

PESTICIDE TYPE	INSECTICIDE
Chemical Class	Anthranilic diamide
Common Trade Names	Acceleron; Reatis; Tetrino
Major Degradate	Tetraniliprole quinazolinone
Application Rate (lb a.i./A)	Max Single: 0.027 to 0.178 Max Annual: 0.04 to 0.178
Registration Status	EPA: Registered unconditionally in March 2021 Minnesota: 2021
Toxicity Profile for Applicators	Signal word: CAUTION Not acutely toxic via the dermal, oral, or inhalation routes of exposure
Basic Manufacturer	Bayer CropScience/ Environmental Science & FMC Corporation
MDA Laboratory Capabilities	Methods confirmed for tetraniliprole and tetraniliprole quinazolinone in water
HUMAN HEALTH	
Non-Cancer	Low risk to human health*
Cancer	"Suggestive Evidence of Carcinogenic Potential"
* No toxicity endpoints were established to conduct a quantitative risk assessment.	
ENVIRONMENTAL AQUATIC TOXICITY	
Fish	Acute: >5,450 ppb Chronic: 646 ppb
Invertebrate	Acute: 71.5 ppb Chronic: 12.5 ppb
Aquatic Plants	Vascular: 11,300 ppb Non-vascular: 910 ppb
POLLINATOR TOXICITY	
Honey Bee	Acute Contact: 0.156 µg ai/bee Acute Oral: 0.00142 µg ai/bee
<i>Level of Concern (LOC) has been applied to all toxicity values. Listed values are based on studies using the technical grade active ingredient.</i>	

## INTRODUCTION

Tetraniliprole is a systemic insecticide that was first registered by the U.S. Environmental Protection Agency (EPA) in March 2021. It belongs to the anthranilic diamide class of insecticides and is registered for use on a variety of agricultural crops, including corn, soybean, potatoes, and several fruit and vegetable crops. Tetraniliprole is also registered by the EPA for use on turfgrass in and around residential, commercial, and industrial buildings, golf courses, sports fields, and sod farms. Approved uses include foliar, soil, and/or seed treatment applications.

Tetraniliprole is classified by the Insecticide Resistance Action Committee as a ryanodine receptor modulator (Group 28). It acts on ryanodine receptors causing impaired muscle regulation, paralysis, and death of insect pests. Target pests include caterpillars, beetles, flies, and some sucking insects.

The Minnesota Department of Agriculture's (MDA) extensive review of the EPA tetraniliprole labels and risk assessments for issues relevant to Minnesota is summarized below.

## PROJECTED USE IN MINNESOTA

At the time of this review, tetraniliprole has been registered for use as a seed treatment in corn and soybean in Minnesota to control seedcorn maggot, corn rootworm, and wireworm, among other pests. Currently, two end-use products containing tetraniliprole are registered in Minnesota.

- **Tetraniliprole ST 480 FS/Acceleron I-374 Insecticide Seed Treatment (EPA Reg. No. 264-1192)** – This product is a flowable suspension containing 40.34% tetraniliprole. It is labeled for use as a seed treatment in corn and soybean.
- **Tetraniliprole 43 SC Insecticide Turf/Tetrino (EPA Reg. No. 432-1591)** – This product is a suspension concentrate containing 4.07% tetraniliprole. It is labeled for use on turfgrass.

A current list of products containing tetraniliprole that are registered in Minnesota can be accessed through: [www.kellysolutions.com/MN/searchbychem.asp](http://www.kellysolutions.com/MN/searchbychem.asp).

Additional products containing tetraniliprole are registered by the EPA but are not currently registered for use in Minnesota. Registrants may submit applications to the MDA for other federally registered products in the future, thereby expanding the use of tetraniliprole in Minnesota.

## LABEL ENVIRONMENTAL HAZARDS

### Water Quality

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- **Groundwater Advisory** – 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 Advisory** – This product may impact surface water quality due to runoff of rainwater. This is especially true for poorly draining soils and soils with shallow groundwater.
- Do not apply by ground within 25 feet or by air within 50 feet of waterbodies.
- Do not cultivate within 25 feet of aquatic areas to allow growth of a vegetative filter strip. Employ best management practices for minimizing runoff.

### Other Restrictions

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- For foliar applications, leave a 10-foot downwind in-field buffer if blooming vegetation is present within 10 feet of downwind edge of the field being treated.

## TOXICOLOGY AND EXPOSURE

The 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, 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** – Tetraniliprole is classified by the EPA as having "Suggestive Evidence of Carcinogenic Potential."
- **Drinking Water Guidance** – There is potential for exposure to tetraniliprole through drinking water; however, no adverse effects were observed with any route of exposure in the toxicological studies submitted to the EPA for registration. Therefore, the EPA concluded that dietary exposures will not pose a significant human health risk.
- **Occupational Exposure** – Because no adverse effects were observed in the submitted toxicological studies, EPA concluded that occupational and residential exposures to tetraniliprole do not pose a significant health risk. The restricted entry interval for tetraniliprole is 12 hours.

### Non-target Species

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- **Residues of Concern** – Tetraniliprole and tetraniliprole quinazolinone are considered residues of concern for all aquatic taxa and terrestrial vertebrates. Tetraniliprole, is the only residue of concern for terrestrial invertebrates.
- **Aquatic Life Exposure** – Tetraniliprole is slightly to practically non-toxic to freshwater fish and practically non-toxic to aquatic phase amphibians on an acute exposure basis. Tetraniliprole is highly toxic to freshwater invertebrates and use may cause effects to invertebrates in the benthic zone;

however, mitigation measure including application buffer zones have been added to the label to reduce this risk. Use is expected to pose a low risk to aquatic plants.

- **Terrestrial Life Exposure** – Tetraniliprole is practically non-toxic to birds and mammals on an acute oral exposure basis, and risk to terrestrial plants is low. Tetraniliprole-treated corn seeds may pose a chronic risk to birds; however, language on treated seed containers is intended to minimize this risk.
- **Pollinators** – Tetraniliprole is highly toxic to adult and larval honeybees and adult bumble bees on an acute oral exposure basis. It is highly toxic to adult honeybees and practically non-toxic to adult bumble bees on an acute contact exposure basis. Foliar and soil applications to select crops may pose a risk to individual honeybees, though risks to colonies are considered low for most tetraniliprole uses. For crops where risks were identified, the EPA has proposed crop-specific application timing restrictions.

## ENVIRONMENTAL FATE

Tetraniliprole is slightly to moderately soluble in water and is classified as moderately mobile. It is slightly persistent to persistent in the environment, and its main route of degradation is hydrolysis (neutral and basic pHs) and aqueous photolysis. Tetraniliprole may reach surface water through spray drift, runoff, and erosion or groundwater via leaching.

### Soil

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- **Half-life (20°C)** – Aerobic: 69 to 144 days  
Anaerobic: 160 to 177 days
- **Mobility** –  $K_{oc}$  values range from 150 to 2,100 mL/g<sub>oc</sub>  
Solubility in water (20°C) is 1.0 to 1.3 mg/L
- **Photolysis Half-life** – 70 days (daylight adjusted)
- **Persistence** – Field dissipation DT<sub>50</sub> values range from 30 to 359 days; 1,000 days at one location

### Aquatic

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- **Half-Life (25°C)** – Aerobic: 11 to 925 days  
Anaerobic: 104 to 218 days
- **Photolysis Half-life** – 10.6 days (pH 4; daylight adjusted)
- **Hydrolysis Half-life** – 40-60 days (pH 7); 0.76-1.3 days (pH 9), stable at pH 4

### Air

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- **Volatilization** – Not a major route of dissipation. Vapor pressure (20°C) =  $2.4 \times 10^{-8}$  torr; Henry's law constant  $1.7 \times 10^{-8}$  atm m<sup>3</sup> mol<sup>-1</sup>

### Degradates

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Tetraniliprole has eight major environmental degradates: BCS-CQ63359 (tetraniliprole quinazolinone); BCS-CR74541; BCS-CU81055; BCS-CT30673; BCS-CY28906; BCS-CY28900; BCS-CT30672; BCS-CY28897. Of these, tetraniliprole quinazolinone is the only degradate included as a residue of concern for aquatic taxa and terrestrial vertebrates. Compared to the parent, tetraniliprole quinazolinone is equally or less toxic to freshwater benthic invertebrates and less toxic to adult honeybees. It is more persistent but less mobile than the parent.