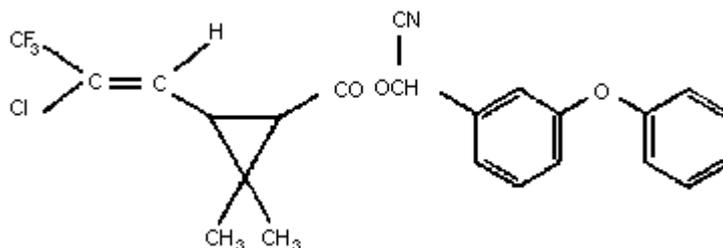


Lambda-cyhalothrin



Chemical name: Lambda-cyhalothrin

Other names: (RS)-alpha-cyano-3-phenoxybenzyl 3-(2-chloro-3,3,3-trifluoropropenyl)-2,2,-dimethylcyclopropanecarboxylate

Lambda cyhalothrine, lambda-cialotrina, lambda-cyhalotrin, lambdacylalothrim

Compound: C₂₃H₁₉ClF₃NO₃

CAS Number: 91465-08-6

Pesticide type: insecticide, acaricide

Characteristics

Cyhalothrin is a synthetic pyrethroid insecticide and lambda-cyhalothrin is a mixture of highly active isomers of cyhalothrin introduced in 1985. It is commonly mixed with buprofezin, pirimicarb, dimethoate or tetramethrin. Pyrethroids disrupt the normal functioning of the nervous system in an organism, which may cause paralysis or death. It is a non-systemic insecticide with contact and stomach action, and repellent properties. Gives rapid knockdown and long residual activity. Residues of lambda-cyhalothrin have been detected in irrigation and storm runoff water and in their associated sediments in California, where it is widely used.

Use

It is used to control a variety of pests in a variety of applications. Pests controlled include aphids, Colorado beetles and butterfly larvae. Crops where it is usually applied are cotton, cereals, hops, ornamentals, potatoes, vegetables or others. It may also be used for structural pest management or in public health applications to control insects such as cockroaches, mosquitoes, ticks and flies. Brand names include Karate, Kung-fu, Matador, Hot Shot, Real Kill, Excaliber, Icon or Samurai.

Possible hazards and regulation

Suspected endocrine disruptor and possible groundwater contaminant.

Restricted Use Pesticide in EPA toxicity class II – must bear the signal word “warning”.

Registered use in Australia, Canada, Denmark, Finland, Germany, Hungary, New Zealand, Philippines, Portugal, UK, US, Burkina Faso, Chad, Gambia, Madagascar, Mali, Mauritania, Niger, Senegal, South Africa, Uganda. Not allowed to be used as an active ingredient after July 25, 2003, within the European Union.

WHO II moderately hazardous

Toxicity

Lambda-cyhalothrin is moderately toxic in the technical form, but may be highly toxic via some routes in formulation (Karate).

Acute effects due to exposure could be neuropathy, cyhalothrin may act on ion channels within the nerve cells to disrupt proper function of the cells. Observable effects include tingling, burning or numbness sensations, tremors, incoordination of movement, paralysis or other disrupted motor

function, and confusion or loss of consciousness. Effects are generally reversible due to rapid breakdown of the compound in the body.

Toxicity to humans

It is unlikely that lambda-cyhalothrin would cause chronic effects in humans under normal conditions. Symptoms of chemical poisoning are burning facial sensation, skin irritation, respiratory tract irritation, headache, nausea, vomiting, anorexia, fatigue, salivation, fluid in lungs and convulsions. Workers in laboratories reported symptoms of facial tingling and burning sensations that began within 30 minutes of exposure and lasted for 6 hours to 2 days. Four out of 38 field workers reported adverse health effects like skin rash.

ADI 0,005 mg/kg/day (older sources 0,02 mg/kg/day)

Acute toxicity limits

Moderately toxic via the oral route. Oral LD50 is 79mg/kg in rats.

4-hour inhalation LC50 is 0,175 mg/l in rats, indicating moderate to high toxicity via the inhalation route (rats had the following symptoms: paw flicking, erect tails, altered walking, eye tearing and salivation)

Dermal LD50 is 632mg/kg in rats.

Found to be non-irritating to the skin of rabbits and non-sensitizing to the skin of guinea pigs, but may cause mild eye irritation in rabbits.

Chronic toxicity:

May cause decreased body weight gain and decreased food consumption. These effects occurred in rats at oral doses of 1,5 mg/kg/day.

In a 26week feeding study on dogs, doses of 2,5 mg/kg/day disrupted water absorption resulting in liquid feces, and at doses of 3,5 mg/kg/day and higher, neurological effects were noted.

Reproductive effects:

In several studies it caused reduced body weight gain, but produced no observable reproductive effects. Reduced numbers of viable offspring at very high doses of 50mg/kg/day in rats.

Ecological effects

Slightly toxic to practically non-toxic to birds. Oral LD50 in the mallard duck greater than 3950 mg/kg. In bobwhite quail LC50 is greater than 500ppm. There is evidence that it does not accumulate in the eggs or tissues of birds.

It is very highly toxic to many fish and aquatic invertebrates. LC50 in bluegill sunfish is 0,00021mg/l in rainbow trout 0,00024 mg/l and in mysid shrimp 0,0049 mg/l. Moderately toxic to algae with acute 72 hour EC50 0,3 mg/l.

Highly toxic to bees, with oral LD50 of 0,038 mg/bee.

Carcinogenicity

Evidence is not conclusive, but suggests it is probably not carcinogenic (US EPA Carcinogens D – unclassifiable).

Mice fed cyhalothrin for 2 years detected an increased frequency in mammary tumors in female mice, but results unclear and could not be linked to cyhalothrin.

Mutagenity: negative results in all tests

Bioaccumulation: unlikely (but bioconcentration possible in aquatic species – accumulation factor 1000-2000, but when exposed fish is placed in clean water, the residues decline rapidly, with half-lives of 7 days)

Mobility: non-mobile

Persistence and degradability in environment

Moderately persistent in the soil environment. Field half-lives range from 4 to 12 weeks. It shows a high affinity for soil and it is not expected to be appreciably mobile in most soils. There is little potential for groundwater contamination. Leaching is minimal. It has extremely low water solubility and is tightly bound to soil, therefore is not expected to be prevalent in surface waters.

Limits

Codex Alimentarius MRL (mg/kg):

apricot 0,5, cabbage 0,3, citrus fruit 0,2, kidney of cattle 0,2, maize 0,02, meat 3, milk 0,2, oats 0,05, olives 1, rice 1, sugar cane 0,05, wheat 0,05

Vyhláška 381/2007 Sb. (mg/kg): bananas 0,1, onion 0,05, tea 1, grapes 0,2, hops 10, corn 0,05, raspberries 0,2, nuts 0,05, tomatoes 0,1, meat 0,5, milk and dairy products 0,05, eggs 0,02

Hazard Symbol : T+ very toxic
Xn harmful
N dangerous for the environment

Risk Phrases :

R21 Harmful in contact with skin

R26 Very toxic by inhalation

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)*

S36/37/39 Wear suitable protective clothing, gloves and eye/face protection

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://npic.orst.edu/factsheets/l_cyhalogen.pdf

<http://pmep.cce.cornell.edu/profiles/extoxnet/haloxyp-methylparathion/lambda-cyhalothrin-ext.html>

<http://www.springerlink.com/content/k42r537847127p21/>

<http://www.fluoridealert.org/pesticides/lambda-cyhalothrin.-page.htm>

http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC35463

<http://www.inchem.org/documents/hsg/hsg/hsg038.htm>

<http://www.codexalimentarius.net/pestres/data/pesticides/details.html?id=146>

<http://sitem.herts.ac.uk/aeru/footprint/en/Reports/415.htm>



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