Beauveria bassiana GHA

Review Date: 07/20/2012
CAS #: Not applicable

Type	Microbial insecticide
Controls	Controls adults and larvae of many insects including; beetles, whitefly, aphids, thrips, psyllids, mealy bugs, leafhoppers and plant hoppers, weevils, plant bugs, borers, leaf-feeding insects, grasshoppers, locusts, crickets, stem-boring lepidoptera, etc.
Mode of Action	The fungus grows on the insect and secretes enzymes that weaken the insect's outer coat allowing them inside where they continue to grow and eventually kill the pest.

Thurston County Review Summary:

Beauveria bassiana is a fungus and GHA is a specific strain of that fungus. Beauveria bassiana GHA is a naturally occuring fungus that is commonly found in soil throughout the world. The EPA believes that using this fungus as a pesticide is not expected to have adverse effects on people or the environment and allows its use on food crops.

Beauveria bassiana strain GHA is rated low in hazard and products containing it as the sole active ingredient pass Thurston County's pesticide review criteria.

MOBILITY

Property	Value	Reference	Value Rating
Water Solubility (mg/L)	Not applicable		
Soil Sorption (Kd=mL/g)	Value not found		
Organic Sorption (Koc=mL/g)	Value not found		

Mobility Summary:

The GHA strain of Beauveria bassiana and many other strains of this fungus are found in soil throughout the world. The spores of any fungus have the potential to move with water, but the hazard of these spores moving off the site of application is rated low.

PERSISTENCE

Property	Value	Reference	Value Rating
Vapor Pressure (mm Hg)	Not applicable		
Biotic or Aerobic Half-life (days)	4-16	1	Low
Abiotic Half-life (days)	<3 hours (photolysis)	1	Low
Terrestrial Field Test Half-life (days)	4-16	1	Low
Hydrolysis Half-life (days)	Value not found		
Anaerobic Half-life (days)	Value not found		
Aquatic Field Test Half-life (days)	Value not found		

Persistence Summary:

Beauveria bassiana GHA spores can be viable (have the ability to germinate) for 56 days but the viability half life on plants was 4 to 16 days (Reference 1). The persistence of viable Beauveria bassiana GHA is rated moderate (likely to degrade to half of the viable spore concentration between 7 and 60 days).

BIOACCUMULATION

Property	Value	Reference	Value Rating
Bioaccumulation Factor	Value not found		
Bioconcentration Factor	Value not found		
Octanol/Water Partition Coefficient	Not applicable		

Bioaccumulation Summary:

When Beauveria bassiana GHA was administered to mice, it was elimimated from their bodies within three (oral or intravenous) to seven (inhalation) days (Reference 1). The potential for Beauveria bassiana GHA to bioaccumulate is rated low.

ACUTE WILDLIFE TOXICITY VALUES and Risk Assessment

Test Subject	Value	Reference	Value Rating
Mammalian (LD50)	>108 colony forming units (cfu)/animal	1	Low
Avian (LD50)	1 µl/g of body mass	1	"non-toxic"
Honey bee or insect (LD50)	21,100,000,000,000 conidia/acre	1	Moderate
Annelida -worms (LC50)	Value not found		
Fish (LC50)	Value not found		
Crustacean (LC50)	>9,300,00,000 cfu/L	1	Assumed low
Mollusk (LC50)	Value not found		
Amphibian (LD50 or LC50)	Value not found		

Acute Toxicity Testing and Ecotoxicity Summary:

Testing of Beauveria bassiana GHA on animals indicates that it is low in toxicity and pathogenicity when introduced orally, intravenously, or by inhalation but moderately toxic by the dermal route of exposure (based on skin irritation). It is also considerd low in toxicity to birds and some aquatic organisms although data on toxicity to fish could not be located. The microorganism Beauveria bassiana is not known as an aquatic microorganism, and therefore is not expected to proliferate in aquatic habitats (Reference 1). Toxicity testing with beetles indicates that the concentration that kills 50% of the beetles is more than twice the application rate indicating a moderate hazard to non-target beneficial insects. EPA label requirements include the following statement: "This product is potentially pathogenic to honeybees. Avoid application to areas where honeybees are actively foraging or around bee hives" (Reference 1).

Except for some beneficial insects, the hazard for toxicity to non-target organisms from pesticidal use of Beauveria bassiana GHA is rated low.

ACUTE HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
Risk from short-term exposures is low in hazard						
Risk from short-term exposures is low in hazard						
Risk from short-term exposures is low in hazard						
Risk from short-term exposures is low in hazard						

Acute Toxicity Risk Assessment Summary:

Beauveria bassiana GHA was not pathogenic, infective or toxic in rats when dosed orally with 108 colony forming units (cfu)/animal., which the EPA determined to be low in acute oral toxicity (Reference 1).

The EPA made the following statement about the potential risk from pesticidal exposures to Beauveria bassiana GHA:

"Exposure and risk to adults, infants and children via treated lawns or recreational areas are likely if the pesticide is used as labeled. However, the pesticide is a naturally occurring microbe and is ubiquitous in the environment. Based on the low toxicity potential as evidenced by the data submitted, the microbial pesticide active ingredient is likely to pose minimal to non-existent risks if used as labeled" (Reference 1).

CHRONIC HUMAN TOXICITY HAZARDS

Property	Value	Adverse Effect	Reference	Rating
Carcinogenicity	Testing not required			
Mutagenicity	Testing not required			
Neurotoxicity - (NOAEL)	Testing not required			
Endocrine Disruption	Value not found	No effects to endocrine system expected	1	Low
Developmental Toxicity (NOAEL)	Testing not required			
Reproductive Toxicity (NOAEL)	Testing not required			
Chronic Toxicity (NOAEL)	Testing not required			

Chronic Toxicity Hazard Summary:

The EPA believes that no adverse effects to the endocrine or immune systems are expected from exposures to Beauveria bassiana GHA from pesticidal use. "Beauveria bassiana strain GHA is not known to be a human pathogen nor is it known to produce metabolites which are dermally absorbed. The acute oral and inhalation toxicology studies also demonstrated a low toxicity/pathogenicity potential" (Reference 1). The human toxicity hazards of Beauveria bassiana GHA are rated low.

CHRONIC HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
Long-term exposures are not expected and not rated						
Long-term exposures are not expected and not rated						
Long-term exposures are not expected and not rated						
Long-term exposures are not expected and not rated						

Chronic Toxicity Risk Assessment Summary:

The EPA determined that the risks posed by dietary exposure to Beauveria bassiana GHA pesticides are likely to be minimal to non-existent for sensitive subpopulations, such as infants and children. Since the EPA combines all potential exposures including residential, crop, drinking water, and post-application; the overall hazard for potential exposures to Beauveria bassiana GHA is rated low.

Metabolites and Degradation Products:

Impurities and metabolites of Beauveria bassiana strain GHA production could not be located but production is monitored with required batch testing and disposal of non-conforming batches.

Comments:

Beauverial bassiana GHA is an eye irritant that does not produce irreversible effects (EPA Toxicity Category III) and is also a potential skin irritant (EPA Toxicity Category III). Product labels for Beauveria bassiana GHA state that repeated exposures to high concentrations of microbial proteins can cause allergic sensitization and applicators are required to wear respirators and chemically resistant gloves (Reference 2, 3 and 4).

References

1. USEPA.Office of Pesticide Programs. Ombudsman, Biopesticides and Pollution Prevention Division. Beauveria bassiana Strain GHA (128924) Technical Document. September 6, 2000.
2. Laverlam International Corporation. Product label: BotaniGard 22WP. EPA Reg. Number 82074-2. January 27, 2011.
2. Laverlam International Corporation. Product label: Mycotrol 0. EPA Reg. Number 82074-3. January 27, 2011.
2. Laverlam International Corporation. Product label: Mycotrol ES. EPA Reg. Number 82074-1. January 27, 2011.