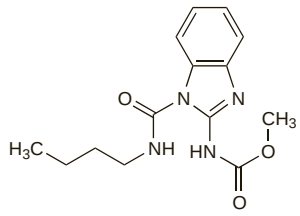
Benomyl

Benomilo. Methyl 1-(butylcarbamoyl)benzimidazol-2-ylcarbamate.

$C_{14}H_{18}N_4O_3$ = 290.3.
CAS — 17804-35-2.



Profile

Benomyl is a fungicide used for the treatment and control of fungal plant diseases.

◊ References.

1. WHO. Benomyl. *Environmental Health Criteria 148*. Geneva: WHO, 1993. Available at: http://www.inchem.org/documents/ehc/ehc/ehc148.htm (accessed 23/04/04)
2. WHO. Benomyl health and safety guide. *IPCS Health and Safety Guide 81*. Geneva: WHO, 1993. Available at: http://www.inchem.org/documents/hsg/hsg/hsg81_e.htm (accessed 23/04/04)

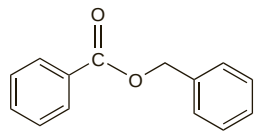
Toxicity. Although experimental evidence in *animals* has suggested a possible link between benomyl and congenital eye defects (anophthalmia) the association could not be confirmed in humans.[1-4]

1. Gilbert R. "Clusters" of anophthalmia in Britain. *BMJ* 1993; **307:** 340–1.
2. Bianchi F, *et al.* Clusters of anophthalmia. *BMJ* 1994; **308:** 205.
3. Kristensen P, Irgens LM. Clusters of anophthalmia. *BMJ* 1994; **308:** 205–6.
4. Castilla EE. Clusters of anophthalmia. *BMJ* 1994; **308:** 206.

Benzyl Benzoate

Bencilo, benzoato de; Bensylbensoat; Bentsyylibentsoaatti; Benzil Benzoat; Benzil-benzoát; Benzilbenzoatas; Benzoato de bencilo; Benzoato de Benzilo; Benzoesäurebenzylester; Benzyl Benz.; Benzyl-benzoát; Benzyle, benzoate de; Benzylis benzoas; Benzylu benzoesan.

$C_6H_5.CO.O.CH_2.C_6H_5$ = 212.2.
CAS — 120-51-4.
ATC — P03AX01.
ATC Vet — QP53AX11.



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

Ph. Eur. 6.2 (Benzyl Benzoate). Colourless or almost colourless crystals, or a colourless or almost colourless oily liquid. F.p. is not below 17°. Practically insoluble in water; miscible with alcohol, with dichloromethane, and with fatty and essential oils. Store in well-filled airtight containers. Protect from light.

USP 31 (Benzyl Benzoate). A clear, colourless, oily liquid with a slight aromatic odour. Practically insoluble in water and in glycerol; miscible with alcohol, with chloroform, and with ether. Store at a temperature not exceeding 40° in well-filled airtight containers. Protect from light.

Adverse Effects and Treatment

Benzyl benzoate is irritant to the eyes and mucous membranes and it may be irritant to the skin. Hypersensitivity reactions have been reported. If ingested, benzyl benzoate may cause stimulation of the CNS and convulsions. Systemic symptoms have been reported on excessive topical use. For poisoning associated with topical use the skin should be washed. Appropriate symptomatic measures should also be instituted.

Uses and Administration

Benzyl benzoate is an acaricide used in the treatment of scabies (p.2035) although other treatments are generally preferred. A 25% emulsion is applied to the whole body, usually from the neck down (although the *BNF* considers that application should be extended to the scalp, neck, face, and ears). If the application is thorough, one treatment may suffice, although the possibility of failure is lessened by a second application within 5 days. Alternatively, three applications at 12-hour intervals, without bathing, may be made, followed by bathing 12 hours after the last application. The *BNF* recommends one application to the whole body, repeated, without bathing, on the next day, and washed off 24 hours later; a third application may sometimes be necessary. Benzyl benzoate is not generally recommended for infants and children, but if used the application should be diluted to minimise the risk of irritation, although this also reduces efficacy.

Benzyl benzoate has also been used as a pediculicide.

Benzyl benzoate is also used as a solubilising agent.

Preparations

BP 2008: Benzyl Benzoate Application;
USP 31: Benzyl Benzoate Lotion.

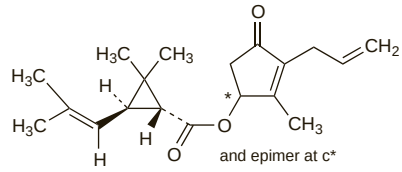
Proprietary Preparations (details are given in Part 3)
Austral.: Ascabiol; Benzemul; ***Braz.:*** Acarsan; Bencocan; Benzibel†; Benzin†; Benzoax; Benzoben†; Benzocan†; Benzolato†; Benzolina†; Benzolom†; Benzotisan; Miticocan; Parasimed; Pruridol; Sanasar; Sarnaton†; Sarnezan†; Sarnilab; Sarnodex; Scabenzil; Scabioid; Zilaben; ***Ger.:*** Acaril†; Acarosan†; Antiscabiosum; ***Gr.:*** Benzogal; ***Irl.:*** Ascabiol†; ***Israel:*** Scabiex; ***Ital.:*** Mom Lozione Preventiva; ***Mex.:*** Ansar; Hastilan; ***Pol.:*** Novoscabin; ***Port.:*** Acarilbial; Neo-Acarina†; Piozil; ***S.Afr.:*** Ascabiol; ***UK:*** Ascabiol; ***Venez.:*** Benzalcor; Benzo-Bencil; Benzodit†; Niostal†.

Multi-ingredient: ***Arg.:*** Anusol Duo S; Anusol-A; Arnecrem†; Bencil Scab; Detebencil; Hexabencil; Perbel; Permecil; Sapucai†; Scabioderm; ***Austral.:*** Anusol; ***Belg.:*** Pulmex; Pulmex Baby; ***Braz.:*** Anusol-HC; ***Fr.:*** Allerbiocid S†; Ascabiol; Sanytol†; ***Hong Kong:*** Anusol-HC†; ***Hung.:*** Novascabin; ***Irl.:*** Anugesic-HC; Anusol-HC; ***Ital.:*** Antiscabbia Candioli al DDT Terapeutico; Antiscabbia CM; Dekar 2; Prurex; Skab 2; ***Malaysia:*** Anucare; Anusol; ***NZ:*** Anusol; ***Pol.:*** Cetriscabin; ***S.Afr.:*** Anugesic; ***Singapore:*** Anusol; ***Spain:*** Tulgrasum Cicatrizante; Yacutin; ***Swed.:*** Tenutex; ***Thai.:*** Anusol; ***UK:*** Anugesic-HC; Anusol-HC, Plus HC; Sudocrem; ***USA:*** Anumed; Anumed HC; Hemril; ***Venez.:*** Kertyol.

Bioallethrin *(BAN)*

Allethrin I; Bioaletrina; Depallethrin. (*RS*)-3-Allyl-2-methyl-4-oxocyclopent-2-enyl (1*R*,3*R*)-2,2-dimethyl-3-(2-methylprop-1-enyl)-cyclopropanecarboxylate.

$C_{19}H_{26}O_3$ = 302.4.
CAS — 584-79-2.
ATC — P03AC02.
ATC Vet — QP53AC02.



Profile

Bioallethrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049). It is used topically, with the synergist piperonyl butoxide (p.2049), in the treatment of pediculosis (p.2034). It is also used in anti-mosquito devices and for the control of household insect pests.

◊ References.

1. WHO. Allethrins. *Environmental Health Criteria 87*. Geneva: WHO, 1989. Available at: http://www.inchem.org/documents/ehc/ehc/ehc87.htm (accessed 23/04/04)
2. WHO. Allethrins health and safety guide. *IPCS Health and Safety Guide 24*. Geneva: WHO, 1989. Available at: http://www.inchem.org/documents/hsg/hsg/hsg024.htm (accessed 23/04/04)

Preparations

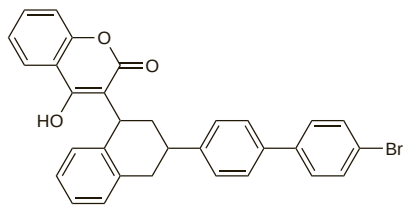
Proprietary Preparations (details are given in Part 3)
UK: Actomite.

Multi-ingredient: ***Arg.:*** Limpacid; Para Piojicida; Scabioderm; ***Austral.:*** Paralice†; ***Belg.:*** Para; ***Braz.:*** Sarnapen†; ***Canad.:*** Para†; ***Fr.:*** Para Special Poux; ***Ger.:*** Jacutin N; Spregal; ***Israel:*** Monocide; ***Ital.:*** Cruzzy; ***Neth.:*** Para-Speciaal.

Brodifacoum

Brodifacum; WBA-8119. 3-[3-(4′-Bromobiphenyl-4-yl)-1,2,3,4-tetrahydro-1-naphthyl]-4-hydroxycoumarin.

$C_{31}H_{23}BrO_3$ = 523.4.
CAS — 56073-10-0.



Profile

Brodifacoum is an anticoagulant rodenticide. It is reported to be effective in warfarin-resistant strains of rodents.

◊ References.

1. WHO. Anticoagulant rodenticides. *Environmental Health Criteria 175*. Geneva: WHO, 1995. Available at: http://www.inchem.org/documents/ehc/ehc/ehc175.htm (accessed 23/04/04)
2. WHO. Brodifacoum health and safety guide. *IPCS Health and Safety Guide 93*. Geneva: WHO, 1995. Available at: http://www.inchem.org/documents/hsg/hsg/hsg093.htm (accessed 23/04/04)

Toxicity. Brodifacoum, a second-generation anticoagulant rodenticide, inhibits prothrombin synthesis to cause bleeding that may be occult.[1] It is absorbed from the gastrointestinal tract; dermal absorption is possible. Poisons containing 100 mg in each kg of bait are not hazardous to man; more concentrated forms are particularly hazardous and their availability should be restricted. Baits, which should be prepared only by trained personnel, should contain a suitable marker-dye.

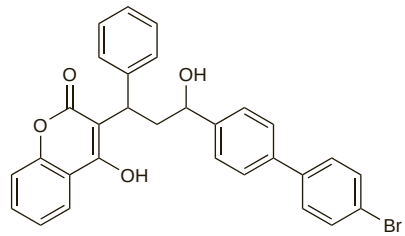
There have been reports of poisoning with brodifacoum.[2-10]

1. WHO. Safe use of pesticides: ninth report of the WHO expert committee on vector biology and control. *WHO Tech Rep Ser 720* 1985. Available at: http://libdoc.who.int/trs/WHO_TRS_720.pdf (accessed 21/07/08)
2. Watts RG, *et al.* Accidental poisoning with a superwarfarin compound (brodifacoum) in a child. *Pediatrics* 1990; **86:** 883–7.
3. Ross GS, *et al.* An acquired hemorrhagic disorder from long-acting rodenticide ingestion. *Arch Intern Med* 1992; **152:** 410–12.
4. Kruse JA, Carlson RW. Fatal rodenticide poisoning with brodifacoum. *Ann Emerg Med* 1992; **21:** 331–6.
5. Tecimer C, Yam LT. Surreptitious superwarfarin poisoning with brodifacoum. *South Med J* 1997; **90:** 1053–5.
6. Corke PJ. Superwarfarin (brodifacoum) poisoning. *Anaesth Intensive Care* 1997; **25:** 707–9.
7. La Rosa FG, *et al.* Brodifacoum intoxication with marijuana smoking. *Arch Pathol Lab Med* 1997; **121:** 67–9.
8. Miller MA, *et al.* Rapid identification of surreptitious brodifacoum poisoning by analysis of vitamin K-dependent factor activity. *Am J Emerg Med* 2006; **24:** 383.
9. Olmos V, López CM. Brodifacoum poisoning with toxicokinetic data. *Clin Toxicol* 2007; **45:** 487–9.
10. Kapadia P, Bona R. Acquired deficiency of vitamin K-dependent clotting factors due to brodifacoum ingestion. *Conn Med* 2008; **72:** 207–9.

Bromadiolone

Bromadiolona. 3-[3-(4′-Bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin.

$C_{30}H_{23}BrO_4$ = 527.4.
CAS — 28772-56-7.



Profile

Bromadiolone is an anticoagulant rodenticide.

◊ References.

1. WHO. Anticoagulant rodenticides. *Environmental Health Criteria 175*. Geneva: WHO, 1995. Available at: http://www.inchem.org/documents/ehc/ehc/ehc175.htm (accessed 23/04/04)
2. WHO. Bromadiolone health and safety guide. *IPCS Health and Safety Guide 94*. Geneva: WHO, 1995. Available at: http://www.inchem.org/documents/hsg/hsg/hsg094.htm (accessed 23/04/04)

Toxicity. Bromadiolone, a second-generation anticoagulant rodenticide, inhibits prothrombin synthesis to cause bleeding that may be occult.[1] It is absorbed from the gastrointestinal tract; dermal absorption is possible. Poisons containing 100 mg in each kg of bait are not hazardous to man; more concentrated forms are particularly hazardous and their availability should be restricted. Baits, which should be prepared only by trained personnel, should contain a suitable marker-dye.

There have been reports of poisoning with bromadiolone.[2-5]

1. WHO. Safe use of pesticides: ninth report of the WHO expert committee on vector biology and control. *WHO Tech Rep Ser 720* 1985. Available at: http://libdoc.who.int/trs/WHO_TRS_720.pdf (accessed 21/07/08)
2. Greeff MC, *et al.* "Superwarfarin" (bromodialone) poisoning in two children resulting in prolonged anticoagulation. *Lancet* 1987; **ii:** 1269.
3. Chow EY, *et al.* A case of bromadiolone (superwarfarin) ingestion. *CMAJ* 1992; **147:** 60–2.
4. Grobosch T, *et al.* Acute bromadiolone intoxication. *J Anal Toxicol* 2006; **30:** 281–6.
5. Lo VM, *et al.* Bromadiolone toxicokinetics: diagnosis and treatment implications. *Clin Toxicol* 2008; 1–8.