UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

MEMORANDUM

SUBJECT: Human Health Risk Assessment of *Trichoderma atroviride* strain K5, a New Active Ingredient, in 86431-GL (Manufacturing-use Product) and 86431-GA (End-use Product) Proposed for Registration and an Associated Petition Requesting a Tolerance Exemption

Action Code Case Numbers:	0142277; 142278; 142279; 348597; 348598
Submission Numbers:	1083771; 1083776; 1056441, 1053442; 1056443
EPA Reg. Nos.:	86431-GL; 86431-GA
Active Ingredient Name:	*Trichoderma atroviride* strain K5
PC Code:	119010
Active Ingredient Tolerance Exemption:	0F8867
MRID (s):	518008-01 518605-01; 518605-02 518606-01 519845-01; 519845-02 520188-01
Applicant Name:	Agrauxine Corp.

FROM: Joel V. Gagliardi, Ph.D.; Microbial Ecologist
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I. Background

In December of 2020, EPA received an application for registration under Section 3 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for a manufacturing-use and two end-use products (File Symbols 86431-GU, 86431-GL, 86431-GA). In the interim these products were transferred to Agrauxine Corp. and a 75-day deficiency letter was issued in October of 2021. In December of 2021 and March of 2022 responses to deficiencies were received including a request to amend the manufacturing process and discontinue one EP (86431-GU) and continue registrations for *Trichoderma atroviride* K5 Technical (100%) (File Symbol 86431-GL) and ATROFORCE (0.68%) (File Symbol 86431-GA) containing *Trichoderma atroviride* strain K5 as the sole active ingredient on deposit in a patent culture collection as NRRL B-50520. While it is accurate to report the culture collection identifier this should not be part of the unique name of the microbe on the label and CSF.

II. Executive Summary

ATROFORCE (0.68%) (File Symbol 86431-GA) is an end-use product containing 0.68% *Trichoderma atroviride* strain K5, a new active ingredient. This fungus is naturally occurring, found in habitats such as soils and rhizosphere or plant surfaces. As a pre-harvest fungicide and nematicide on food and non-food crops, its putative mode of action is to induce plant systemic resistance, improve plant responses to biotic stress, improve plant nutrient availability and provide niche competition to fungal pathogens and nematodes surrounding plant roots.

Trichoderma atroviride strain K5 has no demonstrated infectivity and low acute toxicity based on the toxicity and infectivity study results and information presented for the active ingredient and its closely related species. Dietary and drinking water exposure is expected to be negligible since significant residues are not expected due to soil incorporation and habitation of plant roots prior to harvest. There is potential for occupational exposure; however, no toxicological endpoints have been identified in guideline studies done at the limit dose. There are currently no residential uses proposed for the active ingredient, and any potential residential or non-occupational exposures, should they occur, would be negligible. The Agency has determined that no further studies are needed at this time considering all the available hazard and exposure data on *Trichoderma atroviride* strain K5. FIFRA Determination: Based on the available toxicology and exposure information, no adverse effects to humans are expected from the use of *Trichoderma atroviride* strain K5 as a pesticide when EPA-approved product label instructions are followed. FFDCA Determination: Further, there is a reasonable certainty that no harm will result to the U.S. population, including infants and children, from aggregate exposure to residues of *Trichoderma atroviride* strain K5 resulting from the proposed pesticidal uses.

III. Product Identity and Analysis Review

The Product Identity, Manufacturing Process, Discussion of Formation of Unintentional Ingredients, Analysis of Samples, Certification of Limits, and Physical/Chemical Characteristics data were submitted for these products. These studies are available under MRID numbers 518008-01; 518605-01; 518605-02; 518606-01; 519845-01; 519845-02 and 520188-01. These guideline requirements are classified as acceptable with the exception that storage stability and corrosion characteristics data was not submitted (Appendix 1).

IV. Summary of Toxicology Data

The toxicity, pathogenicity and infectivity data are summarized below for the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) (File Symbol 86431-GL) and ATROFORCE (0.68%) (File Symbol 86431-GA) containing *Trichoderma atroviride* strain K5 (Table 1A). The supporting information/data provided on testing of the technical grade of the active ingredient (TGAI) manufacturing-use product (MP) and end-use product (EP) is sufficient to satisfy the Tier I toxicology data requirements for human health risk assessment of the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) (File Symbol 86431-GL) and ATROFORCE (0.68%) (File Symbol 86431-GA). Acute testing was not specifically performed on the EP; however, rationale was sufficient to demonstrate that no additional toxicity is expected as a result of the combination of the active and inert ingredients.

Table 1A. Summary of Toxicity, Pathogenicity and Infectivity Data/Rationales Supporting the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) and ATROFORCE (0.68%).

Data Requirement	OCSPP Guideline No.	Results Summary, Classification and Toxicity Category	MRID No.
Acute Oral Toxicity/ Pathogenicity	885.3050	**Rationale:** The registrant cites the lack of toxic effects during toxicity/pathogenicity and irritation testing with the active ingredient *Trichoderma atroviride* strain K5 NRRL B-50520 and no expected toxicity or irritation based on the combination of inert ingredients added to these products. In an acute oral toxicity study the product was rated EPA Toxicity Category IV for limit dose testing at 5,000 mg/Kg. Eye irritation was rated EPA Toxicity Category III and dermal irritation was rated EPA Toxicity Category IV for the manufacturing-use product. Pulmonary and intraperitoneal administration did not reveal any potential for infectivity, pathogenicity or toxicity. A literature search did not reveal any concerns for pathogenicity, infectivity or toxicity. Inert ingredients combined meet the existing food tolerance exemption at 40 CFR 180.950, minimal risk active and inert ingredients and are not expected to pose any significant health effects. Food grade ingredients are used for cultivation with process controls in place, and the final product is tested for strain consistency and for growth of any contaminants. **Classification: ACCEPTABLE**.	508999-04 509001-04 509002-04

Table 1A. Summary of Toxicity, Pathogenicity and Infectivity Data/Rationales Supporting the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) and ATROFORCE (0.68%).			
Data Requirement	**OCSPP Guideline No.**	**Results Summary, Classification and Toxicity Category**	**MRID No.**
Acute Pulmonary Toxicity/ Pathogenicity	885.3150	In an acute pulmonary toxicity and pathogenicity study, groups of 10-11 week old RccHan:WIST rats (25/sex) were exposed by the intratracheal route to *Trichoderma atroviride* strain K5 NRRL B-50520 diluted in Phosphate Buffered Saline (PBS). Three/sex were treated with heat-inactivated *Trichoderma atroviride* strain K5 NRRL B-50520, two/sex served as untreated controls, and two/sex served as shelf controls. No clinical signs of toxicity or pathogenicity were observed during the 21-day study. Body weight gain was normal throughout the study. No abnormalities were observed in any animal at necropsy. *Trichoderma atroviride* strain K5 NRRL B-50520 were recovered from the lungs of treated animals 3 hours following dosing at 2.8-7.9x10^4 CFU/g; by day 3 viable counts reduced to 4.4-6.7x10^3 CFU/g from the lungs with clearance by day 14. *Trichoderma atroviride* strain K5 NRRL B-50520 was recovered from the cecum contents of treated animals at 1100-2600 CFU/g on day 3 following dosing with clearance by day 14. *Trichoderma atroviride* strain K5 NRRL B-50520 was not recovered from the blood or any other organs in treated animals. **Classification: ACCEPTABLE** – inhalation LD > 0.42x10^8 CFU/rat – clearance was demonstrated – not infective, pathogenic or toxic.	512425-01
Acute Injection Toxicity/ Pathogenicity	885.3200	In an acute intraperitoneal injection toxicity and pathogenicity study, 3/sex approximately 11-12 week old RccHan:WIST rats were injected with *Trichoderma atroviride* strain K5 NRRL B-50520 in sterile PBS at a dose of 1.92x10^7 CFU/rat and observed for up to 21 days. An inactivated treatment group (3/sex), untreated vehicle shelf group (2/sex), and non-shelf group (2/sex), served as controls. All animals survived to scheduled sacrifice. There were no clinical signs reported throughout testing. All animals gained weight normally throughout testing. Terminal macroscopic examination did not reveal any abnormalities or fluid buildup. Though enumeration of the test substance was not required for IP administration, no viable *Trichoderma atroviride* strain K5 NRRL B-50520 were recovered at interim and terminal sacrifice from blood, organs or cecal contents. **Classification: ACCEPTABLE** – intraperitoneal LD > 1.92x10^7 CFU/rat – not infective, pathogenic or toxic.	508999-05 510317-01

Table 1A. Summary of Toxicity, Pathogenicity and Infectivity Data/Rationales Supporting the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) and ATROFORCE (0.68%).			
Data Requirement	**OCSPP Guideline No.**	**Results Summary, Classification and Toxicity Category**	**MRID No.**
Acute Oral Toxicity	870.1100	In an acute oral toxicity study, six female RccHan:WIST rats were given progressive oral doses of K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 up to 5,000 mg/Kg bw by gavage as a suspension in corn oil. The rats were then observed for 14 days. Based on the results of this study, K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 showed no toxicity to rats after exposure to oral doses up to 5,000 mg/Kg bw. All animals survived and gained weight throughout the study. There were no signs of systemic toxicity or abnormalities noted at necropsy. **Classification: ACCEPTABLE -** LD >5,000 mg/Kg bodyweight - EPA Toxicity Category IV**.**	508999-06
Acute Dermal Toxicity	870.1200	**Rationale:** The registrant cites the lack of toxic effects during toxicity/pathogenicity and irritation testing with the active ingredient *Trichoderma atroviride* strain K5 NRRL B-50520 and no expected toxicity or irritation based on the combination of inert ingredients added to these products. In an acute oral toxicity study the product was rated EPA Toxicity Category IV for limit dose testing at 5,000 mg/Kg. Eye irritation was rated EPA Toxicity Category III and dermal irritation was rated EPA Toxicity Category IV for the manufacturing-use product. Pulmonary and intraperitoneal administration did not reveal any potential for infectivity, pathogenicity or toxicity. A literature search did not reveal any concerns for pathogenicity, infectivity or toxicity. Inert ingredients combined meet the existing food tolerance exemption at 40 CFR 180.950, minimal risk active and inert ingredients and are not expected to pose any significant health effects. Food grade ingredients are used for cultivation with process controls in place, and the final product is tested for strain consistency and for growth of any contaminants. **Classification: ACCEPTABLE** – EPA Toxicity Category IV.	508999-04 509001-04 509002-04

Table 1A. Summary of Toxicity, Pathogenicity and Infectivity Data/Rationales Supporting the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) and ATROFORCE (0.68%).			
Data Requirement	**OCSPP Guideline No.**	**Results Summary, Classification and Toxicity Category**	**MRID No.**
Acute Inhalation Toxicity	870.1300	**Rationale:** The registrant cites the lack of toxic effects during toxicity/pathogenicity and irritation testing with the active ingredient *Trichoderma atroviride* strain K5 NRRL B-50520 and no expected toxicity or irritation based on the combination of inert ingredients added to these products. In an acute oral toxicity study the product was rated EPA Toxicity Category IV for limit dose testing at 5,000 mg/Kg. Eye irritation was rated EPA Toxicity Category III and dermal irritation was rated EPA Toxicity Category IV for the manufacturing-use product. Pulmonary and intraperitoneal administration did not reveal any potential for infectivity, pathogenicity, or toxicity. A literature search did not reveal any concerns for pathogenicity, infectivity or toxicity. Inert ingredients combined meet the existing food tolerance exemption at 40 CFR 180.950, minimal risk active and inert ingredients and are not expected to pose any significant health effects. Food grade ingredients are used for cultivation with process controls in place, and the final product is tested for strain consistency and for growth of any contaminants. **Classification: ACCEPTABLE** – EPA Toxicity Category IV.	508999-04 509001-04 509002-04
Primary Eye Irritation	870.2400	In an acute eye irritation study, 0.1 g of K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 was instilled into the conjunctival sac of the right eye of three female New Zealand White rabbits (13-15 weeks old). The animals were observed for 72 hours. Corneal opacity and iritis were not noted in any animal, while positive conjunctival irritation (redness) was noted in all animals (score=1) with clearance by 48 hours. Chemosis was noted in one animal (score=1) with clearance by 24 hours. The maximum average irritation score was calculated as 0.33 at 1 hour after test material instillation with clearance by 48 hours. K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 was mildly irritating in rabbit eyes. **Classification: ACCEPTABLE** - mildly irritating to the eye - EPA Toxicity Category III.	508999-07
Primary Dermal Irritation	870.2500	In a primary dermal irritation study, three male New Zealand White rabbits (13-18 weeks old) were dermally exposed to 0.5 g of K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 for 4 hours to 6 cm^2 of clipped body surface. The animals then were observed for 3 days. Very slight erythema was noted on all animals (Score=1; no edema) on all animals one hour after patch removal, with clearance by 48 hours. The primary irritation index was calculated as 0.33. Based on the results of this study, K5 TGAI containing $2.15x10^{10}$ CFU/g *Trichoderma atroviride* strain K5 NRRL B-50520 is slightly irritating to the skin of rabbits. **Classification: ACCEPTABLE -** slightly dermally irritating - EPA Toxicity Category IV.	508999-08

Table 1A. Summary of Toxicity, Pathogenicity and Infectivity Data/Rationales Supporting the manufacturing-use and end-use products *Trichoderma atroviride* K5 Technical (100%) and ATROFORCE (0.68%).			
Data Requirement	**OCSPP Guideline No.**	**Results Summary, Classification and Toxicity Category**	**MRID No.**
Hypersensitivity Incidents	885.3400	Guideline 885.3400 is not a testing requirement of registration but rather an ongoing duty to report any incidents of Hypersensitivity related to pesticide use "including immediate type and delayed-type reactions of humans or domestic animals, [that] occur during the testing or production of the TGAI, MP, or EP, or are otherwise known to the applicant must be reported if they occur" under FIFRA 6(a)(2) adverse effects reporting procedures.	
Cell Culture	885.3500	Not a virus so not a required test.	

V. Literature Search Findings and Adverse Incidents

A literature search was conducted with the PubMed search engine using the terms "*Trichoderma pathogen*", "*Trichoderma infect*" and "*Trichoderma toxin*." *Trichoderma longibrachiatum* and the closely related *Trichoderma citrinoviride* are reported as opportunistic pathogens in some immune compromised people, however*, Trichoderma harzianum*, *Trichoderma koningii, Trichoderma pseudokoningii* and *Trichoderma viride* infections have also been sporadically reported in the immune compromised (Kredics et al 2003). Several search results note that species identification of *Trichoderma,* which involves careful morphological observation and comparison, is difficult and when molecular techniques were employed six isolates from infections in immune compromised patients were all *Trichoderma longibrachiatum* (Kuhls et al. 1999) while a larger study of 73 human and animal clinical isolates using molecular techniques found that "the most frequent species was *Trichoderma longibrachiatum* (26%), followed by *Trichoderma citrinoviride* (18%), the *Hypocrea lixii*/*Trichoderma harzianum* species complex (15%), the newly described species *Trichoderma bissettii* (12%), and *Trichoderma orientale* (11%). The most common anatomical sites of isolation in human clinical specimens were the respiratory tract (40%), followed by deep tissue (30%) and superficial tissues (26%), while all the animal-associated isolates were obtained from superficial tissue samples" (Sandoval-Denis et al. 2014). *Trichoderma longibrachiatum* can produce trilongins which are indoor mold toxins while *Trichoderma arundinaceum* can produce trichothecene mycotoxins, mostly trichodermin and harzianum A (Siddiquee 2014). There have been no adverse events reported from use of the various registered *Trichoderma* strains based on these search parameters.

VI. Human Exposure and Risk Characterization Assessment

a. Description of Uses

ATROFORCE containing 0.68% *Trichoderma atroviride* K5 Technical (100%) is applied at a rate of 0.125 - 10.00 fluid ounces to pre-plant seeds or bulbs depending on their size, or at 0.25 - 5.00 fluid ounces per acre to soil in-furrow or with drip- or sub-irrigation. Applicators and handlers including those involved in cleanup and repair activities must wear a long-sleeved shirt and long pants, chemical resistant gloves, shoes plus socks, protective eyewear and wear a minimum of a NIOSH-approved particulate filtering facepiece respirator with any R, or P filter; OR a NIOSH-approved elastomeric particulate respirator with any R, or P filter; OR a NIOSH-

approved powered air- purifying respirator with an HE filter. When applicators use closed systems (i.e., enclosed cabs) the personal protective equipment requirements may be reduced or modified but must be available for use in case of failure of closed systems.

The modes of action for *Trichoderma atroviride* strain K5 include induction of systemic resistance, improved response to biotic stress, nutrient and niche competition, when applied in-furrow to soil or as a pre-plant seed treatment. *Trichoderma atroviride* strain K5 enhances plant growth and yield and minimizes the effects of root pathogens such as *Fusarium* spp*., Rhizoctonia* spp., and *Pythium* spp., through control or suppression of the pathogens and through root growth enhancement. It also reduces root damage caused by nematodes, including reniform, root knot, lesion, dagger, spiral and lance and soybean cyst (*Rotylenchulus sp., Meloidogyne sp., Pratylenchus sp., Xiphinema sp., Helicotylenchus sp., Hoplolaimus sp., Heterodera sp*) and minimizes egg laying and/or hatching of all of these, thereby reducing populations in the field.

b. Federal Food, Drug, and Cosmetic Act (FFDCA) Considerations

Section 408(c)(2)(A)(i) of FFDCA allows EPA to establish an exemption from the requirement of a tolerance (the legal limit for a pesticide chemical residue in or on a food) only if EPA determines that the exemption is "safe." Section 408(c)(2)(A)(ii) of FFDCA defines "safe" to mean that "there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information." This includes exposure through drinking water and in residential settings but does not include occupational exposure. Pursuant to FFDCA section 408(c)(2)(B), in establishing or maintaining in effect an exemption from the requirement of a tolerance, EPA must take into account the factors set forth in FFDCA section 408(b)(2)(C) and (D), which require EPA to give special consideration to exposure of infants and children to the pesticide chemical residue in establishing a tolerance or tolerance exemption and to "ensure that there is a reasonable certainty that no harm will result to infants and children from aggregate exposure to the pesticide chemical residue . . . ." Additionally, FFDCA section 408(b)(2)(D) requires that EPA consider "available information concerning the cumulative effects of [a particular pesticide's] . . . residues and other substances that have a common mechanism of toxicity."

EPA performs a number of analyses to determine the risks from aggregate exposure to pesticide residues. First, for microbial pesticides, EPA determines the pathogenicity and toxicity of the pesticide. Second, EPA examines exposure to the pesticide through food, drinking water, and other exposures that occur as a result of pesticide use in residential settings, as well as other non-occupational exposure to the substance.

1. Aggregate Exposure and Risk Characterization

In examining aggregate exposure, FFDCA section 408 directs EPA to consider available information concerning dietary exposures from the pesticide residue (including food and drinking water) and from all other non-occupational exposures to the pesticide residue. These non-occupational exposures include exposures through pesticide use in gardens, lawns or buildings (residential and other indoor uses). Microbial active ingredients differ from chemical and other ingredients in how they may behave once released into the environment. The premise is that after release they may increase from the number applied and are complex or impossible to model or

accordingly track and measure once released. That is why residue analysis is conditionally required and generally not assessed in Tier 1, and why a tolerance exemption assessment is performed, and no tolerance is set for microbial active ingredients. Based on this premise a maximum hazard dose is applied during animal testing, corresponding to the largest physical dose possible by a route of administration that will not cause physical effects during the test, so that pathogenicity, infectivity and toxicity are assessed and is intended to be protective of aggregate exposures. In effect the maximum hazard for the microbial active ingredient is obtained without having precise knowledge of various exposures that may occur. The maximum hazard dose is intended to be protective of aggregate exposures. For potential hypersensitivity events, often caused from repeat high dose inhalation exposures, no relevant test is conducted or available. However, microbial pesticide mixers, loaders and applicators are directed on the label to wear respiratory PPE as a preventive measure and to report any such incidents as FIFRA 6(a)(2) adverse events so label directions can be further examined and changes made, as necessary.

No adverse effects were observed in toxicological tests with *Trichoderma atroviride* strain K5 as described previously; therefore, given this, plus the explanation above regarding residues, the EPA did not conduct a quantitative exposure assessment.

a. Food Exposure and Risk Characterization

Based on the proposed uses for ATROFORCE, exposure to this active ingredient through food commodities is a possibility. However, *Trichoderma atroviride* is already present on a variety of minimally processed foods, and no infectivity, pathogenicity or toxicity was noted when a maximum hazard dose of *Trichoderma atroviride* strain K5 was tested by the oral, pulmonary or injection routes of administration. Based on the characteristics of *Trichoderma atroviride* strain K5 and the lack of adverse effects in the toxicity and pathogenicity studies performed with this active ingredient, dietary exposure resulting from use of this pesticide is not expected to pose any quantifiable risk. Therefore, a quantitative food exposure assessment was not performed.

b. Drinking Water Exposure and Risk Characterization

Based on the proposed use patterns for ATROFORCE, the potential for *Trichoderma atroviride* strain K5 to enter surface or ground water does exist. However, significant human exposure to residues of *Trichoderma atroviride* strain K5 through drinking water is unlikely as this microbe is mainly closely associated with the roots of growing plants and is not expected to percolate through soil to reach ground water. Further, ATROFORCE is applied via seed treatment or soil directed methods at planting thereby reducing the potential for drift to nearby surface waters. Should exposure to this active ingredient through drinking water occur, the supporting toxicity data demonstrated no infectivity, pathogenicity, or toxicity when a maximum hazard dose of *Trichoderma atroviride* strain K5 was tested by the oral, pulmonary or injection routes of administration. Based on the characteristics of *Trichoderma atroviride* strain K5 and the lack of adverse effects in the toxicity and pathogenicity studies performed with this active ingredient, drinking water exposure resulting from use of this pesticide is not expected to pose any quantifiable risk. Therefore, a quantitative drinking water assessment was not performed.

c. Non-occupational, Residential Exposure and Risk Characterization

As previously stated, ATROFORCE is intended only for agricultural uses. As a result, residential or non-occupational exposures resulting from use of this active ingredient are not anticipated.

Further, should significant exposure occur in a residential or non-occupational setting (e.g., through spray drift, which is expected to be minimal), the toxicity data submitted to support this registration has demonstrated no infectivity, pathogenicity, or toxicity when a maximum hazard dose of *Trichoderma atroviride* strain K5 was tested by the oral, pulmonary or injection routes of administration. Based on the characteristics of *Trichoderma atroviride* strain K5 and the lack of adverse effects in the toxicity and pathogenicity studies performed with this active ingredient, non-occupational and residential exposures resulting from use of this pesticide are not expected to pose any quantifiable risk. Therefore, a quantitative non-occupational/residential assessment was not performed.

2. Cumulative Effects

Section 408(b)(2)(D)(v) of FFDCA requires that, when considering whether to establish, modify or revoke a tolerance, EPA consider "available information concerning the cumulative effects of a pesticide's residues and other substances that have a common mechanism of toxicity". *Trichoderma atroviride* strain K5 is not toxic and does not have a common mechanism of toxicity with other substances. Consequently, FFDCA section 408(b)(2)(D)(v) does not apply.

3. Determination of Safety for U.S. Population, Infants and Children

a. U.S. Population

For all of the reasons discussed previously, EPA concludes that there is reasonable certainty that no harm will result to the U.S. population, including infants and children, from aggregate exposure to residues of *Trichoderma atroviride* strain K5. This includes all anticipated dietary exposures and all other exposures for which there is reliable information.

b. Infants and Children

FFDCA section 408(b)(2)(C) provides that EPA shall apply an additional tenfold margin of safety for infants and children in the case of threshold effects to account for prenatal and postnatal toxicity and the completeness of the database on toxicity and exposure, unless EPA determines based on reliable data that a different margin of safety will be safe for infants and children. This additional margin of safety is commonly referred to as the Food Quality Protection Act Safety Factor. In applying this provision, EPA either retains the default value of 10X or uses a different additional safety factor when reliable data available to EPA support the choice of a different factor. As discussed previously, EPA has concluded that *Trichoderma atroviride* strain K5 is not toxic, pathogenic, or infective to mammals, including infants and children. Because there are no threshold levels of concern to infants, children, and adults when ATROFORCE is used in accordance with label directions and good agricultural practices, EPA concludes that no additional margin of safety is necessary to protect infants and children.

c. Occupational Exposure and Risk Characterization

Based on the proposed use pattern of ATROFORCE there is potential for occupational exposure to applicators and handlers through the eye, dermal or inhalation routes. However, the submitted data and rationales support that there is no significant toxicity, irritation, pathogenicity or other adverse effects attributable to this active ingredient and its end-use product when used as labeled. Further, the product label specifies use of respiratory PPE, protective eyewear, coveralls, gloves and shoes plus socks while handling this active ingredient. Since occupational exposure to *Trichoderma atroviride* strain K5 is not expected to exceed any toxicity thresholds when

pesticide handlers follow the precautions and requirements identified on the product label, a quantitative occupational assessment has not been performed.

4. Human Health Conclusions

The Risk Assessment Branch (RAB) has evaluated the hazard potential resulting from the use of ATROFORCE, which contains *Trichoderma atroviride* strain K5 as the active ingredient, with consideration given to the relevant safety factors in FFDCA and FIFRA as modified by FQPA. EPA concludes that use of *Trichoderma atroviride* strain K5 will not result in adverse effects to humans and that there is a reasonable certainty that no harm will result to the U.S. population, including infants and children, from aggregate exposure to residues of *Trichoderma atroviride* strain K5 will result from the pesticidal uses of ATROFORCE containing *Trichoderma atroviride* strain K5 when the product label instructions and precautions are followed. In addition, residues of *Trichoderma atroviride* strain K5 will be covered by an exemption from the requirement of a tolerance in or on food commodities.

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Appendix I

Table A1. Summary of data submitted to comply with product analysis data requirements published in 40 CFR § 158.2120 for support of the registration of products containing *Trichoderma atroviride* strain K5. Confidential information has been omitted.

Data Requirement	OCSPP (OPPTS) Guideline No.	Results Summary and Classification (As Applicable)	MRID No.
Product Analysis Data for *Trichoderma atroviride* K5 Technical (100%) (EPA File Symbol 86431-GL).			
Product Identity	885.1100	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	508999-01
Manufacturing Process	885.1200	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	518605-02
Deposition of a Sample in a Nationally Recognized Culture Collection	885.1250	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	508999-01
Discussion of Formation of Unintentional Ingredients	885.1300	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	508999-02
Analysis of Samples	885.1400	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	518605-01 519845-02
Color	830.6302	Green	508999-03
Physical State	830.6303	Powder	508999-03
Odor	830.6304	Earthy	508999-03
Stability to Normal and Elevated Temperatures, Metals, and Metal Ions	830.6313	Requirement waived since the active ingredient is not expected to be exposed to temperatures greater than 50 degrees C during product storage or come into contact with metals/metal ions during bulk storage or as packaged for use.	N/A
Storage Stability	830.6317	No data was submitted – study is in progress	N/A
Corrosion Characteristics	830.6320	No data was submitted – study is in progress	N/A
pH	830.7000	6.06	508999-03
Density/Relative Density/Bulk Density (Specific Gravity)	830.7300	0.18 g/mL	508999-03
Product Analysis Data for ATROFORCE (0.68%) (EPA File Symbol 86431-GA).			
Product Identity	885.1100	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	512427-01
Manufacturing Process	885.1200	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	518605-02
Discussion of Formation of Unintentional Ingredients	885.1300	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	518605-02
Analysis of Samples	885.1400	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	518606-01 519845-02
Certification of Limits	885.1500	Submitted data fulfill the requirement. **Classification: ACCEPTABLE**	512427-01
Storage Stability	830.6317	No data was submitted – study is in progress	N/A

Miscibility	830.6319	Miscible in water	509002-03
Corrosion Characteristics	830.6320	No data was submitted – study is in progress	N/A
Viscosity	830.7100	1.76 cP	509002-03