

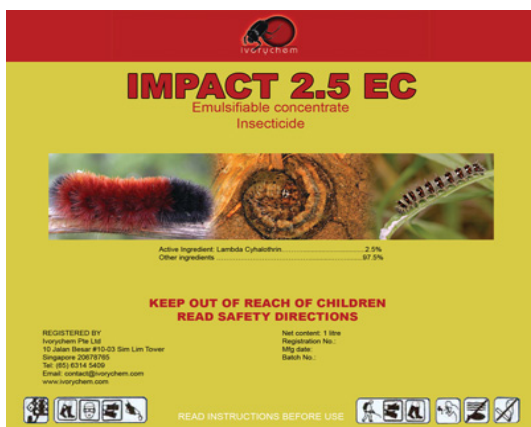
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READ THE ENTIRE LABEL BEFORE USING THIS PRODUCT.

USE ONLY IN ACCORDANCE WITH INSTRUCTIONS.

KEEP OUT OF REACH OF CHILDREN

IMPACT 2.5 EC



INGREDIENTS

Lambda Cyhalothrin.....2.5%
Other ingredients97.5%

IMPACT 2.5 EC is a synthetic pyrethroid insecticide and acaricide, used to control a wide range of pests in a variety of applications. Pests controlled include aphids, Colorado beetles and butterfly larvae. Crops on which it may be applied include 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, which may act as disease vectors.

Lambda cyhalothrin is available as an emulsifiable concentrate, wettable powder or ULV liquid, and is commonly mixed with buprofezin, pirimicarb, dimethoate or tetramethrin. It is compatible with most other insecticides and fungicides. Unless otherwise stated, data presented herein refer to the technical product.

Trade Names Of Other Firms: Trade names for products containing lambda cyhalothrin include Charge, Excaliber, Grenade, Hallmark, Icon,

Karate, Matador, OMS 0321, PP321, Saber, Samurai and Sentinel.

What is IMPACT 2.5 EC and how does it work?

IMPACT 2.5 EC's mode of action is Sodium channel modulator, which attacks the nervous system. Like most pyrethroids, it is specifically designed to be more stable in the environment (although still lasting only days or weeks), and thus provide longer-lasting control.

IMPACT 2.5 EC act on tiny channels through which sodium is pumped to cause excitation of neurons. They prevent the sodium channels from closing, resulting in continual nerve impulse transmission, tremors, and eventually, death.

Key Benefits of IMPACT 2.5 EC:

1. Quick knockdown effect.
2. Highly effective against target pests
3. Available in other formulations for application flexibility

PRECAUTIONS

Harmful if swallowed, inhaled or absorbed through skin. Causes eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing dust or vapor. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse. Keep children or pets away from treated area until dry.

SYMPTOMS OF POISONING

Irritation on skin or eyes.

MEDICAL TREATMENT

Treatment is symptomatic.

FIRST AID

Remove contaminated clothes. Rinse and then wash skin with water and soap. If in eyes, first rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. If ingested, do NOT induce vomiting. Refer for medical attention.

DIRECTIONS OF USE

Pests	Rate (lb. a.i.a)	Special instructions
Loopers	0.02 – 0.03	Labelled for spotted cabbage looper. Apply by ground or air in sufficient

		gallonage to obtain full coverage. Use a minimum of 2 gallons of water per acre by air. Do not apply more than 0.09 lb a.i. (0.75 pt) per acre per season after bloom initiation. PHI is 45 days. REI is 24 hours.
Painted lady caterpillar	0.02 – 0.03	Follow special instructions under loopers.
Woollybear caterpillars	0.02 – 0.03	Follow special instructions under loopers
Alfalfa weevil	0.02 - 0.03	
Armyworm		
Cutworms		
Green cloverworm		
webworms		

Crop	Dosage	Special instructions
Rice	6.25-10 g ai/ha	Control against Tagosodes orizicolus (Muir) and Spodoptera frugiperda (palomilla)
Sugarcane	3.20 oz/acre	21 days from last application for harvest
Onion	12.5-17.5 g ai/ha	Control against larva and lepidoes
Cucumbers		
Maize Pepper		
Tobacco		
Tomato		
Environmental hygiene	10-30 mg ai/m ²	For the control of flying and crawling insects
Tobacco	12.5 g ai/ha	Control of Lepidoptera larva

DISPOSAL METHODS

Do not dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

STORAGE CONDITION

Store in the closed, original container in a cool, well-ventilated area. Do not store for prolonged periods in direct sunlight. Store in a locked room or place away from children, animals, food, feedstuffs, seed and fertilizers. Triple or preferably pressure rinse containers before disposal. Add rinsing to spray tank.

For More Details including effects on environment email contact@ivorychem.com with Subject "IMPACT 2.5 EC DETAILS"

More Details:

TOXICOLOGICAL EFFECTS

- Acute Toxicity:** Lambda cyhalothrin is moderately toxic in the technical form, but may be highly toxic via some routes in formulation (e.g., as Karate). Available data indicate that lambda cyhalothrin is moderately toxic via the oral route in test animals. Reported oral LD50 values are 79 mg/kg and 56 mg/kg for male and female rats, respectively (12, 107). The vehicle used was corn oil. The rat oral LD50 has also been reported as 144 mg/kg (108). The reported rat LD50 for the technical product is similar, 64 mg/kg (107). These indicate moderate acute toxicity via the oral route of exposure. No data were available regarding the acute toxicity of the technical compound via the inhalation route, but for Karate the reported 4-hour inhalation LC50s were 0.175 mg/L and 0.315 mg/L for female and male rats, respectively (107). These data indicate a moderate to high toxicity via the inhalation route for the formulated product Karate. The technical product has reported dermal LD50s of 632 mg/kg and 696 mg/kg for male and female rats (vehicle used was propane-1,2-diol) (12, 107). It has also been found to be non-irritating to the skin of rabbits (12, 107) and non-sensitizing to the skin of guinea pigs (107) but may cause mild eye irritation in rabbits (12). The formulated product, Karate, however, causes severe primary skin irritation in rabbits and mild skin sensitization in guinea pigs (107). Primary eye irritation also was observed with the technical product (107). In addition to the corrosive effects to skin and eyes, other acute effects due to exposure to lambda cyhalothrin, like

- those of other pyrethroids, will be mainly neuropathy (effects on the nervous system) (107, 108). Cyhalothrin may act on ion channels within the nerve cells (neurons) to disrupt proper function of the cells of both the peripheral and central nervous systems (108). At lower doses, this may take the form of stable, repetitive firing of the neuron, but high doses may result in depolarization of the nerve cell and blockage of conduction (108). These effects may result in observable effects such as: tingling, burning or numbness sensations (particularly at the point of skin contact); tremors, incoordination of movement, paralysis or other disrupted motor function; and confusion or loss of consciousness (108). Since most pyrethroids are generally absorbed only poorly through the skin (108, 109), the latter two systemic effects are unlikely unless the compound has been ingested. Effects are generally reversible due to rapid breakdown of the compound in the body (108, 109). Like many compounds of the pyrethroid family, the observed toxicity of lambda cyhalothrin may vary according to not only the concentration of the active ingredient, but also according to the solvent vehicle (62).
- **Chronic Toxicity:** The principal toxic effects noted in chronic studies were decreased body weight gain and decreased food consumption. These effects occurred in rats at oral doses of 1.5 mg/kg/day (the highest dose tested) in a three-generational study conducted in 1984 (107, 110). In a two-year study in rats, no effects were observed at oral doses of 2.5 mg/kg/day and doses of up to 8.5 mg/kg/day produced no observable changes in the function or structure of the liver or nervous system (107, 110). In this study, decreased body weight gain and decreased food consumption occurred at doses of 12.5 mg/kg/day as did elevation of plasma triglycerides (107, 110). In a 26 week feeding study on dogs, doses of 2.5 mg/kg/day disrupted water absorption from the small intestine resulting in liquid feces (107, 110), and at doses of 3.5 mg/kg/day and higher, neurological effects were noted (109). In two teratology studies, no maternal toxicity was observed at doses of 10 mg/kg/day in both rats and rabbits (107, 110). It is unlikely that lambda cyhalothrin would cause chronic effects in humans under normal conditions.
 - **Reproductive Effects:** In two studies, lambda cyhalothrin caused reduced body weight gain at doses of 15 mg/kg/day in pregnant rats (highest dose tested) and at doses of 30 mg/kg/day in pregnant rabbits (also the highest dose tested) (107, 110), but these doses produced no observable reproductive effects. There were reduced numbers of viable offspring at doses of 50 mg/kg/day in the second and third generations in the three-generational rat study noted above (107, 110). It is unlikely that lambda cyhalothrin would cause reproductive effects in humans under normal conditions.
 - **Teratogenic Effects:** No teratogenic or fetotoxic effects were observed in teratology studies of lambda cyhalothrin in rats and rabbits at the highest doses tested in both species (15 mg/kg/day and 30 mg/kg/day, respectively); (107, 110). Based on these data, it is unlikely that lambda cyhalothrin causes teratogenic effects.
 - **Mutagenic Effects:** Lambda cyhalothrin produced negative results in all Ames mutagenicity assays using five different test strains, both with and without metabolic activation (12, 109). Results of other in-vitro cytogenetic assays and chromosomal structural aberration tests indicated no mutagenic or genotoxic effects were caused by lambda cyhalothrin (107, 109). The available evidence suggests that lambda cyhalothrin is non-mutagenic and non-genotoxic.
 - **Carcinogenic Effects:** No carcinogenic effects have been noted in studies of lambda cyhalothrin on various test animals (rats, rabbits, dogs) (107). The evidence regarding the carcinogenicity of lambda cyhalothrin is inconclusive, but suggests that it is probably not carcinogenic.
 - **Organ Toxicity:** No specific target organs or organ systems have been identified in the available studies of chronic toxicity. The nervous system may be affected after acute exposure.
 - **Fate in Humans & Animals:** In rat studies, lambda cyhalothrin is rapidly metabolized and excreted via the urine and feces (12). Hydrolytic cleavage of the ester bond occurs, forming more polar, water-soluble compounds which are less toxic and more easily eliminated (12, 110).

ECOLOGICAL EFFECTS

- **Effects on Birds:** Lambda cyhalothrin's toxicity to birds ranges from slightly toxic to practically non-toxic. In the mallard duck, the reported oral LD50 is greater than 3,950 mg/kg (12, 107), and the reported dietary LC50 is 3,948 ppm (107). In bobwhite quail the reported dietary LC50 is greater than 500 ppm (12, 107). There is evidence that it does not accumulate in the eggs or tissues of birds (12)
- **Effects on Aquatic Organisms:** Lambda cyhalothrin is very highly toxic to many fish and aquatic invertebrate species. Reported LC50s in these species are as follows: bluegill sunfish, 0.21 ug/L (12, 107); rainbow trout, 0.24 ug/L (12, 107); Daphnia magna, 0.36 ug/L (107); mysid shrimp, 4.9 ng/L (107); sheepshead minnow, 0.807 ng/L (107). A median effect concentration, EC50 (i.e. the concentration at which the effect occurs in 50% of the test population), for the eastern oyster of 0.59 ng/L has been reported (107). Bioconcentration is possible in aquatic species, but bioaccumulation is not likely. Bioconcentration in channel catfish has been reported as minimal, with rapid depuration (elimination) (111). A bioconcentration factor of 858 has been reported in fish (4, species unspecified), but concentration was confined to non-edible tissues and rapid depuration was observed (107).
- **Effects on Other Animals (Nontarget species):** Lambda cyhalothrin is highly toxic to bees, with a reported oral LD50 of 38 ng/bee and reported contact LD50 of 909 ng/bee (0.9 ug/bee) (107).

ENVIRONMENTAL FATE

- **Breakdown of Chemical in Soil and Groundwater:** Lambda cyhalothrin is moderately persistent in the soil environment. Reported field half-lives range from four to 12 weeks (107, 111, 112). Its field half-life is probably close to 30 days in most soils (112). It shows a high affinity for soil; the reported Koc is 180,000 (112). Lambda cyhalothrin is not expected to be appreciably mobile in most soils. There is little potential for groundwater contamination. Soils with high sand content or with very low organic matter content may tend to retain the compound to a lesser degree. In field studies of Karate, leaching of lambda cyhalothrin and its degradates from the

soil were minimal (12, 107). Breakdown products formed in the soil environment are similar to those formed in mammalian systems, via the hydrolysis of the central ester bond and oxidation (12). Breakdown rates of both the technical product and Karate were similar under aerobic and anaerobic conditions (107, 111).

- **Breakdown of Chemical in Surface Water:** Lambda cyhalothrin has extremely low water solubility and is tightly bound to soil, it is therefore not expected to be prevalent in surface waters. One possible source of infiltration into surface waters would be surface runoff. In this event, the compound would most probably remain bound to the solid particle and settle to the bottom.
- **Breakdown of Chemical in Vegetation:** No data were available regarding the breakdown of lambda cyhalothrin in vegetation.

PHYSICAL PROPERTIES AND GUIDELINES

Physical Properties:

- **Appearance:** Lambda cyhalothrin is a colorless solid at room temperature, but may appear yellowish in solution.
- **Chemical Name:** (RS)-alpha-cyano-3-phenoxybenzyl 3-(2-chloro-3,3-trifluoropropenyl)-2,2-dimethylcyclopropanecarboxylate (12)
- **CAS Number:** 91465-08-6 (12)
- **Molecular Weight:** 449.9 (12)
- **Water Solubility:** 0.005 mg/L @ pH 6.5 and 20 degrees C (12)
- **Solubility in Other Solvents:** acetone v.s, methanol v.s., toluene v.s., hexane v.s. (12)
- **Melting Point:** 49.2 degrees C (12)
- **Vapor Pressure:** negligible at 20 degrees C (12)
- **Partition Coefficient:** 10,000,000 (12)
- **Adsorption Coefficient:** 180,000 (112)



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