BIOPESTICIDES REGISTRATION ACTION DOCUMENT

Trichoderma asperellum strain T34

Pesticide Chemical (PC) Code: 119209

U.S. Environmental Protection Agency
Office of Pesticide Programs
Biopesticides and Pollution Prevention Division

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TABLE OF CONTENTS

BIOPESTICIDES REGISTRATION ACTION DOCUMENT TEAM

Office of Pesticide Programs (OPP)
Biopesticides and Pollution Prevention Division
Microbial Pesticides Branch

Science Reviews

John L. Kough, Ph.D.	Product Characterization and Human Health Assessment
Ibrahim S. Barsoum, Ph.D.	Product Characterization and Human Health Assessment
Shannon Borges	Environmental Effects Assessment
Zigfridas Vaituzis	Environmental Effects Assessment

Regulations

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Anna Gross	Regulatory Action Leader
Matthew Thompson	Regulatory Action Leader
Michael Glikes	Regulatory Action Leader

I. EXECUTIVE SUMMAR

Trichoderma asperellum strain T34 is a naturally occurring fungus that increases plant defenses against *Fusarium oxysporum*, a pathogenic, soil-born fungus of significant economic importance in the United States. When *Trichoderma asperellum* strain T34 ("T34"), is preventatively applied, it protects plants from this disease-causing organism by initially colonizing the roots and building a physical barrier against pathogens. T34 induces the synthesis of defense proteins in the plant, which increases the plants' resistance to infection by *Fusarium oxysporum*. T34 also has the ability to parasitize and kill the plant pathogen. Biocontrol Technologies, S.L. ("applicant") has proposed to register an end-use microbial pesticide product, T34 Biocontrol (EPA File Symbol 87301-R), containing T34 as the active ingredient. The proposed product is intended for use in greenhouses to control *Fusarium oxysporum* on nonfood crops, specifically, carnations.

Environmental Protection Agency ("EPA" or "Agency") scientists have reviewed product analysis, toxicology, and nontarget organism data (reference 40 Code of Federal Regulations (CFR) §§ 158.2120, 158.2140, and 158.2150, respectively), and other information submitted by the applicant to support the registration. The submitted data and information fulfill the current data requirements and demonstrate that the proposed greenhouse use of T34 will not generally cause unreasonable adverse effects on the environment, in accordance with the requirements for pesticide registration under Section 3(c)(5) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

On October 1, 2009, EPA announced a new policy to provide a more meaningful opportunity for the public to participate in major registration decisions before they occur. According to this policy, EPA intends to provide a public comment period prior to making a registration decision for, at minimum, the following types of applications: new active ingredients; first food uses; first outdoor uses; first residential uses; or any other registration actions for which EPA believes there may be significant public interest.

Consistent with the policy of making registration actions more transparent, the proposed pesticide products containing T34 as a new active ingredient were subject to a 30-day comment period. The docket identification number, associated with these registration actions and accessed through either http://www.regulations.gov/ or http://www.epa.gov/pesticides/regulating/registration-status.html, is EPA-HQ-OPP-2010-0247. The following documents were made available for comment in EPA-HQ-OPP-2010-0058: (1) draft *Trichoderma asperellum* strain T34 Biopesticides Registration Action Document (BRAD); (2) environmental risk assessment for T34; and (3) draft product label for the end-use product, T-34 Biocontrol (EPA File Symbol 87301-R). While a final decision on registration is contingent upon review and consideration of public comments, EPA presently believes that, based upon the risk assessment and information submitted in support of T-34 Biocontrol, it is in the best interest of the public and the environment to issue these registrations. The basis for this decision can be found in the risk assessment for T34, which is characterized throughout this BRAD.

II. ACTIVE INGREDIENT OVERVIEW

Biological Name: *Trichoderma asperellum* strain T34

Product Name: T-34 Biocontrol

Culture Deposit: Spanish Collection of Type Cultures, University of Valencia in Valencia, Spain under CECT No. 20417.

OPP Chemical Code: 119209

Type of Pesticide: Microbial Pesticide – Fungicide

See Appendix B for specific information (e.g., use sites, application rates, methods of application, formulation types, and target pests) regarding the registered pesticide products containing this active ingredient.

III. REGULATORY BACKGROUND

A. Applications for Pesticide Registration

On December 31, 2009, Wagner Regulatory Associates, Inc. (address: P.O. Box 640, 7460 Lancaster Pike, Suite #9, Hockessin, DE 19707-0640) on behalf of Biocontrol Technologies, S.L. (address: 08028 Barcelona, Spain, C/ Baldiri Reixac, 15-21), submitted applications to register an end-use product (EP) T34 BIOCONTROL (EPA Reg. No. 87301-R) containing a new TGAI *Trichoderma asperellum* strain T34 ("T34"), under section 3(c)(5) of FIFRA. On November 24, 2010, EPA announced receipt of these applications to register pesticide products containing a new active ingredient (75 Federal Register (FR) 71697) and opened a 30-day public comment period pursuant to the provisions of FIFRA section 3(c)(4). No comments were received following this publication.

B. Food Tolerance Exemption

No tolerance or exemption from the requirement of a tolerance is associated with or required for this regulatory action as only nonfood uses are currently proposed for T34. Accordingly, this action is outside the scope of the Food Quality Protection Act (FQPA). There are no CODEX maximum residue levels established for T34.

IV. RISK ASSESSMENT

In the Federal Register of October 26, 2007, EPA issued a Final Rule on the data requirements to support registration of microbial pesticides and updated the definition for microbial pesticides (72 FR 61002). The rule became effective on December 26, 2007. The data and information evaluated for this BRAD were considered in light of these requirements.

The classifications for each data submission are assigned by EPA science reviewers, and are an indication of the usefulness of the information contained in the documents for risk

assessment. A rating of "ACCEPTABLE" indicates the study is scientifically sound and is useful for risk assessment. A "SUPPLEMENTAL" rating indicates the data provide some information that can be useful for risk assessment. The studies may have certain aspects determined not to be scientifically acceptable ("SUPPLEMENTAL: UPGRADEABLE"). If a study is rated as "SUPPLEMENTAL: UPGRADEABLE," EPA always provides an indication of what is lacking or what can be provided to change the rating to "ACCEPTABLE." If there is simply a "SUPPLEMENTAL" rating, the reviewer will often state that the study is not required by 40 CFR Part 158. Both "ACCEPTABLE" and "SUPPLEMENTAL" studies may be used in the risk assessment process as appropriate. An "UNACCEPTABLE" rating indicates that new data need to be submitted.

For the acute toxicity data requirements, Toxicity Categories are assigned based on the hazard(s) identified from studies and/or other information submitted to EPA in support of a pesticide registration. The active ingredient or particular product is classified into Toxicity Category I, II, III, or IV, where Toxicity Category I indicates the highest toxicity and Toxicity Category IV indicates the lowest toxicity.

A. Product Analysis Assessment (40 CFR § 158.2120)

All product analysis data requirements for T34, have been **fulfilled**. Refer to Table 1 in Appendix A for a brief summary of the data requirements, including both generic and product-specific information.

B. Human Health Assessment (40 CFR § 158.2140)

1. Toxicity

All toxicology data requirements for T34, have been **fulfilled**. Acceptable Tier I mammalian toxicology data and information support registration of the T34 pesticide products. Furthermore, Tier II and Tier III studies were not required for T34, based on the lack of acute toxicity/pathogenicity in the Tier I studies.

For a comprehensive summary of the generic toxicology data requirements described in sections IV(B)(1)(a) and IV(B)(1)(b), as well as additional product-specific data submitted to support the individual registrations, refer to Table 3 Appendix A.

a. Acute Toxicity/Pathogenicity – Tier I

Acute Oral Toxicity/Pathogenicity (Office of Chemical Safety and Pollution Prevention (OCSPP) Guideline 885.3050; Master Record Identification Number (MRID No.) 48067401 and 48067403): In an acute oral toxicity study (MRID 48067401), groups of fasted, 8-12 week old HsdRccHan:32 WIST rats (3/sex) were given a single oral dose of T34 (Batch No. 5170708;11.71% T-334, 1.8 x 10^9/g), at a concentration of 0.1 g in 1.5 mL water per animal (~10^8 cfu/animal).The animals were observed up to 21 days with interim sacrifices on Days 3, 7, and 14. Two untreated males and 2 females were housed together with the treated animals as shelf controls, and two untreated animals were housed separately from the test groups as room controls.

There were no treatment related clinical signs, necropsy findings, or significant changes in

body weight. The clearance of T34 from the feces was established by day 19, and no viable counts were noted from any organ of animals sacrificed on day 21. No viable counts were noted in the organ samples of untreated shelf control animals.

Based on the results of this study, T34 does not appear to be infective and/or pathogenic in HsdRccHan: 32 WIST rats, when dosed at 1.1 x 10^8 cfu/animal. Toxicity has been observed in the pancreas and adrenal glands of treated animals at necropsy. This study satisfies the requirement for an acute oral toxicity and pathogenicity study, and is classified as ACCEPTABLE.

Acute Pulmonary Toxicity/Pathogenicity (OCSPP Guideline 885.3150; MRID No. 47946906 and 48067404): In an acute pulmonary toxicity and pathogenicity study (MRID No.47946906), groups of 8-12 week old HsdRccHan: 44 WIST rats (3 or 5/sex) received intratracheal treatment with T34 (Batch No. 5170708; 11.71% T-334, 1.8 x 10^9/g). The animals were observed for up to 21 days. Five males and five females served as untreated controls.

Following instillation of 0.2 mL test substance, one male and one female died immediately and one male and two females died approximately 10 minutes thereafter. Thereafter, the instillation volume was decreased to 0.1mL. One female was found dead 2.5 hours after test material instillation but all other animals survived to scheduled sacrifice. No clinical signs were observed in surviving animals. Body weight gain of the treated animals was slightly lower than that in the control group. Slight effects on lungs, pancreas, liver, thymus, adrenal glands, and/or spleen in treated animals were noted at necropsy. No grossly observable pathological changes were found in control animals. The test material showed slight toxic effects but did not proliferate in the treated animals following a single intratracheal instillation. Nevertheless, the organism could be detected in selected tissue samples, particularly the lung, until day 21 of the study.

Based on these results, T34 appears to be slightly toxic but not infective and/or pathogenic in rats.

The dose the animals received may be less than that suggested by guideline requirements. The study report states the test material (1.8 x 10^9 cfu/g) was diluted 1:10 (~1.8 x 10^8 cfu/mL) and the animals received 0.1 mL (~1.8 x 10^7 cfu/animal). This study satisfies the acute pulmonary toxicity and pathogenicity guideline requirement and is classified as ACCEPTABLE.

Acute Injection Toxicity/Pathogenicity (Intravenous) – Rat (OCSPP Guideline 885.3200; MRID No. 47946903 and 48067406): In an acute intravenous injection toxicity and pathogenicity study (MRID No. 47946903), three male and three female young adult 8-12 week old HsdRccHan:10 WIST rats were injected IP with T34 (Batch No. 5170708;11.71% T-334, 1.8 x 10^9/g), at a dose of 0.1 g/animal, at a dose volume of a 1 mL suspension. The test material was suspended in water prior to use. Two males and two females not treated served as controls. Surviving animals were observed for up to 21 days.

All treated animals died or were euthanized within 19-52 hours of test material injection. Before death, the animals had reduced spontaneous activity, apathy, sunken flanks and ruffled fur. All control animals survived, gained weight, and had no clinical symptoms

during the study. All decedents had an accumulation of fluid in the peritoneum and stomach, brightened fringes of the liver, and slightly reddish and swollen pancreas. The control animals had no gross pathological changes at necropsy.

The test for enumeration of the test organisms in tissues and feces of treated animals were validated in MRID 48067406.

Based on the results of this study, T34 showed toxic characteristics in rats following a single intrapertioneal injection administration of 0.1 g/animal; however, infectivity and pathogenicity were not addressed. Oral and pulmonary studies have shown that the test organism does appear infective or to be a pathogen.

The Agency requested further testing of the spores vs. the filtrate to elucidate the mortality and pancreatic toxicity observed in the acute toxicity/pathogenicity studies. Specifically, further testing will determine if the presence of the toxins is the cause of the observed mortality and pancreatic toxicity in the treated animals.

The applicant responded to the Agency request noting: The high mortality observed in the rats from the study "Acute Injection Toxicity/Pathogenicity with Biocontrol Technologies, S.L., T34" (dosed at 1 x 10^8 cfu/rat) was not due to the production of toxins by T34, but rather to the high concentration of spores injected intrapertioneally to the rats. This conclusion is based on:

1. New GLP studies conducted to find the test dose that causes moderate but non-lethal symptoms in rats, and a new acute toxicity/pathogenicity study with T34 (MRID 48348306, 48348307).

2. No toxins have been detected in T34 compared with other Trichoderma species that do produce toxins (MRID 48377002).

Hypersensitivity Incidents (OCSPP Guideline 885.3400; MRID No. 47945023): No hypersensitivity incidents, including immediate-type or delayed-type reactions of humans and domestic animals that occurred during research, development, or testing of T34, were reported by the applicant. Any future hypersensitivity incidents must be reported per OCSPP Guideline 885.3400.

Cell Culture (OCSPP Guideline 885.3500): This study is not required because T34 is not a virus (refer to test note #4 of 40 CFR § 158.2140(d)).

b. Acute Toxicology and Subchronic Toxicity/Pathogenicity – Tier II; Reproductive Fertility Effects, Carcinogenicity, Immunotoxicity, and Infectivity/Pathogenicity Analysis – Tier III

Tier II and Tier III studies were not required for T34, based on the lack of acute toxicity/pathogenicity in the Tier I studies.

c. Endocrine Disruptors

As required under FFDCA section 408(p), EPA has developed the Endocrine Disruptor

Screening Program (EDSP) to determine whether certain substances (including pesticide active and other ingredients) may have an effect in humans or wildlife similar to an effect produced by a "naturally occurring estrogen, or other such endocrine effects as the Administrator may designate." The EDSP employs a two-tiered approach to making the statutorily required determinations. Tier 1 consists of a battery of 11 screening assays to identify the potential of a chemical substance to interact with the estrogen, androgen, or thyroid (E, A, or T) hormonal systems. Chemicals that go through Tier 1 screening and are found to have the potential to interact with E, A, or T hormonal systems will proceed to the next stage of the EDSP where EPA will determine which, if any, of the Tier 2 tests are necessary based on the available data. Tier 2 testing is designed to identify any adverse endocrine-related effects caused by the substance, and establish a quantitative relationship between the dose and the E, A, or T effect.

Between October 2009 and February 2010, EPA issued test orders/data call-ins for the first group of 67 chemicals, which contains 58 pesticide active ingredients and 9 inert ingredients. This list of chemicals was selected based on the potential for human exposure through pathways such as food and water, residential activity, and certain post-application agricultural scenarios. This list should not be construed as a list of known or likely endocrine disruptors.

T34 is not among the group of 58 pesticide active ingredients on the initial list to be screened under the EDSP. Under FFDCA section 408(p), EPA must screen all pesticide chemicals. Accordingly, EPA anticipates issuing future EDSP orders/data call-ins for all pesticide active ingredients.

For further information on the status of the EDSP, the policies and procedures, the list of 67 chemicals, the test guidelines and the Tier 1 screening battery, please visit our website: *http://www.epa.gov/endo/*.

2. Food Quality Protection Act (FQPA) Considerations

Although no tolerance or exemption from the requirement of a tolerance is associated with or required for this regulatory action as only nonfood uses are currently proposed for T34, the applicant submitted waiver requests for Residue Chemistry Guidelines OCSPP 885.2100, 885.2200, 885.2250, 885.2500, 885.2550, and 885.2600.

The following points were made to support the waivers for Residue Chemistry requirements: (1) the proposed use pattern for T34 Biocontrol EP is limited to closed greenhouse systems on nonfood crops, specifically, carnations; (2) T34 occurs naturally in soil. It can grow only in soil, under specific conditions (high soil organic matter content, humidity, and temperatures $<35^{O}C$); (3) the T34 mode of action is to protect roots by inducing the plant's own enzyme production to stimulate growth and biological control of plant disease; (4) T34 does not produce any known toxins. No T2 toxin (trichodermin; harzianum A) was found in a sample of 0.25 g of the EP that was sonicated, extracted with ethyl acetate, and the supernatant evaluated by mass spectroscopy, and (5) T34 is not hazardous to humans, based on acute oral, pulmonary, and intravenous toxicity studies conducted in rats. Rats treated with 5.5×10^{5} to 10^{8} units/animal had color changes in unspecified organs, but these effects were not sufficient to classify T34 as toxic. It was determined that the provided rationale was

adequate to justify a waiver for the requested Residue Chemistry Guidelines.

3. Occupational Exposure and Risk Characterization

Handler exposure to T34 is not expected to pose any undue risk. Regardless, appropriate personal protective equipment and precautionary statements are required on pesticide product labels to mitigate any potential risks to pesticide handlers due to prolonged or numerous exposures. Handlers applying T34 end-use products in commercial and agricultural settings must wear a long-sleeved shirt, long pants, and shoes plus socks. Additional PPE, other than the standard described above, may be required on a product-specific basis.

4. Human Health Risk Characterization

The Agency considered human exposure to T34 in light of the standard for registration in FIFRA and the relevant safety factors in FFDCA. A determination has been made that T34 has no known potential to cause adverse human health effects or to produce a mammalian toxin, and that residues are not likely to be present in or on food when used in accordance with EPA-approved labeling.

C. Environmental Assessment (40 CFR § 158.2150)

The data and data waiver rationale, submitted by the applicant to support the pesticide products containing T34, are sufficient to **fulfill** the Tier I nontarget organism data requirements and for risk assessment purposes. Further testing of nontarget organisms at higher tier levels (i.e., Tiers II, III, and IV) is not required for the current uses and application methods. EPA has performed an environmental risk assessment based on the data and data waiver rationale provided by the applicant and has determined that the proposed use of T34 does not pose significant risk to nontarget organisms when used according to label directions.

For a comprehensive summary of the generic data requirements described in sections IV(C)(1), refer to Table 4 in Appendix A.

1. Ecological Exposure and Risk Characterization

a. Terrestrial Animals and Plants

The proposed registration limits use to indoor environments within greenhouses and the proposed maximum application use rates result in concentrations that are not above measured concentrations of *Trichoderma* spp. naturally occurring in soil. Therefore, exposure in the terrestrial environment is expected to be negligible, if it occurs at all.

The applicant submitted data waiver rationales to fulfill the requirement of acute oral and avian inhalation toxicity/pathogenicity studies. Data from an optimum growth temperature study was also submitted, and showed that T34 does not grow at normal avian body temperatures. Based on this information, exposure of birds to T34 is not expected to result in adverse effects on birds and risk to birds resulting from the proposed use of T34 is not anticipated.

Acute oral toxicity/pathogenicity testing indicated no significant adverse effects to laboratory rats dosed at 1.1 x 10^8 cfu/animal after 21 days (MRID 48067401). There is no reason that tests on laboratory mammals are not representative of the potential hazard to wild mammals in this case; therefore, based on this information, adverse effects on wild mammals are not expected from exposure to T34. Since the proposed use is also expected to minimize exposure, risk to wild mammals resulting from the proposed registration of T34 is not anticipated.

The applicant submitted information on the toxicity/pathogenicity data for several insect species exposed to *Trichoderma harzianum* (the former classification of some strains of *Trichoderma asperellum*) and *Trichoderma gamsii*. While these data cannot be used directly to determine the potential hazard of this particular strain of *Trichoderma asperellum*, they do provide some evidence of the lack of effects of *Trichoderma* spp. on insects. The Agency had previously expressed concern over the potential hazard of *Trichoderma harzianum*, strain T39 (USEPA 2000), and several papers have shown adverse effects of this related fungus on nontarget insects, particularly coleopteran species (Cardoza et al., 2006; Jassim et al., 1990; Shakeri and Foster 2006). Nontarget insect testing has not been performed for T34 because nontarget insects' exposure to this strain is not expected. Future expansion of the uses of T34 may require nontarget insect toxicity/pathogenicity testing.

As with other nontarget insects, the Agency had previously expressed concerns for potential effects on honey bees for a related *Trichoderma* spp., *Trichoderma harzianum* strain T39 (USEPA 2000); however, data were subsequently submitted to show that adverse effects are not expected from exposure to that strain. *Trichoderma* spp. are widely understood to present no potential adverse effects to honey bees, which is supported by data submitted by the applicant showing lack of effects of honey bees and bumble bees (*Bombus terrestris*) following exposure to several *Trichoderma* spp. Therefore, BPPD concluded that T34 will not pose risk to honey bees as a result of the proposed labeled uses.

Studies on the toxicity/pathogenicity of T34 to terrestrial plants were not required because *Trichoderma asperellum*, and other *Trichoderma* spp., are not taxonomically related to any known plant pathogens. Therefore, adverse effects to plants are not expected as a result of the proposed uses of T34.

b. Aquatic Animals and Plants

The applicant presented extensive rationale to show that exposure of T34 in aquatic environments would be negligible, if it occurred at all, and would have no effects on fish or aquatic invertebrates if this biopesticide were to reach surface waters. Data from a study was submitted to show that at four months after the last application of T34 to potted plants, leachate from the pots contains 10^2 cfu/mL of T34, which is less than the amount of *Trichoderma* spp. found naturally in soil. Therefore, spillage onto greenhouse soil and outdoor disposal of treated potting material would not increase the amount of *Trichoderma* spp. normally found in soil or in runoff. Incidents such as these are expected to have negligible contribution to exposure. The applicant presented additional data from public literature to show that if T34 were to reach surface waters, it would be unable to proliferate and would be unlikely to survive. Based on the information provided, exposure to aquatic environments is expected to be negligible and adverse effects in these environments are not

expected. Therefore, BPPD concludes that the proposed use of T34 will not result in risk of adverse effects to fish and aquatic invertebrates in freshwater and marine environments.

Studies on the toxicity/pathogenicity of T34 to aquatic plants were not required because *Trichoderma asperellum* and other *Trichoderma* spp. are not taxonomically related to any known plant pathogens and exposure in these environments is not expected. Therefore, adverse effects to aquatic plants are not expected as a result of the proposed uses of T34.

c. Open Literature Information

Literature searches were performed to determine if other effects have been reported that were not contained within the information provided by the applicant. Both the Science Citation Index Expanded database (1970-present) and the Environmental Information Search service (1964-present) were searched using the terms "*Trichoderma asperellum*," "*Trichoderma asperellum* strain T34," and "*asperellum* strain T34." The Environmental Information Search service includes the Agricola; Biosis Previews; CAB Abstracts; Energy, Science, and Technology; General Science Abstracts; National Technical Information Service; and Waternet databases. None of the records found in any of the searches described here reported effects on any non-target species.

2. Environmental Fate Data

The information provided, for the current uses and application methods is sufficient to satisfy the Tier I nontarget organism data requirements, and for conducting a nontarget organism risk assessment for T34, further testing at higher tier levels (i.e., Tiers II, III, and IV) is not required.

3. Threatened and Endangered Species Assessment

Since EPA has determined that no effects are anticipated for any nontarget species exposed to T34 as a result of the proposed labeled applications, effects to threatened and endangered species and their designated critical habitats also are not expected. Therefore, a "No Effect" determination was made for direct and indirect effects to listed species and their designated critical habitats resulting from the registered uses of T34.

V. ENVIRONMENTAL JUSTICE

EPA seeks to achieve environmental justice—the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income—with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal environmental programs and policies. Meaningful involvement means that (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence the regulatory agency's decision; (3) the concerns of all participants involved will be considered in the decision-making process; and (4) the decision-makers seek out and facilitate the involvement

of those potentially affected. EPA has this goal for all communities and persons across the United States.

To help address potential environmental justice issues, EPA seeks information on any groups or segments of the population who, as a result their location, cultural practices, or other factors, may have atypical, unusually high exposure to T34 compared to the general population. During the comment period, the Agency solicited comments from the public on any subpopulations that may have atypical, unusually high exposure compared to the general population.

For additional information regarding environmental justice issues, please visit EPA's web site at *http://www.epa.gov/compliance/environmentaljustice/index.html*.

VI. RISK MANAGEMENT DECISION

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.

The four criteria of the eligibility determination for pesticidal active ingredients were satisfied by the science assessments supporting products containing T34. Such products are not expected to cause unreasonable adverse effects and are likely to provide protection as claimed when used according to label instructions. Therefore, we have concluded that T34 is eligible for registration for the labeled uses.

VII. ACTIONS REQUIRED BY THE APPLICANT

A. Final Printed Labeling

Before releasing pesticide products containing T34 for shipment, the applicant will be required to provide appropriate final printed labeling to EPA.

B. Terms of Registration

We propose the following as terms for the T34 Biocontrol registration: the applicant must submit the following data upon completion:

(1) Acute Injection Toxicity/Pathogenicity – Rat (OCSPP Guideline 885.3200): Due to the results of a previous IP toxicity study and the high potential of toxicity of the product, a new toxicity/pathogenicity study, using a lower concentration of the TGAI, was performed and has been accepted by the Agency. Another IP injection study addressing concern relating to culture filtrates and killed cultures is in process and will be submitted to the UK and the EU. US EPA also expects to receive this study upon completion.

C. Reporting of Adverse Effects and Hypersensitivity Incidents

Notwithstanding the information stated in the previous sections, it should be clearly understood that certain, specific data are required to be reported to EPA as a requirement for maintaining the federal registration for a pesticide product. A brief summary of these types of data are described below.

Reports of all incidents of adverse effects to the environment must be submitted to EPA under the provisions stated in FIFRA section 6(a)(2). Additionally, all incidents of hypersensitivity (including both suspected and confirmed incidents) must be reported to EPA under the provisions of 40 CFR § 158.2140(d).

VIII. GLOSSARY OF ACRONYMS AND ABBREVIATIONS

BPPD	Biopesticides and Pollution Prevention Division
BRAD	Biopesticides Registration Action Document
CFR	Code of Federal Regulations
cfu	Colony-forming unit(s)
cfu/kg	Colony-forming units per kilogram
cfu/mL	Colony-forming units per milliliter
cP	Centipoise
EDSP	Endocrine Disruptor Screening Program
EP	End-use product
EPA	Environmental Protection Agency (the "Agency")
FFDCA	Federal Food, Drug, and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FQPA	Food Quality Protection Act
FR	Federal Register
g/mL	Gram per milliliter
LC_{50}	Median lethal concentration. A statistically derived concentration of a substance that can be expected to cause death in 50% of test animals. It is usually expressed as the weight of substance per weight or volume of water, air, or feed (e.g., mg/L, mg/kg, or ppm).
LD_{50}	Median lethal dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, or inhalation). It is expressed as a weight of substance per unit weight of animal (e.g., mg/kg).
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MP	Manufacturing-use product
MPCA	Microbial Pesticide Control Agent
MPCP	Microbial Pesticide Control Product
MRID No.	Master Record Identification Number
NIOSH	National Institute for Occupational Safety and Health
NRRL	Northern Regional Research Laboratory
OCSPP	Office of Chemical Safety and Pollution Prevention (formerly OPPTS).
OPP	Office of Pesticide Programs
PC Code	Pesticide Chemical Code
PP	Pesticide Petition
PPE	Personal protective equipment
ppm	Parts per million
TGAI	Technical grade of the active ingredient

IX. BIBLIOGRAPHY

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APPENDIX A. MICROBIAL PESTICIDES DATA REQUIREMENTS (40 CFR PART 158 – SUBPART V)

TABLE 1. Product Analysis Data Requirements for the Technical Grade of the Active Ingredient (TGAI) T34 & End-Use Product (EP) T34 Biocontrol, (EPA Reg. No. 87301-R) (40 CFR § 158.2120)

OCSPP Guideline Number	Data Requirement	Results		MRID No.
		TGAI/MPCA	EP/MPCP	
885.1100	Product Identity	Not applicable.	Submitted data fulfill the requirement for product identity. T34 Biocontrol contains 12.00% active ingredient *T34*, 88.00% other ingredients.	479461127
885.1200	Manufacturing Process	Submitted data fulfill the requirement for manufacturing process.		479461127
Not applicable	Deposition of a Sample in a Nationally Recognized Culture Collection	T34 is deposited in the Spanish Collection of Type Cultures, University of Valencia in Valencia Spain (CECT No. 20417).	Not applicable.	47946917
885.1300	Discussion of Formation of Unintentional Ingredients	Submitted data fulfill the requirement for discussion of formation of unintentional ingredients.		479461127
885.1400	Analysis of Samples	Submitted data fulfill the requirement for analysis of samples.		479461127
885.1500	Certification of Limits	Not applicable.	Limits listed on the confidential statement of formula are acceptable.	479461127
Additional Studies				
830.1800	Enforcement Analytical Method	Not applicable.	Submitted data fulfill the requirement for an enforcement analytical method.	479461127

TABLE 2. Physical and Chemical Characteristics for the Technical Grade of the Active Ingredient (TGAI) T34 & End-Use Product (EP) T34 Biocontrol, (EPA Reg. No. 87301-R) (40 CFR § 158.2120)

OCSPP Guideline Number	Data Requirement	Results		MRID No.
		TGAI/MPCA	EP/MPCP	
830.6302	Color	Colorless (transparent or translucent), green or brown.	Not applicable.	47946913
830.6303	Physical State	Solid (Colony)	Not applicable.	47946913
830.6304	Odor	Decaying wood or forest-like.	Not applicable.	47946913
830.6313	Stability to Normal and Elevated Temperatures, Metals, and Metal Ions	Viability was maintained for 14 days at 36-40^{O}C, but viability decreased at 45^{O}C after 5 days, and all colonies died after 3 days at 50^{O}C. Stability to metals is not relevant as the product will not be packaged in metal containers (waiver requested).	Not applicable.	47946911 47946924 47946925 47946926
830.6317	Storage Stability	Stable at 4^{O}C for 2 years and at 25^{O}C for <5 months.		47946925-26 483483-04
830.6319	Miscibility	Not applicable.	Not required because T34 Biocontrol is not an emulsifiable liquid to be mixed with petroleum solvents (refer to test note #10 of 40 CFR § 158.2120(d)).	Not applicable
830.6320	Corrosion Characteristics	Not applicable.	Data Waiver Request; EP has no oxidizing properties, inters are noncorrosive, and packaging not exposed to metal, metal ions or humidity.	Not applicable
830.7000	pH	5.95 (1% suspension of TGAI in water)	Not applicable.	47946927 47946916 CSF
830.7100	Viscosity	Not applicable.	Data not required, the material is a powder.	47946911
830.7300	Density/Relative Density/Bulk Density (Specific Gravity)	200-600kg/m^3 at 20^{O}C per the MSDS CSF lists 200 kg/m^3 at 20^{O}C	Not applicable.	47946911 47946918 CSF

TABLE 3. Toxicology Data Requirements for the Technical Grade of the Active Ingredient (TGAI) T34 & End-Use Product (EP) T34 Biocontrol, (EPA Reg. No. 87301-R) (40 CFR § 158.2140)				
OCSPP Guideline Number	**Data Requirement**	**Results**		**MRID No.**
		TGAI/MPCA	**EP/MPCP**	
Tier I				
885.3050	Acute Oral Toxicity/Pathogenicity	T34 does not appear to be toxic, infective, and/or pathogenic to rats when dosed at 1.1 x 10^8 cfu/animal **Classification: Acceptable**	Not applicable	48067401 48067403
885.3150	Acute Pulmonary Toxicity/Pathogenicity	T34 appears to be slightly toxic but not infective and/or pathogenic in rats when dosed at 1.1 x 10^8 cfu/animal **Classification: Acceptable**	Not applicable	47946906 48067404
885.3200	Acute Injection Toxicity/Pathogenicity (Intravenous)	T34 is associated with mild to moderate signs of toxicity but no mortality when dosed with 4.2 x 10^7 cfu/animal **Classification: Acceptable**	Not applicable	47946903 48067406 483483-07
885.3400	Hypersensitivity Incidents	No hypersensitivity incidents, including immediate-type or delayed-type reactions of humans and domestic animals that occurred during research, development, or testing of the TGAI/MP, were reported by the applicant. Any future hypersensitivity incidents must be reported per OCSPP Guideline 885.3400.		
885.3500	Cell Culture	Not required because T34 is not a virus (refer to test note #4 of 40 CFR § 158.2140(d)).	Not applicable	Not applicable
870.1100	Acute Oral Toxicity	Not applicable	Oral LD_{50} female rats > 2,000 mg/kg bw. **Classification: Acceptable TOXICITY CATEGORY III**	47946902
870.1200	Acute Dermal Toxicity	Not applicable	Dermal LD_{50} combined (male and female) rabbits > 2,000 mg/kg bw. **Classification: Acceptable TOXICITY CATEGORY III**	47946907
870.1300	Acute Inhalation Toxicity	Not applicable	Inhalation LC_{50} combined (male and female) rats > 2.03 mg/L. **Classification: Acceptable TOXICITY CATEGORY IV**	47946908
870.2400	Acute Eye Irritation	Not applicable	T34 was mildly irritating to the eyes of rabbits. **Classification: Acceptable TOXICITY CATEGORY III**	47946905
870.2500	Primary Dermal Irritation	Not applicable	T34 was not to the skin of rabbits. **Classification: Acceptable TOXICITY CATEGORY IV**	47946901
Tiers II and III				
Not required for T34, based on the lack of acute toxicity/pathogenicity in the Tier I studies.				
Additional Studies				
870.2600	Skin Sensitization	T34 was a dermal sensitizer to guinea pigs. **Classification:**		47946904

TABLE 3. Toxicology Data Requirements for the Technical Grade of the Active Ingredient (TGAI) T34 & End-Use Product (EP) T34 Biocontrol, (EPA Reg. No. 87301-R) (40 CFR § 158.2140)				
OCSPP Guideline Number	**Data Requirement**	**Results**		**MRID No.**
		TGAI/MPCA	**EP/MPCP**	
		Acceptable		
Not applicable	Production of Toxins	If any trichodermin is produced by T34, the amounts are smaller compared to known producer strains and no toxicity is expected. **Classification: Supplemental – Not a required study**		48377002

TABLE 4. Nontarget Organism Toxicity and Environmental Fate Data Requirements for the Technical Grade of the Active Ingredient (TGAI) T34 & End-Use Product (EP) T34 Biocontrol, (EPA Reg. No. 87301-R) (40 CFR § 158.2150)			
OCSPP Guideline Number	**Data Requirement**	**Results**	**MRID No.**
Tier I			
885.4050 885.4200 885.4240 885.4280 885.4340 885.4380	• Avian Oral toxicity/pathogenicity • Freshwater fish toxicity/pathogenicity • Freshwater invertebrate toxicity/pathogenicity • Estuarine/marine fish and invertebrate testing • Nontarget insect testing • Honey bee testing	Data waiver rationale provides sufficient information to determine that toxicity/pathogenicity to avian wildlife, wild mammals, freshwater and marine/estuarine fish and invertebrates, nontarget insects and honey bees is not expected as a result of the proposed label. **Classification: Acceptable**	47068102
885.4150	Wild Mammal Toxicity/Pathogenicity	Studies required by 40 CFR § 158.2140 are adequate and appropriate for assessment of hazards to wild mammals. Acute oral toxicity/pathogenicity testing indicated no significant adverse effects to laboratory rats dosed at 1.1×10^8 cfu/animal after 21 days. **Classification: Acceptable for wild mammal risk assessment**	47945023
885.4100 885.4300	• Avian Inhalation Toxicity/Pathogenicity • Nontarget plant testing	Not required- active ingredient is not related to known avian or plant pathogens.	N/A
Tiers II, III, and IV			
Not required for T34, based on the current uses and application methods.			

APPENDIX B. PESTICIDE PRODUCT

EPA File Symbol	Registration Name	Percentage Active Ingredient	Formulation Type	Use Site(s)	Method(s) of Application	Application Rate	Target Pest
87301-R	T34 Biocontrol	12.00%	End Use-Powder	Greenhouse Carnations	Standard ground spray, root soak, or irrigation	Maximum of 10g/L	*Fusarium oxysporum*