Registration Decision for the New Active Ingredient

Z-11-tetradecenal

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Approved by:

Ed Messina

Digitally signed by EDWARD MESSINA
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Ed Messina, Esq.
Director, Office of Pesticide Programs
Environmental Protection Agency

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1. Introduction

This document announces that the Environmental Protection Agency (EPA or the Agency) has completed its initial evaluation of the new biochemical active ingredient Z-11-tetradecenal, intended for use as a mating disruptor, and has concluded that it meets the regulatory and safety standards under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Federal Food, Drug and Cosmetic Act (FFDCA).

Z-11-Tetradecenal is a pheromone produced by various insects of the order lepidoptera as an attractant for mating and is found naturally in the environment. As an active ingredient (a.i.), it is a synthetically produced colorless or pale yellow liquid that is classified a Straight Chain Lepidopteran Pheromone (SCLP). Like most other SCLPs, its use in end-use products (EPs) is intended to cause confusion among mating pests, making them unable to find one another, and expending their limited energy in vain pursuit of one another. The use of Z-11-tetradecenal in pesticide end-use products (EPs) is not anticipated to exceed naturally occurring background levels. Due to the low application rates and the rapid biodegradation of SCLPs, the Agency anticipates minimal dietary exposure from the use of Z-11-tetradecenal in EPs. Minimal exposure notwithstanding, as an SCLP, Z-11-tetradecenal is exempt from the requirement of a tolerance under 40 CFR § 180.1153. As with other SCLPs, humans have had a long history of safe exposure to Z-11-tetradecenal, dietarily and otherwise.

After reviewing all submitted data, EPA concluded that there is reasonable certainty of no harm from residues of this new active ingredient and that its use will cause no unreasonable adverse effects to human health or the environment. Therefore, the Agency is registering a manufacturing-use product (MP), Bedoukian z-11-TETRADECENAL Technical Pheromone (EPA File Symbol 52991-GT) containing the new biochemical active ingredient Z-11-tetradecenal, under FIFRA section 3(c)(5).

The registration of the MP is intended for formulation into EPs to control cotton bollworm, Eastern spruce budworm, orange tortrix, South American tortricid moth, and western spruce budworm. Although the registration of the new active ingredient Z-11-tetradecenal in an MP does not involve the concurrent registration of an EP, the Agency is nonetheless familiar with the risks associated with EPs containing SCLP active ingredients. As with most SCLPs, Z-11-tetradecenal will be applied through retrievable dispensers and spray mediums; it is not expected to be available to avian species and its applications are not to exceed 150 grams active ingredient/acre/year.

2. Background

As a recognized natural lepidopteran pheromone, the compound Z-11-tetradecenal is biochemically classified as an SCLP. Like other SCLPs, Z-11-tetradecenal is characterized by its natural occurrence, history of exposure to humans and the environment and non-toxic mode of action to the target pest(s).

On January 21, 2021, EPA received applications from Bedoukian Research, Inc., for the registration of an MP containing the new biochemical active ingredient Z-11-tetradecenal. Bedoukian Research, Inc. provided product chemistry and waiver requests for their human health

and ecological toxicity data requirements. In the Federal Register of June 21, 2021 (86 FR 32371), EPA published a Notice of Receipt (NOR) that announced receipt of a new product application containing the new active ingredient, Z-11-tetradecenal. No Notice of Filing (NOF) was necessary as Z-11-tetradecenal is an SCLP and is automatically exempt from the requirement of a tolerance under 40 CFR § 180.1153 when applied to growing crops at a rate not to exceed 150 grams active ingredient/acre/year in accordance with good agricultural practices, or when applied as a post-harvest treatment to stored food commodities at a rate not to exceed 3.5 grams active ingredient/1,000 ft 2/year (equivalent to 150 grams active ingredient/acre/year) in accordance with good agricultural practices.

3. Evaluation

In evaluating a pesticide registration application, EPA assesses a variety of studies to determine the likelihood of adverse effects (i.e., risk) from exposures associated with the use of the pesticide product. Risk assessments are developed to evaluate how the active ingredient might affect a range of nontarget organisms, including humans and terrestrial and aquatic wildlife (plants and animals). Based on these assessments, EPA evaluates and approves language for each pesticide label to ensure the directions for use and safety measures are appropriate to mitigate any potential risk. In this way, the pesticide's label helps to communicate essential limitations and mitigations that are necessary for public and environmental safety. In fact, the pesticide law has a provision that indicates it is a violation to use a pesticide in a way that conflicts with the label.

3.1 Assessment of Risk to Human Health

To assess risks to human health from use of biochemical pesticides, EPA evaluates the potential toxicity of a product and the likelihood, amount, and types of exposure users and bystanders are likely to experience. In conducting a risk assessment, EPA must consider: (1) the hazards of a substance and (2) the exposure to that substance that a person will be exposed to as a consequence of use either directly or indirectly. EPA uses this combined information to assess and characterize the risk(s) and predict the probability, nature, and magnitude of the adverse health effects that may occur from use of the substance in the manner described.

On the toxicity side for biochemical pesticides, EPA typically requires a range of Tier I data: acute toxicity data (acute oral toxicity, acute inhalation toxicity, acute dermal toxicity); irritation tests (primary eye irritation, primary dermal irritation and dermal sensitization); subchronic testing (90-day oral); mutagenicity testing (bacterial reverse mutation test and *in vitro* mammalian cell assay) and developmental toxicity testing (prenatal development). Tier II and III testing is triggered only when there is indication, usually through lower tier testing, that a biochemical pesticide has unusual characteristics such as subchronic toxicity or is suspected or known to be a carcinogen.

3.1.1 Toxicological Data/Information

In the case of SCLPs, no human health data are required based on EPA's robust understanding of this class of biochemicals. Per 40 CFR § 158.2050 (a)(2), the exemption from submitting product specific human health data is codified as follows: "The data in this section are not required for straight chain lepidopteran pheromones when applied up to a maximum use rate of 150 grams active ingredient/acre/year." The rationale for this exemption is summarized in EPA's Biopesticide Registration Action Document (BRAD) for SCLPs dated 02/27/2009, which states

"the Agency has concluded that based on low toxicity in animal testing, and expected low exposure to humans, risks to human health are not anticipated from the use of lepidopteran pheromones, and consumption of food containing residues of these pheromones presents negligible risk." [1] In that no human health data are required, EPA uses a default of Toxicity Category III for all routes of exposure as a precautionary measure.

3.1.2 Dietary and Occupational Exposure and Risks

Dietary Exposure and Risk Characterization: A dietary exposure and risk characterization is not required at this time. The active ingredient, Z-11-tetradecenal, is a straight chain lepidopteran pheromone and is exempt from the requirement of a tolerance under 40 CFR § 180.1153. There is no EP submitted with this application; however, according to the label the MP can only be formulated into EPs that are applied at rates that do not exceed 150 grams active ingredient/acre/year. This restriction meets the requirements of the tolerance exemption.

Due to the low toxicity of lepidopteran pheromones in animal testing, and the expected low exposure to humans, dietary risk of concern to human health is not expected from the use of these active ingredients in pesticide products.

Drinking Water Exposure and Risk Characterization: A quantitative drinking water exposure and risk assessment has not been conducted at this time because risk attributed to dietary exposure to residues of Z-11-tetradecenal in drinking water is expected to be negligible and not of concern.

Residential (Non-occupational) Exposure and Risk Characterization: There is no EP being registered with this MP. However, based on the described use pattern on the label of Bedoukian z-11- TETRADECENAL Technical Pheromone, no residential (non-occupational) uses are anticipated. And relatedly, no resulting post-application risk of concern would be expected.

Occupational Exposure and Risk Characterization: Occupational handler risks and occupational post-application risks from exposure to Z-11-tetradecenal are expected to be negligible and not of concern based on the lack of toxicological concerns.

3.1.3 Cumulative Risk

Data have not been identified to suggest that Z-11-tetradecenal has a common mechanism of toxicity with other substances. Therefore, the EPA has not made a common mechanism of toxicity finding for Z-11-tetradecenal and any other substances.

3.1.4 Human Health Conclusions

EPA concludes that use of Z-11-tetradecenal will not result in unreasonable 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 Z-11-tetradecenal. EPA does not expect dietary (food and drinking water) or other non-occupational risks of concern from

1 The EPA BRAD for SCLPs dated 02/27/2009 can be found at

https://www3.epa.gov/pesticides/chem_search/reg_actions/registration/decision_G-113_27-Feb-09.pdf

use of Z-11-tetradecenal as an active ingredient in pesticide products. Data demonstrate that SCLPs, including Z-11-tetradecenal, are of low toxicity through all routes of exposure.

The SCLP database, as captured in EPA's SCLP BRAD dated 02/27/2009, adequately supports the human health assessment for the new biochemical pheromone Z-11-tetradecenal. For more information on the human health hazard assessment of Z-11-tetradecenal please see the supporting documentation provided in the associated regulatory (search for "EPA-HQ-OPP-2021-0343" at http://www.regulations.gov).

3.2 Assessment of Ecological Exposure and Risk

Typically, Tier I nontarget organism toxicity data (avian, fish, aquatic invertebrates, plants and nontarget insect toxicity) are required for TGAIs. In the case of SCLPs, no such nontarget organism data are required based on EPA's robust understanding of this class of biochemicals. Per 40 CFR § 158.2060 (a)(2), the exemption is codified as follows: "The data in this section are not required for arthropod pheromones when applied at up to a maximum use rate of 150 grams active ingredient/acre/year except when the product is expected to be available to avian species (*i.e.*, granular formulation)." The rationale for this exemption is summarized in EPA's SCLP BRAD dated 02/27/2009, which states "adverse effects on nontarget organisms are not expected because these pheromones are released in very small quantities in the environment and act on a select group of insects."

3.2.1 Endangered Species Conclusion

A quantitative risk assessment is not required for birds, fish, aquatic invertebrates, plants and insects, including endangered/threatened organisms due to the negligible toxicity of SCLPs. The EPA has determined there is a reasonable expectation of no discernible effects to occur to any non-target species exposed to Z-11-tetradecenal as a result of the labeled applications. Effects to federally listed threatened and endangered ('listed') species and their designated critical habitats are also not expected. Therefore, a "No Effect" determination is made for direct and indirect effects to listed species and their designated critical habitats resulting from the uses of Z-11-tetradecenal as labeled.

The environmental hazard assessment for SCLPs, as articulated in EPA's SCLP BRAD dated 02/27/2009, serves as the basis for assessing Z-11-tetradecenal and makes clear why no environmental effects are expected relative to the use of this new pheromone. For more information on the environmental hazard assessment of Z-11-tetradecenal, please see the supporting documentation provided in the associated regulatory docket (search for "EPA-HQ-OPP-2021-0343" at http://www.regulations.gov).

4. Benefits

By definition, biochemicals are favorable when compared to currently registered conventional alternatives because biochemicals are naturally occurring substances (or substances structurally similar and functionally identical to naturally occurring substances) with a history of exposure to humans and the environment demonstrating minimal toxicity and a nontoxic mode of action to the target pest(s). Benefits of biochemical pesticides as compared to conventional pesticides typically include lower toxicity profiles for humans and nontarget organisms, and faster degradation in the environment. Beyond the benefits of using a biochemical, there is a demand for a pesticide with a

toxicity profile like Z-11-tetradecenal that is able control a variety of lepidopteran pests. To that end, the registration of Z-11-tetradecenal would be a valuable addition to the pesticide tool kit as a low-risk biochemical alternative to conventional broad-spectrum insecticides.

5. Public Comments

On June 21, 2021, EPA announced receipt of an application in the *Federal Register* to register an MP, Bedoukian z-11-TETRADECENAL Technical Pheromone (EPA File Symbol 52991-GT), containing the new biochemical active ingredient Z-11-tetradecenal (86 FR 32371). No comments were received in response to this Notice of Receipt.

Because the pesticide product contains Z-11-tetradecenal, which is a new active ingredient, EPA opened a 15-day public comment period. EPA took this action in accordance with a policy, first implemented in October 2009, designed to provide a more meaningful opportunity for the public to participate in major registration actions. There were no comments received as part of that process.

6. Regulatory Decision

The SCLP database, as captured in EPA's SCLP BRAD dated 02/27/2009, is considered to be supportive of the registration of the new biochemical pheromone Z-11-tetradecenal relative to any human health and environmental fate data requirements. In considering the hazard assessment to human health and the environment, the Agency concludes that Z-11-tetradecenal meets the regulatory standard under FIFRA. Therefore, the EPA is granting the unconditional registration of Z-11-tetradecenal as a new active ingredient for incorporation into EPs intended to control a variety of lepidopteran pests under Section 3(c)(5) of FIFRA.

One product is being registered: a manufacturing-use product (MP), Bedoukian z-11-TETRADECENAL Technical Pheromone (EPA File Symbol 52991-GT) containing the new active ingredient Z-11-tetradecenal. This MP is for incorporation into EPs for the purpose of disrupting the mating cycles of the following pests: leafroller (*Choristoneura rosaceana*), pandemis leafroller (*Pandemis pyrusana*), fruittree leafroller (*Archips argyrospilus*), threelined leafroller (*Pandemis limitata*), European leafroller (*Archips rosanus*), cotton bollworm (*Helicoverpa armigera)*, eastern spruce budworm *(Choristoneura fumiferana),* orange tortrix *(Argyrotaenia citrana*), South American tortricid moth (*Argyrotaenia sphaleropa*), and western spruce budworm (*Choristoneura occidentalis*).

The risk assessments and label supporting this decision can be found in the associated regulatory docket (search for "EPA-HQ-OPP-2021-0343" at www.regulations.gov).