

PESTICIDE TYPE	<b>BIOPESTICIDE</b>
CHEMICAL CLASS	Microbial Pesticide <u>Molluscide</u>
COMMON TRADE NAMES	Zequanox®
APPLICATION RATE (oz a.i./gal of water)	Max: 0.027 for up to 24 hours total per month
REGISTRATION STATUS	EPA: 2011
TOXICITY PROFILE FOR APPLICATORS	Signal word- CAUTION Toxicity III or IV
BASIC MANUFACTURER	Marrone Bio Innovations
MDA LABORATORY CAPABILITIES	N/A due to use pattern

## HUMAN HEALTH

NON-CANCER	Acute PAD = N/A; see page 2 Chronic PAD = N/A; see page 2
CANCER	N/A; see page 2

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

## ENVIRONMENTAL AQUATIC TOXICITY

FISH	Acute & Chronic: < 100 ppm
INVERTEBRATE	Acute & Chronic: < 100 ppm
AQUATIC PLANTS	Vascular: N/A Non-vascular: N/A

Level of Concern (LOCs) have been applied to all values

## Introduction

*Pseudomonas fluorescens* strain CL145A is a biopesticide for controlling quagga and zebra mussels. It is applied as a concentrated product solution into a defined static or flowing system. This biopesticide is digested by the mussels and disrupts the epithelial cells lining in their digestive system causing mussel mortality. Minnesota Department of Agriculture (MDA) extensive review of the U.S. Environmental Protection Agency (EPA) *pseudomonas fluorescens* strain CL145A labels and risk assessments for issues relevant to Minnesota is summarized below.

## Projected Use in Minnesota

*Pseudomonas fluorescens* strain CL145A is registered for use on water in enclosed and other confined static or flowing water infrastructures. EPA is registering this product as a one-year time-limited registration, with the understanding that public comments could bring to light new information or concerns that could inform EPA's initial decision. There are no products registered for homeowner use or for application to public waters.

- **Zequanox (EPA Reg. No. 84059-15; registered in MN)- Time Limited Registration** Use on water enclosed and other confined static or flowing water infrastructures to control quagga and zebra mussels.

## Label Environmental Hazards

### Water Quality:

Do not discharge effluent containing this product into waters unless in accordance with the requirements of a NPDES permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority.

### Other Restrictions:

- Treatment of open water, such as infested ponds, lakes, reservoirs, rivers, and streams, or other unconfined aquatic systems, is prohibited.
- Prior to treatment, site assessments must be conducted to ensure that the concentration of treated water from mussel infested infrastructure does not exceed an EEC of 0.013 oz (i.e., 102 ppm) of active ingredient/gallon of water in receiving waters

## 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

- **Acute toxicity** testing was waived because *Pseudomonas fluorescens* is a ubiquitous inhabitant of soil and water on the surface and roots of a variety of plant types, including those of food plants consumed raw.
- **Carcinogenic Effects**- Not determined based on results of EPA Tier 1 studies indicating no toxic, infective and/or pathogenic effects.
- **Drinking Water Guidance**- Drinking water exposure is expected to be negligible for three reasons:
  1. Concentrations of *Pseudomonas fluorescens* strain CL145A will be diluted as water flows past points of application
  2. Natural degradation of the microbial active ingredient will occur
  3. Flocculating and filtering at water treatment plants will further inactivate and decrease levels of *Pseudomonas fluorescens* strain CL145A
- **Occupational Exposure**- Respiratory protection is necessary when handling and applying undiluted *Pseudomonas fluorescens* strain CL145A to sites listed on the label, including confined water structures in dams and industrial sites. Exposures to diluted end-use products would be a low hazard.

### Environment- Non-target Species

- **Formulation Toxicity Data**- *Pseudomonas fluorescens* strain CL145A had no effect at 100 ppm on fish, aquatic invertebrates, freshwater mussels and mallard ducks. Non-irradiated cells of *Pseudomonas fluorescens* strain CL145A caused up to 89% mortality in treated fish. The *Pseudomonas fluorescens* strain CL145A used in production is irradiated to significantly reduce the number of viable cells.
- It is unlikely that *Pseudomonas fluorescens* strain CL145A will cause substantial effects on non-target organisms during the one-year limited registration provided:
  1. Discharge is prohibited in the vicinity of federally listed endangered or threatened species
  2. The calculated concentration of Zequanox in receiving waters is limited to concentrations at or below 100 ppm
  3. Treatment monitoring ensures that measured concentrations are at or below 1 ppm at a pre-determined location 200 meters from discharge into flowing or static waters
- For long-term use Marrone Bio Innovations needs to submit more testing on a variety of studies, namely: Avian Oral; Freshwater Fish; Freshwater Aquatic Invertebrate; Estuarine and Marine Animal; Nontarget Insect Testing; Aquatic Invertebrate Range; Fish Life Cycle Studies; Bivalve Acute Toxicity (Embryo-Larval); Oyster Acute Toxicity (Shell Deposition)

## Environmental Fate

---

**Soil, Air, and Water environmental fate data was not a part of EPA's *Pseudomonas fluorescens* strain CL145A biopesticide registration action document. *Pseudomonas fluorescens* is considered ubiquitous in soil and water and is commonly associated with plants.**