

K-Othrine® SC 25

Technical Data Sheet

General Description

K-Othrine® SC 25 is a deltamethrin water based suspension concentrate formulation. It is a broad-spectrum, fast-acting, water-dilutable insecticide used for either:

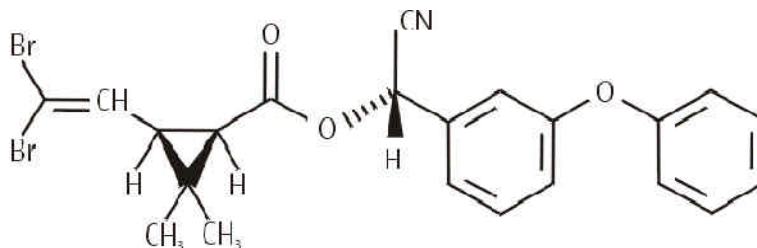
- Dipping treatment of mosquito bednets, which will give up to 12 months protection against vectors of malaria and leishmaniasis. It will also control other nuisance and biting insects e.g. flies, fleas, head lice and bed bugs. K-Othrine® SC 25 both repels and kills mosquitoes, adding to the passive protection of the net by preventing insect attack through the net and penetration by the mosquitoes or sandflies via intact or damaged nets.

Or

- Surface spray for professional use in vector control and public health to control crawling insects e.g. Triatominae etc. and flying insect control e.g. mosquitoes, flies etc.. It may be applied with any compression sprayer capable of producing a coarse spray. However best results are obtained using a compression sprayer fitted with a 8002 nozzle which gives a fan shaped spray.

Chemistry

The commercial product, deltamethrin, contains the *cis* isomer, (S)- α -cyano-3-phenoxybenzyl, (1R,3R)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate.



Technical deltamethrin has >98% purity. Deltamethrin is chemically stable and exposure to breakdown products is therefore not an issue. It has a low vapour pressure (1.24×10^{-8} Pa at 25°C, 4.13×10^{-8} Pa at 35°C) and is considered to be practically non-volatile (3.13×10^{-2} Pa \times m³ \times mole⁻¹ at 25°C); inhalation risks are thus likely to be low.

It is lipophilic (n-Octanol/water partition coefficient: 4.02×10^4 at 25°C) and is readily soluble in organic solvents, but is virtually insoluble in water (≤ 2 µg/l at 25°C), forming suspensions rather than solutions.



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	Unit	K-Othrine® SC 25
EC Classification		Not classified
Active ingredient	% w/w	Deltamethrin (WHO/SIT/24.R2): 2.5
Acute tox		
Oral (rat)	LD ₅₀ (mg/kg bw)	> 15,000
Dermal (rat)	LD ₅₀ (mg/kg bw)	> 10,000
Inhalation (rat)	LC ₅₀ (mg/l)	> 2.3
Skin irritation (rabbit)		Non-irritant
Eye irritation (rabbit)		Non-irritant
Skin sensitisation (pig)		Not a sensitiser
Phys-Chem data		
Shelf life	years	3 (if storage temperature does not exceed 35° C)
Recipe		AE F032640 00 SC02 A8
Description		White to cream liquid
Flammability		Non flammable
Density	g/ml	App. 1.04 at 20° C (CIPAC MT 3.3)
Suspensibility	%	≥ 92 in suspension within 30 min (CIPAC MT 161)
pH	pH	4.5 - 7 (CIPAC MT 75) (10% suspension in distilled water)
Pourability: residue	%	2.77
rinsed residue		0.20 (CIPAC MT 148)
Mean Particle Size	µm	< 3 (CIPAC MT 59.3)
	Deltamethrin	

Usage

Bednet treatment	Application rate is between: 20 – 25 mg a.i./m ² Synthetic nets (Nylon or Polyester) For 20 mg/m ² - Dilute 1 part + 35 parts water For 25mg/m ² - Dilute 1 part + 30 parts water Cotton Nets For 20 mg/m ² - Dilute 1 part + 175 parts water For 25mg/m ² - Dilute 1 part + 140 parts water
Surface spray	Mosquito or Triatominae control: 250 ml K-Othrine® SC 25 to 10 L of water Spray 10 L of dilution / 250 m ² = 25 mg a.i. / m ²



Environmental Protection

- Prepare only the amount of required for immediate usage. Do not store diluted material.
- Do not dispose of any excess diluted product and rinsings of dip containers into waterways, ponds, streams etc. It should be poured onto level ground away from any water sources and crops.

1. Soil

Persistence and Degradation

Deltamethrin is rapidly degraded in most soils with DT_{50} values of approximately 3 weeks. Deltamethrin is absorbed onto soil particles very rapidly and with high adsorption constants; the desorption is very low, therefore the risk of leaching of the parent compound into deep soil layers can be excluded.

Mobility

Deltamethrin should be considered as non-persistent and immobile.

2. Ecotoxicity

Fish LC_{50} (96h) Rainbow trout:
0.91 $\mu\text{g/l}$

Daphnia LC_{50} (48h): 3.5 $\mu\text{g/l}$

Worms LC_{50} (14d) Earthworm:
1290 ppm

Safety Advice

- | | |
|---|--|
| <p><i>Bednets</i></p> <ul style="list-style-type: none">• Wear rubber or plastic gloves when handling products or dipping nets.• Allow treated nets to dry and air thoroughly before use. | <ul style="list-style-type: none">• Keep away from food, drink and animal feeding stuffs.• When using do not eat, drink or smoke. |
| <p><i>Residual applications</i></p> <ul style="list-style-type: none">• Wear suitable protective clothing when handling concentrate (e.g. coveralls, gloves and faceshield) or applying the product (e.g. coveralls, gloves and spray mask) | <ul style="list-style-type: none">• Keep out of reach of children.• Toxic to fish. Do not contaminate ponds, waterways and ditches with chemical or used container. |
| <p><i>In addition:</i></p> <ul style="list-style-type: none">• Wash splashes from skin or eyes immediately with plenty of water.• Wash hands and exposed skin before meals and after work. | <ul style="list-style-type: none">• Wash out container thoroughly and dispose of safely. |

First Aid measures in case of exposure

Instructions for physician: Symptomatic treatment

- Irritancy:** If the diluted product contacts skin then cutaneous sensations may occur, such as burning, stinging sensations on the face and mucosa, without lesions and is transient for some hours, maximum 24 hours.
- Inhalation:** Remove to fresh air.
Help victim to blow his nose.
If required, seek medical advice immediately.
- Skin Contact:** Wash thoroughly with water and soap.
Skin irritations may be treated with fatty creams and locally with anaesthetic ointments.
In case of persistent irritation, seek medical advice.
- Eye contact:** Should diluted material splash into eyes, flush immediately with plenty of water for at least 15 minutes.
Then take the advice of an ophthalmologist.
- Ingestion:** If the person is conscious do not induce vomiting and give activated charcoal.
Stand the victim in half-upright position, in case of consciousness problem.
Call a physician immediately and contact the nearest poison control centre.

Risk Assessment (human exposure)

(Reference:

Risk Assessment of The Use of Deltamethrin on Bednets for the Prevention of Malaria
Susan Barlow, Frank Sullivan and Jo Lines,
2001, Food and Chemical Toxicology, in press)

Should a child suck or chew a net with a deposit of 25 mg Deltamethrin/ m^2 (area of 50 cm^2) and handle a net then transfer hand to mouth, the maximum amount of Deltamethrin absorbed results in a Margin of Safety of x 75 for a newborn child and x 250 for a 2 year old, respectively.

Any toxicity risk from inhalation by a person sleeping under a treated net is negligible, the short-term inhalation study in rats with a NOEL of 3 mg/m^3 , which is around 55000 times greater than the estimated maximum concentration under nets.



Method of Use

Bednet treatment:

- Shake concentrate well before use.
- Measure required volume of water into dip vessel first than add exact volume of concentrate.
- The application rate chosen may be between 20 – 25 mg Deltamethrin/m². The treatment will remain effective for up to 12 months and 3 washes. If the number of washes exceed this, re-treatment is recommended.

For bulk dipping of nets or where the exact size of the bednet (m²) is known

Product & diluent	Synthetic bed nets		Cotton bed nets	
	20 mg/m ²	25 mg/m ²	20 mg/m ²	25 mg/m ²
K-Othrine® SC 25	1 part	1 part	1 part	1 part
Water	35 parts	30 parts	175 parts	140 parts

Dipping the Mosquito Net

- Prepare solution in suitable dip bath e.g. plastic bowl. Do not hang the net when wet or the insecticide will be unevenly distributed.
- Thoroughly dip nets for 2 minutes working the liquid evenly throughout the fabric.
 - When dry hang over the bed.
- Lay out net flat on a plastic sheet to dry in the shade.
 - Retreat annually or after every 3rd wash.

Surface spray application:

Shake concentrate well before use.

For residual control of insects **K-Othrine® SC 25** should be diluted with water and applied with any suitable compression sprayer producing coarse droplets. The spray should be applied, typically, at a rate of 4 litres/100m² or to a point of run-off. On very absorbent surfaces run-off may not be attained and these surfaces should be thoroughly wetted.

Firstly the furnishings, cooking utensils etc. should be removed outside or covered with protective sheets before spraying. The walls should be sprayed evenly in vertical

spray pattern, spraying from top to bottom of all internal walls. Ensure even coverage. Special attention should be paid to wall and roof eaves where gaps exist and mosquitoes may enter. If the roof is of thatch or similar then the internal surface of the roof should be sprayed.

The subsequent residual life of **K-Othrine® SC 25** depends on the:

- the species to be controlled
- the type surface sprayed
- the physical and chemical conditions to which the deposit is exposed

Recommendations for use of K-Othrine® SC 25

Target	Sites of applications	Dilution rate	Application rate	Normal Deposit level of active ingredient (mg/m ²)
Mosquito or Triatominae control	Surface (e.g. wood, concrete, mud, thatch etc.)	250 ml of K-Othrine® SC 25 to 10 litres of water	4 litres of diluted insecticide per 100 m ²	25

Further information is available from:

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F-69266 Lyon Cedex 09