

Preparations

Proprietary Preparations (details are given in Part 3)
Austria: Colme; **Rus.:** Colme (Комме); **Spain:** Colme.

Calcium Dihydrogen Phosphate

Acid Calcium Phosphate; Calcium Dihydrogenphosphoricum; E341; Fosfato monocálcico; Monobasic Calcium Phosphate; Monocalcium Phosphate. Calcium tetrahydrogen diphosphate monohydrate.

$\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot \text{H}_2\text{O} = 252.1$.
 CAS — 7758-23-8 (anhydrous calcium dihydrogen phosphate).

Pharmacopoeias. In *Jpn* and *Swiss*.

Profile

Calcium dihydrogen phosphate is used in fertilisers. It is also used as an antioxidant in baking powders and flours and as a source of calcium in some mineral supplement preparations.

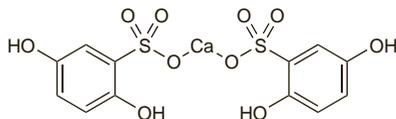
Preparations

Proprietary Preparations (details are given in Part 3)
Multi-ingredient: **Fr.:** Phosphoneuros.

Calcium Dobesilate (*rINN*)

Calcii dobesilas; Calcium, dobésilate de; Calcium Doxybenzylate; CLS-2210; Dobesilan vápenatý; Dobésilate de Calcium; Dobesilato de calcio; 205E; Kalcio dobesilas; Kalciumdobesilat; Kalcium-dobezilat; Kalsiumdobesilaatti; Kalsiyum Dobesilat. Calcium 2,5-dihydroxybenzenesulphonate.

Кальция Добезилат
 $\text{C}_{12}\text{H}_{10}\text{CaO}_{10}\text{S}_2 = 418.4$.
 CAS — 88-46-0 (dobesilic acid); 20123-80-2 (calcium dobesilate).
 ATC — C05BX01.
 ATC Vet — QC05BX01.



Pharmacopoeias. In *Eur.* (see p.vii) which specifies the monohydrate.

Ph. Eur. 6.2 (Calcium Dobesilate Monohydrate). A white or almost white hygroscopic powder. Very soluble in water; freely soluble in dehydrated alcohol; practically insoluble in dichloromethane; very slightly soluble in isopropyl alcohol. A 10% solution in water has a pH of 4.5 to 6.0. Store in airtight containers. Protect from light.

Profile

Calcium dobesilate is claimed to reduce capillary permeability and has been used in various peripheral circulatory disorders including diabetic retinopathy and haemorrhoids (p.1697). Gastrointestinal disturbances have occurred with its use, and there are also reports of hypersensitivity reactions.

Calcium dobesilate is given orally in usual doses of 0.5 to 1.5 g daily in divided doses. It is also given rectally for haemorrhoids and is an ingredient of some preparations given for various skin disorders.

◇ **Reviews.**

- Tejerina T, Ruiz E. Calcium dobesilate: pharmacology and future approaches. *Gen Pharmacol* 1998; **31**: 357-60.
- Berthet P, et al. Calcium dobesilate: pharmacological profile related to its use in diabetic retinopathy. *Int J Clin Pract* 1999; **53**: 631-6.

Adverse effects. Agranulocytosis has been reported¹⁻³ in a few patients after treatment with calcium dobesilate, and in 2 cases recurred on challenge.^{1,2} However, a later review⁴ of the safety profile of calcium dobesilate concluded that the overall risk of adverse effects was low with the most prominent symptoms being fever, arthralgias, and gastrointestinal disturbances. Reports of agranulocytosis were rare and the authors concluded that there may have been methodological bias in previous assessments of risk.

- Kulesa W, et al. Wiederholte Agranulozytose nach Einnahme von Calciumdobesilat. *Dtsch Med Wochenschr* 1992; **117**: 372-4.
- Cladera Serra A, et al. Agranulocytosis inducida por dobesilato calcico. *Med Clin (Barc)* 1995; **105**: 558-9.
- García Benayas E, et al. Calcium dobesilate-induced agranulocytosis. *Pharm World Sci* 1997; **19**: 251-2.
- Allain H, et al. Safety of calcium dobesilate in chronic venous disease, diabetic retinopathy and haemorrhoids. *Drug Safety* 2004; **27**: 649-60.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Doxium; Duffelmina†; Eflivar; **Austria:** Doxium; Vasactin; **Chile:** Doxium; **Cz.:** Danium; Dobica; Doxium; **Ger.:** Dexium; Dobica; **Gr.:** Doxytrex; Nugatex; **Hong Kong:** Dobesifast†; Doxium; **Hung.:** Doxilek; Doxium; **India:** Dobilet; **Ital.:** Doxium; **Malaysia:** Doxium; **Mex.:** Doxium;

Philipp.: Doxium; **Pol.:** Doxium; **Port.:** Doxi-Om; **Rus.:** Doxi-Hem (Докси-хем); **S.Afr.:** Doxium; **Spain:** Doxium; **Switz.:** Doxium; **Turk.:** Doxium; **Venez.:** Deoxicall; Doxium.

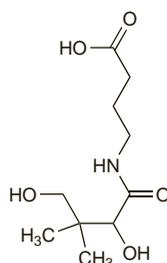
Multi-ingredient: **Arg.:** Vasodual†; **Cz.:** Danium Compositum†; Dobexil; Dobexil Plus†; Doxiproct; Doxiproct Plus; Doxivenil†; **Hung.:** Doxiproct; Doxiproct Plus; Doxivenil; **Ital.:** Doxiproct; **Mex.:** Doxiproct Plus; Doxiproct†; **Port.:** Doxiproct; Doxiproct Plus; Doxivenil; **Spain:** Acnisdin; Acnisdin Retinoico; Proctium; **Switz.:** Doxiproct; Doxiproct Plus; Doxivenil; **Venez.:** Doxivenil.

Calcium Hopantenate (*rINN*)

Calcii Hopantenas; Calcium Homopantothenate; Hopanténate de Calcium; Hopantenato cálcico. Calcium D-(+)-4-(2,4-dihydroxy-3,3-dimethylbutyramido)butyrate hemihydrate.

Кальций Гопантенат

$\text{Ca}(\text{C}_{10}\text{H}_{18}\text{NO}_5)_2 \cdot \text{H}_2\text{O} = 513.6$.
 CAS — 18679-90-8 (hopantenic acid); 17097-76-6 (anhydrous calcium hopantenate); 1990-07-4 (calcium hopantenate hemihydrate).



(hopantenic acid)

Profile

Calcium hopantenate is a homologue of pantothenic acid (p.1959) and has been tried in the treatment of various behavioural and extrapyramidal disorders. Its use is limited by severe metabolic adverse effects and fatalities have been reported.

Preparations

Proprietary Preparations (details are given in Part 3)

Rus.: Pantocalcin (Пантокальцин); Pantogam (Пантогам); Pantohamum (Пантогам)†.

Calcium Hydroxide

Calcii hydroxidum; Calcium Hydrate; Calcium, hydroxyde de; E526; Hidróxido cálcico; Hydroxid vápenatý; Kalcio hidroksidas; Kalcium-hydroxid; Kalciumhydroxid; Kalsiumhydroksidi; Slaked Lime; Wapnia wodorotlenek.

$\text{Ca}(\text{OH})_2 = 74.09$.

CAS — 1305-62-0.

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

Ph. Eur. 6.2 (Calcium Hydroxide). A fine white or almost white powder. Practically insoluble in water.

USP 31 (Calcium Hydroxide). A white powder with a slightly bitter alkaline taste. Soluble 1 in 630 of water and 1 in 1300 of boiling water; insoluble in alcohol; soluble in glycerol and in syrup. Store in airtight containers.

Profile

Calcium hydroxide is a weak alkali. It is used in the form of Calcium Hydroxide Solution (lime water) in some skin lotions and oily preparations to form calcium soaps of fatty acids which produce water-in-oil emulsions.

Calcium hydroxide pastes are used in dentistry. A paste made from a mixture of calcium hydroxide and potassium hydroxide and known as Vienna paste was used as an escharotic. Soda lime (p.2388) is a mixture of calcium hydroxide and potassium hydroxide and/or sodium hydroxide. With sulfur, calcium hydroxide forms sulfated lime solution (p.1614).

Homeopathy. Calcium hydroxide has been used in homeopathic medicines under the following names: Calcarea caustica; Cal. caus.

Adverse effects. A report of ocular alkali burns in children, leading to severe visual loss, caused by packets of calcium hydroxide ('Chuna') popularly consumed in India as an additive to chewing tobacco.¹

For the use of sodium edetate in the treatment of calcium hydroxide burns of the eye, see p.1464.

- Agarwal T, Vajpayee RB. A warning about the dangers of chuna packets. *Lancet* 2003; **361**: 2247.

Preparations

BP 2008: Calcium Hydroxide Solution;
USP 31: Calcium Hydroxide Topical Solution.

Proprietary Preparations (details are given in Part 3)
Ger.: Dermi-cyl; **Mex.:** Oleoderm.

Multi-ingredient: **Cz.:** Aviril H†; **Mex.:** Caliderm; Liniderm; Oleoderm Plus; **Pol.:** Acne Sulf; **Spain:** Cremsol; **Switz.:** Sansilla.

Calcium Oxide

Calcii Oxidum; Calcium Oxidatum; Calcium, oxyde de; Calx; Calx Usta; Chaux Vive; E529; Gebrannter Kalk; Lime; Oxid vápenatý; Óxido de calcio; Quicklime; Wapnia tlenek; Wapnia tlenek.

$\text{CaO} = 56.08$.
 CAS — 1305-78-8.
 ATC Vet — QP53AX18.

Pharmacopoeias. In *Jpn*, *Pol.*, and *US*.

USP 31 (Lime). Hard, odourless, white or greyish-white masses, granules, or powder. When it is moistened with water a reaction occurs, heat being evolved and calcium hydroxide formed. Slightly soluble in water; very slightly soluble in boiling water. Store in airtight containers.

Adverse Effects and Treatment

Calcium oxide may cause burns on contact with moist skin and mucous membranes; it is particularly irritant to the eyes. Washing or flooding of affected areas may need to be prolonged. Pneumonitis may follow inhalation.

◇ For the use of sodium edetate in the treatment of calcium oxide burns of the eye, see p.1464.

Uses and Administration

Calcium oxide has been used in various dermatological preparations. A paste made from a mixture of calcium oxide and sodium hydroxide and known as London paste was used as an escharotic.

Preparations

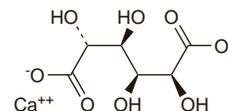
Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Ital.:** Oleo Calcarea†.

Calcium Saccharate (*rINN*)

Calcii Saccharas; Calcium D-Saccharate; Sacarato cálcico; Sacarato de calcio; Saccharate de Calcium; Suate de Calcium. Calcium D-glucarate tetrahydrate.

Кальция Сахарат
 $\text{C}_{12}\text{H}_{20}\text{CaO}_{16} \cdot 4\text{H}_2\text{O} = 320.3$.
 CAS — 5793-88-4 (anhydrous calcium saccharate); 5793-89-5 (calcium saccharate tetrahydrate).



NOTE. The names calcium saccharate and calcium sucrate have also been used to describe saccharated lime.

Pharmacopoeias. In *US*.

USP 31 (Calcium Saccharate). A white, odourless, crystalline powder. Very slightly soluble in cold water and in alcohol; slightly soluble in boiling water; practically insoluble in chloroform and in ether; soluble in dilute mineral acids and in solutions of calcium gluconate.

Profile

Calcium saccharate is used as a stabilising agent in solutions of calcium gluconate for injection. Each g of calcium saccharate contains about 3.1 mmol of calcium. Calcium saccharate 8 g is equivalent to about 1 g of calcium.

Preparations

Proprietary Preparations (details are given in Part 3)

Austria: Calcium Fresenius; **Ger.:** Calcium Fresenius†;
Multi-ingredient: **Ger.:** Calcium Braun; **Switz.:** C-Calcium; Glucocalcium.

Calcium Sulfate

Calcii sulfas; Calcium, sulfat de; Calcium Sulphate; E516; Gypsum (calcium sulfate dihydrate); Kalcio sulfatas; Kalciumsulfat; Kalcium-sulfát; Kalsiumsulfatti; Síran vápenatý; Sulfato cálcico; Wapnia siarczan.

$\text{CaSO}_4 = 136.1$.
 CAS — 7778-18-9 (anhydrous calcium sulfate); 10101-41-4 (calcium sulfate dihydrate).

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Int.*, and *Jpn* which specify the dihydrate. Also in *USNF* which specifies the dihydrate or the anhydrous material.

Ph. Eur. 6.2 (Calcium Sulphate Dihydrate). A white or almost white fine powder. Very slightly soluble in water; practically