eur. 6.2 (Eugenol). A colourless or pale yellow liquid with a strong odour of clove. Practically insoluble in water and in glycerol; freely soluble in alcohol (70%); miscible with alcohol, with glacial acetic acid, with dichloromethane, and with fatty oils. Eugenol darkens in colour on exposure to air. Store in well-filled containers. Protect from light.
USP 31 (Eugenol). It is obtained from clove oil or from other sources. A colourless or pale yellow liquid having a strongly aromatic odour of clove. Upon exposure to air, it darkens and thickens. Slightly soluble in water; miscible with alcohol, with chloroform, with ether, and with fixed oils. Store in airtight containers. Protect from light.

Profile
Eugenol is a constituent of clove oil (p.2285) and some other essential oils. It is used in dentistry, often mixed with zinc oxide, as a temporary anodyne dental filling, and is an ingredient in oral hygiene preparations. Eugenol has been used as a flavour.

Eugenol is an irritant and sensitiser and can produce local anaesthesia. It is reported to inhibit prostaglandin synthesis.

For the pulmonary effects of eugenol inhalation from clove cigarettes, see Abuse, under Clove, p.2284.

◊ References.

1. Sarrami N, *et al*. Adverse reactions associated with the use of eugenol in dentistry. *Br Dent J* 2002; **193:** 257–9.

Preparations
Proprietary Preparations (details are given in Part 3)
Chile: Analgesico Dental; ***USA:*** Red Cross Toothache.

Multi-ingredient: ***Arg.:*** Sicadentol Plus†; ***Austria:*** Ledermix; ***Belg.:*** Dentophar; Olbas; ***Braz.:*** Passaja†; Relampago†; Um Instante†; ***Chile:*** Astrijesan; Listermint Con Fluor; ***Cz.:*** Alvogyl; Parodontal F5†; ***Denm.:*** Ledermix†; ***Fr.:*** Alodont; Pectoderme†; ***Ger.:*** Ledermix; ***Gr.:*** Counterpain; ***Hong Kong:*** Begesic; Counterpain; Flanil; ***Indon.:*** Counterpain; Counterpain-PXM; Lafalos; Molakrim; Nufasic; Painkila; Remakrim; Stop X; Zeropain; ***Israel:*** Dentin; ***Ital.:*** Creosoto Composto; Eugenol-Guaiacolo Composto; Odongi; Odontalgiche (Dentali)†; ***Malaysia:*** Flanil; ***Philipp.:*** Begesic; Counterpain; ***S.Afr.:*** Counterpain; ***Singapore:*** Antipain; Begesic; Counterpain; Flanil; ***Spain:*** Alvogil; Piorlis; Tangenol†; Tifell†; ***Switz.:*** Alodont†; Alvogyl; Benzocaine PD; Ledermix; ***Thai.:*** Begesic†; Centropain; Counterpain; Counterpain Plus; Filup; Flanil; Heat Cream; Hot Ize; Masabalm; Muscalax; Neotica†; Nox-Pain; Olympic Balm†; Painza; Reduxpain; Sancago; Stopain; X-Pain; ***UK:*** Ledermix; ***Venez.:*** Flemicaine.

Euphorbia

Euforbia; Pill-bearing Spurge; Snake Weed.

Pharmacopoeias. *Chin.* includes monographs for *Euphorbia humifusa* or *E. maculata* herb and *E. pekinensis* root.

Profile
Euphorbia, the aerial parts of *Euphorbia hirta* (*E. pilulifera*, *Chamaesyce hirta*) (Euphorbiaceae), has sedative and expectorant properties and is used in the treatment of asthma and other