

PESTICIDE TYPE	FUNGICIDE
Chemical Class	Triazole (conazole)
Common Trade Names	Revytek <sup>®</sup> ; Cevya <sup>®</sup> ; Maxtima <sup>®</sup> ; Navicon <sup>®</sup> ; Veltyma <sup>®</sup> ; Provysol <sup>®</sup>
Major Degradates	Mef-001; Mef-002; Mef-005; Mef-006; Mef-006; Mef-037
Application Rate (lb a.i./A/year)	Max Annual: 0.54 (ag) 1.83 (turf)
Registration Status	EPA: Registered unconditionally in July 2019 Minnesota: 2019
Toxicity Profile for Applicators	Signal word: CAUTION or WARNING Category III or IV (oral, dermal, inhalation, and eye exposure) Dermal sensitizer
Basic Manufacturer	BASF Corporation
MDA Laboratory Capabilities	In discussion
HUMAN HEALTH	
Non-Cancer	Acute PAD= 0.73 mg/kg/day Chronic PAD= 0.035 mg/kg/day
Cancer	Not likely to be carcinogenic to humans
<i>Acute and chronic PADs are doses that include all relevant uncertainty and safety factors</i>	
ENVIRONMENTAL AQUATIC TOXICITY	
Fish	Acute: 268 ppb Chronic: 7.4 ppb
Invertebrate	Acute: 473 ppb Chronic: 9.1 ppb
Aquatic Plants	Vascular (EC50): >1874 ppb Non-vascular (EC50): 393 ppb
POLLINATOR TOXICITY	
Honey Bee	Acute Contact (LD50): >40 µg/bee Acute Oral (LD50): >40 µg/bee
<i>Level of Concern (LOC) has been applied to all values. Formulated products may be more toxic than the technical grade active ingredient</i>	

## INTRODUCTION

Mefentrifluconazole (Revsol) is a new broad-spectrum triazole fungicide that belongs to FRAC (Fungicide Resistance Action Committee) Code 3. It is classified as a demethylation inhibitor (DMI) and acts by inhibiting the biosynthesis of ergosterol, which is a critical component of fungi cell membranes. Mefentrifluconazole is registered for use on a variety of crops including corn (field, sweet, seed, pop), soybeans, potatoes, sugar beets, grapes, canola, various cereal grains, and legume vegetables. It is also approved for on-farm seed treatment with select crops (e.g., soybean, wheat, corn) and for use on non-residential turf and ornamentals.

The Minnesota Department of Agriculture’s (MDA) extensive review of the USEPA mefentrifluconazole product labels and risk assessments for issues relevant to Minnesota is summarized below.

## PROJECTED USE IN MINNESOTA

Mefentrifluconazole can be used to control a variety of fungal diseases including powdery mildew of grapes, Alternaria diseases in potatoes and Cercospora diseases of corn and soybeans. In Minnesota, use on sugar beets to control Cercospora leaf spot disease is also of interest. According to University of Minnesota Extension, mefentrifluconazole was not tested on soybeans in Minnesota; however, North Dakota State University Extension hopes to evaluate its efficacy in sugar beets in the near future.

End-use products containing mefentrifluconazole are formulated as emulsifiable concentrates or suspension/soluble concentrates. Depending on the use site, aerial, ground, handheld, and chemigation application methods can be used.

Six end-use products containing mefentrifluconazole (solo and premix) are currently registered in Minnesota including:

- **Revytek Fungicide** (EPA Reg. No. 7969-406) – This product contains 11.61% mefentrifluconazole, 15.49% pyraclostrobin, and 7.74% fluxapyroxad for use on corn, potato, soybeans, sugar beets, etc.
- **Cevya Fungicide** (EPA Reg. No. 7969-407) – This product contains 34.93% mefentrifluconazole for use on grapes, pome fruits, stone fruits, and tree nuts.
- **Maxtima Fungicide** (EPA Reg. No. 7969-404) – This product contains 34.93% mefentrifluconazole for use on non-residential turfgrass and ornamentals.
- **Navicon Intrinsic Fungicide** (EPA Reg. No. 7969-403) – This product contains 17.56% mefentrifluconazole and 17.56% pyraclostrobin for use on non-residential turfgrass.
- **Provysol Fungicide** (EPA Reg. No. 7969-411) – This product contains 34.93% mefentrifluconazole for use on corn, potato, rapeseed (canola), specified small grains, sorghum, soybeans, and sugar beets.

## LABEL ENVIRONMENTAL HAZARDS

### Water Quality

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Mefentrifluconazole product labels carry the following groundwater and surface water advisories:

- **Groundwater** – This chemical has properties and characteristics associated with chemicals detected in groundwater. This chemical may leach into groundwater if used in areas where soils are permeable, particularly where the water table is shallow.
- **Surface water** – This product is classified as having high potential for reaching aquatic sediment via runoff for several months or more after application. Sound erosion control practices will reduce this product's potential to reach aquatic sediment via runoff.

### Other Restrictions

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- Do Not apply above label-specified wind speeds or if winds are gusty.
- Do Not apply during a temperature inversion.

## TOXICOLOGY AND EXPOSURE

USEPA'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

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- **Carcinogenic Effects** – Mefentrifluconazole is classified as "not likely to be carcinogenic to humans."
- **Drinking Water Guidance** – Mefentrifluconazole has the potential to reach surface and ground sources of drinking water; however, USEPA acute and chronic dietary (food + water) exposure estimates were below the level of concern for the general population and all population subgroups. Estimated Drinking Water Concentrations (EDWCs) of 42.3 and 18.4 ppb in surface water were used for acute and chronic dietary risk assessments, respectively.
- **Occupational Exposure** – Exposure risks were below USEPA levels of concern for all anticipated uses with the exception of post-application dermal exposure from the girdling and turning activities for grapes. Proposed changes to the use pattern on grapes have reduced this risk. A restricted entry interval (REI) of 12 hours is required for all label uses.
- **Residential Exposure** – Residential handler exposures are not anticipated based on the proposed use sites. While there is potential for post-application dermal exposure, the USEPA found that risk estimates were not of concern for all ages.

### Non-target Species

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- **Stressor of Concern** – The parent, mefentrifluconazole, is considered to be the only stressor of concern due to its high persistence.
- **Aquatic & Terrestrial Life Exposure** – Mefentrifluconazole is moderately to highly toxic to freshwater fish, and highly toxic to freshwater invertebrates on an acute basis. It is slightly toxic to birds, moderately to highly toxic to mammals, and practically non-toxic to adult honey bees and larvae. It is practically non-toxic to aquatic plants, and endpoints could not be determined for terrestrial plants due to lack of toxicity. Formulated products may be more toxic than the technical grade active ingredient.

## ENVIRONMENTAL FATE

Mefentrifluconazole is slightly mobile in soil and is persistent in both soil and aquatic systems. Mefentrifluconazole is not expected to leach to groundwater due to its strong sorption; however, it may enter surface water via drift, runoff, and erosion of soil-bound residues.

### Soil

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- **Half-life** (25°C) – Aerobic: 355 to 626 days  
Anaerobic: 325 to 1,105 days
- **Mobility** – Koc is 2,163 to 3,648 L/kgoc (mean = 3,539 L/kgoc)  
Solubility in water is 0.81 mg/L (pH 7)
- **Photolysis** (half-life) – 326 days
- **Persistence** – DT<sub>50</sub> value 123 to 1,177 days

### Aquatic

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- **Half-Life** (25°C) – Aerobic: 2.2 to 11.5 years  
Anaerobic: Stable
- **Half-life via hydrolysis** – Stable
- **Photolysis in water** (half-life) – 313 days

### Air

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- **Volatilization** – Low potential for volatilization, vapor pressure (25°C) =  $2.4 \times 10^{-8}$  Torr; Henry's law constant  $1.55 \times 10^{-8}$  atm m<sup>3</sup> mole<sup>-1</sup>

### Degradates

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Mefentrifluconazole transforms into five major degradates via aqueous photolysis: Mef-002, Mef-005, Mef-006, Mef-007, and Mef-037. Degradation pathways other than photolysis yielded only one major metabolite, Mef-001 (1,2,4-Triazole), which was found in an aerobic aquatic metabolism study along with the minor degradate Mef-003. Mef-001 and Mef-003 are expected to be the most persistent and abundant degradates in the environment; however, the parent, mefentrifluconazole, is considered to be the only residue of concern by the EPA for ecological exposure and drinking water exposure. This is due to its high persistence and toxicity relative to the degradates. Degradate toxicity is up to 3 orders of magnitude lower than mefentrifluconazole.