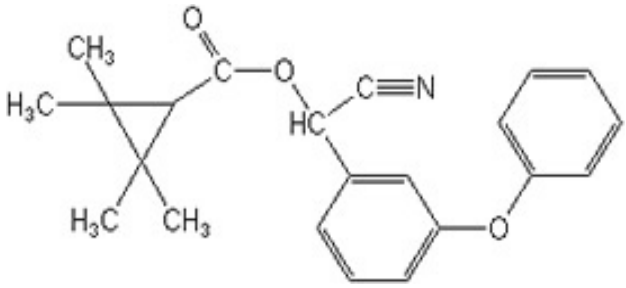
Fenpropathrin



Chemical name: Fenpropathrin
Other names: (RS)-alpha-Cyano-3-phenoxybenzyl-2,2,3,3-tetramethylcyclopropanecarboxylate, alpha-Cyano-3-phenoxybenzyl 2,2,3,3-tetramethylcyclopropanecarboxylate, Fenepropatrina, Fenpropanate, fenpropathrine, Fenpropatrin
Compound: $C_{22}H_{23}NO_3$
CAS Number: 39515-41-8
Pesticide type: insecticide - miticide

Characteristics

Liquid or solid substance, with yellow to brown colour and faint characteristic odour, belonging to the pyrethroid chemical family. Initially registrated in 1989. Trade names include Danitol, Herald, Meothrin, Rody, Digital etc. Repellent and contact and stomach action.

Use

Fenpropathrin is used to control a range of insects, especially mites, in fruits and vegetables. Main target pests include mites, aphids, beet armyworm, mealybug, potato leafhopper, moths, leafrollers, lacebugs. Most often used on pome fruit, citrus fruit, vines, hops, vegetables, ornamentals, cotton, field crops and glasshouse crops. In addition it also exerts a considerable repellent action. The effects of a treatment normally last for 3-4 weeks.

Possible hazards and regulation

Fenpropathrin may cause the following symptoms, typical for pyrethroid compounds poisoning: irritation of skin and eyes, irritability to sound or touch, abnormal facial sensations, sensation of tingling or creeping on skin, numbness, headache, dizziness, nausea, vomiting, diarrhea, fatigue, in severe cases fluid in the lungs and muscle twitching may develop. Seizures may also occur.
PAN Bad Actor Chemical
US EPA product label highly toxic
WHO II moderately hazardous

Toxicity

Toxic by oral and dermal exposure. Very toxic by inhalation. Slightly toxic as an eye-irritant – may cause redness, swelling and pain. 97% is eliminated in 48 hours and little residue after 8 days. Highest concentrations found in fat. It can directly enter the lungs if it is swallowed – once in the lungs, the substance is very difficult to remove and can cause injury to the lungs and even death.

Toxicity to humans

Signs of acute toxicity typical of pyrethroid intoxication and include decreased motor activity, hyperexcitability, tremors, diarrhoea and salivation. In a study in Japan, six workers participated in two tests using fenpropathrin and wearing protective clothing. No effects were reported. Some workers exposed to pyrethroids in the laboratory or in field in England reported transient abnormal facial sensations. In another study with 23 workers, nineteen had experienced at least one episode of

abnormal facial sensations. Symptoms were limited to the face and appeared 30 minutes to 8 hours after exposure.
ADI 0,03 mg/kg/day
Acute toxicity limits
Acute oral toxicity in rat LD50 54,0 mg/kg.
Acute dermal rat LD50 1600 mg/kg.

Chronic toxicity:
13-week study in rats – NOAEL 150ppm, equal to 8mg/kg/day.
1-year study in dogs, NOAEL of 100ppm, equal to 3mg/kg/day.

Reproductive effects:
No developmental toxic effects observed in rats at dose levels greater than 10 mg/kg/day. Maternal NOEL established at 0,4 mg/kg/day for rats.

Ecological effects
Highly toxic to mammals by the oral route. Extremely toxic to fish and aquatic organisms (LC50 for rainbow trout 2,3ppb), also bioconcentrates in fish. Toxic to wildlife. Slightly toxic to birds following acute exposure: LD50 for mallard duck 1089 mg/kg, bobwhite quail LD50 greater than 10000 mg/kg. Environmental concentrations of up to 2,0 ppm do not present a reproductive hazard to birds. Moderately toxic to algae with acute 72hour EC50 2mg/kg, highly toxic to bees -acute 48hour LD50 0,05 mg/kg. Moderately toxic to earthworms with acute 14day LC50 184 mg/kg.

Carcinogenity
No evidence of any carcinogenic effects in a 2-year dietary study in rats at dose levels up to and including 600ppm equal to 5mg/kg/day (only symptom at this level was marginally increased hyperactivity).

Mutagenity: not mutagenic
Bioaccumulation: no accumulation in soil
Mobility: non-mobile

Persistence and degradability in environment
When applied, it is degraded by a combination of photochemical and microbiological processes and it is unlikely that it would remain in the soil long enough to give rise to carry-over residues to affect succeeding crops. Degrades under aerobic soil conditions with a half-life of 33-34 days. Strongly adsorbed by normal agricultural soils and it is very resistant to leaching. Fenpropathrin will not cause contamination of groundwater in normal circumstances.

Limits
National MRLs in food (mg/kg):
Austria – apple 1, cucumber 0,1, eggplant 0,1, grapes 1, tomato 0,1
Belgium – apple 0,5, cucumber 1, eggplant 1, tomato 1
France – apple 0,5, grapes 0,5, peach 0,5
Germany – cucumber 0,2, tomato 1
Hungary – apple 0,3, cucumber 0,1, grapes 0,2, pears 0,3, tomato 0,2
Japan – apple 1, fruits 2, cucumber 2, eggplant 2, tea 30
Switzerland - beans 0,02, cucumber 0,02, fruits 0,02
Codex Alimentarius (mg/kg):
cattle meat 0,5, cattle milk 0,1, eggplant 0,2, eggs 0,1, grapes 5, tea 2, tomato 1

Hazard Symbol : T+ very toxic
Xn harmful

N dangerous for the environment

Risk Phrases :
R26 Very toxic by inhalation
R25 Toxic if swallowed
R21 Harmful in contact with skin
R50 Very toxic to aquatic organisms
R53 May cause long-term adverse effects in the aquatic environment

Safety Phrases :
S1/2 Keep locked up and out of the reach of children
S28 After contact with skin, wash immediately with plenty of ... (*to be specified by the manufacturer*)
S36/37 Wear suitable protective clothing and gloves
S38 In case of insufficient ventilation wear suitable respiratory equipment
S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)
S60 This material and its container must be disposed of as hazardous waste
S61 Avoid release to the environment. Refer to special instructions/safety data sheet

Links
http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC33191
http://pmep.cce.cornell.edu/profiles/insect-mite/fenitrothionmethylpara/fenpropathrin/fenprop_cfs_1289.html
http://www.hdcchem.com/Fenpropathrin.html
http://www.agrochem.com.eg/product/msds/insecticide_technical/Fenpropathrin%20Tech.pdf
http://www.inchem.org/documents/jmpr/jmpmono/v93pr10.htm
http://sitem.herts.ac.uk/aeru/iupac/Reports/306.htm
http://www.codexalimentarius.net/pestres/data/pesticides/details.html?id=195

http://www.fao.org/ag/agp/agpp/Pesticid/JMPR/Download/93_eva/fenpropa.pdf

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