Material Safety Data Sheet

"DELTAMETHRIN 2.8% EC"

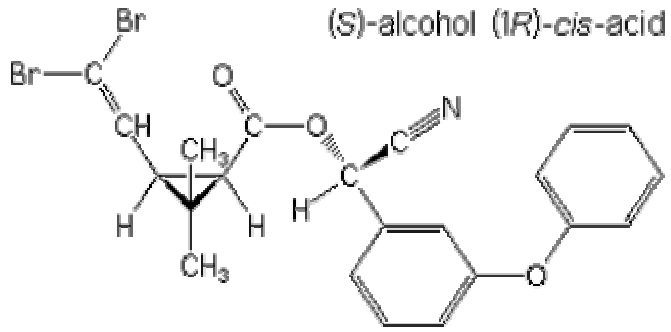
1. General:

1.1	Name and address of manufacturer	Jai Shree Rasayan Udyog Ltd. M-4, Aradhana Bhawan, Commercial Complex, Azadpur, Delhi (INDIA)
1.2	Trade name	Dr. DEN
1.3	Use category	Agriculture

2. Data on active ingredient:

2.1. Chemistry of active ingredient	Deltamethrin 2.8% EC
2.1.1. Common name accepted by ISO and synonyms:	Deltamethrin (ISO, BSI)
2.1.2. CAS no.:	52918-63-5
2.1.3. Chemical name (IUPAC):	(*S*)-cyano(3-phenoxyphenyl)methyl (1*R*,3*R*)-3-(2,2-dibromoethenyl)-2,2-dimethylcyclopropanecarboxylate
2.1.4. Empirical formula:	$C_{22}H_{19}Br_2NO_3$

2.1.5. Structural formula:



2.1.6. Chemical class	Synthetic Pyrethroid
2.1.7. Mol. weight	505.20

2. Data on formulated products:

2.1. Type of formulation	Emulsifiable concentrate
2.2. Formulation composition	Active ingredient(s): Inert ingredients

S. No.	Ingredients	%age	CAS No.
1	Deltamethrin Technical	2.80 % w/w	52918-63-5
2	Emulsifiers (Mixture of Ethylene oxide condensate of Alkyl-phenol and Sulphonated alkyl benzene)	8.00 % w/w	68412-54-4 and 26264-06-2
3	Solvent (Nephtha)	88.20 % w/w	64742-95-6
4	Butylated hydroxytoluen	1.00 % w/w	128-37-0.
	Total:	100.00 % w/w	

2.3. Physical and chemical properties of formulated product

2.3.1. Colour:	Light yellowish
2.3.2. Physical state:	Liquid
2.3.3. Odour:	Mild aromatic odour
2.3.4. pH: (alkalinity or acidity as % H_2SO_4)	4 - 6
2.3.5. Flammability:	Flammable (Auto flammable >450 ^oC)
2.3.6. Explosivity:	Non-Explosive
2.3.7. Viscosity:	1.09 mm^2/s @ 40 ^oC
2.3.8. Corrosivity:	Non corrosive to packing material.
2.3.9. Density:	0.89 at 20 ^oC
2.3.10. Emulsion stability:	No creaming layer or sedimentation seen while 2 ml of samples dissolved in 100 ml water in emulsion cylinder at 31^0c upto one hour.
2.3.11. Flash point:	48 ^oC
2.3.12. Storage stability (see ref. shelf-life).	It is stable for 2 year under normal ambient condition.
Heat stability (2 weeks at 54 C):	Stable for two week at 54c^o
Cold stability (for liquid):	No turbidity or No separation at 10c^o

3. Toxicology of the active ingredient & end use product

3.1. Fate in animal:	Deltamethrin is primarily absorbed from the gastrointestinal tract. It is also readily absorbed by inhalation of spray mist. Dermal absorption has not been demonstrated in preliminary trials with labeled deltamethrin in rats.

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3.2. Acute toxicity:

Route of application	Animal	Active ingredient	Formulated product
Oral LD50	Rat	139 mg/kg	86 mg/kg
Dermal (LD50)	Rabbit	>2000 mg/kg	2460 mg/kg
Inhalation (LC50)	Rat	3.0 mg/L	3.5 mg/L
Skin irritation	Rabbit	Slightly irritatant	Slightly irritatant
Eye irritation	Rabbit	Seavear irritatant	Slightly irritatant
Skin sensitisation	Guinea pig	Weak skin sensitiser	does not sensitise

WHO Classification: active ingredient and formulated product WHO Class -III Moderately Hazardous

3.3. **Sub Chronic feeding studies:**

Study	Dose	Effects	NOAEL
3-month feeding, rat	67 mg/kg	There is substantial degeneration in both the liver & sciatic nerve	>500 ppm mg/kg bw/day
3-month feeding dog	67 mg/kg	Reduced Body Weight gain but no gross pathological or histopathological effects were seen.	367 mg/kg b/w day

3.4. Chronic Toxicity & carcinogenicity studies:

Study Dose	Effects	NOAEL
2-year feeding, rats 100 mg/kg	up to 20 ppm	Did not produce any toxicological effects related to the test substance.
18-month feeding rabbits mg/kg	up to 25 mg/kg	No increase in tumor incidence was noticed
2-year feeding, dogs mg/kg	upto 1 mg/kg	Did not produce any toxicological effects.

3.5. Carcinogenicity:

Statement on conclusion	There was no changes in organ weights or lesions that might have been directly induced by treatment were found. No increases in tumour incidence were found, and there was no reduction in the latency of tumour appearance in the treated mice in comparison with controls. The NOAEL was 100 ppm of diet, equal to 16

	mg/kg bw per day, on the basis of skin ulceration secondary to scratching and irritation at 1000 ppm, equal to 160 mg/kg bw per day (Richard, 1995).
3.6. Delayed neurotoxicity:	
Statement on conclusion:	Deltamethrin (purity unstated) in corn oil was administered by gavage to groups of five male and five female Wistar rats at a dose of 0 or 25 mg/kg bw per day on 2 consecutive days. The animals were given a tilting plane test every second day from day 4 to day 16 of the study. Two treated males died after the second treatment. No neurological effect was found on the slip angle (Davies et al., 1983).
3.7. Teratogenicity & Reproduction	Deltamethrin (purity, 99.4%) suspended in Tween 80 and diluted in 0.5% carboxymethylcellulose, was administered by gavage to groups of 16 gravid New Zealand white rabbits at a daily dose of 0, 10, 25, or 100 mg/kg bw on days 7–19 of gestation. Fetuses were removed from all surviving females on day 29 of gestation and observed morphologically. The death of one rabbit at 100 mg/kg bw per day was attributed by the author to treatment, but there were no other indications of maternal toxicity. Resorptions of entire litters were observed at each dose, the proportions per gravid doe being 0/14, 3/14, 2/13, and 1/15 in the four groups, respectively. The lack of a dose–response relationship suggests that this effect is of no toxicological significance. Other observations were similar in the control and treated groups. The occurrence of unossified pubic bones and tail vertebrae in fetuses at 100 mg/kg bw per day is indicative of some growth retardation. The NOAEL for maternal toxicity was 25 mg/kg bw per day on the basis of the death of one female. The NOAEL for developmental toxicity was also 25 mg/kg bw per day, on the basis of retardation

of ossification at 100 mg/kg bw per day. No evidence of teratogenic potential was found (Schardein, 1990b).

3.8. Mutagenicity

In three different systems

Test		Result
Ames test: S.typhi 98, 100, 1537		Negative
Chromosome aberration, Ch. Hamster ovary cells, with & without metabolic activation		Negative
DNA repair in rat hepatocytes		Negative

Statement on conclusion: It is non-mutagenic

3.9. Acceptable daily intake: 0 to 0.01 mg/kg per day

4. Fate in plants and residues in target crops:

Commodity	MRL (mg/kg)	Previous estimate (mg/kg)
Leafy vegetables	0.5	(0.2)
Brassica leafy vegetables	0.2	(0.05)
Fruiting vegetables with edible peel	0.2	(0.05)
Wheat flour (wholemeal)	1	(2)

5. Consumer Risk Assessment: 0.05 mg/person/per day

6. Environmental Fate :

Half life under acidic (2 to 4 weeks): In neutural or acid aqueous solution deltamethrin hydrolyzes slowing with hydrolysis being more rapid at half life under acidic.

6.2. Photolysis: Deltamethrin under goes photodegration under bright sunlight.

6.3. Fate in soil: Deltamethrin is not persistent in the

environment. It is destroyed by soil micro-organisms and does not leave residues in the environment or build up in the food chain.
Do not contaminate streams, rivers or waterways with the product or used containers..

6.4. Leaching (Mobility) in Soil

Intermediate mobility movement in the soil is extremely limited and downward leaching of the parent molecule through the soil does not occur to an appreciable extent under normal condition of use.

7. Ecotoxicology

7.1. Effect on non-target organisms
Bee toxicity:

Test	24-hrs-LD50
Oral	0.035 ug/bee
Topical	0.02 ug/bee

Statement on bee toxicity

Highly toxic to honeybee in lab but field application at recommended doses not put live at risk.

7.2. Aquatic toxicity:

96-hour exposure resulted in the following LC50 values:

Species	LC50
Rainbow trout	0.0093 ug/l
Speephead minnow	0.037 ug/l

Statement on fish toxicit

Toxic to fish

7.3. Accumulation in aquatic organisms:
Bioaccumulation to be expected under practical Conditions

Deltamethrin residues in fish were Fairly uniformly distributed (Mean values 1-2 mg/kg tissues) except that the brain contained lower residues than the other tissues.

7.4. Effect on natural enemies: N/A

7.5. Effect on earthworm: No death occurred in worms exposed to levels of 100 mg/kg in soil for 14 days.

Statement on earth worm toxicity: Earthworm generally resistant to Delta
7.6. Effect on Birds: Low toxic effects were found on birds.

The following values were determined in acute oral studies:

Species	Acute oral LD50 mg/l
Mallard duck	>4000 mg/kgs
Chicken	>2500 mg/kgs

Statement on bird toxicity Shows Low toxic to Birds

8. Safety handling: Keep locked up out of reach of children and other, unauthorized persons.

Symptoms: Nervousness, anxiety, tremor, skin allergies, running nose.

First aid: Wash with plenty of water if skin contact, and devometing if ingested.

Antidote if available: Intravenous injection of Phenobarbital or treat symptomatically.

9. Storage & disposal

Storage : Store in a cool and dry place. Keep out of reach of children. Do not store near food stuffs

Shelf-life : - for temperate climates
- for hot climates

Container disposal: Burn in an incinerator or burry in an approved dump area away from habitation.

10. Type of container and Packaging Material Aluminium and PET containers

11. Transport In formation
Inland waterways

Proper shipping name:	Pyrethroid pesticide liquid toxic flammable (contains petroleum distillate and deltamethrin)
UN Number:	1993
Class:	3
Item:	31

Sea

Proper shipping name:	Pyrethroid pesticide liquid toxic flammable (contains petroleum distillate and deltamethrin)
UN Number	1993
Class:	3
Packaging group:	III
Marine pollutant:	Pollutant

Air

Proper shipping name:	Pyrethroid pesticide liquid toxic flammable (contains petroleum distillate and deltamethrin)
UN Number	1993
Class:	3
Packaging group:	III

12. Declaration:

I hereby declare that the information furnished in this form is true and correct according to the today state of the art. I guarantee that any consignment of the product entering the country whether for experimental or commercial use will conform with the requirements stated herewith, providing that the uses and precautionary measures recommended by the company are followed: