



ORGANIC SUSTAINABLE SOLUTIONS THROUGH MICROBIOLOGY

**PureAg**<sup>™</sup>  
SIMPLE SOIL SCIENCE

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## Trichoderma

Trichoderma is a beneficial fungus that helps to protect your plants against molds and bacteria. These fungus stand up against root rot and gray mold, protecting your plants from being destroyed. By creating a barrier, they make it very difficult for harmful bacteria and pathogens to pass through.

Trichoderma surround your plant's roots releasing compounds that help trigger their natural defense systems. They combat potential pathogens, and also have the ability to kill those that may already be present. Additionally, trichoderma reduces pythium, fusarium and rhizoctonia, by wrapping themselves around the harmful fungi, and releasing enzymes that then dissolve the invaders cell wall. (microbe parasitism).

They produce mainly two types of enzymes: cellulase and chitinase. Cellulase is an enzyme that breaks down cellulose (the structure of plant cell walls). On the flip side, chitinase is an enzyme that breaks down chitin (the structure of fungal cell walls). Chitinase is also what breaks down the crunchy exoskeleton of insects. Trichoderma know when to activate which enzyme depending on what root system and soil that it is residing within and not cause harm.

There are four different species of trichoderma harzianum, viride, longibrachiatum and reesei. Each of these have defining characteristics and qualities but mainly are separated by what they eat.

### Trichoderma Harzianum

The most commonly known species of this beneficial fungi. It likes temperatures between 86 to 98.6 degrees Fahrenheit. It is used as a fungicide and a biocontrol for a number of different fungal pathogens.

### Trichoderma Viride

Known as the "green mold disease of mushrooms". It breaks down both chitin and cellulose and uses them as its food source. This species can grow on wood (cellulose) and fungi (chitin).

### Trichoderma Viride

A voracious appetites for all fungi.

### Trichoderma Reesei

In addition to eating cellulose, reesei excretes antibiotics for the plants. These antibiotics trigger the resistance response within the plant to help it to fight off fungal pathogens. The enzymes enable it to perform as a bioremediator (meaning that they can clean up heavy metals).

### Trichoderma Koningii

A pathogen and an antagonist of fungi that also has a negative effect on certain nematodes. It is being used as a biological fungicide.

### Trichoderma Virens

Play a role in regulating the growth and development of seedlings including increased biomass production and stimulating lateral root development.

### Trichoderma Hamatum

Highly antagonistic to other species of fungi because of the production of soluble antibiotics (peptides), volatile and non-volatile antibiotics, or by direct parasitism. The various mechanisms include antibiosis, parasitism, inducing host-plant resistance, and competition.

## **Trichoderma Polysporum**

Control pathogenic fungus and possess innate resistance to most agricultural chemicals, including fungicides, and have the ability to increase the rate of plant growth and development.

## **Two Fungi are Better Than One**

Mycorrhizae are highly beneficial for organic long-term gardens but when working with a 90 day crop cycle, trichoderma will benefit you more in a shorter amount of time. However, the two make a great team. They are not competitive in anyway and when applied to your grow, you will reap the benefits of both being present. In our experience, when the two work together they help to create the most resilient plants that you can grow, with the bonus of using organic and natural products.

## **The More You Know, The Better You Grow!**

By using Trichoderma in your grow, you are taking action to create a healthy root system and plants that are more resistant to pesky pathogens. PureAg Simply Rootamendary is all natural and saves you from having to resort to applying nasty chemicals.

Consult your PureAg professional to learn how to design your program.