United States
Environmental Protection
Agency

Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

540/FS-90-080

EPA

Pesticide Fact Sheet

Name of Chemical: Fenpropathrin
Reason for Issuance: New Chemical
Date Issued: December 22, 1989
Fact Sheet Number: 210

1. Description of the Chemical

Generic Name: (alpha-Cyano-3-phenoxybenzyl-2,2,3,3-tetramethyl cyclopropanecarboxylate)
Common Name: Fenpropathrin (proposed)
Trade Name: Danitol
Other Names: S-3206, ML-41706, SD-41706
EPA Shaughnessy Code (OPP Chemical Code): 127901
Chemical Abstracts Service (CAS) Number: 39515-41-8
Year of Initial Registration: 1989
Pesticide Type: Insecticide-Miticide
Chemical Family: Pyrethroid
Producer: Sumitomo Chemical Company, Ltd.

2. Use Patterns and Formulations

Application Sites: Greenhouse Ornamentals including Lath House and Shade House Use (container-grown plants only).

Type and Methods of Application: Foliar spray (ground application)

Rates of Application: 0.1 to 0.3 pound active ingredient (ai) per 100 gallons of spray (5.33 to 16 oz product).

Types of Formulations: 90% Technical; 2.4 Emulsifiable Concentrate Spray (30% ai; 2.4 lb ai/gallon).

Usual Carriers: Water.

Target Pests: Mites (two spotted, Southern Red, European Red, McDaniel), Aphids (apple, wooly apple, rose), Beet armyworm, mealybug (including immature stages of citrus mealybug), potato leafhopper, San Jose scale (crawlers, Japanese Beetle, spotted tentiform leafminer, thrips, Pandemis moth, codling moth, leafrollers, southern red pine, lacebugs.

Limitations: For Commercial Greenhouse Use Only.

3. Science Findings

Summary Science Statement: The end-use product (Danitol 2.4 EC Spray) has moderate to low acute oral, dermal, inhalation and eye/skin irritation toxicity. This product is assigned to Toxicity Category II (Warning) due to oral route of exposure and eye irritation hazard. The technical product is highly toxic to mammals by the oral route, with rat oral LD_{50} values of 54.0 mg/kg (male), and 48.5 mg/kg (female). There was no evidence of any carcinogenic effects in a 2-year dietary study (0, 40, 150, 600 ppm) in rats at dose levels up to and including 600 ppm. No developmental toxic effects were observed in rats at dose levels greater than 10 mg/kg/day nor in rabbits at levels greater than 36 mg/kg/day (highest dose levels tested). Fenpropathrin was not found to be mutagenic. Laboratory data indicate fenpropathrin is extremely toxic to fish and aquatic organisms and is toxic to wildlife. Leaching data show that fenpropathrin and its aged residues are unlikely to leach in most soils. It is unlikely that ground water contamination will occur.

Chemical Characteristics: (Technical Grade)

Physical State: Liquid or solid

Color: Yellowish brown

Odor: Faint characteristic odor

Melting Point: 25-50 °C

Boiling Point: 377 °C

Specific Gravity: d 20/20 = 1.05

Density at 20 °C: 1.103

Empirical Formula: $C_{24}H_{25}O_3N$

Molecular Weight: 349.4

Solubility: 0.33 ppm at 25 °C in H_2O; easily soluble in common organic solvents

Octanol/Water Partition Coefficient: $P_{ow} = 1 \times 10^6$

Storage Stability: Data indicate that S-3206 is stable in organic solvents at warehouse temperature and in light of wavelengths above 350 nm.

Toxicology Characteristics

Technical Formulation:

- Acute Oral Toxicity, Rat: LD_{50} = 54.0 mg/kg (males), 48.5 mg/kg (females). Toxicity Category I

- Acute Dermal, Rat: LD_{50} = 1600 mg/kg (males), 870 mg/kg (females). Toxicity Category II.

- Acute Inhalation LC_{50}, Mouse and Rat: The maximum attainable concentration (0.009 ug/L as vapor) was nontoxic. Toxicity Category IV.

Primary Eye Irritation, Rabbit: No corneal involvement. Mild iris and conjunctival irritant. Toxicity Category III.

Primary Dermal Irritation, Rabbit: Not an irritant. Toxicity Category IV.

Dermal Sensitization, Guinea Pig: Not a sensitizer.

Neurotoxicity, Hen: No delayed neurotoxicity at $\leq$ 1000 mg/kg/day x 5.

2-Year Feeding/Carcinogenic, Mouse: Systemic NOEL > 600 ppm (HDT; M/F 56.0/65.2 mg/kg/day). There were no indications of toxicity or oncogenicity other than marginally increased hyperactivity in females dosed at 600 ppm.

2-Year Feeding/Carcinogenic, Rat: Systemic NOEL = 450 ppm (17.06 mg/kg/day) in males, 150 ppm (7.23 mg/kg/day) in females
Systemic LEL = 600 ppm (HDT; 22.80 mg/kg/day) in males (increased mortality, body tremors, increased pituitary, kidney, and adrenal weights)
450 ppm (19.45 mg/kg/day) in females (increased mortality and body tremors)

There was no evidence of oncogenicity at any dose.

1-Year Feeding, Dog: Systemic NOEL = 2.5 mg/kg/day
Systemic LEL = 6.25 mg/kg/day

Developmental Toxicity, Rabbit:

Maternal NOEL = 4 mg/kg/day
Maternal LEL = 12 mg/kg/day (grooming, anorexia, flicking of the forepaws)
Developmental NOEL > 36 mg/kg/day (HDT)

Developmental Toxicity, Rat:

Maternal NOEL = 0.4 mg/kg/day
Maternal LEL = 2.0 mg/kg/day
Developmental NOEL > 10 mg/kg/day (HDT)

3-Generation Reproduction, Rat:

Parents: Systemic NOEL = 40 ppm (M/F 3.0/3.4 mg/kg/day)
Systemic NOEL = 120 ppm (M/F 8.9/10.1 mg/kg/day)
(body tremors with spasmodic muscle twitches, increased sensitivity and maternal lethality)

Pups: Reproductive NOEL = 120 ppm (M/F 8.0/10.1 mg/kg/day)
Reproductive LEL = 360 ppm (M/F 26.9/32.0 mg/kg/day)
(decreased mean F_1 B pup weight, increased F_2 B loss)
Fetotoxic NOEL = 40 ppm (M/F 3.0/3.4 mg/kg/day)
Fetotoxic LEL = 120 ppm (M/F 8.9/10.1 mg/kg/day) (body tremors, increased mortality)

Mutagenicity Studies:

A. Gene Mutation Test:	Negative for Salmonella TA98, TA100, TA1535, TA1537, and TA1538; and E. coli WP2uvrA (trp⁻) with or without metabolic activation.
In Vitro Assay in Mouse Lymphoma cells	Equivocal results - probably of no concern
B. Structural Chromosome Aberration Test:	Data submitted October 1989 and under review.
C. In Vitro Sister Chromatid Exchange Test:	There were no increases in sister chromatid exchanges seen in CHO-K1 cells.
D. DNA Damaging Sister Chromatid Exchange Test	Not mutagenic

Metabolism Studies:

A. Metabolism, Rat (2 studies)	97% is eliminated in 48 hours. Little residue after 8 days. Highest concentration in fat. Metabolites were identified in urine.
B. Percutaneous Absorption, Rat	Over a 24-hour period, very little test article was absorbed through the skin. The major route of elimination was the urine.

End-Use Formulation:

- Acute Oral, Rat: LD_{50} = 72.4 mg/kg (males), 71.8 mg/kg (females) and 72.1 mg/kg (both sexes). Toxicity Category II

- Acute Dermal, Rabbit: LD_{50} > 2000 mg/kg. Toxicity Category III

- Acute Inhalation, Rat: LC_{50} = 3.72 mg/L (males, 2.75 mg/L (females), 3.20 mg/L (both sexes). Toxicity Category III

- Primary Eye Irritation, Rabbit: Moderately persistent corneal opacity. Toxicity Category II

- Primary Dermal Irritation, Rabbit: Draize Score = 2.2. Toxicity Category III

- Skin Sensitization, Guinea Pig: Not a sensitizer

- 21-Day Dermal, Rabbits: Local irritation only at dose levels of 100 mg/kg/day and above. No systemic pathology at 900 mg/kg (HDT)

Physiological and Biochemical Characteristics:

Foliar Absorption: Not absorbed

Translocation: Not translocated

Mechanism of Pesticide Action: Neurotoxicity characteristic of pyrethroid insecticides (contact action).

Ecological Effects Characteristics:

Avian Acute Oral
Mallard Duck: LD_{50} = 1089 mg/kg

Avian Dietary
Bobwhite quail: LD_{50} = > 10,000
Mallard duck: LC_{50} = 9026 ppm

Freshwater Fish
Rainbow trout: LC_{50} = 2.3 ppb
Bluegill: LC_{50} = 2.2 ppb

Channel catfish: LC_{50} = 5.5 ppb
Sheepshead minnow: LC_{50} = 3.1 ppb

Aquatic Invertebrate
Daphnia magna: LC_{50} = 0.53 ppb (48 hr)
Daphnia magna: MATC > 0.22 < 0.35 ppb

Avian Reproduction Studies
Bobwhite quail: Environmental concentrations of up to 2.0 ppm do not present a reproductive hazard

Mallard duck: No reproductive related effects were seen at 2.0 ppm (HDT).

Environmental Fate and Ground Water Characteristics:

Hydrolysis: Stable at environmental pH (pH 6-8) and temperature of 25 °C.

Aerobic Soil Metabolism: Degrades under aerobic soil conditions with a half-life of 33 to 34 days. Fenpropathrin degrades to desphenylfenpropathrin and other minor metabolites which undergo further degradation to CO_2.

Mobility/Leaching: Soil column leaching data show that fenpropathris and its aged residues are unlikely to leach in most soils. However, some leaching may occur in sand soils very low in organic matter (e.g., 0.1% organic matter).

Environmental Fate and Surface and Ground Water Contamination Concerns: No concerns at this time.

Exposure of Humans and Nontarget Organisms to Chemical or Degradates: Applicator exposure in greenhouse: Fenpropathrin is not highly toxic by the dermal or inhalation route; however, the formulated product can be irritating to the eyes. Goggles or a face shield will provide protection to the eyes in case of accidental splashing during mixing/loading and during spraying.

Exposure During Reentry Operations: No special precautions needed in greenhouses once spray residues are dry.

Tolerance Assessment

Not applicable for greenhouse ornamental crops.

4. Summary of Regulatory Position and Rationale

The Agency has determined that it should allow the unconditional registration of fenpropathrin to control pests for greenhouse use since all of the data required to support this use pattern have been submitted, reviewed and found acceptable. Adequate data are available to assess the acute and chronic effects of fenpropathrin to humans. Based on exposure to aquatic organisms and terrestrial wildlife from greenhouse usage, adverse effects to nontarget organisms and endangered species are unlikely. Likewise, surface and groundwater contamination is unlikely from greenhouse usage.

5. Summary of Data Gaps

None

6. Required Unique Labeling Summary

The following use limitations must appear on products registered for use in greenhouses:

- o For commercial greenhouse use only.
- o Do not reenter treated areas until sprays have dried.
- o Do not apply this product through any type of irrigation system.
- o Appropriate personal protective equipment and work safety statements must appear on the label of products registered for use on/in lath house, shade house, and greenhouse.

7. Contact Person at EPA

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