

**ECOSOM® - TH**  
*Trichoderma harzianum*  
BioFungicide / BioNematicide  
(Regd in Central Insecticides Board, Govt of India)  
**APPROVED FOR USE IN ORGANIC AGRICULTURE**

### Introducing ECOSOM® - TH

ECOSOM®-TH is a biological fungicide and biological nematicide based on a selected strain of naturally-occurring beneficial soil fungus *Trichoderma harzianum* (IIHR-Th-2) that protects crops from several diseases caused by seed borne and soil borne fungal pathogens like *Rhizoctonia spp*, *Pythium spp*, *Fusarium spp* and *Alternaria spp*; fruit rots caused by *Botrytis* and plant pathogenic nematodes.

ECOSOM®-TH contains spores and mycelial fragments of *Trichoderma harzianum*. It is formulated as Wettable Powder with CFU count of  $2 \times 10^6$  / g. ECOSOM® - TH is registered by Indian Pesticides Regulatory Authority - Central Insecticides Board, Govt of India. ECOSOM® -TH is approved for use in Organic agriculture.

### A Historical Brief

*Trichoderma spp* first description dates back to 1794 by Persoon. In 1865, a link to the sexual state of a *Hypocrea* species was suggested by Tulasne and Tulasne. It was morphologically difficult to distinguish the different species assigned to the genus *Trichoderma/Hypocrea* until 1969 when the development of a concept for its identification was initiated by Rifai. Post this, numerous new species of *Trichoderma/Hypocrea* were discovered and by 2006, the genus comprised of more than 100 phylogenetically defined species (Druzhinina et al. 2006a).

The earliest description of *Trichoderma harzianum* in a broad classification was done by Rifai in 1969. Its property as an effective bio control agent has been described by many authors : Ordentlich et al ( 1992 ) , Inbar et al. ( 1994), Wolffhechel and Jensen ( 1992 ) , Mukherjee et al ( 1995 ) , Samules ( 1996 ).

### Mode of Action

**Substrate Competition for space and Nutrients:** ECOSOM® -TH colonizes maximum space and absorbs maximum nutrients available at the target site and thereby controls the pathogens by starving them for food and competing for space- Domino effect.

**Mycoparasitism:** ECOSOM® -TH is like a prophylactic biological fungicide that attacks disease-causing pathogens before they reach the plant system. It grows fast and coils around the pathogen and penetrates through it. It derives nutrition from the target pathogenic fungus protoplasm and ECOSOM® -TH spores multiply inside target pathogenic fungus body and eventually kill it.

Enzyme production: *Trichoderma harzianum* secretes gliotoxins which are antagonistic to pathogenic fungi or bacteria. It is known to secrete antifungal metabolites like 4-hydroxy-6,6-dimethoxy-3-(2-methyl-1-oxohex-4-enyl)pyridin-2-one, 6-Pentyl-alpha-pyrone, harziapyridone which are antagonistic to the pathogenic fungal species and suppress their growth.

It also inactivates the pathogen's enzymes by secreting certain plant growth stimulating substances. A long lasting effect against pathogens is thus observed owing to the secondary metabolite secretion which exhibit antibiosis effect on the pathogen.

Nematicidal effect: This strain of *Trichoderma harzianum* produces toxins that have a nematicidal property and thus can be used as an effective nematicide.

### Method of Application

Foliar application: Mix 10 g. of ECOSOM® -TH in sufficient quantity of water. Decant the supernatant and use it for foliar spray. Spray volume depends on crop canopy.

Soil application: Mix 50- 150 Kg/ Ha ECOSOM® -TH in sufficient quantity of organic fertilizer and apply to root zone to control pathogenic nematodes in soil.

Soil drenching, Nursery application, Root dipping: Mix 10 g of ECOSOM® -TH per L of water and use to drench soil / nursery / dip roots.

Drip Irrigation: Mix 3- 5 Kg ECOSOM® -TH in 50 L of water and mix well. Allow to sediment and decant supernatant and feed it through drip irrigation.

Note : ECOSOM® -TH should not be used in mushroom farming as it causes disease in mushrooms.

### Target Diseases and Pests

Fungal diseases like Fruit rot caused by *Botrytis spp* and other fungal pathogens attacking the crops.

ECOSOM® -TH is approved for controlling Root knot nematode in Tomato, Brinjal, Carrot, Okra ( Lady's finger ), Gerbera, Carnations, Tuberose, Banana. Controls reniform nematode of Papaya and citrus nematode of Acid lime

### Crops

ECOSOM® -TH is suitable for application on Cereals, Millets, Pulses, Oilseeds, Fibre Crops, Sugar Crops, Forage Crops, Plantation crops, Vegetables, Fruits, Spices, Flowers, Medicinal crops, Aromatic Crops, Orchards and Ornamentals.

## Compatibility

ECOSOM® -TH is compatible with BioPesticides and not with Chemical Fungicides.

## Shelf Life

ECOSOM® -TH is stable for a period of 12 months from the date of manufacturing.

## Mass Composition

CONSTITUENT	W/W %	FUNCTION
<i>Trichoderma harzianum</i> (Spores and Mycelia)	1.00%	Active
Carboxy Methyl Cellulose	1.00%	Inactive
Carrier Powder – Kaolin	98.0%	Inactive

## BIOLOGICAL COMPOSITION

CONSTITUENT	CFU/g.	FORMULATION
<i>Trichoderma harzianum</i>	2*10 <sup>6</sup>	Powder

## OTHER FORMULATIONS AVAILABLE

<i>Trichoderma harzianum</i> CFU/g	1*10 <sup>9</sup>	Soluble Powder
<i>Trichoderma harzianum</i> CFU/ml	1*10 <sup>9</sup>	Liquid
<i>Trichoderma harzianum</i>		Lyophilized

*Free from Salmonella, Shigella, E.Coli*

## Cautions for handling and use of product

1. Avoid inhalation and skin contact while diluting as there could be spillage / splashes of the product
2. Mixing and spraying equipment is to be thoroughly rinsed with water and detergent before using the same equipment for spraying other pesticides.
3. Surplus spray solution should not be disposed in crop lands / stagnant water / flowing water where there is a possibility of causing pollution to natural resources
4. Do not eat / drink / smoke during application.
5. Direct incidence of ECOSOM® -TH may cause irritation and therefore it is recommended that the operator should use protective gear viz gloves, apron, mask, eye gear and hood.

## Symptoms and Antidotes

**Symptoms:** Occasional symptoms include head ache and nausea

**Antidote:** In the case of ingestion: symptomatic treatment is advised. In the case of contact with Eyes: Flush with water liberally for 20 minutes. In case of Skin contact, wash the affected area with plenty of water and soap.

### Citations

There are many citations in public domain on effectiveness of *Trichoderma harzianum* as a BioFungicide and the Indian Institute of Horticulture Research has developed a strain that functions as a BioNematicide

### Commitment to Nature

- ECOSOM<sup>®</sup> -TH is approved for use in organic agriculture.
- ECOSOM<sup>®</sup> -TH can be used as an effective component in IPM programmes, thereby leading to a reduction in use of chemical pesticides/ fungicides and creating a safer soil environment.
- ECOSOM<sup>®</sup> -TH does not lead to residue problems and doesn't cause resistance or resurgence problems.

### Benefits from ECOSOM<sup>®</sup> -TH

- ECOSOM<sup>®</sup> -TH effectively controls most of the economically important fungal diseases like Fruit rot caused by Botrytis spp. Effectively controls nematodes like Root knot nematodes and Remiform nematodes
- Pathogenic fungi load reduction leads to improved plant health and thereby increased crop productivity.
- ECOSOM<sup>®</sup> -TH is earthworm friendly , pet friendly , eco friendly and infant friendly