

PESTICIDE TYPE	<b>Insecticide</b>
CHEMICAL CLASS IRAC Code	Synthetic pyrethroid 4A
COMMON TRADE NAMES	Fastac
ACTIVE INGREDIENT	Alpha-Cypermethrin
APPLICATION RATE (lb a.i./A)	Single: 0.008-0.025 Max Annual: 0.075
REGISTRATION STATUS	EPA: Registered 2013
TOXICITY PROFILE FOR APPLICATORS	Signal word: Danger Toxicity II or III
BASIC MANUFACTURER	BASF
MDA LABORATORY CAPABILITIES	In discussion

## HUMAN HEALTH

NON-CANCER	Acute PAD = 70 µg/kg/day Chronic PAD = N/A
CANCER	Possible Human Carcinogen (Group C)

*Acute and chronic PADs are doses that include all relevant uncertainty and safety factors*

## ENVIRONMENTAL AQUATIC TOXICITY

FISH	Acute: 1.1 ppb Chronic: 0.14 ppb
INVERTEBRATE	Acute: 0.0018 ppb Chronic: 0.00059 ppb
AQUATIC PLANTS	Vascular: 1.39 ppb Non-vascular: 33.5 ppb

## POLLINATOR TOXICITY

HONEY BEES	Acute: 0.0092 ppb/bee
------------	-----------------------

*Level of Concern (LOC) has been applied to all values*

## Introduction

Alpha-cypermethrin is a broad-spectrum type II pyrethroid restricted use pesticide that is registered for use on soybeans, corn, vegetables, sugar beets, wheat, alfalfa and other minor crops. It is an enriched enantiomeric mixture of two isomers of cypermethrin and, like other pyrethroids, is considered an axonic poison that prevents sodium channels in an organism's neuronal membranes from closing, resulting in paralysis. Alpha-cypermethrin is formulated as an emulsifiable-concentrate (EC). Applications can be made with either ground or aerial equipment or through a chemigation system. Minnesota Department of Agriculture (MDA) extensive review of the U.S. Environmental Protection Agency (EPA) alpha-cypermethrin labels and risk assessments for issues relevant to Minnesota is summarized below.

## Projected Use in Minnesota

Alpha-cypermethrin is registered for use on soybeans, corn, potatoes, wheat, sugar beets, vegetables and other crops in Minnesota. Alpha-cypermethrin may be mixed with other products approved for use on the proposed crops, including cypermethrin and zeta-cypermethrin. It has not appeared in University of Minnesota extension evaluation trials, but extension experts expect alpha-cypermethrin to be used against aphids and Lepidoptera species in small grains and vegetable crops. It is not registered for any residential uses. This insecticide is registered in one product:

- **Fastec™ EC (EPA Reg. No. 7969-298; Registered in MN)** – an emulsifiable concentrate for foliar application on many different crops, including corn, soybean, sugar beets and wheat.

## Label Environmental Hazards

### Water Quality

- Labels for crop applications carry advisories for surface water, drift and disposal of equipment washwater.
- This pesticide is extremely toxic to fish and aquatic invertebrates.

### Other

- Highly toxic to bees exposed to direct treatment or residues on blooming crops.
- DO NOT use any products containing cypermethrin and zeta-cypermethrin during a crop season when using this product



## Toxicology and Exposure

---

EPA's screening models generate high-end, conservative exposure estimates for active ingredients and toxicologically significant degradates. Model inputs include annual usage at maximum use rates, maximum treated acres, maximum food residues, peak runoff and drift scenarios, etc. Some proposed products, application rates and use scenarios are not relevant to Minnesota. EPA's estimates, therefore, may not reflect future use and impacts in Minnesota.

### Human Health

- **Carcinogenic Effects**- Classified as Group C "Possible Human Carcinogen". EPA has determined the acute Population Adjusted Dose (aPAD) will adequately account for all chronic toxicity, including carcinogenicity that could result from exposure to the cypermethrins. EPA would typically use a chronic Population Adjusted Dose to protect for cancer concerns, but the aPAD is protective because increasing toxicity with increasing duration of exposure is not demonstrated for the cypermethrins.
- **Drinking Water Guidance**- High-end, screening exposure estimates for drinking water suggest that applications of alpha-cypermethrin may result in surface water and groundwater detections; EPA concludes that conservative exposure estimates are below levels of concern for the general population and all population subgroups.
- **Occupational Exposure**- Low Acute Toxicity. Based on occupational handler scenarios for the proposed and existing uses baseline personal protective equipment level is necessary.

### Environment- Non-target Species

- **Aquatic Life Exposure** – High end, screening exposure estimates for risk to fish and invertebrates generated some concern and alpha-cypermethrin is classified as very highly toxic to freshwater fish and invertebrates, however, EPA concludes risks are mitigated by labeling requirements. Nevertheless, estimates suggest that surface water concentrations could exceed 100% of the acute freshwater fish and invertebrate toxicity benchmarks.
- **Terrestrial Life Exposure** – Highly toxic to honey bees on an acute exposure basis.
- **Bioaccumulation** – Bioaccumulation potential in aquatic organisms.

## Environmental Fate

---

### Soil

- **Half-life** - Aerobic: 28 days
- **Adsorption**- Immobile ( $K_{oc}$  26,492-144,662mL/g).
- **Persistence**- Alpha-cypermethrin is not very persistent and will not leach. Bioaccumulation is not expected.

### Water

- **Half-life via hydrolysis**- 67 days.
- **Surface water**- Alpha-cypermethrin is expected to reach surface water through drift and/or runoff.
- **Groundwater**- Leaching to groundwater is not considered an important source of ground water contamination because of very low mobility in a variety of soils.
- **Sediment**- Will rapidly partition to sediment which acts as an environmental sink for this compound. It will also persist in sediment.

### Air

- **Volatilization**- The tendency to adsorb to soil and sediment along with the relatively low vapor pressure ( $2.5 \times 10^{-9}$  mm Hg) and Henry's law constant ( $3.4 \times 10^{-7}$  atm-m<sup>3</sup>/mol), indicates that volatilization from water and soil will not be important transport process.

### Degradates

With the proposed use, alpha-cypermethrin degradates are not a concern for human health or environment.