



US Environmental Protection Agency Office of Pesticide Programs

BIOPESTICIDES REGISTRATION ACTION DOCUMENT

Gliocladium catenulatum strain J1446 □(PC Code 021009)□□

November 12, 2002

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***Gliocladium catenulatum* strain J1446**
(PC Code 021009)

U.S. Environmental Protection Agency
Office of Pesticide Programs
Biopesticides and Pollution Prevention Division
Gliocladium catenulatum strain J1446
(PC Code 021009)

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I. ABSTRACT

Gliocladium catenulatum strain J1446 is a naturally-occurring saprophytic fungus which is widespread in the environment. *Gliocladium catenulatum* can be cultured on various types of media, where colonies range from whitish with pale-green centers on malt agar to grayish-green on oatmeal agar. This organism is the active ingredient of a microbial pesticide, PRIMASTOP Biofungicide. PRIMASTOP is used to control damping-off, seed rot, root and stem rot, and wilt diseases caused by *Rhizoctonia*, *Pythium*, *Phytophthora*, *Fusarium*, *Didymella*, *Botrytis*, *Verticillium*, *Alternaria*, *Cladosporium*, *Helminthosporium*, *Penicillium*, and *Plicaria*. The use of this product had been limited to greenhouse and indoor settings, but currently the product is also registered to be used outdoors on various vegetables, herbs, ornamental plants, trees, shrubs and turf. No toxicological end-point of concern was identified. The health risk is expected to be minimal for oral, dermal, and inhalation exposure routes. The risk to non-target organisms, including fish, birds, and insects, is expected to be minimal.

II. OVERVIEW

A. Product Overview

- **Microbial Pesticide Name:** *Gliocladium catenulatum* strain J1446
- **Trade Name:** PRIMASTOP Biofungicide
- **OPP Chemical Code:** 021009
- **Basic Manufacturer:** Verdera Oy
(Formerly Kemira Agro Oy)
- **US Agent:** Ms. Kim Davis
RegWest Company
30856 Rocky Road
Greeley, CO 80631-9375

B. Use Profile

Type of Pesticide: Fungicide

Mechanism of action: The mode of action is reported to be by an enzymatic mechanism. There are no reports indicating that *Gliocladium catenulatum* strain J1446 produces any toxins or antibiotics.

Use Sites:

At this time *Gliocladium catenulatum* J1446 is registered for greenhouse, indoor, and outdoor use.

Greenhouse and Terrestrial Food Crops

artichokes, asparagus, beans, beets, broccoli, brussel sprouts, cabbage, carrots, cauliflower, celery, chicory, chinese cabbage, corn, cucumbers, eggplant, endive, garlic, horseradish, kale, kohlrabi, leeks, lentils, lettuce, melons, New Zealand spinach, onions, parsnips, peas, peppers, potatoes, pumpkins, radishes, rutabagas, spinach, squash, strawberries, tomatoes, turnips, watermelons, aniseed, basil, caraway, chives, dill, fennel, lavender, marjoram, oregano, parsley, rosemary, sage, savory, thyme, watercress

Greenhouse, Indoor and Terrestrial Non-Food Sites

ornamentals (including flowers, foliage and potted, bedding and seedling plants), tree shrub seedlings, and turf

Target Pests for Active Ingredient: to control damping-off, seed rot, root and stem rot, and wilt diseases caused by *Rhizoctonia*, *Pythium*, *Phytophthora*, *Fusarium*, *Didymella*, *Botrytis*, *Verticillium*, *Alternaria*, *Cladosporium*, *Helminthosporium*, *Penicillium*, and *Plicaria*

Formulation Types Registered:

Type: End-use product

Form: wettable powder 37.0 % *Gliocladium catenulatum* strain J1446

Method and Rates of Application:

Types of Treatment

soil incorporation, soil drench, foliar spray, and dipping of cuttings, bulbs, and tubers

Equipment

none specified

Timing

at sowing, potting or transplanting and 2-6 weeks later for potted plants and 2-8 weeks later for other plants. Cuttings, bulbs, or tubers may be sprayed after planting or treated before planting or storage.

Rates of Application:

in soil: 0.05- 1.2 x10⁸ CFU/L (0.05 -1.2 gram of PRIMASTOP/L of growth substrate)

seedling trays or beds: 5- 25 x 10⁸ CFU/m² (5- 25 gram of PRIMASTOP /m²)

foliar spray/ Field spraying and turf: 1 - 10 x10⁸ CFU/m² (1- 10 gram PRIMASTOP/m²)

Method of Application:

spray, incorporation in potting media or bulb storage mixture, bulb/tuber dipping

C. Regulatory History

Kemira Agro Oy submitted an application December 4, 1996 for registration of PRIMASTOP Biofungicide along with a pesticide petition which proposed establishing an exemption from the requirement of a tolerance for residues of the microbial pesticide, *Gliocladium catenulatum* strain J1446, on growing crops. On July 2, 1998 the PRIMASTOP Biofungicide product (EPA Reg. No. 64137-8) was registered only for greenhouse and indoor use sites. On May 16, 2000, an amendment was submitted to add outdoor use sites and reduce the re-entry interval to zero hours. Consequently, the Agency has performed a complete ecological risk assessment for these new sites. This Biological Registration Action Decision document includes the latest risk assessment information. On June 19, 2002 the manufacturer, Kemira Agro Oy, changed its name to Verdera Oy.

III. SCIENCE ASSESSMENT

A. Physical and Chemical Properties Assessment

Product Identity:

The agency has classified PRIMASTOP as a microbial fungicide. PRIMASTOP contains living *Gliocladium catenulatum* strain J1446 as the active ingredient. *Gliocladium catenulatum* is a naturally-occurring saprophytic fungus, which is widespread in the environment. The optimal growth conditions for the fungus include a temperature of 25- 28°C and an optimum pH of 5-6, with a range of pH 3-8.2.

“Colonies on malt agar (Oxoid) reaching 29 mm diameter at 25°C, predominately woolly, whitish, in the center pale gray-green; on oatmeal agar, 31 mm diameter, elevated and more

granular in the center, more pronounced grayish green and reverse slightly pinkish due to pigments in the submerged mycelium. On Cherry decoction agar, similar, also turning green rather rapidly.”

“Conidiophores - penicillate, rather irregularly branched predominating, but primary verticillate conidiophores also present. Phialides of penicillate conidiophores mostly 12-17 µm long and approximately 2.5 µm wide in the basal part.”

“Conidia - ellipsoidal, bilaterally symmetrical, with an oblique scar of attachment, mostly 5.0-6.5 X 2.5-3.0 µm. Chlamydospores may be present, terminal and intercalary, 7-10 µm diameter.”

Product chemistry data which support the registration of *Gliocladium catenulatum* strain J1446 are summarized in Table 1.

Table 1. Physical and Chemical Properties for *Gliocladium catenulatum* strain J1446

GUIDELINE Number	STUDY	RESULT	MRID#
151A-10	Product Identity and Disclosure of Ingredients	Acceptable	441893-01 441893-02 441893-03
151A-11	Manufacturing Process	Acceptable	441893-04
151A-12	Formation of Unintentional Ingredients	<i>G. catenulatum</i> strain J1446 has not been reported to produce toxins.	441893-05
151A-13	Analysis of Samples	Acceptable	441893-06
151A-15	Certification of Limits	Limits listed in the CSF are adequate	441893-06
151A-16	Product Chemistry	Acceptable	441893-07 441893-08 441893-09

B. Human Risk Assessment

There is a reasonable certainty that no harm will result from exposure to *Gliocladium catenulatum* strain J1446. This includes all anticipated dietary exposures and all other exposures for which there is reliable information.

1. Human Toxicity Assessment

a. Acute Toxicity

All mammalian toxicology data requirements have been submitted and adequately satisfy data requirements to support registration. The acute oral, acute pulmonary toxicity/pathogenicity, acute dermal irritation and acute eye irritation studies resulted in Toxicity Category IV classifications and indicated that the microbial pesticide is not pathogenic or infective in a single dose. The acute pulmonary toxicity/pathogenicity test resulted in a Toxicity Category III classification based upon the dose level. In the acute intra-peritoneal toxicity/pathogenicity study *G. catenulatum* strain J1446 demonstrated no signs of toxicity or infectivity.

Table 2. Toxicity Data Requirements

GUIDELINE NUMBER	STUDY	RESULT	MRID#
152A-10	Acute Oral Toxicity/ Pathogenicity	Acceptable, Toxicity Category IV	441893-10
152A-10	Acute Oral Toxicity/ Pathogenicity	LD ₅₀ of <i>G. catenulatum</i> strain J1446 in rats is >2000mg/kg. Acceptable, Toxicity Category III	441893-11
152A-11	Acute Dermal Irritation	Acceptable, Toxicity Category IV	441893-12
152A-11	Acute Dermal Toxicity	The LD ₅₀ of <i>G. catenulatum</i> strain J1446 in rats is >2000mg/kg. Acceptable, Toxicity Category IV	442232-01
152A-12	Acute Pulmonary Toxicity/ Pathogenicity	Acceptable, Toxicity Category III	441893-13
152A-12	Acute Pulmonary Toxicity	The LC ₅₀ of <i>G. Catenulatum</i> strain J1446 is > 5.57 mg/L in rats. Acceptable, Toxicity Category IV	441893-14

GUIDELINE NUMBER	STUDY	RESULT	MRID#
152A-13	Acute Intra-Peritoneal Toxicity/Pathogenicity	Acceptable. The preparation produced inflammation in unidentified parts of the rats, but there were not signs of infectivity or toxicity.	441893-15 444995-01
152A-14	Acute Eye Irritation	Acceptable, Toxicity Category IV	441893-16
152A-15	Buehler Sensitization Test	Supplementary. Although not needed for hazard assessment, the results were marginal. The organism is not typically known to be a sensitizer.	441893-17
152A-16	Hypersensitivity Incidents - Human Exposure	No evidence of allergic reactions or other adverse effects in personnel working with <i>G. catenulatum</i> strain J1446 since 1991. Acceptable	441893-18

b. Subchronic Toxicity and Chronic Toxicity

Subchronic and chronic toxicity were not required because survival, replication, infectivity, toxicity, or persistence of the microbial agent was not observed in the test animals treated in the acute oral infectivity test.

2. Effects on the Immune and Endocrine Systems

The Agency has no information to suggest that *Gliocladium catenulatum* has an effect on the immune and endocrine systems. No specific tests have been conducted with *Gliocladium catenulatum* strain J1446 to determine such effects. However, as is expected from a non-pathogenic microorganism, the submitted toxicity/pathogenicity studies in rodents indicated that following several routes of exposure, the immune system is still intact and able to process and clear the active ingredient. There are no reports indicating that *Gliocladium catenulatum* strain J1446 produces any toxins or antibiotics. Therefore, it is unlikely that this organism would have estrogenic or endocrine effects because it is practically non-toxic to mammals.

When the appropriate screening and or testing protocols being considered under the Agency's Endocrine Disruptor Screening Program have been developed, *Coniothyrium minitans* strain CON/M/91-08 may be subjected to additional screening and/or testing to better characterize effects related to endocrine disruption. Based on the weight of the evidence of available data, no endocrine system-related effects have been identified.

3. Dose Response Assessment

No toxicological endpoints are identified.

4. Dietary Exposure and Risk Characterization

The use of *Gliocladium catenulatum* strain J1446 is not expected to result in any new dietary exposure to this organism. Fungi such as *G. catenulatum* strain J1446 are ubiquitous in the agricultural environment. It is anticipated that the concentrations of *G. catenulatum* on treated plants may be elevated immediately after application but will rapidly decline to environmental background levels. The risks anticipated for dietary exposure are considered minimal because no signs of toxicity were observed in the acute oral toxicity/pathogenicity studies. (Toxicity Category IV)

5. Occupational, Residential, School and Day care Exposure and Risk Characterization

a. Occupational Exposure and Risk Characterization

Dermal and inhalation exposure would be the primary routes of exposure for mixer/loader applicators. Since unbroken skin is a natural barrier to microbial invasion of the human body, dermal absorption could occur only if the skin were cut, if the microbe were a pathogen equipped with mechanisms for entry through or infection of the skin, or if metabolites were produced that could be dermally absorbed. *Gliocladium catenulatum* is not known to be a human pathogen nor is it known to produce metabolites that are dermally absorbed. Since the intravenous study demonstrated no adverse effects, it is the Agency's opinion that even cut skin should not pose a risk to health if *Gliocladium catenulatum* strain J1446 was absorbed into the body via entry through a cut. Because the pulmonary study showed no adverse effects, the risks anticipated for inhalation exposure are considered minimal.

Based on the application methods listed on the product label, the potential for dermal, eye and inhalation exposures for pesticide handlers exists. Occupational exposure data, although not required, was provided. This data indicates that research with *Gliocladium catenulatum* J1446 biofungicide has continued at the Agricultural

Research Centre since 1991 and at Kemira Agro Oy Espoo Research Centre since 1993. During these years, an average of 4 persons per year have worked with *Gliocladium catenulatum* J1446 biofungicide on a full-time basis, and 9 persons per year on a part-time basis. There has been no evidence that the *Gliocladium catenulatum* J1446 biofungicide has caused allergic reactions or other adverse effects to the personnel involved in this work.

There may be subpopulations yet to be identified that are prone to allergic reactions from frequent exposure to concentrated levels of *G. catenulatum*. The required personal protective equipment for applicators and handlers is expected to adequately reduce inhalation or dermal exposure to this microbial pesticide.

Occupational exposures and subsequent risks are negligible because the organism has been determined not to be pathogenic to humans and animals. The risks are expected to be minimal based on evaluations of submitted Tier I acute toxicity tests (Table 2).

b. Residential, School and Day Care Exposure and Risk Characterization

Other non-occupational exposure of *Gliocladium catenulatum* strain J1446 via residential and indoor uses of it as a pesticide, e.g., uses around homes, parks, recreation areas, will be minimal to non-existent. The risk from non-occupational exposure is considered minimal as there is no evidence of adverse effects from oral, dermal or inhalation exposure to this microbial agent.

6. Drinking Water Exposure and Risk Characterization

Gliocladium catenulatum strain 1446 is a naturally-occurring microorganism and is widespread in the environment throughout the world. *Gliocladium catenulatum* is not known as an aquatic fungus, and therefore is not expected to proliferate in aquatic habitats. Moreover, the risk from non-occupational exposure is considered minimal as there is no evidence of adverse effects from oral, dermal or inhalation exposure to this microbial agent. Drinking water is accordingly not being screened for *Gliocladium catenulatum* as a potential indicator of microbial contamination or as a direct pathogenic contaminant. Both percolation through soil and municipal treatment of drinking water would reduce the possibility of exposure to *Gliocladium catenulatum* through drinking water. Therefore, the potential of significant transfer to drinking water is minimal to nonexistent. In addition, the risk from consumption of drinking water containing *Gliocladium catenulatum* is considered minimal as there is no evidence of adverse effects from oral exposure to this microbial agent.

7. Acute and Chronic Dietary Risks for Sensitive Subpopulations Particularly Infants and Children

There have been no confirmed reports of immediate or delayed allergic reactions to *Gliocladium catenulatum* strain 1446.

Based on the acute toxicity information discussed above, EPA concludes that there is a reasonable certainty that no harm will result from aggregate exposure to the United States population, including infants and children, to residues of *Gliocladium catenulatum* strain J1446 . This includes all anticipated dietary exposures and all other exposures for which there is reliable information. The Agency has arrived at this conclusion because, as discussed in Unit B. Human Risk Assessment, *Gliocladium catenulatum* strain J1446 is practically non-toxic to mammals and under reasonably foreseeable circumstances it does not pose a risk.

FFDCA section 408 provides that EPA shall apply an additional ten-fold margin of exposure (safety) for infants and children in the case of threshold effects to account for pre- and post-natal toxicity and the completeness of the database, unless EPA determines that a different margin of exposure (safety) will be safe for infants and children. Margins of exposure (safety) are often referred to as uncertainty (safety) factors. In this instance, the Agency believes there is reliable data to support the conclusion that *Gliocladium catenulatum* strain J1446 is practically non-toxic to mammals, including infants and children, and, thus, there are no threshold effects; therefore, EPA has not used a margin of exposure (safety) approach to assess the safety of *Gliocladium catenulatum* strain J1446 . As a result, the provision requiring an additional margin of exposure (safety) does not apply.

8. Aggregate Exposure from Multiple Routes Including Dermal, Oral, and Inhalation

The health risk is expected to be negligible for oral, dermal, and inhalation exposure routes, as stated above. The potential aggregate exposure, derived from dermal and inhalation exposure via mixing, loading and applying *Gliocladium catenulatum* Strain 1446, the dietary exposure from drinking water and treated produce containing this organism, should fall well below the currently tested microbial safety levels. In summary, the potential aggregate exposure, derived from non-dietary and non-occupational exposure, should be minimal.

9. Cumulative Effects

Gliocladium catenulatum strain J1446 is practically non-toxic to mammals. No

mechanism of toxicity in mammals has been identified for this organism. Therefore no cumulative effect with other related organisms is anticipated.

C. Environmental Assessment

1. Environmental Fate

Environmental fate studies are not required at this time since no adverse risks were triggered in Tier I Non-target Organisms Studies. *Gliocladium catenulatum* strain J1446 is a naturally occurring saprophytic soil fungus; as a species, it is found throughout the world in a variety of soil types, without pathogenic incidence to plant or animal. The ubiquitous nature of the organism suggests that the environmental burden is not likely to increase substantially to pose adverse risks to nontarget organisms as a result of the intended outdoor uses.

There were no incidents of pathogenicity or toxicity by *G. catenulatum* to non-target organisms in the literature searches provided.

Estimated Environmental Concentration of *Gliocladium catenulatum* Cell Mass:
Based on the intended rates of application, the estimated environmental concentration of *Gliocladium catenulatum* Cell Mass is not anticipated to exceed ~ 500 mg/L for soil incorporation applications; and ~200 mg/L for soil drench applications.

2. Ecological Toxicity

Results of non-target avian, freshwater fish, daphnia, honey bee and beneficial insect studies submitted to the Agency generally demonstrated a lack of toxicity or pathogenicity to the indicator species. Results of these studies indicate that minimal toxic or pathogenic effects to terrestrial or freshwater wildlife are expected from currently intended applications of *Gliocladium catenulatum* cell mass. Summaries and conclusions of these studies are presented below.

Table 3: Eco-Toxicology Summary

Guideline No.	Study	Status, Classification & Comments	MRID #
154-16 *885-4050	Avian oral toxicity/ pathogenicity	ACCEPTABLE. The no observed effect dosage of <i>Gliocladium catenulatum</i> cell mass was determined at approximately 1.4×10^6 cfu/g body weight for five days. This study showed a lack of toxicity or pathogenicity of <i>Gliocladium catenulatum</i> cell mass to northern bobwhite quail.	445014-01
154-19 *885-4200	Fresh water fish toxicity/ pathogenicity	ACCEPTABLE. The LC_{50} was calculated as 504 mg/L (3.5×10^8 cfu/L). This study is scientifically valid, satisfies current guideline requirements	445014-02
154-20 *885-4240	Fresh water aquatic invertebrate toxicity/pathogenicity	ACCEPTABLE. Under static-renewal conditions, the 21-day EC_{50} value was 7.8 mg/L (5.5×10^6 cfu/L). The LOEC and the NOEC were 11 mg/L and 5.6 mg/L, respectively. The pathogenicity of <i>Gliocladium catenulatum</i> was not evaluated in this study.	445014-03
154-22 *885-4300	Nontarget plant toxicity/pathogenicity	WAIVED. In the literature review submitted, there were no reports of pathogenicity to plants. The literature review satisfies current guidelines for non-target plant testing and may be used as the basis for waiving further non-target plant tests, pending appropriate product characterization and taxonomic verification.	441893-20

Guideline No.	Study	Status, Classification & Comments	MRID #
154-23 *885-4340	Nontarget insect toxicity/pathogenicity	<p><u>Green Lacewing :</u> ACCEPTABLE. The dietary LC₅₀ value for green lacewing larvae exposed to <i>G. catenulatum</i> cell mass for 12 days is presumed greater than 5200 ppm (3.6×10⁶ CFU/g) and the no observed effect concentration is ~5200 ppm (3.6×10⁶ CFU/g). This study showed a lack of toxicity of <i>Gliocladium catenulatum</i> cell mass to green lacewings. There were no evaluations of infectivity or pathogenicity.</p>	445014-04
		<p><u>Parasitic Hymenoptera</u> ACCEPTABLE. The dietary LC50 value for parasitic Hymenoptera exposed to <i>G. catenulatum</i> cell mass for eight days was calculated approximately 1992 ppm (1.4×10⁶ CFU/mL) and the no observed effect concentration determined to be 520 ppm (3.6×10⁵ CFU/mL). This study showed a lack of toxicity of <i>Gliocladium catenulatum</i> cell mass to parasitic Hymenoptera. There were no evaluations of infectivity or pathogenicity.</p>	445014-05
		<p><u>Ladybird Beetles</u> ACCEPTABLE. The dietary LC50 value for ladybird beetles exposed to <i>G. catenulatum</i> cell mass for 16 days is estimated to be greater than 5200 ppm (3.6×10⁶ CFU/mL), the highest concentration tested, and the no observed effect concentration to be 520 ppm (3.6×10⁵ CFU/mL). An LD₅₀ >3.6×10⁶ CFU/mL and an NOEL of 3.6×10⁵ CFU/mL was reported. This study showed a lack of toxicity of <i>Gliocladium catenulatum</i> cell mass to lady beetles. There were no evaluations of infectivity or pathogenicity.</p>	445014-06
154-24 *885-4380	Honeybee toxicological/pathogenicity	ACCEPTABLE. Reported bee mortalities were not dose-responsive nor statistically significant. Therefore the dietary LC ₅₀ value for honey bees exposed to <i>G. catenulatum</i> cell mass for 10 days is estimated to be greater than 5200 ppm (3.6×10 ⁶ CFU/mL), the highest concentration tested, and the no observed effect concentration is estimated to be 5200 ppm (3.6×10 ⁶ CFU/mL). An LD ₅₀ value >3.6×10 ⁶ CFU/mL and an NOEL of 3.6×10 ⁵ CFU/mL were reported.	445014-07

*885 series = OPPTS Microbial Pesticide Test Guideline Numbers.

a. Toxicity to Terrestrial Animals

(i) Avian Species: Acute Toxicity/Pathogenicity:

Under conditions of the reported study (MRID# 445014-01), no adverse effects were exhibited by juvenile northern bobwhite after 30 days when administered (by oral gavage) daily doses of 1×10^4 *Gliocladium catenulatum*-cfu/g body weight/day for a five day period. This dosage is approximately equivalent to a total dosage of 7×10^6 cfu/g body weight for 5 days. The no observed effect dosage of *Gliocladium catenulatum* cell mass was determined at approximately 1.4×10^6 cfu/g body weight for five days. There were no evidences of test substance replication, lesions, plaques or other indications of infectivity or pathogenicity for the groups treated with *Gliocladium catenulatum* cell mass in gross necropsies. This study showed a lack of toxicity or pathogenicity of *Gliocladium catenulatum* cell mass to northern bobwhite quail.

This study is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic and pathogenic effects of *Gliocladium catenulatum* Strain J1446 to terrestrial avian species.

(ii) Wild Mammals and Other Terrestrial Animals: Acute Toxicity/Pathogenicity:

b. Toxicity to Aquatic Animals

(i) Freshwater Fish:

Under static-renewal conditions, the no-observed effect concentration was 179 mg/L (1.3×10^8 cfu/L) for juvenile rainbow trout dual-exposed via aqueous test solutions and in a daily diet for 30 days. The no mortality concentration was 357 mg/L (2.5×10^8 cfu/L). The LC_{50} was calculated as 504 mg/L (3.5×10^8 cfu/L).

There were no signs of infection in fish tissues examined for necropsy, and all appeared internally and externally normal. *Gliocladium catenulatum* was isolated from the heart, liver and brain samples of fish treated with 179 mg/L test substance; and from the kidney, heart, liver and brain samples of fish treated with 357 mg/L test substance. Although the test substance was present, target organs did not appear to be affected, and there were no apparent effects upon the health of the fish.

This study (MRID# 445014-02) is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic and pathogenic effects of *Gliocladium catenulatum* Strain J1446 to freshwater fish.

(ii) Freshwater Aquatic Invertebrate

Under static-renewal conditions, the 21-day EC₅₀ value for survival of neonate *Daphnia magna* exposed aqueously to *Gliocladium catenulatum* was 7.8 mg/L (5.5 x 10⁶ cfu/L). The LOEC and the NOEC were 11 mg/L and 5.6 mg/L, respectively.

Of the three parameters assessed (survival, growth and reproduction), reproduction proved to be the most sensitive parameter. The EC₅₀ value was 7.8 mg/L (~5.5 x 10⁶ cfu/L); and the NOEC and the LOEC were 2.8 (2.0 x 10⁶ cfu/L) and 5.6 mg/L (3.9 x 10⁶ cfu/L), respectively.

This study (MRID# 445014-03) is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic effects of *Gliocladium catenulatum* Strain J1446 to aquatic invertebrates. The pathogenicity (or infectivity) of *Gliocladium catenulatum* was not evaluated in this study.

c. Toxicity to Plants

A review of the literature resulted in the utility of *Gliocladium catenulatum* to control plant diseases caused by other fungi, *Rhizoctonia*, *Pythium*, *Botrytis*, *Fusarium*, *Didymella*, *Verticillium*, *Alternaria*, *Cladosporium*, *Helminthosporium*, *Penicillium* and *Pilcaria*. There were no reports of pathogenicity to plants.

Therefore, *G. catenulatum* is not expected to cause adverse effects to nontarget plants. The literature review (MRID # 441893-20) satisfies current guidelines for non-target plant testing and may be used as the basis for waiving further non-target plant tests, pending appropriate product characterization and taxonomic verification.

d. Toxicity/Pathogenicity to Honeybees and Nontarget Insects

Honey Bees:

This study (MRID# 445014-07) was conducted in compliance with Good Laboratory Practice Standards as published by the U.S. Environmental Protection Agency, Office of Pesticide Programs in 40 CFR Part 160.

Reported bee mortalities were not dose-responsive nor statistically significant. Therefore the dietary LC₅₀ value for honey bees exposed to *G. catenulatum* cell mass for 10 days is estimated to be greater than 5200 ppm (3.6×10⁶ CFU/mL), the highest concentration tested, and the no observed effect concentration is estimated to be 5200 ppm (3.6×10⁶ CFU/mL).

An LD₅₀ value >3.6×10⁶ CFU/mL and an NOEL of 3.6×10⁵ CFU/mL were reported. This study showed a lack of toxicity of *Gliocladium catenulatum* cell mass to honey bees. Mortalities were therefore presumed to be associated with other environmental variables associated with the test arena. There were no evaluations of infectivity or pathogenicity.

This study is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic effects of *Gliocladium catenulatum* Strain J1446 to honey bees.

Green Lacewing:

The rates of mortality and pupation were similar in the treatment groups as in the untreated control group. Reported mortalities were not treatment related. Therefore, the dietary LC₅₀ value for green lacewing larvae exposed to *G. catenulatum* cell mass for 12 days is presumed greater than 5200 ppm (3.6×10⁶ CFU/g) and the no observed effect concentration is ~5200 ppm (3.6×10⁶ CFU/g). This study (MRID# 445014-04) showed a lack of toxicity of *Gliocladium catenulatum* cell mass to green lacewings. There were no evaluations of infectivity or pathogenicity.

This study is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic effects of *Gliocladium catenulatum* Strain J1446 to green lacewings.

Parasitic Hymenoptera:

Mortalities were related to the test substance in one group--treated with 5,200 ppm *G. catenulatum* cell mass. Therefore the dietary LC50 value for parasitic Hymenoptera exposed to *G. catenulatum* cell mass for eight days was calculated approximately 1992 ppm (1.4×10⁶ CFU/mL) and the no observed effect concentration determined to be 520 ppm (3.6×10⁵ CFU/mL). This study (MRID# 445014-05) showed a lack of toxicity of *Gliocladium catenulatum* cell mass to parasitic Hymenoptera. There were no evaluations of infectivity or pathogenicity.

This study is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic effects of *Gliocladium catenulatum* Strain J1446 to parasitic wasps.

Lady Beetles:

Mortalities were not dose-responsive, nor associated with *Gliocladium catenulatum* cell mass. Therefore the dietary LC50 value for ladybird beetles exposed to *G. catenulatum* cell mass for 16 days is estimated to be greater than 5200 ppm (3.6×10⁶ CFU/mL), the highest concentration tested, and the no observed effect concentration to be 520 ppm (3.6×10⁵ CFU/mL). An LD₅₀ >3.6×10⁶ CFU/mL and an NOEL of 3.6×10⁵ CFU/mL was reported.

This study showed a lack of toxicity of *Gliocladium catenulatum* cell mass to lady beetles. There were no evaluations of infectivity or pathogenicity.

This study (MRID# 445014-06) is scientifically valid, satisfies current guideline requirements, and is acceptable for assessing short-term toxic effects of *Gliocladium catenulatum* Strain J1446 to ladybird beetles.

IV. RISK MANAGEMENT AND RE/REGISTRATION DECISION

A. Determination of Eligibility-

Section 3(c)(5) of FIFRA provides for the registration of new active ingredients if it is determined that (A) its composition is such as to warrant the proposed claims for it; (B) its labeling and other materials required to be submitted comply with the requirements of FIFRA; (C) it will perform its intended function without unreasonable adverse effects on the environment; and (D) when used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment.

To satisfy criterion "A" above, *Gliocladium catenulatum* strain J1446 has well known properties. The Agency has no knowledge that would contradict the claims made on the label of this product. Criterion "B" is satisfied by the current label and by the data presented in this document. It is believed that this new pesticidal active ingredient will not cause any unreasonable adverse effects, is a broad spectrum microbial fungicide, and does provide protection as claimed satisfying criterion "C". Criterion "D" is satisfied in that *Gliocladium catenulatum* strain J1446 is not expected to cause unreasonable adverse effects when used according to label instructions.

Therefore, *Gliocladium catenulatum* strain J1446 is eligible for registration. The uses are listed in the Section II, B. Use Profile.

B. Regulatory Position

1. Unconditional Registration

The data requirements are fulfilled and the Biopesticides and Pollution Prevention Division recommends unconditional registration of the product containing *Gliocladium catenulatum* strain J1446 as the sole Active ingredient (PRIMASTOP).

2. Tolerances for Food Uses and /or exemptions

EPA received a pesticide petition (PP 7F806) from Kemira Agro Oy, proposing

[pursuant to section 408(d) of the Federal Food, Drug and Cosmetic Act, 21 U.S.C. section 346a(d)], to amend 40 CFR part 180 by establishing an exemption from the requirement of a tolerance for residues of the microbial pesticide, *Gliocladium catenulatum* strain J1446, on growing crops.

EPA issued a notice establishing an exemption from the requirements of a tolerance for residues of *Gliocladium catenulatum* strain J1446 in or on all food commodities.

3. CODEX Harmonization

There are no CODEX values for *Gliocladium catenulatum* strain J1446 .

4. Risk Mitigation

Since there are no risk issues, no risk mitigation measures are required at this time for dietary risk, occupational and residential risk, or ground and surface water contamination for *Gliocladium catenulatum* strain J1446 .

5. Endangered Species Statement

Impacts to endangered species from intended exposures of Primastop™ are anticipated to be negligible or nonexistent. This assessment is premised upon a combination of several factors: (1) low estimated environmental concentration values; (2) data and evidence from the public literature as summarized in the **Environmental Fate** portion of this assessment; and (3) the practically nontoxic (and non-infective) status of the MPCA in surrogate toxicity/pathogenicity studies summarized in the **Ecological Effects** portion of this assessment.

C. Labeling Rational

1. Human Health Hazard (WPS and non-WPS)

Gliocladium catenulatum strain J1446 products with commercial use sites are subject to the Worker Protection Standard. Because of the low toxicity of *Gliocladium catenulatum* strain J1446 , the Re-Entry Interval for uses within the scope of WPS is zero hours. Precautionary statements and personal protective equipment as specified below are required based on the acute toxicity categories of this organism.

2. Environmental Hazard

Precautionary labeling is required as indicated below.

V. ACTIONS REQUIRED BY REGISTRANTS

A. Precautionary Labeling

Gliocladium catenulatum strain J1446 products must state the following under the heading “Precautionary Statements”:

Caution. Harmful if swallowed or inhaled. Avoid breathing dust or spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

Personal Protective Equipment required for Applicators and other handlers must wear:

Long sleeved shirt and long pants. Waterproof gloves. Shoes plus socks. A NIOSH approved respirator with any N, P, R, or HE filter.”

WPS labels must state the following under the heading “User Safety Recommendations”

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.

Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Users should remove PPE immediately after handling this product. If gloves are worn, wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

B. Environmental Hazards Labeling

Provided the following statement is placed into the environmental hazards statement, the risk of *Gliocladium catenulatum* strain J1446 is minimal to nonexistent to non-target organisms including endangered species.

1. End-Use Product Environmental Hazards Labeling

"Do not apply directly to water, or to areas where surface water is present or to intertidal

areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment washwaters. "

2. Manufacturing-Use Product Environmental Hazards Labeling

"Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public water unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA."

3. Application Rate

It is the Agency's position that the labeling for the pesticide products containing *Gliocladium catenulatum* strain J1446 as the active ingredient complies with the current pesticide labeling requirements. The Agency has not required a maximum number of applications per a season of this active ingredient.

C. Labeling

The attached label for PRIMASTOP Biofungicide Powder (EPA Reg. No. 64137-8) conforms with the labeling requirements for *Gliocladium catenulatum* strain J1446 . Some of the essential label requirements are highlighted below.

Signal word is "Caution," based on (toxicity category III). The product shall contain the following information:

- Product Name
- Ingredient Statement
- Registration Number
- "Keep Out of Reach of Children"
- Signal Word (CAUTION)
- Personal Protective Equipment (PPE) Requirements
- Environmental Hazard Statement
- Storage and Disposal Statement
- Agricultural Use Requirements
- Non-Agricultural Use Requirements
- Directions for Use

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