TECHNICAL INFORMATION GUIDE

Cyrux™ 25 EC

(CYPERMETHRIN 250 G/L EC)

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CHEMICAL AND PHYSICAL PROPERTIES

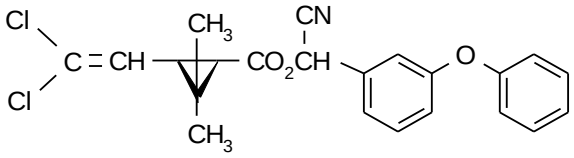
Active ingredient

Chemical name : *(RS)-alpha*-Cyano-3-phenoxybenzy (1*RS*)-cis-trans-3-(2,2-dichlorovinyl)-1,1-dimethylcyclopropanecarboxylate (IUPAC)

cyano(3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate (*C.A.*)

Common name : cypermethrin (BSI, E-ISO, ANSI, BAN)

Structural formula:



Empirical formula : C_{22} H_{19} C_{l2} NO_3

Molecular weight : 416.3

Physical form : Viscous yellow-brown semi-solid mass (tech.), which is liquid at 60°C

Specific gravity : 1.12 – 1.13 at 22°C (tech.)

Melting point : 60-80°C (tech.)

Vapour pression : 0.51 nPa at 70°C

Ko/w : 4000 000

Stability : Relatively stable in neutral and weakly acidic media, with optimum stability at ph 4. Hydrolyzed in alkaline media. Relatively stable to light. Thermally stable up to 220°C.

Solubility : In water at 20°C, ca. 0.01 mg/l. In acetone, chloroform, cyclohexanone, xylene >450, ethanol 337, hexane 103 (allin g/l at 20°C).

Corrosiveness : Non-corrosive to metals.

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Compatibility : Compatible with many insecticides and fungicides, but incompatible with alkaline materials.

Formulation :

Formulation type	EC - Emulsifiable Concentrate
Appearance	Limpid yellowish liquid
Specific gravity (20°C)	0.964 +/- 0.0025
Flash point	Approx. + 45°C
Emulsion characteristics	Good - conform to CIPAC methods
Shelf life	Min. 2 years
Stability	No significant modification of specifications after accelerated aging test (14 days at 54°C).
Quality & specifications	Conforms to international standards (FAO/WHO, CIPAC methods)

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BIOLOGICAL ACTIVITY AND RECOMMENDATIONS FOR USES

Cyrux™ 25 EC is an emulsifiable concentrate insecticide containing 250 g/l of cypermethrin, a neurotoxic synthetic pyrethroid insecticide, acting by contact, stomach and respiratory action against most insect pests as a preventive or curative treatment. Cypermethrin exhibits also an anti-feeding action.
This emulsifiable concentrate product can be recommended to replace conventional insecticides in several field crops, vegetables, fruit trees and ornamental plants to control a wide range of sucking and chewing insect pests.

Biological activity
Cypermethrin possesses a very high level of activity against a wide range of insect pests, particularly Lepidoptera. This activity is usually greater than ten times that of organophosphate and carbamate standards. The compound is both a stomach and contact insecticide. It has shown adulticidal, ovicidal and particularly larvicidal activity on a variety of pest species. This is also extremely effective against the great majority of insects resistant to common chemical treatments such has organochlorines and organophosphates, it can, therefore, give significantly better levels of insect control than insecticides in current use.

Because of its wide spectrum of activity and advantages, Cypermethrin has rapidly taken an important place in the protection of a variety of crops in many countries under different climatic conditions. The dose rates of active ingredient most often used are within the range 25 to 75 g per hectare.
Cypermethrin has given excellent results against soil-surface pests e.g. cutworms in maize, lettuce and tobacco, but because of its physico-chemical properties, it is not recommended for use against soil-dwelling pests attacking beneath the soil surface.

In Public Health pests:
Cypermethrin has a very high level of activity against all the major public health pests. It is highly active against flies, mosquitoes and crawling insects. This compound is used as a residual spray and is persitent on all inert surfaces. Cypermethrin gives quick knock-down on contact followed by kill. It has low toxicity to man and to animals, making it safe to both the spray operator and the general public.
Cypermethrin is applied as a residual surface spray. In field trials in a number of countries, it has given excellent control of *Musca domestica*. When Cypermethrin was applied at 0.05 g/m² more than 3 months, control can be achieved.

Against mosquito species, Cypermethrin is extremely active against adults and larvae when applied to breeding sites. The inherent activity of the pyrethroids to mosquitoes is very high. When used as a surface spray, Cypermethrin can give rapid knock-down as the following table for *Blatella germanica* (German cockroach) shows. Cypermethrin is coupled with this knock-down, it has good persistence.

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METHODS AND RATES OF APPLICATION

This product is ready to be mixed with water and may be applied with conventional dilute or concentrate ground sprayers. It is ready to be mixed into water just before application.
Add the required dose rate of Cyrux™ 25 EC to the half-filled tank and start agitation. Add the remaining water in the tank and spray the mixture immediately. The spray concentration depends on the type of spray equipment, the crop, the infestation pressure and the local experience.

The recommendations of rates of application which follow (expressed in g of a.i. per ha or per 100 l water) are given as a guide to the very wide range of pests controlled by Cypermethrin and to suggested dosage rates. It may be necessary to vary the recommended rates according to the growth stage of the crop, infestation pressure, spray equipment and local experience.

Dosage will also be affected by the spray interval required. Higher doses will normally maintain control for longer periods. Lower rates will give levels of control at least equivalent to those achieved with conventional products. To avoid excessive residue at harvest, do not exceed the maximum dose rate recommended.
Good crop penetration and coverage is required to achieve satisfactory results, particularly when the pests are in the lower half of the crop. Early treatment will maximise Cypermethrin repellent activity.

Order	Pests	Dosage rate (g a.m. per ha)
Coleoptera	Weevils, flea beetles, beetles	20-80
Diptera	Leaf miners, midges maggots, Mediterranean fruit fly	25-75 50-75
Hemiptera-Homoptera	Aphids, scales, whiteflies, leafhoppers, plant hoppers, mealy bugs, suckers, leaf rollers	25-75
Hemiptera-heteroptera	Plant bugs, capsids, stainers	20-75
Hymenoptera	Sawflies	50-75
Lepidoptera	Stalk borers, bollworms, cutworms, armyworms, loopers, leaf rollers	10-75
Orthoptera	Grasshoppers	15-50
Thysanoptera	Thrips	25-75

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MAXIMUM RESIDUE LEVEL

Data on individual crops derived from some typical applications are summarised in the table below.

CROP	DOSAGE RATE	Nr of treatments	Preharvest interval (weeks)	Residue range mg/kg
Apples & pears	10-20 g a.m. per 100 litres water	1-6	2-4	0.3-1.0
Citrus	10-20 g a.m. per 100 litres water	1-2	3-6	0.4-1.3
Cotton seed	100-150 g a.m. per ha	1-6	1-2	0.01-0.04
Grapes	75-200 g a.m. per ha	1-4	2-4	0.01-1.5
Peaches	5-20 g a.m. per 100 litres water	1-4	1-2	0.2-0.6
Potatoes	75-200 g a.m. per ha	1-4	2-8	<0.01
Tomatoes	100-115 g a.m. per ha	2-3	1	0.2-06

Pre-harvest intervals

National pre-harvest intervals and MRLs have been established in several countries. Follow the local requirements.

Toxicology of the active ingredient

Acute toxicity

Oral LD50	Technical material
Rat (M, F)	303 mg/kg bw (cis:trans, 50:50, in dimethyl-sullfoxide)
Mouse (M, F)	138 mg/kg bw (cis:trans, 50:50, in dimethyl-sulfoxide)
Rabbit (F)	+2400 mg/kg bw (cis:trans, 40:60, undiluted)

Dermal LD50

Rat (F)	+4800 mg/kg bw (cis:trans, 40:60, undiluted)
Rat (M, F)	+1600 mg/kg bw (cis:trans, 50:50, in xylene)
Rabbit (F)	+2400 mg/kg bw (cis:trans, 40:60, undiluted)

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Primary irritation and sensitization
Moderate skin irritation and mild eye irritation were produced by single applications of undiluted technical cypermethrin in rabbits. Weak sensitization potential in guinea-pigs.

Short term toxicity
NOEL 90-d feeding study (rats) = 5.0 mg/kg bw per day.
NOEL 90-d feeding study (dogs) = 1.25 mg/kg bw per day.

Long term
NOEL 2-y feeding study (rats) = 5.0 mg/kg bw per day.

Carcinogenicity
No evidence of increased incidence of tumours in a single long-term cypermethrin diet study in rats

Teratogenicity
No evidence of teratogenic potential was observed in rats and rabbits given doses of up to 70 mg/kg bw per day from day 6 to day 15 of gestation in rats or 30 mg/kg bw per day from day 6 to day 18 of gestation in rabbits.

Reproduction
In a three-generation study, following cypermethrin administration at concentrations up to 500 mg/kg of diet, no adverse effects on reproductive parameters were observed.

Mutagenicity
Cypermethrin (with and without rat liver microsomal activation) was not observed to be genetically active in mitotic gene conversion assay, mutation rate assay, revertant gene assay, mouse host-mediated assay and Chinese hamster chromosomal damage assay

Neurotoxicity
No evidence of delayed neurotoxicity in hens given 1.0 mg/kg bw of cypermethrin.

Safety precautions

This product is harmful if swallowed, irritating to skin and flammable Observe also the general rules for handling the crop protection chemicals:
- Keep out of reach of children, away from food, drink or feed.
- Wear suitable protective clothing and rubber gauntlet gloves
- When using, do not eat, drink or smoke.
- Do not breathe spray mist.
- Wash any contamination from skin or eyes immediately.
- Wash hands and exposed skin before eating, drinking or smoking, before meals and after works.
- If you feel unwell, seek medical advice (show label where possible).

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Storage and disposal

- Store in the original container, tightly closed, in a cool, well ventilated local, protected heat, away from other pesticides, fertilizers, food, drink or animal feeding stuffs.
- **Toxic to fish**: do not contaminated ponds, waterways or ditches with chemical or used container.
- **Do not reuse emptied product containers.**
  For any purpose except storage of the unused, leftover specific product. To prevent reuse, destroy rinsed non combustible containers by puncturing and crushing. Dispose of containers preferably at a waste disposal site (landfill) approved for such use or bury it below topsoil away from water surfaces. Polyethylene containers may be burned if allowed. Keep out of the smoke from burning containers.

Emergency guidelines

Cypermethrin is a synthetic pyrethroid. It is a neurotoxic agent most probably acting through the central nervous system to cause repetitive nerve activity. It is readily absorbed from the gastrointestinal tract, by inhalation of dust and fine spray mist and only minimally through intact skin. The hydrolysis and oxidation products of metabolism are rapidly excreted in the urine and faeces.

Symptoms of poisoning

Early signs of poisoning may be: salivation irritability, tremors and ataxia. Respiratory and cardiovascular dysfunction may also occur.
Burning and itching facial sensation sometimes follow contact and may be a early sign of skin exposure.

First aid

- If poisoned by skin absorption, remove all contaminated clothing and wash the patient thoroughly with plenty of water and soap. Contaminated clothing should be laundered thoroughly before re-use.
- In case of eye contact, flush eyes with copious amounts of water for at least 15 minutes. Avoid exposing affected skin or eyes to bright light.
- If product has been swallowed, induce vomiting if person is conscious and aspiration of vomit into the lungs can be avoided. In the event of collapse apply artificial respiration. Keep in mind that if mouth to mouth respiration is used, vomit may contain toxic amount of cypermethrin. Do not induce vomiting when the patient is unconscious. Seek medical advice immediately.
- Keep the patient at absolute rest, lying face doxnwards, and ensure clear airway.

Note to physician

There is no specific antidote, medical treatment is largely symptomatic and supportive and directed against convulsions and anoxemia.

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