Harpin αβ protein (006506) Fact sheet

Summary

Harpin αβ protein is a harpin-based active ingredient similar in chemical structure and biological activity to Harpin protein (Messenger®) registered in April, 2000. It acts by initiating a complex defense mechanism in plants, analogous in some ways to a broad spectrum immune response in animals. This protective response makes the plant resistant to a wide range of fungal, bacterial, and viral diseases during crop growth and post-harvest. Unlike the action of most pesticide chemicals, Harpin αβ does not interact directly with disease pests. Consequently, these pests are not expected to develop resistance to Harpin αβ. In addition to protecting against various diseases, Harpin αβ enhances plant growth and improves yield and quality of many crops, including food crops, turf, and ornamentals. As is also true for the first registered Harpin protein, the use of Harpin αβ is not expected to cause adverse effects to human health or the environment.

I. Description of the Active Ingredient

Source and Manufacture

Harpin αβ is a protein molecule that consists of four fragments from other harpin proteins found in certain bacteria that cause diseases in plants. For commercial production of the protein, the DNA sequence coding for Harpin αβ was put into a weakened strain of *Eschericia coli* (E. coli K-12) commonly used experimentally and commercially. This genetically modified E. coli K-12 produces large amounts of Harpin αβ, which is then isolated and purified from the bacterial growth medium.

Mode of Action

Harpin αβ does not act directly on disease organisms, nor does it permanently alter the DNA of treated plants. Instead, Harpin αβ activates a natural defense mechanism in plants, referred to as systemic acquired resistance (SAR). Harpin αβ and the Harpin protein registered in the year 2000 are structurally and functionally similar. Harpin αβ protects against certain bacterial, viral, and fungal diseases; soil-borne pathogens; and harmful nematodes and insects. Harpin αβ protein also enhances plant growth and vigor, and increases the yield for a variety of crops, including vegetables, trees, and ornamentals.

Benefits

Because Harpin αβ does not directly act on plant pests, the pests are unlikely to become resistant to this active ingredient. By decreasing the use of conventional--and usually more

toxic-- pesticide products, Harpin proteins can play an important role in reducing risks to workers, the public, and the environment.

II. Use Sites, Target Pests, and Application Methods

- Use Sites: All food commodities; trees, turf, and ornamentals
- Target Pests: Effective in controlling a wide variety of fungal, bacterial and viral plant pathogens in the growing plant, with the effect continuing post-harvest. Also reduces infestation of selected insect and nematode pests.
- Application Methods: The end use product may be applied as a pre-plant dip, as a seed treatment, by aerial or ground spray, or as a soil drench in greenhouses. Applications are usually repeated at 14-day intervals.

III. Assessing Risks to Human Health

Whether or not a substance poses a risk to humans or other organisms depends on two factors: how toxic the substance is, and how much of it an organism is exposed to. Therefore, the EPA considers toxicity data and exposure data in determining whether to approve a pesticide for use. Human health risks posed by Harpin αβ are expected to be minimal to nonexistent. No harmful effects were seen in mammalian toxicity tests. It is applied at low rates and degrades rapidly in the field, thus minimizing residues on treated crops. Risks to pesticide applicators and workers are expected to be very low, and will be further decreased by required personal protective equipment (PPE) (viz., long-sleeved shirt and long pants; shoes and socks; and dust mask).

IV. Assessing Risks to the Environment

Harpin αβ is not expected to cause any harm to the environment. Because Harpin αβ is applied at low rates and degrades rapidly after application, it poses little or no concern as a ground or surface water contaminant. In addition, the Harpin proteins show no adverse effects on birds, fish, aquatic invertebrates, honeybees, non-target plants, and algae. Therefore, risks to wildlife and beneficial insects are expected to be minimal to nonexistent.

V. Regulatory Information

The first pesticide product containing Harpin αβ protein as an active ingredient was registered on February 9, 2005. As of that date, ProActTM (EPA Reg # 69834-5) was the only registered pesticide product with this active ingredient.

VI. Producer Information

Plant Health Care, Inc.
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1-800-421-9051

VII. Additional Contact Information

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