

Pyrethrins in the form of pyrethrum extract have a long history of use as insecticides. Pyrethrum is rapidly toxic to many insects. It has a much quicker knock-down effect than clofenotane or lindane, but it is less persistent and less stable. Its action can be enhanced by certain substances such as piperonyl butoxide (p.2049), and pyrethrins with piperonyl butoxide are used clinically in the treatment of pediculosis (p.2034).

Pyrethroid insecticides (synthetic analogues of pyrethrins), such as permethrin and phenothrin, are also used clinically; deltamethrin and permethrin are among those used for the vector control of malaria.

Pyrethrum, pyrethrins, and pyrethroids are also used as topical ectoparasitides in veterinary practice and as agricultural, horticultural, and household insecticides.

Preparations

Proprietary Preparations (details are given in Part 3)

Ital.: Pearsol; SH3.

Multi-ingredient: **Arg.:** Quitosof; **Austral.:** Banlice; **Canad.:** Licetrol; Pronto; R & C; **Fr.:** Spray-Pax; **Ger.:** Goldgeist; **Israel:** A-200; Kin Soff; **Ital.:** Milice; Sinezan; **Port.:** Para-Pio; **Rus.:** Bubil (Бубил); Spray-Pax (Спрей-пакс); **Turk.:** Kwell-P; **UK:** Fortefog; Prevent; **USA:** Blue; Licide; Pronto; Pyrinyl II; Pyrinyl Plus; RID; Tisit.

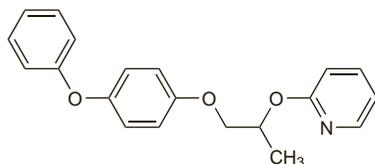
Pyriproxyfen

Piriproxifen; Pyriproksifeeni; Pyriproxifen; Pyriproxifène; Pyriproxifenium; Pyriproxyfenium; S-9318; S-31183. 2-[1-Methyl-2-(4-phenoxyphenoxy)ethoxy]pyridine.

$C_{20}H_{19}NO_3 = 321.4$.

CAS — 95737-68-1.

ATC Vet — QP53AX23.



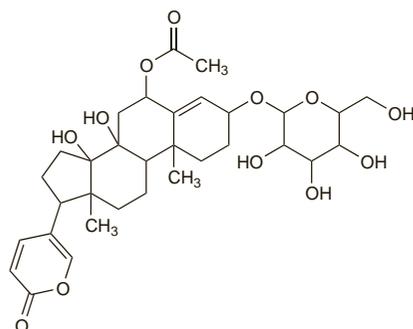
Profile

Pyriproxyfen is used as a topical ectoparasiticide in veterinary practice.

Red Squill

Esquila.

CAS — 507-60-8 (scilliroside).



(scilliroside)

Profile

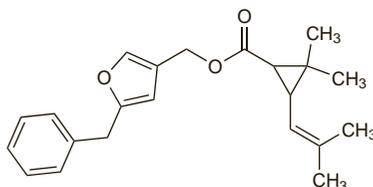
Red squill is a red variety of *Urginea maritima*, which contains, in addition to cardiac glycosides, an active principle, scilliroside. It is very toxic to rats and has been incorporated in rat poisons; it has neurotoxic and cardiotoxic properties.

Resmethrin

Resmetrina. 5-Benzyl-3-furylmethyl (1*RS*,3*RS*)-(1*RS*,3*SR*)-2,2-dimethyl-3-(2-methylprop-1-enyl)cyclopropanecarboxylate.

$C_{22}H_{26}O_3 = 338.4$.

CAS — 10453-86-8.



Profile

Resmethrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) used in veterinary practice for the control of ectoparasites in the environment. Resmethrin is also used as an agricultural, horticultural, and household insecticide, but is not synergised by pyrethrum synergists such as piperonyl butoxide (p.2049).

References

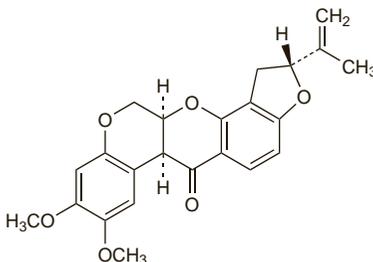
- WHO. Resmethrins. *Environmental Health Criteria* 92. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc092.htm> (accessed 26/04/04)
- WHO. Resmethrins health and safety guide. *IPCS Health and Safety Guide* 25. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg025.htm> (accessed 26/04/04)

Rotenone

Rotenona; Rotenonum. (2*R*,6*aS*,12*aS*)-1,2,6,6*a*,12,12*a*-Hexahydro-2-isopropenyl-8,9-dimethoxychromeno[3,4-*b*]furo[2,3-*h*]chromen-6-one.

$C_{23}H_{22}O_6 = 394.4$.

CAS — 83-79-4.



Profile

Rotenone is a non-systemic insecticide used in agriculture and in horticulture.

Rotenone is the active ingredient of derris (the dried rhizome and roots of *Derris elliptica*; also known as tuba root or aker-tuba) and of lonchocarpus (the dried root of *Lonchocarpus utilis*; also known as cube root, timbo, or barbusco). Powdered forms of derris and of lonchocarpus have been used as insecticides and fish poisons.

References

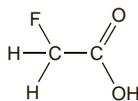
- WHO. Rotenone health and safety guide. *IPCS Health and Safety Guide* 73. Geneva: WHO, 1992. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg073.htm> (accessed 26/04/04)

Sodium Fluoroacetate

Compound 1080; Fluoroacetato sódico; Sodium Monofluoroacetate.

$FC_2H_2CO_2Na = 100.0$.

CAS — 62-74-8.



(fluoroacetic acid)

Adverse Effects, Treatment, and Precautions

Sodium fluoroacetate is highly toxic, the lethal dose if ingested being about 1 to 5 mg/kg. Toxic effects may be delayed for several hours after absorption by mouth or inhalation, and include nausea and vomiting, apprehension, muscle twitching, cardiac irregularities, convulsions, respiratory failure, coma, and death usually due to ventricular fibrillation.

Treatment is generally supportive and symptomatic.

References to sodium fluoroacetate toxicity.

- Chi CH, *et al.* Clinical presentation and prognostic factors in sodium monofluoroacetate intoxication. *J Toxicol Clin Toxicol* 1996; **34**: 707-12.
- Chi CH, *et al.* Hemodynamic abnormalities in sodium monofluoroacetate intoxication. *Hum Exp Toxicol* 1999; **18**: 351-3.
- Goncharov NV, *et al.* Toxicology of fluoroacetate: a review, with possible directions for therapy research. *J Appl Toxicol* 2006; **26**: 148-61.
- Proudfoot AT, *et al.* Sodium fluoroacetate poisoning. *Toxicol Rev* 2006; **25**: 213-19.

Uses

Sodium fluoroacetate is a highly effective rodenticide but must be used with great caution because of its toxicity to other animals and to man.

Sulfiram (BAN, rINN)

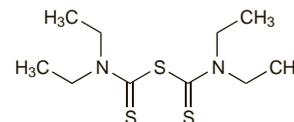
Monosulfiram; Sulfiramum. Tetraethylthiuram monosulphide.

Сульфирам

$C_{10}H_{20}N_2S_3 = 264.5$.

CAS — 95-05-6.

ATC Vet — QS02QA02.



Adverse Effects and Precautions

An erythematous rash has occasionally been reported. Sulfiram produces effects similar to those of disulfiram (p.2296) if ingested with alcohol. As there may be a risk of absorption after application of sulfiram to the whole body, patients are advised to abstain from alcohol for at least 48 hours.

The reactions to alcohol occasionally reported in patients who have applied sulfiram solution^{1,2} resemble those seen with disulfiram. Analysis has shown that sulfiram solutions exposed to room light undergo photochemical conversion to disulfiram, and that the concentration of disulfiram, and the ability of the solution to inhibit aldehyde dehydrogenase and hence the metabolism of alcohol, increases with the duration of such storage.^{3,4} Whether patients who have applied sulfiram solution should avoid direct light immediately afterwards has not been elucidated.⁴

- Blanc D, Deprez P. Unusual adverse reaction to an acaricide. *Lancet* 1990; **335**: 1291-2.
- Burgess I. Adverse reactions to monosulfiram. *Lancet* 1990; **336**: 873.
- Mays DC, *et al.* Photolysis of monosulfiram: a mechanism for its disulfiram-like reaction. *Clin Pharmacol Ther* 1994; **55**: 191.
- Lipsky JJ, *et al.* Monosulfiram, disulfiram, and light. *Lancet* 1994; **343**: 304.

Uses and Administration

Sulfiram is a pesticide that has been used as an acaricide, either alone or with benzyl benzoate, in the treatment of scabies (p.2035), although other treatments are now preferred.

Sulfiram has also been used as a pesticide in veterinary practice.

Preparations

Proprietary Preparations (details are given in Part 3)

Braz.: Sarifam; Sulfirafat; Tetmosol; Valifran; **India:** Tetmosol; **Mex.:** Tetmosol; **Port.:** Thiosan; **S. Afr.:** Tetmosol; **Singapore:** Tetmosol; **Multi-ingredient: Fr.:** Ascabiol.

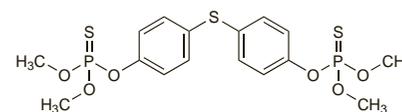
Temefos (USAN, rINN)

27165; Téméfós; Temefós; Temefosum; Temephos. *O,O'*-(Thiodi-*p*-phenylene) *O,O',O'*-tetramethyl bis(phosphorothioate).

Темэфос

$C_{16}H_{20}O_6P_2S_3 = 466.5$.

CAS — 33833-96-8.



Profile

Temefos is an organophosphorus insecticide (p.2047). It is effective against the larvae of mosquitoes, blackflies, and other insects, and is used for the larvicidal treatment of rivers in the control of onchocerciasis (p.137). It is also effective against the crustacean host to the larvae of the guinea worm and is used in the control of dracunculiasis (p.136); treatment of drinking water is both effective and acceptable.

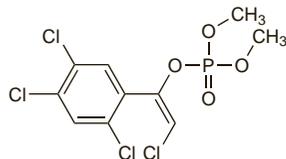
Tetrachlorvinphos

ENT-25841; SD-8447; Tetrachlorowinfos; Tetrachlorvinfós. 2-Chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl phosphate.

$C_{10}H_9Cl_4O_4P = 366.0$.

CAS — 961-11-5; 22248-79-9 (*Z*-tetrachlorvinphos); 22350-76-1 (*E*-tetrachlorvinphos).

ATC Vet — QP53AF14.

**Profile**

Tetrachlorvinphos is an organophosphorus insecticide (p.2047) used as an ectoparasiticide in veterinary practice.

Tetramethrin ^(†INN)

Tétraméthrine; Tetramethrinum; Tetrametrina. Cyclohex-1-ene-1,2-dicarboximidomethyl (1*RS*,3*RS*)-(1*RS*,3*SR*)-2,2-dimethyl-3-(2-methylprop-1-enyl)cyclopropanecarboxylate.

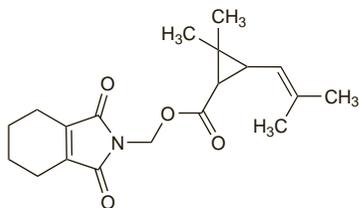
Тетраметрин

$C_{19}H_{25}NO_4 = 331.4$.

CAS — 7696-12-0.

ATC — P03BA04.

ATC Vet — QP53AC13.

**Profile**

Tetramethrin is a pyrethroid insecticide (see Pyrethrum Flower, p.2049) used in the treatment of pediculosis (p.2034). It is also used in veterinary practice for the control of ectoparasites in the environment and as a household insecticide.

◊ **References.**

1. WHO. Tetramethrin health and safety guide. *IPCS Health and Safety Guide 31*. Geneva: WHO, 1989. Available at: <http://www.inchem.org/documents/hsg/hsg/hsg031.htm> (accessed 26/04/04)
2. WHO. Tetramethrin. *Environmental Health Criteria 98*. Geneva: WHO, 1990. Available at: <http://www.inchem.org/documents/ehc/ehc/ehc98.htm> (accessed 26/04/04)

Preparations

Proprietary Preparations (details are given in Part 3)

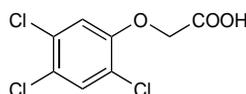
Multi-ingredient: **Fr.:** Aspipur; **Gr.:** Cif Candioli; Runde; **Ital.:** Baygon; Mom Piretro Emulsione†; Mom Shampoo Antiparassitario; Neo Mom; **Rus.:** Pedilin Ко (Педилин Ко).

Trichlorophenoxyacetic Acid

2,4,5-*T*; Triclorofenoxiacético, ácido. 2,4,5-Trichlorophenoxyacetic acid.

$C_8H_5Cl_3O_3 = 255.5$.

CAS — 35915-18-5.

**Profile**

Trichlorophenoxyacetic acid is a selective herbicide with similar actions to dichlorophenoxyacetic acid (p.2040). It is usually used in ester formulations. It was used with dichlorophenoxyacetic acid as a defoliating agent in the Vietnam war.

Toxicity. The phenoxy herbicides were used for defoliation in Vietnam as Agent Orange, which consisted of a mixture of dichlorophenoxyacetic acid, trichlorophenoxyacetic acid, and the impurity TCDD (dioxin), and concern has been expressed that they may have contributed to an increased incidence of cancer among exposed subjects as well as an adverse effect on the offspring of those subjects. This has been a matter of considera-

ble debate,¹ prompting a series of biennial reassessments of the health effects of Agent Orange by the US National Academy of Sciences' Institute of Medicine.² To date the Institute has concluded³ that there is evidence of increased incidence of chronic lymphocytic leukaemia, soft tissue sarcoma, Hodgkin's disease, non-Hodgkin's lymphoma, and chloracne, with phenoxy herbicides.

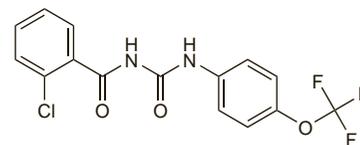
1. McCarthy M. Agent Orange. *Lancet* 1993; **342**: 362.
2. Stephenson J. New IOM report links Agent Orange exposure to risk of birth defect in Vietnam vets' children. *JAMA* 1996; **275**: 1066-7.
3. Institute of Medicine. *Veterans and Agent Orange: update 2002 (2003)*. Washington: The National Academies Press. Also available at: <http://www.nap.edu/openbook.php?isbn=0309086167> (accessed 24/07/08)

Triflumuron

Triflumurón; Trifluron. 2-Chloro-*N*-[4-(trifluoromethoxy)phenyl]amino]carbonyl]benzamide.

$C_{15}H_{10}ClF_3N_2O_3 = 358.7$.

CAS — 64628-44-0.

**Profile**

Triflumuron is an insecticide used in agriculture and as a topical ectoparasiticide in veterinary practice.

Preparations

Proprietary Preparations (details are given in Part 3)

Ital.: Baycidal†.