for a period of up to 12 weeks. Improvement usually occurs in 4 to 8 weeks.

◊ References.

1. Fitton A, Goa KL. Azelaic acid: a review of its pharmacological properties and therapeutic efficacy in acne and hyperpigmentary skin disorders. *Drugs* 1991; **41:** 780–98.
2. Breathnach AS. Melanin hyperpigmentation of skin: melasma, topical treatment with azelaic acid, and other therapies. *Cutis* 1996; **57** (suppl): 36–45.
3. Elewski B, Thiboutot D. A clinical overview of azelaic acid. *Cutis* 2006; **77** (suppl): 12–16.
4. Del Rosso JQ. The use of topical azelaic acid for common skin disorders other than inflammatory rosacea. *Cutis* 2006; **77** (suppl): 22–4.
5. Liu RH, *et al.* Azelaic acid in the treatment of papulopustular rosacea: a systematic review of randomized controlled trials. *Arch Dermatol* 2006; **142:** 1047–52.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Cutacelan; ***Austral.:*** Finacea; Skinoren; ***Austria:*** Skinoren; ***Belg.:*** Skinoren; ***Braz.:*** Azelan; Dermizan; ***Cz.:*** Aknoren; Skinoren; ***Denm.:*** Finacea; Skinoren; ***Fin.:*** Skinoren; ***Fr.:*** Finacea; Skinoren; ***Ger.:*** Skinoren; ***Gr.:*** Alenzantyl; Azedose; Azelac; Azelaxine; Azelderm; Cevigen; Chemilaic†; Exazen; Forcilen†; Kenedril; Noreskin; Opilet; Prevolac†; Skinoren; Sonalent; Zelicrema; Zorkenil; Zumilin; ***Hong Kong:*** Qualicren; Qualilaic; Skinoren; ***Hung.:*** Skinoren; ***Indon.:*** Aza 20; Skinoren; Zelface; Zeliris; ***Irl.:*** Skinoren; ***Israel:*** Skinoderm; ***Ital.:*** Acnezaic†; Finacea; Neocutis; Skinoren; ***Malaysia:*** Skinoren; ***Mex.:*** Cutacelan†; Finacea; ***Norw.:*** Finacea; Skinoren; ***NZ:*** Skinoren; ***Philipp.:*** Skinoren; ***Pol.:*** Acne-Derm; Hascoderm; Skinoren; ***Port.:*** Dermazil; Finacea; Skinoren; ***Rus.:*** Skinoren (Скинорен); ***S.Afr.:*** Skinoren; ***Singapore:*** Skinoren; ***Spain:*** Finacea; Skinoren; Zeliderm; ***Swed.:*** Finacea; Skinoren; ***Switz.:*** Skinoren; ***Thai.:*** Skinoren; ***Turk.:*** Azelderm; Skinoren; ***UK:*** Finacea; Skinoren; ***USA:*** Azelex; Finacea; Finevin; ***Venez.:*** Cutacelan.

Multi-ingredient: ***Austral.:*** Acnederm Medicated; ***Hong Kong:*** Acnederm; ***Ital.:*** Zeroac; ***Malaysia:*** Acnederm Lotion; ***NZ:*** Acnederm; ***Singapore:*** Acnederm.

Becaplermin *(BAN, USAN, rINN)*

Becaplermina; Bécaplermine; Becaplerminum; Bekaplermiini; Bekaplermin; RWJ-60235. Recombinant human platelet-derived growth factor B.

Бекаплермин

CAS — 165101-51-9.
ATC — D03AX06.
ATC Vet — QD03AX06.

Profile

Becaplermin is a recombinant human platelet-derived growth factor (rhPDGF-BB) that enhances the formation of granulation tissue and promotes wound healing (p.1585). Becaplermin is applied topically as a 0.01% gel in the management of full thickness neuropathic diabetic skin ulcers (see Diabetic Complications, p.433). It is applied once daily, covered by a moist saline gauze dressing, for up to 20 weeks. If no meaningful healing process (decrease in ulcer size of about 30%) is evident after 10 weeks of therapy, treatment should be re-assessed.

Becaplermin should not be applied to ulcers where neoplasms are present or to clinically infected ulcers. If the ulcer becomes infected during therapy, becaplermin should be stopped until the infection has cleared. US licensed product information warns that an increased rate of death from all cancers has been seen in patients treated with 3 or more tubes of becaplermin gel (tube size not specified).

Becaplermin is used with a resorbable synthetic calcium phosphate matrix to promote bone and tissue growth in the treatment of periodontal disease. It is also under investigation in the treatment of osteonecrosis of the jaw, fractures, and osteoporosis, and in the repair of cartilage, ligament, and tendon injuries.

◊ References.

1. Wieman TJ, *et al.* Efficacy and safety of a topical gel formulation of recombinant human platelet-derived growth factor-BB (becaplermin) in patients with chronic neuropathic diabetic ulcers: a phase III randomized placebo-controlled double-blind study. *Diabetes Care* 1998; **21:** 822–7.
2. Smiell JM, *et al.* Efficacy and safety of becaplermin (recombinant human platelet-derived growth factor-BB) in patients with nonhealing, lower extremity diabetic ulcers: a combined analysis of four randomized studies. *Wound Repair Regen* 1999; **7:** 335–46.
3. Guzman-Gardearzabal E, *et al.* Treatment of chronic ulcers in the lower extremities with topical becaplermin gel .01%: a multicenter open-label study. *Adv Therapy* 2000; **17:** 184–9.
4. Mandracchia VJ, *et al.* The use of becaplermin (rhPDGF-BB) gel for chronic nonhealing ulcers: a retrospective analysis. *Clin Podiatr Med Surg* 2001; **18:** 189–209.
5. Nagai MK, Embil JM. Becaplermin: recombinant platelet derived growth factor, a new treatment for healing diabetic foot ulcers. *Expert Opin Biol Ther* 2002; **2:** 211–18.
6. Nevins M, *et al.* Platelet-derived growth factor stimulates bone fill and rate of attachment level gain: results of a large multicenter randomized controlled trial. *J Periodontol* 2005; **76:** 2205–15.
7. McGuire MK, *et al.* rhPDGF-BB promotes healing of periodontal defects: 24-month clinical and radiographic observations. *Int J Periodontics Restorative Dent* 2006; **26:** 223–31. Correction. *ibid.* 2007; **27:** 88.

Preparations

Proprietary Preparations (details are given in Part 3)
Austria: Regranex; ***Canad.:*** Regranex; ***Cz.:*** Regranex; ***Fr.:*** Regranex; ***Ger.:*** Regranex; ***Gr.:*** Regranex; ***Israel:*** Regranex; ***Mex.:*** Regranex; ***Neth.:*** Regranex; ***Port.:*** Regranex; ***Spain:*** Regranex; ***Switz.:*** Regranex; ***UK:*** Regranex; ***USA:*** Regranex.

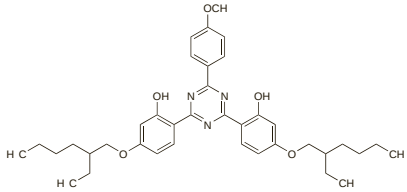
Multi-ingredient: ***USA:*** GEM 21S.

Bemotrizinol *(USAN, rINN)*

Bémotrizinol; Bemotrizinolum; BEMT; Bis-ethylhexyloxyphenol Methoxyphenol Triazine; FAT-70884. 2,2′-[6-(4-Methoxyphenyl)-1,3,5-triazine-2,4-diyl]bis{5-[(2-ethylhexyl)oxy]phenol}.

Бемотрицинол

$C_{38}H_{49}N_3O_5$ = 627.8.
CAS — 187393-00-6.



NOTE. Tinosorb S is a trade name that has been used for bemotrizinol.

Profile

Bemotrizinol is used as a sunscreen (p.1576). It is effective against UVA light (for definitions, see p.1580).

Preparations

Proprietary Preparations some preparations are listed in Part 3.

Bentoquatam *(USAN)*

Quaternium 18-bentonite.

Бентокватам

CAS — 1340-69-8.

Profile

Bentoquatam, described as an organoclay compound, is a barrier preparation that is applied topically as a 5% lotion to prevent allergic contact dermatitis caused by poison ivy, poison oak, or poison sumac. The lotion is applied in a sufficient quantity to form a visible coating 15 minutes before possible contact with the plants. If continued protection is required the lotion may be re-applied every 4 hours or at any time if the visible coating is removed.

Preparations

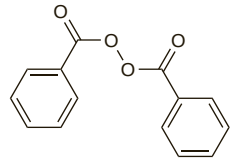
Proprietary Preparations (details are given in Part 3)
USA: Ivy Block.

Benzoyl Peroxide *(USAN)*

Bensoylperoxid; Bentsoyyliperoksidi; Benzoilo peroksidas; Benzoil-peroxid; Benzoyil Peroksit; Benzoylis peroxidum; Benzoylperoxid; NSC-675; Peróxido de benzoilo; Peroxyde de benzoyle. Dibenzoyl peroxide.

Бензоил Пероксид; Пероксид Бензоила

$C_{14}H_{10}O_4$ = 242.2.
CAS — 94-36-0 (anhydrous benzoyl peroxide).
ATC — D10AE01.
ATC Vet — QD10AE01; QD11AX90.



(anhydrous benzoyl peroxide)

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Int.*, and *US*.
Ph. Eur. 6.2 (Benzoyl Peroxide, Hydrous). It contains not less than 70% and not more than 77% of anhydrous benzoyl peroxide and not less than 20% of water. It rapidly loses water on exposure to air and may explode if the water content is too low. A white or almost white, amorphous or granular powder. Practically insoluble in water; slightly soluble in alcohol; soluble in acetone; soluble in dichloromethane with separation of water. Store at 2° to 8° in a container that has been treated to reduce static charges and that has a device for the release of excess pressure. Unused material should not be returned to its original container but should be destroyed by the addition of sodium hydroxide solution (10%). Destruction can be considered to be complete if the addition of a crystal of potassium iodide does not result in the release of free iodine after acidification with dilute hydrochloric acid. Protect from light.
USP 31 (Hydrous Benzoyl Peroxide). It contains not less than 65% and not more than 82% of anhydrous benzoyl peroxide with a water content of about 26%. The hydrous form is a white granular powder with a characteristic odour. Sparingly soluble in water and in alcohol; soluble in acetone, in chloroform, and in ether. Store in the original container, treated to reduce static charges. Unused material should not be returned to its original container but should be destroyed by the addition of sodium hydroxide solution (10%). Destruction can be considered to be complete if the addition of a crystal of potassium iodide does not result in the release of free iodine.

Adverse Effects and Precautions

Topical application of benzoyl peroxide may produce skin irritation, particularly at the start of treatment. In some patients the irritation may require reduced frequency of application or temporary suspension of treatment. Skin dryness, peeling, rash, and transient local oedema may also occur. Contact sensitisation has been reported in some patients using preparations containing benzoyl peroxide. Caution is required when applying it near the eyes, the mouth and other mucous membranes, and to the neck and other sensitive areas. Patients should be alerted to benzoyl peroxide's bleaching property.

Body odour. An unusual unpleasant body odour in a patient was attributed to the topical use of benzoyl peroxide.[1]

1. Molberg P. Body odor from topical benzoyl peroxide. *N Engl J Med* 1981; **304:** 1366.

Carcinogenicity. There has been concern at the implications of some *animal* studies showing benzoyl peroxide to possess some tumour-promoting activity.[1] However, a retrospective survey in Canada concluded that there was no indication that the normal use of benzoyl peroxide in the treatment of acne was associated with an increased risk of facial cancer.[2] A comprehensive review[3] that included *in-vitro* and *animal* studies, as well as human data, also concluded that there was no evidence to associate the topical use of benzoyl peroxide with the development of skin cancer in humans. However, the International Agency for Research on Cancer[4] considers that there is inadequate evidence in humans and its overall evaluation is that benzoyl peroxide is not classifiable as to its carcinogenicity to humans.

1. Jones GRN. Skin cancer: risk to individuals using the tumour promoter benzoyl peroxide for acne treatment. *Hum Toxicol* 1985; **4:** 75–8.
2. Hogan DJ, *et al.* A study of acne treatments as risk factors for skin cancer of the head and neck. *Br J Dermatol* 1991; **125:** 343–8.
3. Kraus AL, *et al.* Benzoyl peroxide: an integrated human safety assessment for carcinogenicity. *Regul Toxicol Pharmacol* 1995; **21:** 87–107.
4. IARC/WHO. Benzoyl peroxide. *IARC monographs on the evaluation of carcinogenic risks to humans volume 71* 1999. Available at: http://monographs.iarc.fr/ENG/Monographs/vol71/volume71.pdf (accessed 27/09/07)

Handling. Benzoyl peroxide powder may explode if subjected to grinding, percussion, or heat. Hydrous benzoyl peroxide containing water to reduce the risk of explosion may still explode if exposed to temperatures higher than 60° or cause fires in the presence of reducing substances.

Hypersensitivity. Benzoyl peroxide appears to induce contact hypersensitivity quite often when used to treat leg ulcers,[1] but it is unclear how often this occurs when used in the treatment of acne.[2] Patch testing[3,4] in some studies suggests that up to 76% of patients may be hypersensitive to benzoyl peroxide but this does not appear to correlate either with the clinical irritation produced during treatment, which usually resolves on continued use, or with the reported incidence of hypersensitivity.[2,4] In one study 25% of patients were considered to be hypersensitive from patch testing but only 2 of 44 patients developed clinical hypersensitivity.[4] Another study involving 204 patients with acne found that the incidence of false-positive irritant skin reactions to benzoyl peroxide was about 15% but only 1% of the patients had true allergic reactions to the drug on further testing.[5] However, there has been concern that hypersensitivity to benzoyl peroxide may be mistaken for irritation or worsening of the acne.[3]

1. Vena GA, *et al.* Contact dermatitis to benzoyl peroxide. *Contact Dermatitis* 1982; **8:** 338.
2. Cunliffe WJ, Burke B. Benzoyl peroxide: lack of sensitization. *Acta Derm Venereol (Stockh)* 1982; **62:** 458–9.
3. Leyden JJ, Kligman AM. Contact sensitization to benzoyl peroxide. *Contact Dermatitis* 1977; **3:** 273–5.
4. Rietschel RL, Duncan SH. Benzoyl peroxide reactions in an acne study group. *Contact Dermatitis* 1982; **8:** 323–6.
5. Balato N, *et al.* Acne and allergic contact dermatitis. *Contact Dermatitis* 1996; **34:** 68–9.

Pharmacokinetics

◊ Work *in vitro* and in *animals*[1] suggests that although there is some absorption of benzoyl peroxide after topical application, any absorbed drug appears to be metabolised in the skin to benzoic acid and rapidly excreted in the urine.

1. Yeung D, *et al.* Benzoyl peroxide: percutaneous penetration and metabolic disposition II: effect of concentration. *J Am Acad Dermatol* 1983; **9:** 920–4.

Uses and Administration

Benzoyl peroxide has mild keratolytic properties. Its antimicrobial action is probably due to its oxidising effect and activity has been reported against *Staphylococcus epidermidis* and *Propionibacterium acnes*. It is used mainly in the treatment of acne (below), applied once or twice daily in topical preparations usually containing 2.5 to 10%, sometimes with other antimicrobials. For use in young children, see below. It has been used similarly in the treatment of fungal skin infections (p.521), such as tinea pedis although other drugs are usually preferred. A 20% lotion has been applied every 8 to 12 hours in the treatment of decubitus or stasis ulcers. Strengths are expressed as anhydrous benzoyl peroxide although it is used in a hydrous form for safety (see Pharmacopoeias, above).

Benzoyl peroxide is also used as a bleaching agent in the food industry and as a catalyst in the plastics industry.

Acne. Benzoyl peroxide applied topically in concentrations of up to 10% is probably the most widely used first-line drug in the management of mild acne (p.1577). Early studies in *animals* found benzoyl peroxide to be sebosuppressive[1] but later studies demonstrated that sebum excretion rises during the first few months of treatment,[2,3] probably due to the comedolytic action of benzoyl peroxide, and remains at a stable level thereafter. Benzoyl peroxide has been shown to have a significant inhibitory effect on skin microflora, with reductions in surface and follicular micro-organisms within 48 hours of beginning treatment, but clinical improvement took several more days to appear.[4] The combined use of benzoyl peroxide with topical clindamycin or erythromycin can inhibit the development of antibacterial resistance and bring about clinical improvement when resistance already exists.[5]

1. Gloor M, *et al.* Cytokinetic studies on the sebo-suppressive effect of drugs using the example of benzoyl peroxide. *Arch Dermatol Res* 1980; **267:** 97–9.
2. Cunliffe WJ, *et al.* Topical benzoyl peroxide increases the sebum excretion rate in patients with acne. *Br J Dermatol* 1983; **109:** 577–9.
3. Pierard-Franchimont C, *et al.* Topical benzoyl peroxide increases the sebum excretion rate. *Br J Dermatol* 1984; **110:** 506.
4. Bojar RA, *et al.* The short-term treatment of acne vulgaris with benzoyl peroxide: effects on the surface and follicular cutaneous microflora. *Br J Dermatol* 1995; **132:** 204–8.
5. Taylor GA, Shalita AR. Benzoyl peroxide-based combination therapies for acne vulgaris: a comparative review. *Am J Clin Dermatol* 2004; **5:** 261–5.

Administration in children. Benzoyl peroxide has been used topically in the treatment of neonatal and infantile acne, applied once or twice daily starting with lower strength preparations of 2.5%.

Preparations

BP 2008: Benzoyl Peroxide Cream; Benzoyl Peroxide Gel; Benzoyl Peroxide Lotion; Potassium Hydroxyquinoline Sulphate and Benzoyl Peroxide Cream;
USP 31: Benzoyl Peroxide Gel; Benzoyl Peroxide Lotion; Erythromycin and Benzoyl Peroxide Topical Gel.

Proprietary Preparations (details are given in Part 3)
Arg.: Acnepas; Acnesan; Benzihex; Clidan B; Eclaran; Ecnagel PB; Paracne; PB Gel; Solugel; Tiltis; Vixiderm E; ***Austral.:*** Benzac; Brevoxyl; Clearasil Ultra; Neutrogena Acne Mask†; Oxy; PanOxyl; ***Austria:*** Akneroxid; Benzaknen; Brevoxyl; PanOxyl; Scherogel; ***Belg.:*** Akneroxid; Benzac; Brevoxyl; Pangel; ***Braz.:*** Acnase; Benzac AC; PanOxyl; Solugel; ***Canad.:*** Acetoxyl; Benoxyl; Benzac; Benzagel†; Clean & Clear Continuous Control; Clean & Clear Persa Gel; Clearasil B.P. Plus; Dermance†; Dermoxyl†; Desquam-X; Neo Strata Astringent Acne Treatment†; Neo Strata Blemish Spot†; Neutrogena Acne Mask†; Neutrogena On The Spot Acne Treatment†; Oxy; Oxyderm; PanOxyl; Solugel; ***Chile:*** Benzac; Pansulfox; Peroxiben Plus; Pirobac; Solugel; ***Cz.:*** Aknecide†; Aknefug-oxid†; Akneroxid; Antopar†; Basiron AC; Eclaran; Inoxitan†; Oxy; ***Fin.:*** Basiron; Brevoxyl; ***Fr.:*** Brevoxyl; Cutacnyl; Eclaran; Effacne; Pannogel; PanOxyl; ***Ger.:*** Aknederm Oxid†; Aknefug-oxid; Akneroxid; Benzaknen; Benzoyt; Benzperox; Brevoxyl; Cordes BPO; Dercome; Klinoxid; Marduk; PanOxyl; Sanoxit; Scherogel†; ***Gr.:*** Benzac-W; Brevoxyl; ***Hong Kong:*** Acnacyl†; Acneclear; Benzac AC; Brevoxyl; Oxy; PanOxyl; ***Hung.:*** Acne-Med†; Aknefug-oxid; Akneroxid; Lubexyl; ***India:*** Benzac AC; Persol; ***Indon.:*** Benzolac; Pimplex; ***Irl.:*** Acnecide; Brevoxyl; PanOxyl; ***Israel:*** Acne Derm; Acne Mask†; Benzac AC; Clearex Cover Up; Oxy; Oxy Sensitive; PanOxyl; ***Ital.:*** Benoxid; Benzac; PanOxyl; Reloxyl; ***Malaysia:*** Akneroxid; Benzac AC; Brevoxyl; PanOxyl; ***Mex.:*** Akeprul; Benoxyl; Benzac AC; Benzaderm; Oxy†; Solugel; ***Neth.:*** Akneroxid; Benzac; Clearamed†; Oxy; Tendox; ***Norw.:*** Basiron; Brevoxyl; PanOxyl; ***NZ:*** Benzac; Brevoxyl; Clearasil Ultra; PanOxyl; ***Philipp.:*** Benoxyl; Benzac AC; Brevoxyl; PanOxyl; Ultra Clearasil; ***Pol.:*** Akneroxid; Benzacne; Benzapur; Brevoxyl; Clearasil Ultra†; Lubexyl; ***Port.:*** Benacne; Benoxygel; Benzac; Eclaran; Lutsimed; PanOxyl; Peroxiben; ***Rus.:*** Basiron (Базирон); ***S.Afr.:*** Benoxyl; Benzac AC; Brevoxyl; Clearasil Benzoyl P; Dry & Clear; PanOxyl; ***Singapore:*** Acnacyl†; Akneroxid; Benzac; Brevoxyl; PanOxyl; ***Spain:*** Benoxygel; Oxiderma; PanOxyl; Peroxacne; Peroxiben; Solucel; Stop Espinilla Normaderm; ***Swed.:*** Basiron; Bexid†; Brevoxyl; Stioxyl†; ***Switz.:*** Acnefuge†; Akneroxid; Aknex; Basiron†; Benzac; Effacne†; Lubexyl; PanOxyl†; ***Thai.:*** Acnexyl†; Benzac; Brevoxyl; PanOxyl; ***Turk.:*** Aknefug BP; Aksil; Benzac AC; ***UK:*** Acnecide; Brevoxyl; Oxy; PanOxyl; ***USA:*** Acne Clear; Ambi 10; Benzac; Benziq; Brevoxyl; Clearasil; Clinac BPO; Del Aqua; Desquam; Fostex; NeoBenz; Oxy; PanOxyl; Triaz; Zaclir; ***Venez.:*** Acnex; Benoxyl†; Benzac AC; Ecuaderm; PanOxyl†; Solugel†.

Multi-ingredient: ***Arg.:*** Acnepas E; Benzamycin†; Clindacur; Clindoxyl; CP-Acne; Dermaclean; Duo Clindacin; Erimicin; Kitacne PB†; Pentoclave Combi; Perclin; Peroximicina; ***Austral.:*** Duac; ***Austria:*** Acne Plus; Clindoxyl; ***Belg.:*** Acneplus; Benzamycin; ***Braz.:*** Acnase; Akirol†; Benzac Eritromicina†; Clindoxyl; ***Canad.:*** Benzaclin; Benzamycin; Clindoxyl; ***Chile:*** Benzac Plus; Benzamycin†; Erimicin; Indoxyl; Klina; ***Cz.:*** Duac; ***Fr.:*** Epiduo; ***Ger.:*** Acne Plus; ***Gr.:*** Benzamycin†; Indoxyl; ***Hong Kong:*** Benzamycin; Duac; ***India:*** Persol Forte; ***Indon.:*** Benzolac Cl; Feldixid; ***Irl.:*** Benzamycin; Duac; Quinoderm; ***Israel:*** Benzamycin; ***Ital.:*** Acnidazil; Delta 80; Delta 80 Plus; Katoxyn; ***Mex.:*** Benzac Plus; Benzaclin; Benzamycin; Clindapack; Indoxyl; ***Neth.:*** Acnecare; Acnecure†; Acnidazil†; Duac; ***NZ:*** Duac; ***Philipp.:*** Acne Plus; ***Pol.:*** Duac; ***Port.:*** Duac; Zacne; ***S.Afr.:*** Acneclear; Acnidazil; Benzamycine†; Quinoderm; ***Singapore:*** Benzamycin; ***Spain:*** Duac; ***Swed.:*** Duac; ***Switz.:*** Acne Creme Plus; ***Turk.:*** Benzamycin; ***UK:*** Benzamycin†; Duac Once Daily; Quinoderm; ***USA:*** Benzaclin; Benzamycin; Duac; Sulfoxyl; Vanoxide-HC; Zacare Kit; Zoderm.

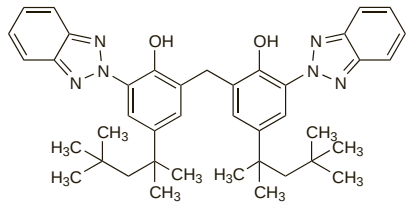
Bisoctrizole *(USAN, rINN)*

Bisoctrizol; Bisoctrizolum; FAT-75634; MBBT; Methylene Bis-Benzotriazolyl Tetramethylbutylphenol. 2,2′-Methylenebis[6-(2*H*-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol].

Бизоктризол

$C_{41}H_{50}N_6O_2$ = 658.9.

CAS — 103597-45-1.



NOTE. Tinosorb M is a trade name that has been used for bisoctrizole.

Pharmacopoeias. In *US*.
USP 31 (Bisoctrizole). Store at a temperature of 20° to 25°, excursions permitted between 15° and 30°.

Profile

Bisoctrizole is used as a sunscreen (p.1576). It is effective against UVB and UVA light (for definitions, see p.1580).

Preparations

Proprietary Preparations some preparations are listed in Part 3.

Calamine

Calamina; Kalamin; Prepared Calamine.

Каламин

Pharmacopoeias. In *Br., Chin., Int.*, and *US*.
BP 2008 (Calamine). It is a basic zinc carbonate coloured with ferric oxide. It is an amorphous, impalpable, pink or reddish-brown powder, the colour depending on the variety and amount of ferric oxide present and the process by which it is incorporated. Practically insoluble in water; it dissolves with effervescence in hydrochloric acid.
USP 31 (Calamine). It is zinc oxide with a small proportion of ferric oxide. A pink, odourless, fine powder. Insoluble in water; practically completely soluble in mineral acids.

Profile

Calamine has mild astringent and antipruritic actions and is used as a dusting powder, cream, lotion, or ointment in a variety of skin conditions although its value is uncertain.

Preparations

BP 2008: Aqueous Calamine Cream; Calamine and Coal Tar Ointment; Calamine Lotion; Calamine Ointment;
USP 31: Calamine Topical Suspension; Phenolated Calamine Topical Suspension.

Proprietary Preparations (details are given in Part 3)
Braz.: Calaphyl†; Ducilamina; ***Spain:*** Talquistina.

Multi-ingredient: ***Arg.:*** Acuaderm; Caladryl; Calcusan; Dermithan; Irricutan; Northicalm; Pinklot; Piracalamina; Pruripelen†; Prurisedan; Prurisedan Rosa; Urtikalma; ***Austral.:*** Animine; Calaband; Calamine Lotion; Dermalife Plus; Quinaband†; ***Belg.:*** Caladryl; ***Braz.:*** Caladerm†; Caladryl; Calamed; Calamina; Calamyn; Dermamina; Dermdryl†; Solardril Composto; ***Canad.:*** Aveeno Anti-Itch; Caladryl; Calamine Antihistamine; ***Chile:*** Ivarest; Pruriced; ***Fr.:*** Gel de Calamine; Pruriced; ***Hong Kong:*** Cadramine-V; Caladryl; Calamine-D†; ***India:*** Caladryl; Siloderm; ***Indon.:*** Caladine; Caladryl; Calamec; Calarex; Minos; Regata; ***Irl.:*** Benadryl; RBC; Vasogen; ***Israel:*** Baby Paste + Chamomile; Calamine Lotion; Calatrim cum Sulphur†; Calatrim†; ***Ital.:*** Mavipiu†; ***Malaysia:*** Dermoplex Calamine; Twinkle Calamine; ***Mex.:*** Caladryl; Dermocare; Procicar; ***NZ:*** Am-O-Lin; Lacto Calamine†; ***Philipp.:*** Caladryl; Calmoseptine; ***Port.:*** Benaderma com Calamina; Benaderma Pruridermase†; Caladryl; Pruridermase†; Solpic†; ***S.Afr.:*** Biohist; Caladryl; Calasthetic; Histamed; Lacto Calamine†; ***Singapore:*** Acne Clear; ***Thai.:*** Ancamin†; Cadinyl; Cadramine; Caladerm†; Caladryl; Calanol; Calapro; Hista; Lanol; M-D; ***Turk.:*** Caladryl; Diyenil; Kalmosan; Tanol; ***UK:*** Calaband; Lacto Calamine; Quinaband†; RBC; Swarm; Vasogen; ***USA:*** Caladryl; Calamycin; Dome-Paste; Ivarest; RA Lotion; ***Venez.:*** Borocanfor; Caladryl†; Calaminol; Calaminol Simple†; Calasyl Original; Micofeet.

Calcipotriol *(BAN, rINN)*

Calcipotriene *(USAN)*; Calcipotriolum; Kalcipotriol; Kalcypotriol; Kalsipotriol; Kalsipotrioli; MC-903. (5*Z*,7*E*,22*E*,24*S*)-24-Cyclopropyl-9,10-secochola-5,7,10(19),22-tetraene-1α,3β,24-triol.

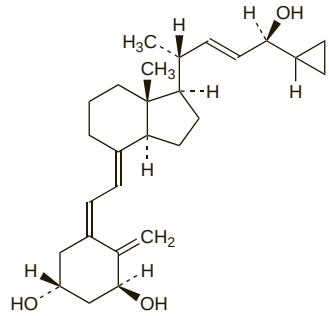
Кальципотриол

$C_{27}H_{40}O_3$ = 412.6.

CAS — 112828-00-9; 112965-21-6.

ATC — D05AX02.

ATC Vet — QD05AX02.



Pharmacopoeias. In *Eur.* (see p.vii), which also includes the monohydrate.
Ph. Eur. 6.2 (Calcipotriol, Anhydrous; Calcipotriolum Anhydricum). A white or almost white, crystalline powder. It is sensitive to heat and light. A reversible isomerisation to pre-calcipotriol takes place in solution, depending on temperature and time. The activity is due to both compounds. Practically insoluble in water; freely soluble in alcohol; slightly soluble in dichloromethane. Store in airtight containers at a temperature of –20° or below. Protect from light.
Ph. Eur. 6.2 (Calcipotriol Monohydrate; Calcipotriolum Monohydricum). A white or almost white, crystalline powder. It is sensitive to light. A reversible isomerisation to pre-calcipotriol takes place in solution, depending on temperature and time. The activity is due to both compounds. Practically insoluble in water; freely soluble in alcohol; slightly soluble in dichloromethane. Store in airtight containers. Protect from light.

Adverse Effects and Precautions

The most frequent adverse effect associated with calcipotriol is skin irritation and it should not therefore be applied to the facial area. Symptoms may include burning, itching, erythema, and dry skin, but stopping therapy is seldom necessary. Aggravation of psoriasis may occur. Hypercalcaemia has occurred during treatment with calcipotriol and although rapidly reversible on withdrawal, it should not be used in patients with disorders of calcium metabolism. Other rare adverse effects may include skin atrophy, hyperpigmentation, and photosensitivity. Patients should limit or avoid excessive exposure to both natural and artificial sunlight, because *animal* studies have suggested that topical calcipotriol may enhance the effect of UV radiation to induce skin tumours.

Effects on calcium homoeostasis. Calcipotriol is a vitamin D derivative and therefore has the potential to cause hypercalcaemia and hypercalciuria. Up to December 1993, when about 150 000 patients in the UK had been treated with calcipotriol, the UK CSM had received 6 reports of hypercalcaemia and 2 of hypercalciuria.[1] Three of the patients with hypercalcaemia either had used doses in excess of the recommended maximum (see Uses and Administration, below) or had pustular or exfoliative psoriasis. Hypercalcaemia and hypercalciuria were reversible on withdrawal of calcipotriol. A study[2] investigating the effect of calcipotriol on urine calcium excretion found that use of the maximum recommended dose for 4 weeks produced increased urine calcium excretion, and the authors suggested that patients requiring the maximum dose of calcipotriol should be monitored for hypercalciuria before and during treatment. A review[3] of the effects of vitamin D analogues on calcium homoeostasis concluded that patients with unstable psoriasis are at particular risk of