

PESTICIDE TYPE	FUNGICIDE
CHEMICAL CLASS	Pyridinamine FRAC Code: 29
COMMON TRADE NAMES	Secure
APPLICATION RATE (lbs a.i./A)	Single: 0.71 Max Annual: 8.4
REGISTRATION STATUS	EPA: First registered February 1992 ; first residential use 2012 Minnesota: First registered in 2012
TOXICITY PROFILE FOR APPLICATORS	Signal word- Warning Toxicity III or IV; except acute eye I and acute inhalation II
BASIC MANUFACTURER	ISK Biosciences, Syngenta
MDA LABORATORY CAPABILITIES	In discussion

HUMAN HEALTH

NON-CANCER	Acute PAD = 0.5 mg/kg/day Chronic PAD = 0.011 mg/kg/day
CANCER	Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential

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

ENVIRONMENTAL AQUATIC TOXICITY

FISH	Acute: 18 ppb Chronic: 0.69 ppb
INVERTEBRATE	Acute: 90 ppb Chronic: 68 ppb
AQUATIC PLANTS	Vascular: 9,200 ppb Non-vascular: N/A

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

Introduction

Fluazinam is a preventive contact fungicide with a multi-site mode of action. When it is applied to plants, it remains primarily on the plant surface and kills any fungal spores that come into contact with it. It is not taken up to any extent by the plant and, unlike systemic fungicides, is not translocated within the plant. It was first registered by EPA in 1992 for agricultural use on a variety of crops, including peanuts, potatoes, and beans. The only new uses registered in 2012 include golf course turf. The liquid product is applied with ground-based or handheld spray equipment, and the label does not allow aerial or irrigation system applications. Minnesota Department of Agriculture (MDA) extensive review of the U.S. Environmental Protection Agency (EPA) fluazinam labels and risk assessments for issues relevant to Minnesota is summarized below

Projected New Use in Minnesota

From 2005 through 2008, 480 pounds of fluazinam have been sold in the state, with none being sold in 2009. Fluazinam ranks 217 out of 280 in crop pesticide sales in Minnesota. With this new federally-approved use, fluazinam is expected to additionally be used on golf course turf. Furthermore, due to cost and other factors, this product will probably only be used on golf courses that are fastidiously maintained. Fluazinam has excellent activity on the turf fungus “dollar spot,” but only has 14 days of activity. It is suggested be tank mixed with other fungicides to increase the spray interval timing. Fluazinam is thought to be able to help in fungicide rotation and help golf courses adhere to annual chlorothalonil use restrictions.

Label Environmental Hazards

Water quality:

- The fluazinam label carries enforceable language related to direct application to surface waters and equipment cleaning.
- The label includes language not to apply when conditions favor drift.

Other:

- This product is toxic to fish and aquatic invertebrates.

Additional label restrictions on Turf:

- Do not apply within 25 feet of permanent water bodies
- Do not apply by aerial application
- Do not apply through any irrigation system
- Do not apply when the wind direction is toward aquatic areas to minimize drift to these areas



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 "Suggestive Evidence of Carcinogenicity" EPA has determined the chronic population adjusted dose (PAD) is protective of all long-term effects, including potential carcinogenicity. As a result, a separate dietary exposure assessment for the purpose of assessing cancer risk was not necessary.
- **Drinking Water Guidance**- High-end, screening exposure estimates for drinking water suggest that applications of fluazinam may result in surface water detections by spray drift and runoff; however, EPA concludes that conservative exposure estimates are below levels of concern for the general population and all population subgroups.
- **Occupational Exposure**- Low acute toxicity except for a high acute eye irritation toxicity level and a slightly toxic acute inhalation toxicity level. Short- and intermediate- term occupational handler exposure is expected via the dermal and inhalation routes of exposure; however, these exposures do not exceed the Agency's level of concern.

Environment- Non-target Species

- **Aquatic Life Exposure** – High end, screening estimates for risk to fish and invertebrates generated some concern and fluazinam is classified as very highly to 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 freshwater fish aquatic toxicity benchmark.
- Fluazinam and its residues are lipophilic compounds that can adsorb readily to particulate and sediment increasing toxic exposure in the benthos. Currently there is believed to be no risk to freshwater benthic organisms.

Environmental Fate

Soil

- **Half-life**- Aerobic = 132 days
- **Adsorption** - Low mobility with K_{oc} values ranged from 1705-2316
- **Persistence**- Total fluazinam residues (fluazinam and its transformation products) are persistent in most environments and are likely to reach aquatic media through runoff. Fluazinam has the potential to bioaccumulate in fish.

Water

- **Half-life via hydrolysis** - Stable at pH 5; 42 days at pH 7; and 6 days at pH 9
- **Surface water** - Fluazinam and its transformation products are moderately persistent and may present concerns for transport to surface water by spray drift or runoff (especially in soils with low organic content)
- **Groundwater** - Fluazinam should not leach substantially to groundwater.

Air

- **Volatilization**- Fluazinam has a low vapor pressure 1.73×10^{-7} mm Hg and is not likely to substantially volatilize.

Degradates

Fluazinam may photolyze relatively rapidly in water (2.5 days) to form a tricyclic compound (G-504). Degradates were included in the drinking water risk assessment. The total fluazinam residues are persistent in most environments and are likely to reach aquatic media as a totality through runoff. The total residues may reach adjacent water bodies via runoff events and may be persistent. Label use requirements are designed to mitigate related risk concerns.