

# ZONIX™ BIOFUNGICIDE

Protect your crops against Downy Mildew, Late Blight, Root Rot, *Phytophthora* and *Pythium* with ZONIX BIOFUNGICIDE.

## ZONIX Benefits

- Kills zoospores on contact
- Effective against resistant pathogen strains
- Exempt from tolerance limits
- Zero pre-harvest interval
- Four-hour re-entry
- Very low phytotoxicity
- Effective tank mix due to biosurfactant properties
- OMRI listed

## Application

**Rate:** 300-500 ppm

**Mixing:** Use 0.5 - 0.8 ounces of ZONIX per gallon of water.

**Application Methods:** Foliar or soil spray, chemigation, drench

## Active Ingredient

Rhamnolipid Biosurfactant <sup>1</sup>	8.5%
Other Ingredients	91.5%
Total	100.0%

<sup>1</sup> Contains a minimum of 11.30 fl. oz. of rhamnolipid biosurfactant per gallon.

Source Organism: *Pseudomonas aeruginosa*

U.S. EPA Registration No. 72431-1-1839

FRAC CODE: NC

## Approved Uses

Application on seeds, transplants, fruits, vegetables, roots, seedlings, cuttings and foliage are U.S. EPA-approved for the following:

- Tomato/Pepper/Potato
- Cucumber/Squash/Melon/Cantaloupe
- Blueberry/Raspberry/Strawberry
- Grapes/Kiwi/Passion Fruit
- Mint/Chive/Parsley
- Avocado/Coffee/Mango
- Almonds/Apple/Peach
- Ginseng/Buckwheat
- Fiber and Oil Crops
- Tobacco
- Turf and Ornamentals

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**ZONIX BIOFUNGICIDE, based on rhamnolipid technology, is a unique product that supports sustainable agriculture. The U.S. Environmental Protection Agency (EPA) has evaluated rhamnolipids and has established an exemption of a tolerance for residues on all food commodities [40 CFR Part 180, § 180.1245]. Rhamnolipids are versatile and function not only as biofungicides, but also as a specialty additive and biosurfactant. More information on their multiple pathways that target improved plant health is noted below.**

## **Biofungicide**

ZONIX BIOFUNGICIDE's mode of action is by contact, causing the rupture of zoospore fungal cell membranes. The product is effective against Downy Mildew, Late-Blight, Root Rot, and all *Phytophthora* and *Pythium* diseases. ZONIX's physical mechanism does not allow for chemical resistance, therefore it is recommended as a key component of all integrated pest management (IPM) programs.

ZONIX is approved as a biofungicide for use in agricultural, turf and ornamental applications. In agricultural applications, it has a four-hour re-entry time and is exempt from EPA residue limits.

## **Plant Health**

Proper nutrition is integral for healthy plants. In the event that nutrition is unbalanced, the plant will become increasingly susceptible to disease. Rhamnolipids are powerful chelators that are produced by soil bacteria in the root rhizosphere and aid in plant nutrition. Plants and bacteria use rhamnolipids to move minerals and micronutrients such as zinc, copper, iron, or magnesium to the root surface by adsorption. Additionally, rhamnolipids are capable of triggering an immune response in plants against several pathogens.

## **Biosurfactant**

Rhamnolipids are natural wetting agents capable of lowering the surface tension of spray solutions, drip irrigation and drench. This ability is analogous to the action exhibited by agricultural soaps, spreaders and stickers. This important property provides a homogenous solution when two dissimilar liquids, such as water and oil, are blended and prevents potential uneven coating of foliage that can impact the effectiveness of the application. The evaluation of rhamnolipids in foliar application demonstrates great coverage and no evidence of phytotoxicity.

Additionally, rhamnolipid biosurfactants are well suited for utilization in drip irrigation systems. Research conducted at Florida State University demonstrated a level of 40 ppm rhamnolipids lowered soil surface tension of hydrophobic soils to enable penetration of water and fertilizer into the plant root zone.<sup>2</sup> Rhamnolipid applications increased soil hydraulic conductivity reducing water consumption during crop irrigation, particularly under drought conditions.



**For more information visit [stepanbiosolutions.com](https://www.stepanbiosolutions.com) or [contact us](#).**

<sup>2</sup> Renfro, Tyler D. *Rhamnolipid Biosurfactant Transport in Agricultural Soils*. 2013. Florida State University, Master of Science thesis.

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