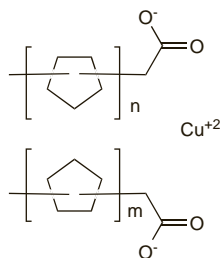


**Copper Naphthenate**

Cobre, naftenato de.  
CAS — 1338-02-9.

**Profile**

Copper naphthenate is the copper salt of naphthenic acid and is classified as a general use pesticide. It is used to preserve wood against a broad spectrum of fungi, termites, and other wood-destroying insects. Copper naphthenate has also been used as a topical antifungal in veterinary medicine.

**Copper Oleate**

Cobre, oleato de.  
Cu(C<sub>18</sub>H<sub>33</sub>O<sub>2</sub>)<sub>2</sub> = 626.5.  
CAS — 1120-44-1.

**Profile**

Copper oleate has been used topically as an insecticide for the treatment of pediculosis (p.2034).

**Preparations**

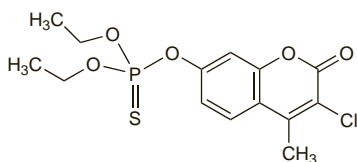
**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** Arg.: Plus & Plus.

**Coumafos** (BAN, rINN)

Bayer-21199; Coumafosum; Coumaphos; Cumarfós; Kumafoosi; Kumafos. *O*-3-Chloro-4-methyl-7-coumarinyl *O,O*-diethyl phosphorothioate.

Кумафос  
C<sub>14</sub>H<sub>16</sub>ClO<sub>3</sub>PS = 362.8.  
CAS — 56-72-4.  
ATC Vet — QP53AF08.

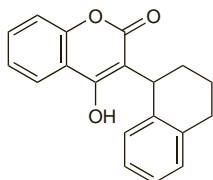
**Profile**

Coumafos is an organophosphorus insecticide (p.2047) used as a topical ectoparasiticide in veterinary practice.

**Coumatetralyl**

Cumatetralilo. 4-Hydroxy-3-(1,2,3,4-tetrahydro-1-naphthyl)coumarin.

C<sub>19</sub>H<sub>16</sub>O<sub>3</sub> = 292.3.  
CAS — 5836-29-3.

**Profile**

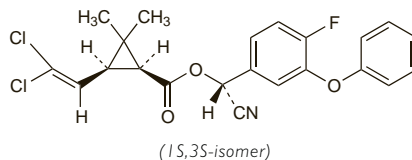
Coumatetralyl is an anticoagulant rodenticide.

**References.**

1. WHO. Anticoagulant rodenticides. *Environmental Health Criteria* 175. Geneva: WHO, 1995. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc175.htm> (accessed 28/05/04)

**Cyfluthrin** (BAN)

Bay-VI-1704; Ciflutrina; Cyfluthin. (*RS*)- $\alpha$ -Cyano-4-fluoro-3-phenoxybenzyl (1*RS*,3*RS*)-(1*RS*,3*RS*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate.  
C<sub>22</sub>H<sub>18</sub>Cl<sub>2</sub>FNO<sub>3</sub> = 434.3.  
CAS — 68359-37-5.  
ATC — P03BA01.  
ATC Vet — QP53AC12.

**Profile**

Cyfluthrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) used in agriculture and veterinary practice, and in the vector control of malaria (p.594).

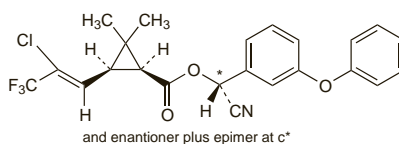
**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Ital.:** Responsar†; Solfac.

**Cyhalothrin** (BAN)

Cihalotrina; Cyhalotryna; PP-563. (*RS*)- $\alpha$ -Cyano-3-phenoxybenzyl (*Z*)-(1*RS*,3*RS*)-3-(2-chloro-3,3,3-trifluoropropenyl)-2,2-dimethylcyclopropanecarboxylate.  
C<sub>23</sub>H<sub>19</sub>ClF<sub>3</sub>NO<sub>3</sub> = 449.9.  
CAS — 68085-85-8.  
ATC Vet — QP53AC06.

**Profile**

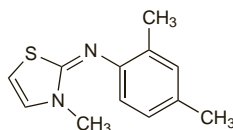
Cyhalothrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) that is used, particularly as a mixture of the (*Z*)-(1*R*,3*R*) *S* ester and the (*Z*)-(1*S*,3*S*) *R* ester (known as lambda-cyhalothrin), for the control of insect pests in public health. It has also been used in agriculture and in veterinary practice.

**References.**

1. WHO. Cyhalothrin. *Environmental Health Criteria* 99. Geneva: WHO, 1990. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc99.htm> (accessed 23/04/04)
2. WHO. Cyhalothrin and lambda-cyhalothrin health and safety guide. *IPCS Health and Safety Guide* 38. Geneva: WHO, 1990. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg038.htm> (accessed 23/04/04)

**Cymiazole**

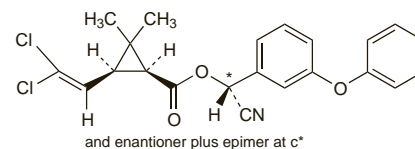
CGA-50439; CGA-192357 (cymiazole hydrochloride); Cimiazol; Cymiazol; Cymiazolum; Symiatsoli; Xymiazole. 2,4-Dimethyl-*N*-(3-methyl-2(3*H*)-thiazolidene)benzenamine.  
C<sub>12</sub>H<sub>14</sub>N<sub>2</sub>S = 218.3.  
CAS — 61676-87-7 (cymiazole); 121034-85-3 (cymiazole hydrochloride).  
ATC Vet — QP53AA02.

**Profile**

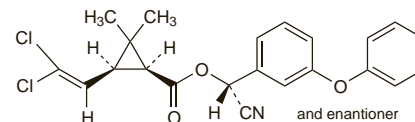
Cymiazole is a pesticide used in beekeeping.

**Cypermethrin** (BAN)

Cipermetrina; Cypermetryna; NRDC-149. (*RS*)- $\alpha$ -Cyano-3-phenoxybenzyl (1*RS*,3*RS*)-(1*RS*,3*RS*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate.  
C<sub>22</sub>H<sub>19</sub>Cl<sub>2</sub>NO<sub>3</sub> = 416.3.  
CAS — 52315-07-8.  
ATC — P03BA02.  
ATC Vet — QP53AC08.

**Alpha-cypermethrin** (BAN)

Alfacipermetrina. (*SR*)- $\alpha$ -Cyano-3-phenoxybenzyl (1*RS*,3*RS*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate.  
C<sub>22</sub>H<sub>19</sub>Cl<sub>2</sub>NO<sub>3</sub> = 416.3.  
CAS — 67375-30-8.

**Profile**

Cypermethrin, an isomeric mixture containing alpha-cypermethrin, is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) used in veterinary practice as a topical ectoparasiticide and to control sea-lice infestation in salmon. It is also used in agriculture. Zeta-cypermethrin is also used. Alpha-cypermethrin is used in agriculture and for vector control in the management of malaria (p.594).

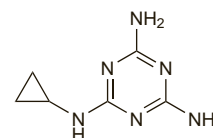
**References.**

1. WHO. Cypermethrin. *Environmental Health Criteria* 82. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc82.htm> (accessed 23/04/04)
2. WHO. Cypermethrin health and safety guide. *IPCS Health and Safety Guide* 22. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg022.htm> (accessed 23/04/04)
3. WHO. Alpha-cypermethrin. *Environmental Health Criteria* 142. Geneva: WHO, 1992. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc142.htm> (accessed 23/04/04)

**Cyromazine** (BAN, rINN)

CGA-72662; Ciromazina; Cyromazinum. *N*-Cyclopropyl-1,3,5-triazine-2,4,6-triamine.

Циромазин  
C<sub>6</sub>H<sub>10</sub>N<sub>6</sub> = 166.2.  
CAS — 66215-27-8.

**Pharmacopoeias.** In *US* for veterinary use only.

**USP 31** (Cyromazine). A white or off-white, odourless, crystalline powder. Slightly soluble in water and in methyl alcohol.

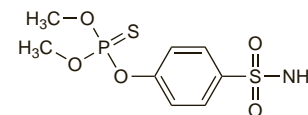
**Profile**

Cyromazine is used as a topical ectoparasiticide in veterinary practice.

**Cythioate** (BAN)

Citioato. *O,O*-Dimethyl *O*-(4-sulphamoylphenyl) phosphorothioate.

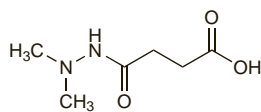
C<sub>8</sub>H<sub>12</sub>NO<sub>5</sub>PS<sub>2</sub> = 297.3.  
CAS — 115-93-5.  
ATC Vet — QP53AF10; QP53BB01.

**Profile**

Cythioate is an organophosphorus insecticide (p.2047) used as a systemic ectoparasiticide in veterinary practice; it is given orally to the host animal.

**Daminozide**Daminozida. *N*-Dimethylaminosuccinamic acid. $C_6H_{12}N_2O_3 = 160.2$ .

CAS — 1596-84-5.

**Profile**

Daminozide is a plant growth regulator that has been used in pesticides to improve fruit crops. There have been concerns about residues of the chemical in the fruit.

**Deltamethrin** (BAN)

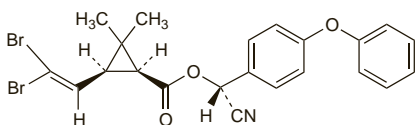
Decamethrin; Deltamethrinum; Deltametriini; Deltametrin; Deltametrina; Deltametryna; NRDC-161. (*S*)- $\alpha$ -Cyano-3-phenoxybenzyl (1*R*,3*R*)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane-carboxylate.

 $C_{22}H_{19}Br_2NO_3 = 505.2$ .

CAS — 52918-63-5.

ATC — P03BA03.

ATC Vet — QP53AC11.

Pharmacopoeias. In *BP(Vet)*.

**BP(Vet) 2008** (Deltamethrin). A white to buff-coloured crystalline powder. Insoluble in water; soluble in alcohol and in acetone.

**Profile**

Deltamethrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) used in the vector control of malaria (p.594). It is also used as a topical ectoparasiticide in veterinary practice and as an agricultural and household insecticide.

## ◇ References.

- WHO. Deltamethrin health and safety guide. *IPCS Health and Safety Guide 30*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg030.htm> (accessed 26/04/04)
- WHO. Deltamethrin. *Environmental Health Criteria 97*. Geneva: WHO, 1990. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc97.htm> (accessed 26/04/04)

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

**Braz.:** Del-Lendj; Deltacid; Deltalab; Deltamitrenj; Deltapioj; Deltasayj; Deotrin; Hexafenj; Neolendj; Pediderm; Sifdelj; **Fr.:** Cinq sur Cinq; Pharmavoyage Moustiquaires; **Mex.:** Difexonj; **Venez.:** Nopucid.

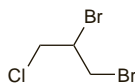
**Multi-ingredient:** **Arg.:** Capitisj; Deca-Scabj; Hexa-Defital NF; Nopucid Compuesto; **Braz.:** Deltacid Plus; **Chile:** Launol.

**Dibromochloropropane**

Dibromochloropropano. 1,2-Dibromo-3-chloropropane.

 $C_3H_5Br_2Cl = 236.3$ .

CAS — 96-12-8.

**Profile**

Dibromochloropropane has been used as a pesticide. Low sperm counts and evidence of testicular damage have occurred in workers exposed to dibromochloropropane.

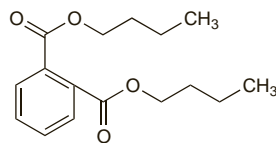
**Dibutyl Phthalate**

Butyl Phthalate; DBP; Dibutil-ftalát; Dibutilo ftalatas; Dibutilo, ftalato de; Dibutyle, phthalate de; Dibutyftalata; Dibutyl-ftalát; Dibutylis phthalas; Dibutylu ftalan; Dibutylyftalaatti. Dibutyl benzene-1,2-dicarboxylate.

 $C_{16}H_{22}O_4 = 278.3$ .

CAS — 84-74-2.

ATC — P03BX03.



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

**Ph. Eur. 6.2** (Dibutyl Phthalate). A clear, oily, colourless or very slightly yellow liquid. Practically insoluble in water; miscible with alcohol. Store in airtight containers.

**USNF 26** (Dibutyl Phthalate). A clear, oily, colourless or very slightly yellow liquid. Practically insoluble in water; miscible with alcohol and with ether. Store in airtight containers.

**Adverse Effects and Precautions**

Dibutyl phthalate has occasionally caused hypersensitivity reactions. As with other phthalates contact with plastics should be avoided.

**Uses and Administration**

Dibutyl phthalate has been used as an insect repellent although it is slightly less effective than dimethyl phthalate (p.2041). It is less volatile and less easily removed by washing than dimethyl phthalate, and its chief use therefore has been for the impregnation of clothing.

Dibutyl phthalate has also been used as a plasticiser.

## ◇ References.

- WHO. Di-*n*-butyl phthalate. *Environmental Health Criteria 189*. Geneva: WHO, 1997. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc189.htm> (accessed 26/04/04)

**Preparations**

**Proprietary Preparations** (details are given in Part 3)

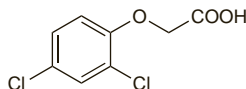
**Multi-ingredient:** **S.Afr.:** Mylofj.

**Dichlorophenoxyacetic Acid**

2,4-D; Diclorofenoxiacético, ácido. 2,4-Dichlorophenoxyacetic acid.

 $C_8H_6Cl_2O_3 = 221.0$ .

CAS — 94-75-7.

**Adverse Effects, Treatment, and Precautions**

Most cases of poisoning with dichlorophenoxyacetic acid have involved its ingestion with other herbicides; the solvent may also play a part in any toxicity. There is little pattern to the range of adverse effects that may occur after ingestion, inhalation, or topical exposure.

Adverse effects have involved the CNS and peripheral nervous system, muscles, and the cardiovascular system. Gastrointestinal effects are common with poisoning. Hepatotoxicity, nephrotoxicity, and pulmonary disorders have occurred but it is not clear that dichlorophenoxyacetic acid contributed to the toxicity. The role of phenoxyacetic acids in cancer is discussed under trichlorophenoxyacetic acid (p.2051).

Activated charcoal or possibly gastric lavage should be considered after ingestion of substantial amounts if the patient presents within 1 hour. Contaminated clothing should be removed and the skin washed with soap and water. Forced alkaline diuresis or haemodialysis has been reported to be effective in removing dichlorophenoxyacetic acid; the latter is considered more effective. Further treatment is symptomatic.

## ◇ References.

- WHO. 2,4-Dichlorophenoxyacetic acid (2,4-D). *Environmental Health Criteria 29*. Geneva: WHO, 1984. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc29.htm> (accessed 26/04/04)
- WHO. 2,4-Dichlorophenoxyacetic acid (2,4-D) health and safety guide. *IPCS Health and Safety Guide 5*. Geneva: WHO, 1987. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg005.htm> (accessed 26/04/04)
- WHO. 2,4-Dichlorophenoxyacetic acid (2,4-D)—environmental aspects. *Environmental Health Criteria 84*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc84.htm> (accessed 26/04/04)
- Bradberry SM, et al. Mechanisms of toxicology, clinical features, and management of acute chlorophenoxy herbicide poisoning: a review. *J Toxicol Clin Toxicol* 2000; **38**: 111–22.

**Uses**

Dichlorophenoxyacetic acid is a herbicide widely used for weed control in cereals and other crops. It is usually used as its salts or esters with other herbicides.

**Dichlorvos** (BAN, USAN, rINN)

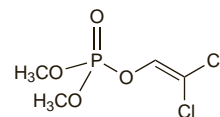
DDVP; Dichlorfos; Dichlorvosum; Diclörvös; NSC-6738; OMS-14; SD-1750. 2,2-Dichlorovinyl dimethyl phosphate.

Дихлорвос

 $C_4H_7Cl_2O_4P = 221.0$ .

CAS — 62-73-7.

ATC Vet — QP52AB03; QP53AF04.



**Pharmacopoeias.** In *Fr.* for veterinary use.

**Profile**

Dichlorvos is an organophosphorus insecticide (p.2047) of short persistence, effective against a wide range of insects. It is sometimes used as a fumigant. It has been used for the extermination of insects in aircraft (disinsection). It is also used as a topical ectoparasiticide and as an anthelmintic in veterinary practice. Concern has been expressed over its possible carcinogenicity.

## ◇ References.

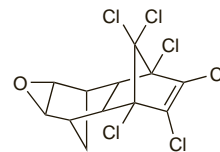
- WHO. Dichlorvos health and safety guide. *IPCS Health and Safety Guide 18*. Geneva: WHO, 1988. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg018.htm> (accessed 26/04/04)
- WHO. Dichlorvos. *Environmental Health Criteria 79*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc79.htm> (accessed 26/04/04)
- Van Maele-Fabry G, et al. Dichlorvos and carcinogenicity: a systematic approach to a regulatory decision. *Regul Toxicol Pharmacol* 2000; **31**: 13–21.
- Ishmael J, et al. Dichlorvos—a comprehensive review of 11 rodent carcinogenicity studies. *Regul Toxicol Pharmacol* 2006; **44**: 238–48.
- Booth ED, et al. Review of the in vitro and in vivo genotoxicity of dichlorvos. *Regul Toxicol Pharmacol* 2007; **49**: 316–26.

**Dieldrin** (BAN, pINN)

Dieldrina; Dieldrine; Dieldrinum; Dieldryna.

Диэлдрин

CAS — 60-57-1 (HEOD).



(HEOD)

**Description.** Dieldrin contains about 85% of (1*R*,4*S*,5*S*,8*R*)-1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4:5,8-dimethanonaphthalene (HEOD),  $C_{12}H_8Cl_6O = 380.9$ . The remaining 15% is mainly chlorinated organic compounds related to HEOD.

**Adverse Effects and Treatment**

As for Chlorinated Insecticides, p.2037.

Dieldrin is more toxic than clofenotane (p.2038) and is readily absorbed through the skin.

## ◇ References.

- WHO. Aldrin and dieldrin. *Environmental Health Criteria 91*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc91.htm> (accessed 26/04/04)
- WHO. Aldrin and dieldrin health and safety guide. *IPCS Health and Safety Guide 21*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg021.htm> (accessed 26/04/04)
- Høyer AP, et al. Organochlorine exposure and risk of breast cancer. *Lancet* 1998; **352**: 1816–20.
- Jorgenson JL. Aldrin and dieldrin: a review of research on their production, environmental deposition and fate, bioaccumulation, toxicology, and epidemiology in the United States. *Environ Health Perspect* 2001; **109** (suppl 1): 113–39.

**Uses**

Dieldrin is a chlorinated insecticide (p.2037) formerly used as a sheepdip. Its use is now limited to a few specified purposes such as termite control.