

PAECILO®
Paecilomyces lilacinus
Bio Nematicide
(Regd in Central Insecticides Board, Govt of India)
APPROVED FOR USE IN ORGANIC AGRICULTURE

Introducing PAECILO®

PAECILO® is a biological nematicide based on a selected strain of naturally-occurring saprobic , filamentous entomopathogenic fungus *Paecilomyces lilacinus* (IIHR PL-2) that infects and kills eggs , larvae and adult stage of many plant pathogenic nematodes like root knot nematodes , cyst nematodes remiform nematode , burrowing nematode , citrus nematode , golden cyst nematode and lesion nematodes. *Paecilomyces lilacinus* is parasitic to eggs and egg masses.

PAECILO® contains spores and mycelial fragments of *Paecilomyces lilacinus* . It is formulated as Wettable Powder with CFU count of 1×10^8 / g. PAECILO® is approved for use in Organic agriculture.

A Historical Brief

The Entomopathogenic property of Paecilomyces lilacinus was first discovered in 1966 where it was found to be associated with nematode eggs. Subsequently it was found parasitizing the eggs of *Meloidogyne incognita* (Root knot nematode) in Peru

Mode of Action

Conidial penetration: *Paecilomyces lilacinus* on getting attached to the host forms a dense mycelium that gives rise to conidiophores. These bear phialides at the ends of which spores are formed in long chains. The fungus produces an appressorium (a swelling on the end of the germ tube) which marks the start of invasion of insect. The appressorium produces a penetration peg that enters the external skin (cuticle) of the host. The fungus produces hyphae inside insect body which proliferate and start feeding on insect's internal contents.

Enzyme production: *Paecilomyces lilacinus* produces a serine protease that is toxic to *Meloidogyne spp* eggs It also produces proteases and chitinase enzymes that weakens nematodes so as to enable a narrow infection peg to be established and push through the insect's exterior and pathogenise it from within.

A novel nematicidal compound 4-(4'-carboxy-2'-ethyl-hydroxypentyl)-5,6-dihydro-6methylcyclobuta[b]pyridine-3,6-dicarboxylic acid, is present in Paeceilo® that weaken the nematodes and then gets inside the insect and kills the infected nematode.

Growth: Once inside, PAECILO® replicates and consumes the nematodes' internal organs and blood-like fluid, the hemolymph eventually killing it. PAECILO® infects the nematode on contact and does not need to be consumed by nematode to cause infection.

Environment factors: The rate at which PAECILO® kills the nematode is dependent on temperature and humidity. High humidity is essential for conidial germination and infection establishes between 24 to 48 hours. The infected nematodes may live for three to five days after hyphal penetration and, after death of nematode, the conidiophores bearing conidia are produced on cadaver. The fungus is specific to Nematodes. Nematodes die before the fungus is visible. *Paecilomyces lilacinus* grows best at 20-30 degree C and at a relative humidity above 65%.

Method of Application

Seed Treatment: Mix 10 g/ Kg seed by making a slurry and coat the seeds with this slurry. Dry the seeds under shade and sow them.

Nursery application: Mix 50 g / sq mt of PAECILO® in nursery bed and apply 2 Tonnes / Acre of FYM before transplanting

Polyhouse application: Mix 50 g / sq mt of PAECILO® in green house at an interval of 3 months for crops such as capsicum , brinjal . tomato and okra (lady's finger)

Soil application: Apply FYM enriched with PAECILO® @ 2 Kg per plant at the time of planting and at an interval of 3 months after planting for crops such as acid lime and papaya.

FYM enrichment: : Mix 1 Kg of PAECILO® with 1 Tonne of FYM /compost. This should be left under shade for 15 days with adequate moisture. Mix thoroughly at an interval of 5 days to enrich the FYM /compost with the bio agent.

Target Pests

Root - knot nematode, Remiform nematode, Cyst nematode, Golden cyst nematode , Citrus nematode and Lesion nematode

Crops

PAECILO® 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

PAECILO® is compatible with BioPesticides and not with Chemical Fungicides.

Shelf Life

PAECILO® is stable for a period of 12 months from the date of manufacturing.

Mass Composition

| CONSTITUENT | W/W % | FUNCTION |
|--|------------|----------|
| <i>Paecilomyces lilacinus</i> (Spores and Mycelia) | 1.0% | Active |
| Carboxy Methyl Cellulose | 00.50% | Inactive |
| Moisture | 08.00% max | Inactive |
| Carrier Powder - Kaolin | q.s. | Inactive |

Biological Composition

| CONSTITUENT | CFU/g. | FORMULATION |
|-------------------------------|-------------------|-----------------|
| <i>Paecilomyces lilacinus</i> | 1*10 ⁸ | Wettable Powder |

Other Formulations available

| | | |
|--------------------------------------|-------------------|----------------|
| <i>Paecilomyces lilacinus</i> CFU/g | 1*10 ⁹ | Soluble Powder |
| <i>Paecilomyces lilacinus</i> CFU/ml | 1*10 ⁹ | Liquid |
| <i>Paecilomyces lilacinus</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 use of other agricultural chemicals.
3. Surplus product 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 PAECILO® 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 *Paecilomyces lilacinus* as a BioNematicide

Commitment to Nature

- PAECILO[®] is approved for use in organic agriculture.
- PAECILO[®] is safe to use along with bio fertilizer inoculums like Agri Life Nitrofix[™] (Nitrogen Fixing bacteria) ; P Sol B[®] (Phospho bacteria) ; K Sol B[®] (Potash mobilizing bacteria); Zn Sol B[®] (Zinc mobilizing bacteria) :S Sol B[®] (Sulphur solubilizing bacteria) : Si Sol B[™] (Silica solubilizing bacteria) : Fe Sol B[®] (Iron / Ferrous solubilizing bacteria) : Mn Sol B[™] (Manganese solubilizing microbe) and Agri Life Agrivam[®] (Vesicular-arbuscular mycorrhiza)
- PAECILO[®] is safe to natural parasites , pollinators and predators
- PAECILO[®] can be used as an effective component in IPM programmes, thereby leading to a reduction in use of chemical nematicides and creating a safer environment.
- PAECILO[®] does not lead to residue problems and doesn't cause resistance or resurgence problems.

Benefits from PAECILO[®]

- PAECILO[®] effectively controls most of the economically important pests such as root knot nematode, remiform nematode, cyst nematode, citrus nematode and lesion nematode.
- Pest reduction leads to improved plant health and thereby increased crop productivity.
- PAECILO[®] is pet friendly , eco friendly and infant friendly