The Benefits and Uses of *Trichoderma*

***Trichoderma* is a genus of filamentous fungus with widely known beneficial functions in agriculture, horticulture and environmental management (Woo et al., 2023). *Trichoderma* is included in our EcoAdvance® premium biology, which is a mix of beneficial soil microbes and bio stimulants that is physically coated onto the rock phosphate-based granules included in all our granular blends. As such, all our granular fertilisers are inoculated with *Trichoderma* spores, which then germinate when the fertiliser is surface spread or incorporated into moist soil.**

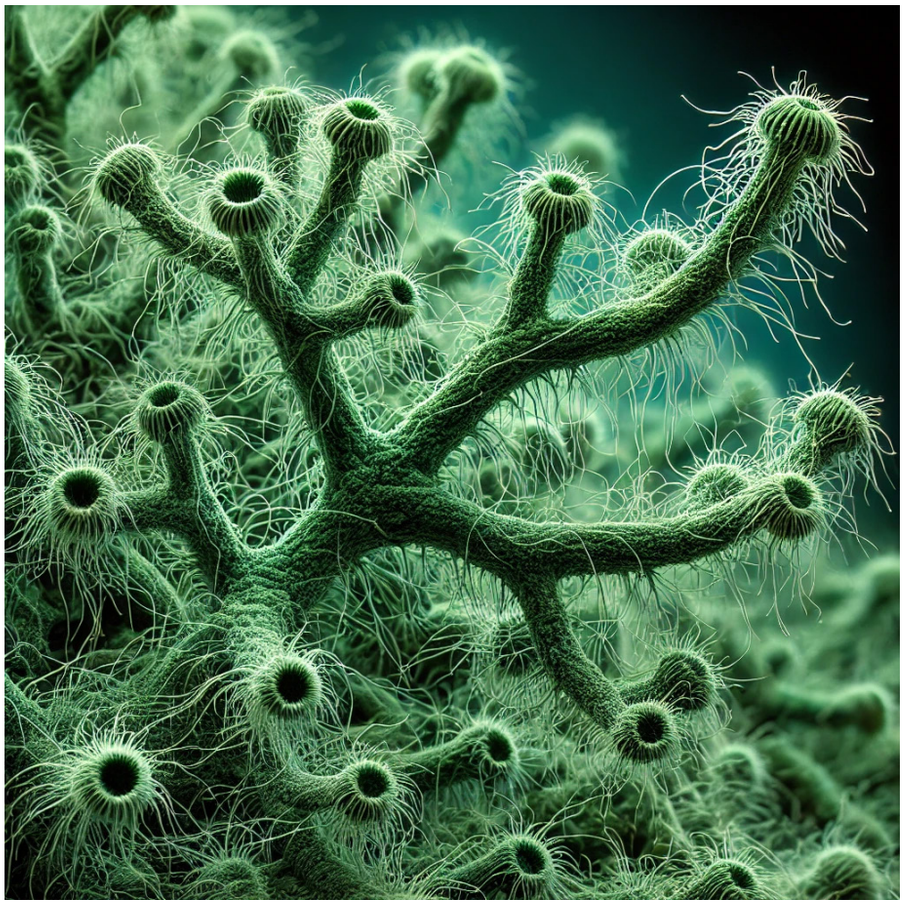
Trichoderma is known for its agricultural benefits including plant growth–promoting effects and biological control of plant diseases. This article explores the diverse applications and key benefits of *Trichoderma*, and in turn highlights how our rock mineral fertiliser coated with EcoAdvance® premium biology offers a bio-active, sustainable alternative to synthetic chemical fertilisers. The combination of rock minerals with the beneficial soil microbes contained in EcoAdvance® premium biology provides soil nutrition that in turn improves soil health.

Biological Control Agent

A substantial benefit of *Trichoderma* is its function as a biological control agent effective against plant pathogens. *Trichoderma* species, including *T. viride* and *T. harzianum,* suppress a wide range of fungal pathogens, including *Phytophthora*, *Rhizoctonia*, *Fusarium*, and *Pythium* (Harman et al., 2004). The mechanisms by which *Trichoderma* exerts biological control are:

- **Mycoparasitism**: by coiling around their hyphae and releasing enzymes that degrade their cell walls, *Trichoderma* parasitises and directly attacks other fungi.
- **Competition**: by taking nutrients and space, *Trichoderma* competes with harmful fungi and reduces their ability to thrive.
- **Antibiosis**: by producing secondary metabolites with antifungal properties, *Trichoderma* inhibits the growth of pathogens.
- **Induced Systemic Resistance (ISR)**: by inducing plant defence systems, *Trichoderma* makes plants more tolerant of biotic and abiotic stress, promoting plant disease resistance from the inside out.

The use of *Trichoderma* as a biocontrol agent minimises the use of chemical fungicides, which reduces environmental pollution and promotes sustainable farming practices that preserve soil biology (Guzmán-Guzmán et al., 2023; Woo et al., 2014).



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Plant Growth

Trichoderma enhances plant growth and productivity through various mechanisms, including:

- **Phytohormones:** by producing plant hormones, including cytokinins, auxins, and gibberellins, *Trichoderma* promotes root and shoot growth.
- **Nutrient Availability:** by stimulating root hair growth and directly solubilising essential nutrients in the soil, *Trichoderma* facilitates greater nutrient access for the plant.

Numerous crop studies have shown that treatment with *Trichoderma* leads to improved root systems and overall higher yields (Woo et al., 2023).

Environment and Soil Health

Trichoderma contributes to environmental conservation and soil health. *Trichoderma* enhances soil structure and fertility by recycling nutrients and decomposing organic matter. It is suitable for use in composting and waste management as it can colonise a variety of substrates. Additionally, *Trichoderma* plays roles in bioremediation by breaking down pesticides and other pollutants in the soil (Tripathi et al., 2013).

Summary

With multifaceted benefits from plant growth enhancement to biological control, *Trichoderma* is a powerful tool for environmental management and sustainable agriculture. Plant-beneficial fungi are a crucial resource in efforts to promote ecological balance and reduce chemical dependency in agriculture. With future advancements in biological understanding and product formulation, *Trichoderma*-based products have potential to be more effective and accessible. Ecogrowth rock mineral fertiliser coated with EcoAdvance® premium biology,

which includes *Trichoderma*, combines beneficial soil microbiology with plant nutrients for holistic management of soil health.

***Trichoderma* primary benefits include:**

- Disease control
- Enhanced plant growth
- Induced Systemic Resistance
- Nutrient availability
- Biodegradation of organic matter
- Environmental safety
- Compatibility with other inputs
- Improved crop yield quality and quantity
- Improved soil structure
- Soil carbon sequestration
- Enhanced plant tolerance to biotic and abiotic stresses

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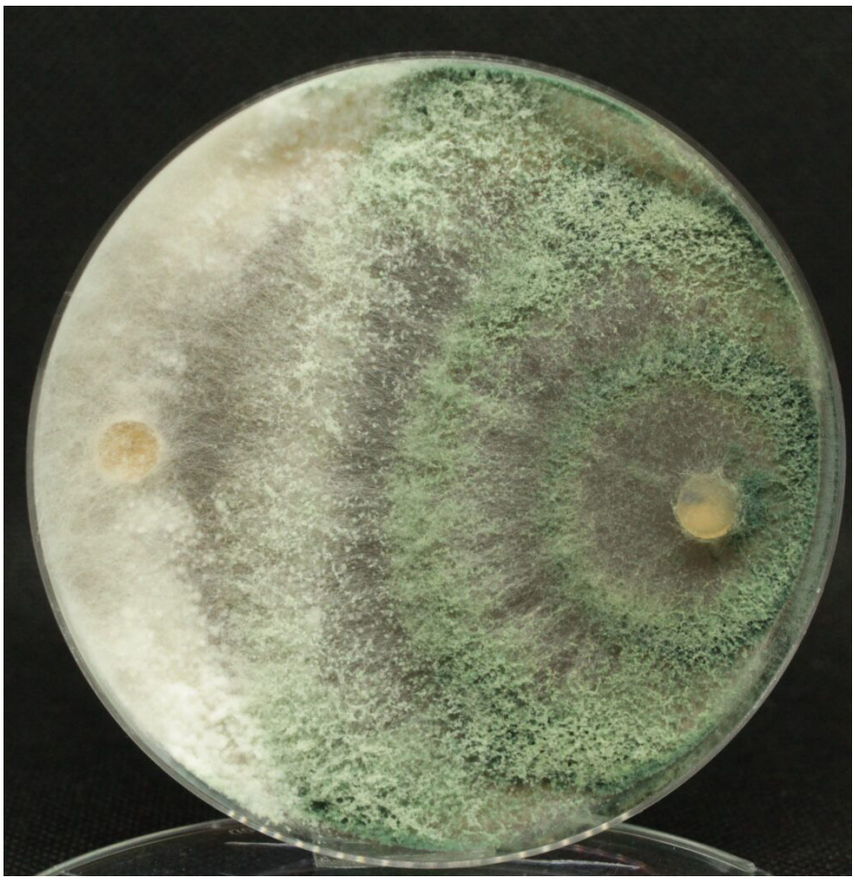

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