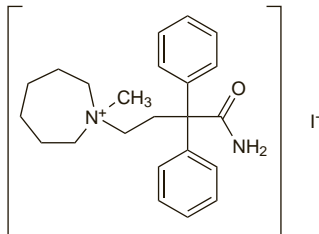


**Preparations****Proprietary Preparations** (details are given in Part 3)**Indon.:** Coliopan; **Jpn.:** Coliopan; **Malaysia:** Coliopan; **Singapore:** Coliopan†.**Buzepide Metiodide** (*rINN*)

Buzépide, Métiodure de; Buzepidi Metiodidum; Diphexamide lodomethylate; Fl-6146; Metazepium iodide; Metioduro de buzepida; R-661. 1-(3-Carbamoyl-3,3-diphenylpropyl)-1-methylperhydroazepinium iodide.

Бузепада Метїодид  
C<sub>23</sub>H<sub>31</sub>N<sub>3</sub>O = 478.4.  
CAS — 15351-05-0.**Profile**

Buzepide metiodide is a quaternary ammonium antimuscarinic with peripheral effects similar to those of atropine (p.1219). It has been given with other compounds for upper respiratory-tract disorders and in gastrointestinal disorders with smooth muscle spasm.

**Preparations****Proprietary Preparations** (details are given in Part 3)**Multi-ingredient:** **Fr.:** Vesadol†; **Ital.:** Denora†.**Calcium Carbonate**

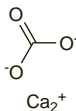
Calcii carbonas; Calcii Carbonas Praecipitatus (precipitated calcium carbonate); Calcium, carbonate de; Carbonato de calcio; Creta Preparada; E170; Kalcio karbonatas; Kalciumkarbonat; Kalciumkarbonat; Kalsiumkarbonaatti; Kalsiyum karbonat; Precipitated Calcium Carbonate; Precipitated Chalk; Uhlíčitan vápenatý; Wapnia węgln; Wapnia węglan strącony (precipitated calcium carbonate).

Кальция Карбонат  
CaCO<sub>3</sub> = 100.1.

CAS — 471-34-1.

ATC — A02AC01; A12AA04.

ATC Vet — QA02AC01; QA12AA04.

**Pharmacopoeias.** In *Chin., Eur.* (see p.vii), *Int., Jpn, US,* and *Viet.***Ph. Eur. 6.2** (Calcium Carbonate). A white or almost white powder. Practically insoluble in water.**USP 31** (Calcium Carbonate). A fine, white, odourless, microcrystalline powder. Practically insoluble in water; its solubility in water is increased by the presence of carbon dioxide or ammonium salts although the presence of any alkali hydroxide reduces its solubility; insoluble in alcohol; dissolves with effervescence in acetic acid, in hydrochloric acid, and in nitric acid.**Adverse Effects, Treatment, and Precautions**

Calcium carbonate may occasionally cause constipation. Flatulence from released carbon dioxide may occur in some patients. High doses or prolonged use may lead to gastric hypersecretion and acid rebound. Like other calcium salts (see p.1676), calcium carbonate can cause hypercalcaemia, particularly in patients with renal impairment or after high doses. Alkalosis (p.1667) may also occur as a result of the carbonate anion. There have been rare reports of the milk-alkali syndrome, see below, and tissue calcification.

For precautions to be observed with the use of calcium carbonate, see Calcium, p.1676.

**Milk-alkali syndrome.** The milk-alkali syndrome of hypercalcaemia, alkalosis and renal impairment was first identified in the 1920s and may still occur in patients who ingest large amounts of calcium and absorbable alkali,<sup>1,2</sup> and in patients being treated for osteoporosis with calcium carbonate plus other drugs that may increase the absorption of calcium.<sup>1</sup> It is not uncommon as a cause of hypercalcaemia requiring hospitalisation.<sup>1</sup> The syndrome has also been reported in a patient taking recommended doses of antacids containing calcium carbonate for chronic epigastric discomfort,<sup>3</sup> and in a pregnant woman taking high, but not grossly excessive, doses of calcium (about 3 g of elemental calcium daily).<sup>4</sup> Metastatic calcification can develop.<sup>5</sup>

For reference to thiazide diuretics increasing the risk of the milk-alkali syndrome in patients taking moderately large doses of calcium carbonate, see p.1310.

1. Picolos MK, *et al.* Milk-alkali syndrome is a major cause of hypercalcaemia among non-end-stage renal disease (non-ESRD) inpatients. *Clin Endocrinol (Oxf)* 2005; **63**: 566–76.
2. Felsenfeld AJ, Levine BS. Milk alkali syndrome and the dynamics of calcium homeostasis. *Clin J Am Soc Nephrol* 2006; **1**: 641–54.
3. Camidge R, Peaston R. Recommended dose antacids and severe hypercalcaemia. *Br J Clin Pharmacol* 2001; **52**: 341–2.
4. Gordon MV, *et al.* Life-threatening milk-alkali syndrome resulting from antacid ingestion during pregnancy. *Med J Aust* 2005; **182**: 350–1.
5. Duthie JS, *et al.* Milk-alkali syndrome with metastatic calcification. *Am J Med* 1995; **99**: 102–3.

**Interactions**

As for other calcium salts, p.1677.

As outlined on p.1692, antacids, including calcium salts, interact with many other drugs both by alterations in gastric pH and emptying, and by formation of complexes that are not absorbed. Interactions can be minimised by giving calcium carbonate and any other medication 2 to 3 hours apart.

**Omeprazole.** In a study<sup>1</sup> of 18 women over the age of 65, the use of omeprazole for a week significantly reduced the absorption of calcium from a calcium carbonate supplement given on an empty stomach. Fractional calcium absorption was reduced from 9.1% with placebo to 3.5% with omeprazole.

1. O'Connell MB, *et al.* Effects of proton pump inhibitors on calcium carbonate absorption in women: a randomized crossover trial. *Am J Med* 2005; **118**: 778–81.

**Pharmacokinetics**

Calcium carbonate is converted to calcium chloride by gastric acid. Some of the calcium is absorbed from the intestines and the unabsorbed portion is excreted in the faeces, as described for other calcium salts, p.1677.

**Uses and Administration**

Calcium carbonate is used as an antacid (p.1692), usually in oral doses of up to about 1.5 g. It is often given with other antacids, especially magnesium-containing antacids.

Calcium carbonate is also used as a calcium supplement in deficiency states and as an adjunct in the management of osteoporosis, as described under Calcium, p.1677.

Calcium carbonate binds phosphate in the gastrointestinal tract to form insoluble complexes and reduces phosphate absorption. It is used to treat hyperphosphataemia in patients with chronic renal failure (see Renal Osteodystrophy, p.1086) or associated secondary hyperparathyroidism (p.1087). For this purpose, initial doses of 2.5 g daily by mouth in divided doses have been given, increased to up to 17 g daily in divided doses as required. The *BNFC* suggests the following doses in infants and children, given 3 or 4 times daily with or before meals, and adjusted as necessary:

- 1 month to 1 year of age, 120 mg
- 1 to 6 years, 300 mg
- 6 to 12 years, 600 mg
- 12 to 18 years, 1.25 g

Calcium carbonate is also used as a food additive.

**Homoeopathy.** Native forms of calcium carbonate have been used in homoeopathic medicines under the following names: Calcarea Carbonica; Calc. Carb.; Calcium carbonicum Hahnemanni; Conchae; Calcium Carbonate of Hahnemann; Cal. carb.**Preparations****BP 2008:** Alginate Raft-forming Oral Suspension; Calcium and Colecalciferol Tablets; Chewable Calcium Carbonate Tablets; **USP 31:** Alumina, Magnesia, and Calcium Carbonate Oral Suspension; Alumina, Magnesia, and Calcium Carbonate Tablets; Alumina, Magnesia, Calcium Carbonate, and Simethicone Tablets; Aluminum Subacetate Topical Solution; Calcium and Magnesium Carbonates Oral Suspension; Calcium and Magnesium Carbonates Tablets; Calcium Carbonate and Magnesia Tablets; Calcium Carbonate Lozenges; Calcium Carbonate Oral Suspension; Calcium Carbonate Tablets; Calcium Carbonate, Magnesia, and Simethicone Tablets.**Proprietary Preparations** (details are given in Part 3)**Arg.:** Bica†; Calcio Acido; Calcional; Calcium-Sandoz; Cavirox Junior†; Dexacid†; Mylanta Pocket†; Pluscal; Renacalcio; Ultracalcium; Uvasal Tums; **Austral.:** Andrews Tums Antacid; Cal-Sup; Caltrate; Sandocal; Titralac; **Austria:** Calcium-Sandoz; Dreisacarb; **Belg.:** Cacit; Calci-Chew; Sandoz Calcium; Steocar; **Braz.:** Calcium-Sandoz F; Calciumvit†; Calsan; Maxical; Natecalc†; Nutricalcio†; Os-Cal; Osporin†; Osseopor; **Canad.:** Apo-Cal; Cal-500; Calcite; Calcium Oyster Shell; Calcium-Sandoz†; Calsan; Caltrate; Hi Potency Cal; Maalox Extra Strength; Maalox Quick Dissolve†; Maalox Regular Strength; Neo Cal; Nu Cal; Os-Cal; Tums; **Chile:** Aplicar†; Calcefor; Calcefor Cap; Calcio; Calcium Forte; Calcium-Sandoz; Kalcidon; Caprimida; Elcal; Kaplus; Levucal; Natecalc; Sanidecal; **Cz.:** Maxi-Kalz; Vitacalcin; **Denm.:** Calcium-Sandoz; **Fin.:** Calcichew; Calcium-Sandoz; Kalcidon; Kalcipos; **Fr.:** Cacit; Calcidia; Calcidose; Calciprat; Calcium-Sandoz; Calperos; Calprimum; Caltrate; Deniscal; Deniscal vitamine D ; Eucalcic; Fixical; Osteocal; Perical; **Ger.:** Basti-Cal†; Biolectra Calcium†; Calci-Gry; Calcigamma; Calcimagon; Calcimed†; Calcitridin†; Calcium AL; Calcium beta; Calcium Dago†; Calcium Heumann†; Calcium Hexal†; Calcium Stada; Calcium Verla; Calcium von CT; Calcium-dura; Calcium-Sandoz; CC-Nefro; Dreisacarb; Loscalcon; Ospar; Ca; Vivural†; **Gr.:** Alcamex; Body-Calcin; Calcioral; Tums; **Hong Kong:** Apo-Cal; Calcichew†; Calcium-Sandoz†; Caltrate; Os-Cal; Scott's Hi-Calcium; Titralac; **Hung.:** Beres Calcium; Calcicarb; Calcichew; Calcium-Sandoz; **India:** Calcium-Sandoz; Sandocal†; **Indon.:** Calcium-Sandoz Junior Strength; Calnat; Calos; Calsan; Osteocal; Stomacain; **Irl.:** Cacit†; Calcichew; Rennie Chewable Tablets; Rowarolan; Sandocal; Tums†; **Israel:** Calci-Rav; Calcimoro; Calcium-Sandoz; Caltrate; Fast; Tums; Tzarevet X; **Ital.:** Adiecal; Biocalcium; Cacit; Cal-Car; Calbisant†; Calciodie; Calcioipio; Calcium-Sandoz; Calmo; Carbo; Carboisint; Carbotop†; Citracal†; Fervical†; Idracal; Lubical; Metocal; Recal; Salcalcium†; Savelcal; Top Calcium; Unical†; **Malaysia:** Apo-Cal†; Cal-Sup; Caltrate; **Mex.:** Bexacal; Calcifar; Calcium-Sandoz; Calsan; Caltrate; Cioacar; Gnsical†; Mubonet; Osteomin; Solibone; Tums; **Neth.:** Cacit; Calci-Chew; Calcium-Sandoz; **Norw.:** Calcium-Sandoz; Titralac; **NZ:** Calcium-Sandoz; Caltrate; Osteo; Titralac; **Philipp.:** Calci-Aid; Calcium-Sandoz; Calmate; Calsan; Tums; **Pol.:** Additiva Calcium; Calcium-Sandoz Forte; Calmore; FruCal; Ostical; Vicalvit; **Port.:** Calcium; Calcioral; Calcitab; Calcium-Sandoz; Natecalc; Sandocal; Tums; **Rus.:** Calcium-Sandoz Forte (Кальций-Сандоз Форте); **S.Afr.:** Calcichew; Calcium-Sandoz; Cal-suba; Caltrate; Titralac; Tums; **Singapore:** Cal-Sup†; Calcium-Sandoz; Caltrate; **Spain:** Calcio 20†; Calcium-Sandoz Forte; Caosina; Carboval; Cimasal; Deniscal; Fortical†; Mastical; Natecalc; **Swed.:** Calcitugg; Calcium-Sandoz; Kalcidon; Kalcipos; Kalcitena; **Switz.:** Calcium-Sandoz; Calperos; Fixateur phospho-calcique; Maxi-calc†; **Thai.:** Bo-Ne-Ca; Cal-Os; Calcanate; Calcar; Calcarbonate; Calcium Central Poly; Calcium-Sandoz; Calsum; Caltab; Caltrate; Carboval; Carbovalc; Kal-Forte; Prima-Cal; Sorcal†; Wei-fa-Calcium; **Turk.:** Anti-Fosfat Cc; Calcium-Sandoz; UK; Adcal; Cacit; Calcichew; Rapp-eze; Remege†; Rennie Soft; Chews; Sandocal; Sea-Cal; Setlers; Titralac†; Tums; **USA:** Alka-Mints; Alklets†; Amitone†; Antacid; Calci-Chew; Calci-Mix; Calcium-600; Caltrate; Chooz; Equile†; Maalox Antacid/Calcium†; Maalox Childrens; Maalox Quick Dissolve†; Malmalmit; Mylanta; Nephro-Calci; Os-Cal; Oysco; Oyst-Cal; Rolaids Extra Strength Softchews; Surpass; Titralac Extra Strength†; Triul Antacid; Tums; **Venez.:** Calcium; Calcium-Sandoz; Caltrate†; Foscalvit; Frutacid; Oscal†; Sandocal; Titralac; Tums.**Multi-ingredient:** numerous preparations are listed in Part 3.Used as an adjunct in: **Arg.:** Aspirina; Bufferin†; **Braz.:** Bufferin; **Canad.:** Aspirin with Stomach Guard; Bufferin; Tri-Buffered ASA; **Hung.:** Kalmopyrin†; **Ital.:** Bufferin†; **Pol.:** Calcipyrina; Polopiryna S; **USA:** Adpinn-B; Aspirin†; Aspirin†; Bufferin†; Extra Strength Bayer Plus; Magnaprin†.**Carboxolone Sodium** (BANM, USAN, rINNM)

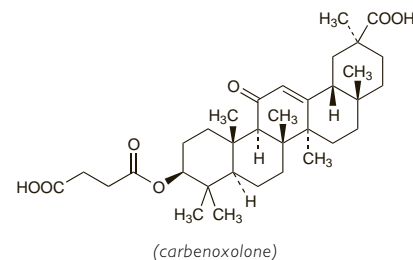
Carbenoxolona sódica; Carbenoxolone Sodique; Disodium Enoxolone Succinate; Karbenoksolon Sodium; Natrii Carbenoxolonum. 3β-(3-Carboxypropionyloxy)-11-oxo-olean-12-en-30-oic acid, Disodium Salt.

Натрий Карбеноксолон

C<sub>34</sub>H<sub>48</sub>Na<sub>2</sub>O<sub>7</sub> = 614.7.CAS — 5697-56-3 (*carbenoxolone*); 7421-40-1 (*carbenoxolone disodium*).

ATC — A02BX01.

ATC Vet — QA02BX01.



(carbenoxolone)

**Pharmacopoeias.** In *Br.***BP 2008** (Carbenoxolone Sodium). A white or pale cream-coloured, hygroscopic powder. Freely soluble in water; sparingly soluble in alcohol; practically insoluble in chloroform and in ether. A 10% solution in water has a pH of 8.0 to 9.2.**Adverse Effects, Treatment, and Precautions**

Carbenoxolone sodium has mineralocorticoid-like effects and ingestion may produce sodium and water retention and hypoka-