



# Pesticide Fact Sheet

Name of Chemical: FLUVALINATE [MAVRIK®]  
Reason for Issuance: Amended Registration (First Food Use)  
Date Issued: March 31, 1986  
Fact Sheet Number: 86 86

## 1. Description of Chemical

Generic Name: N-[2-chloro-4-(trifluoromethyl)phenyl]-  
DL-valine(+)-cyano(3-phenoxyphenyl)  
methyl ester.

Common Name: Fluvalinate.

Other Proposed Names: None.

Trade Names: MAVRIK®

EPA/OPP Chemical Code (Shaughnessy) Number: 109302

Chemical Abstracts Service (CAS) Number: 69409-94-5

Year of Initial Registration: 1983

Pesticide Type: Insecticide/Acaricide.

Chemical Family: Synthetic pyrethroid.

U.S. and Foreign Producers: Zoecon Corporation.

## 2. Use Patterns and Formulations

Application Site: Nonbearing fruit and nut trees and vines; turf;  
certain crops grown for planting seed; and cotton.

Pests Controlled: Tobacco budworm; cotton bollworm; tarnished plant  
bug; cotton leafperforator; lygus bug; cabbage looper;  
pea looper; alfalfa looper; mint looper; pink bollworm;  
whitflies; fleahoppers; flea beetles; salt marsh  
caterpillar; boll weevil; cotton leafworm; garden  
webworm; grasshoppers; aphids; twospotted spider mite;  
pacific spider mite; strawberry spider mite; thrips;  
leafhoppers; beet armyworm; fall armyworm; midge;  
diamondback moth; corn earworm (and other Heliothis  
spp.); imported cabbageworm; cabbage pod weevils;  
Japanese Beetle; Mexican bean beetle; blister beetle;

**Pests Controlled (continued):** cabbage flea leaf beetle; bean leaf beetle; black pollen beetle; greenbug; fall webworm; leaf tiers; onion maggot; velvetbean caterpillar; green cloverworm; cutworm (climbing and surface feeding); Mormon cricket; chinch bugs; earwigs; ticks; ants; lawn moths (sod webworms); Bermuda mites; crickets; Brown Dog Ticks; chiggers; clover mites; sowbugs; millipedes; springtails (Collembola); scales (crawlers); leafrollers; Stink bug; borers (Lesser peach tree); Gypsy moth; Tussock moth; Red humped caterpillar; tufted apple budmoth; cankerworms; rose chafer; curculios; tent caterpillars.

**Types and Methods of Application:** Aerial and ground (excluding ULV).

**Application Rates:** 0.025 to 0.15 pounds of active ingredient per acre per application. Maximum of 0.5 pounds of active ingredient per acre per year to cotton.

**Restrictions:** 30-day pre-harvest interval following last application to cotton.

**Types of Formulations:** Emulsifiable concentrate (2 pounds per gallon)  
Flowable concentrate (2 pounds per gallon)

### 3. Science Findings

#### Summary Science Statement:

Fluvalinate, a synthetic pyrethroid insecticide/acaricide, has moderate to low acute mammalian toxicity except that the formulated products are highly corrosive to the eye. The Agency has a complete battery of subchronic and chronic toxicity data that demonstrate no significant adverse effects.

Fluvalinate is slightly toxic to birds and highly toxic to some aquatic organisms. Additional studies on ecological effects of fluvalinate are required.

#### A. Chemical Characteristics:

1. Physical State: Viscous oil.
2. Color: Yellow to brown.
3. Odor: Undetectable.
4. Boiling Point: >450°C.
5. Melting Point: N/A
6. Vapor Pressure:  $<1 \times 10^{-7}$  Torr at 25°C.

Chemical Characteristics (continued):

7. Density: 1.29 g/cm<sup>3</sup>.
8. Solubility:
  - Water: 2 ppb.
  - Organic solvents: Very soluble
  - Aromatic hydrocarbons: Very soluble
  - Hexane: Slightly soluble
9. Dissociation Constant: N/A
10. Octanol/Water Partition Coefficient: >7000 (log K >3.8)
11. pH: N/A
12. Oxidizing or Reducing Agent: N/A
13. Storage Stability: In glass 24 months at 24°C and 42°C.

B. Toxicological Characteristics:

1. Acute Oral: 261 mg/kg (rat).
2. Acute Dermal: LD<sub>50</sub> >20.1 g/kg (rat).
3. Primary Eye Irritation: Moderately irritating.
4. Primary Skin Irritation: Mildly irritating- erythema and edema.
5. Skin Sensitization: Non-sensitizing.
6. Dermal Repeated Application: Systemic NOEL is 100 mg/kg.
7. 90-day Rat Feeding Study: No effects at 3.0 mg/kg/day
8. 6-months Dog Feeding Study: No effects at 5.0 mg/kg/day
9. Teratology: (rat) No effects at 50.0 mg/kg for terata (HDT).  
Fetotoxicity noted at 50.0 mg/kg.  
  
(rabbit) No effects at 125.0 mg/kg for terata.  
Fetotoxicity noted at 50.0 mg/kg.
10. Reproduction: (rat) No effects at 20 ppm for reproductive effects. Fetotoxicity noted at 250 and 500 ppm (500 ppm was the highest dose level tested).

Toxicological Characteristics (continued):

11. Oncogenicity: (mouse) No oncogenic effects were noted at dosage levels of 2, 10, and 20 mg/kg/day (20 mg/kg/day was the highest dosage level tested).

(rat) No oncogenic effects were noted at dosage levels of 0.25, 0.5, 1.0 and 2.5 mg/kg/day (2.5 mg/kg/day was the highest dosage level tested).

12. Mutagenic Effects: Non mutagen.

13. 21-day Delayed Neurotoxicity: (hen) No effects at 20,000 mg/kg/day.

C. Physiological and Biological Characteristics:

1. Foliar absorption: N/A.

2. Translocation: N/A.

3. Mechanism of Pesticide Action: Neuropathy characteristic of pyrethroid insecticides.

D. Environmental Characteristics:

1. Absorption and leaching in soil: Fluvalinate has little potential to leach. However, major soil metabolites have the potential to leach in some soils.

2. Hydrolysis: Fluvalinate is stable to hydrolysis at environmental pH's and temperature.

3. Photolysis: Fluvalinate photodegrades in aqueous solutions with a half-life of 0.6 - 1.0 day yielding the haloaniline, anilino acid and 3-phenoxybenzoic acid. Photodegradation on soil surface does not appear to occur.

4. Aerobic Soil Metabolism: Fluvalinate degrades in soil under aerobic conditions with half-lives of 4 - 8 days in sandy loam, sandy clay and clay soils.

5. Anaerobic Soil Metabolism: Fluvalinate will anaerobically degrade in soil with a half-life of 15 days in sandy loam soil.

### Environmental Characteristics (continued):

#### 6. Environmental Fate and Surface and Ground Water

Contamination Concerns: Data submitted indicate that parent fluvalinate has little potential to leach. Major metabolites do have potential to leach in some soils. Low application rates, usually below 0.1 lb. a.i./acre will tend to decrease the potential for ground and surface water contamination.

#### 7. Exposure of Humans and Nontarget Organisms to

Chemical or Degradates: Fluvalinate products are classified for restricted use. Minimal exposure to humans is anticipated from use. Additional data are needed to fully assess the environmental fate and ecological effects from fluvalinate.

#### 8. Exposure During Reentry Operations: Not applicable for cotton use.

### E. Ecological Characteristics:

#### 1. Hazards to Fish and Wildlife:

##### Birds - Dietary and Acute Toxicity:

Mallard ducks: Avian dietary LC<sub>50</sub> >5620 ppm.

Bobwhite quail: Avian acute oral LD<sub>50</sub> >2510 mg/kg;  
Avian dietary LC<sub>50</sub> >5620 ppm.

##### Fish:

Bluegill sunfish 96 hr. LC<sub>50</sub> 0.09 (0.7 - 1.1) ug/l.

Rainbow trout 96 hr. LC<sub>50</sub> 2.9 (2.3 - 3.6) ug/l.

##### Freshwater Invertebrates:

Daphnia magna: 48 hr. LC<sub>50</sub> 74 (61 - 89) ug/l.

Mysid shrimp: 48 hr. LC<sub>50</sub> 2.9 (2.3 - 3.6) ug/l.

**F. Tolerance Assessment:**

The established tolerances for residues of fluvalinate in or on raw agricultural commodities are published in 40 CFR 180.427. A summary of these tolerances follows:

**U. S. Tolerances**

<u>Commodities</u>	<u>Maximum Residue Limits in Parts Per Million (PPM)</u>
Cottonseed	0.1
Cattle, fat	0.01
Cattle, mbyp	0.01
Cattle, meat	0.01
Eggs	0.01
Goat, fat	0.01
Goat, mbyp	0.01
Goat, meat	0.01
Hogs, fat	0.01
Hogs, mbyp	0.01
Hogs, meat	0.01
Horses, fat	0.01
Horses, mbyp	0.01
Horses, meat	0.01
Milk	0.01
Poultry, fat	0.01
Poultry, mbyp	0.01
Poultry, meat	0.01
Sheep, fat	0.01
Sheep, mbyp	0.01
Sheep, meat	0.01

Tolerance Assessment (continued):

The established food additive tolerances for residues of fluvalinate are published in 21 CFR 561.437. A summary of these tolerances follows:

U. S. Tolerances

<u>Commodities</u>	<u>Maximum Residue Limits in Parts Per Million (PPM)</u>
Cottonseed hulls	0.3
Cottonseed oil	1.0

The established Acceptable Daily Intake (ADI) for fluvalinate is 0.01 mg/kg/day based on a 2-year rat feeding study and a 100 fold safety factor. The Maximum Permissible Intake (MPI) has been calculated to 0.6 mg/kg/day for a 60 kg person. Based on the established tolerances for residues of fluvalinate as cited under 40 CFR 180.427 and 21 CFR 561.437, the Theoretical Maximum Residue Concentration (TMRC) is 0.0504 mg/day for a 1.5 kg food diet for a 60 kg person. The TMRC is 8.40 % of the ADI.

G. Reported Pesticide Incidents: Several.

Caused general complaints in numerous workers, such as:

1. transient coughing, sneezing and throat irritation;
2. itching, burning sensation of the arms and/or face with or without a rash, blisters and desquamation;
3. ocular irritation; and
4. headache and/or nausea.

4. Summary of Regulatory Position and Rationale

Fluvalinate, formulated as a flowable concentrate and an emulsifiable concentrate, is registered for use on nonbearing fruit and nut trees and vines, turf, certain crops grown for planting seed, and cotton. Because of toxicity to fish and aquatic invertebrates, precautionary labeling (including endangered species identification) is required to warn against contamination of bodies of water with products containing fluvalinate and restricted use classification is required. The conditional registration for fluvalinate is issued for a period ending August 31, 1989.

## 5. Summary of Data Gaps

Acute LC<sub>50</sub> Estuarine and Marine Organisms Study  
(96 hour LC<sub>50</sub> for marine fish plus 48-hour EC<sub>50</sub>  
for oyster embryo larvae) - Guideline Reference  
No. (GRN 72-3) - Due Date - June 30, 1986

Fish Early life stage study (GRN 72-4) -  
Due Date - June 30, 1986  
Two Field Dissipation Studies (GRN 164-1) -  
Due Date - August 31, 1988

Rotational Crop Studies (GRN 165-1) -  
Due Date - August 31, 1989

Aquatic Organism Accumulation (GRN 572-6) -  
Due Date - March 31, 1987

Fish - Life Cycle Test (GRN 572-5) -  
Due Date - June 30, 1988

Simulated Field Testing - Aquatic Organisms  
(GRN 72-7) - Due Date December 31, 1988

6. Contact Person at EPA: George LaRocca  
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