Proposed Registration Decision PRD2013-08

Chlorantraniliprole

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Overview

Proposed Registration Decision for Chlorantraniliprole

Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of Rynaxypyr Technical Insecticide and DuPont Altriset Termiticide, containing the technical grade active ingredient chlorantraniliprole, to control subterranean termites in various sites.

An evaluation of available scientific information found that, under the approved conditions of use, the product has value and does not present an unacceptable risk to human health or the environment.

This Overview describes the key points of the evaluation, while the Science Evaluation section provides detailed technical information on the human health, environmental and value assessments of Rynaxypyr Technical Insecticide and DuPont Altriset Termiticide.

What Does Health Canada Consider When Making a Registration Decision?

The key objective of the *Pest Control Products Act* is to prevent unacceptable risks to people and the environment from the use of pest control products. Health or environmental risk is considered acceptable[1] if there is reasonable certainty that no harm to human health, future generations or the environment will result from use or exposure to the product under its proposed conditions of registration. The Act also requires that products have value[2] when used according to the label directions. Conditions of registration may include special precautionary measures on the product label to further reduce risk.

To reach its decisions, the PMRA applies modern, rigorous risk-assessment methods and policies. These methods consider the unique characteristics of sensitive subpopulations in humans (for example, children) as well as organisms in the environment (for example, those most sensitive to environmental contaminants). These methods and policies also consider the nature of the effects observed and the uncertainties when predicting the impact of pesticides. For more information on how the PMRA regulates pesticides, the assessment process and risk-reduction programs, please visit the Pesticide and Pest Management portion of Health Canada's website at healthcanada.gc.ca/pmra.

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1 "Acceptable risks" as defined by subsection 2(2) of the *Pest Control Products Act.*

2 "Value" as defined by subsection 2(1) of the *Pest Control Products Act*: "the product's actual or potential contribution to pest management, taking into account its conditions or proposed conditions of registration, and includes the product's (*a*) efficacy; (*b*) effect on host organisms in connection with which it is intended to be used; and (*c*) health, safety and environmental benefits and social and economic impact."

Before making a final registration decision on chlorantraniliprole, the PMRA will consider all comments received from the public in response to this consultation document.[3] The PMRA will then publish a Registration Decision[4] on chlorantraniliprole, which will include the decision, the reasons for it, a summary of comments received on the proposed final registration decision and the PMRA's response to these comments.

For more details on the information presented in this Overview, please refer to the Science Evaluation section of this consultation document.

What Is Chlorantraniliprole?

Chlorantraniliprole, the active ingredient in DuPont Altriset Termiticide, controls subterranean termites in structures, the surrounding soil, non-edible fruit and nut bearing trees, and other listed locations. It is also found in commercial class insecticides registered to control insect pests in agricultural crops and turf. Chlorantraniliprole kills insects by overstimulating their muscles, causing paralysis and eventually death.

Health Considerations

Can Approved Uses of Chlorantraniliprole Affect Human Health?

DuPont Altriset Termiticide containing chlorantraniliprole is unlikely to affect your health when used according to label directions.

Potential exposure to chlorantraniliprole in DuPont Altriset Termiticide may occur when handling and applying the product. When assessing health risks, two key factors are considered: the levels where no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers). Only those uses where exposure is well below levels that cause no effects in animal testing are considered acceptable for registration.

Toxicology studies in laboratory animals describe potential health effects from varying levels of exposure to a chemical and identify the dose where no effects are observed. The health effects noted in animals occur at doses more than 100 times higher (and often much higher) than levels to which humans are normally exposed when using pesticide-containing products according to label directions.

In laboratory animals, DuPont Altriset Termiticide was of low acute toxicity via the oral, dermal and inhalation routes of exposure. It was non-irritating to the skin and was minimally irritating to the eyes, and did not cause an allergic skin reaction.

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[3] "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.
[4] "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

The toxicological database for chlorantraniliprole indicates a low overall level of toxicity. Health effects in animals given repeated doses of chlorantraniliprole included effects on the liver and the adrenal gland; findings were considered largely adaptive in nature or observed at doses at, or approaching, the limit dose of toxicity testing. There was no evidence of carcinogenicity, reproductive toxicity, neurotoxicity or immunotoxicity. When chlorantraniliprole was given to pregnant animals, there was no indication that it affects the developing fetus.

The risk assessment protects against these effects by ensuring that the level of human exposure is well below the lowest dose at which these effects occurred in animal tests.

Residues in Water and Food

Based on the use pattern of DuPont Altriset Termiticide, a dietary risk assessment was not required.

Risks in Residential and Other Non-Occupational Environments

Residential risks are not of concern when DuPont Altriset Termiticide is used according to the label directions.

It is unlikely that individuals, residing in homes treated with DuPont Altriset Termiticide, will contact treated surfaces or inhale vapours when the product is applied according to the label directions. Consequently, risk to these individuals is considered negligible.

Occupational Risks from Handling DuPont Altriset Termiticide

Occupational risks are not of concern when DuPont Altriset Termiticide is used according to the proposed label directions, which include protective measures.

Pest control operators mixing, loading or applying DuPont Altriset Termiticide can come into direct contact with chlorantraniliprole on the skin or through inhalation. Therefore, the label specifies anyone mixing, loading or applying DuPont Altriset Termiticide must wear a long-sleeved shirt, long pants and chemical resistant gloves during mixing, loading, application, cleanup and repair.

For bystanders, exposure is expected to be much less than that for workers and is considered negligible. Therefore, health risks to bystanders are not of concern.

Environmental Considerations

What Happens When Chlorantraniliprole is Introduced into the Environment?

Chlorantraniliprole enters the environment when used as a termiticide in buildings, posts, poles, landscape ornamentation, signs, and non-edible fruit and nut trees; in the surrounding soil under firewood, stumps, felled tree material and other cellulose materials; and as an insecticide on various agricultural crops. Please refer to the Evaluation Report ERC2008-03,

Chlorantraniliprole for detailed information on agricultural uses of chlorantraniliprole and the associated environmental risk.

Chlorantraniliprole is persistent and mobile in soil and moderately persistent in the aquatic environment. The major breakdown product, (2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-3,8-dimethyl-4(3H)-quinazolinone (IN-EQW78) is more persistent than chlorantraniliprole in the soil and aquatic environment. Chlorantraniliprole is expected to leach through the soil profile beyond 60 cm; therefore, it has the potential to reach groundwater. In surface waters, chlorantraniliprole will partition to sediment and is expected to accumulate in aquatic systems.

The risk to the environment was assessed for chlorantraniliprole based on the product label of the end-use product, DuPont Altriset Termiticide. Use of chlorantraniliprole according to approved product labels is expected to present negligible risk to wild mammals, birds, earthworms, terrestrial plants, bees, fish, algae and aquatic plants, non-target terrestrial arthropods and aquatic invertebrates.

Value Considerations

What Is the Value of DuPont Altriset Termiticide?

DuPont Altriset Termiticide controls subterranean termites in structures either as a pre-construction or post-construction treatment. The product may also be applied to control termites in other locations listed on the label such as poles, non-bearing fruit and nut trees, the surrounding soil under firewood and under logs. Subterranean termites cause extensive damage to structures, such as homes, which can result in expensive repairs. There are very few active ingredients registered to control subterranean termites. DuPont Altriset Termiticide is a valuable addition to termite management programs and will contribute to resistance management as it is a new mode of action for use against subterranean termites. DuPont Altriset Termiticide can be used in conjunction with other pest management practices such as wood preservatives and physical barriers.

Measures to Minimize Risk

Labels of registered pesticide products include specific instructions for use. Directions include risk-reduction measures to protect human and environmental health. These directions must be followed by law.

The key risk-reduction measures being proposed on the label of DuPont Altriset Termiticide to address the potential risks identified in this assessment are as follows.

Key Risk-Reduction Measures

Human Health

Because there is a concern with users coming into direct contact with chlorantraniliprole on the skin or through inhalation of spray mists, anyone mixing, loading and applying DuPont Altriset Termiticide must wear a long-sleeved shirt, long pants and chemical resistant gloves during mixing, loading, application, cleanup and repair.

Environment

To address potential concerns related to toxicity to aquatic organisms, carryover, runoff, and leaching, environmental hazard label statements are required for DuPont Altriset Termiticide.

Next Steps

Before making a final registration decision on chlorantraniliprole, the PMRA will consider all comments received from the public in response to this consultation document. The PMRA will accept written comments on this proposal up to 45 days from the date of publication of this document. Please forward all comments to Publications (contact information on the cover page of this document). The PMRA will then publish a Registration Decision, which will include its decision, the reasons for it, a summary of comments received on the proposed final decision and the Agency's response to these comments.

Other Information

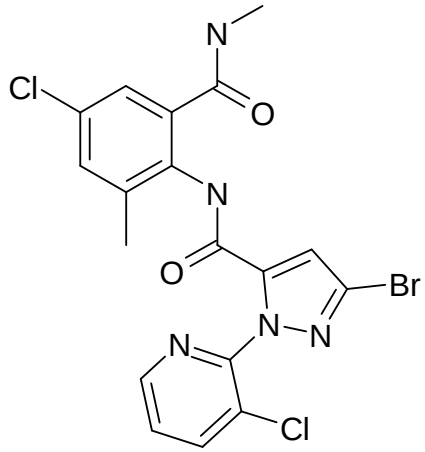
When the PMRA makes its registration decision, it will publish a Registration Decision on chlorantraniliprole (based on the Science Evaluation section of this consultation document). In addition, the test data referenced in this consultation document will be available for public inspection, upon application, in the PMRA's Reading Room (located in Ottawa).

Science Evaluation

Chlorantraniliprole

1.0 The Active Ingredient, Its Properties and Uses

1.1 Identity of the Active Ingredient

Active substance	Chlorantraniliprole
Function	Insecticide
Chemical name	
1. International Union of Pure and Applied Chemistry (IUPAC)	3-Bromo-*N*-[4-chloro-2-methyl-6-(methylcarbamoyl)phenyl]-1-(3-chloropyridin-2-yl)-1*H*-pyrazole-5-carboxamide
2. Chemical Abstracts Service (CAS)	3-Bromo-*N*-[4-chloro-2-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1*H*-pyrazole-5-carboxamide
CAS number	500008-45-7
Molecular formula	$C_{18}H_{14}BrCl_2N_5O_2$
Molecular weight	483.15 g/mole
Structural formula	
Purity of the active ingredient	95.3 %

1.2 Physical and Chemical Properties of the Active Ingredients and End-Use Product

Technical Product—Rynaxypyr Technical Insecticide

Property	Result
Colour and physical state	Fine brown powder
Odour	No odour
Melting range	200–202°C
Boiling point or range	Not applicable

Property	Result
Density	1.5189 g/mL
Vapour pressure at 20°C	6.3×10^{-12} Pa (estimated)
Ultraviolet (UV)-visible spectrum	pH — λ max (nm) neutral — 290 acidic — 290 basic — 320
Solubility in water at 20°C	pH — Solubility (mg/L) Deionized Water — 1.023 4 — 0.972 7 — 0.880 9 — 0.971
Solubility in organic solvents at 20°C (g/100 mL)	Solvent — Solubility (mg/mL) Acetone — 3.4 Acetonitrile — 0.71 Ethyl acetate — 1.1 Dichloromethane — 2.5 Dimethylformamide — 124 n-Octanol — 0.39 Methanol — 1.7 o-Xylene — 0.16 n-Hexane — <0.1µg/mL
n-Octanol–water partition coefficient (K_{ow})	pH — log K_{ow} Distilled Water — 2.76 4 — 2.77 7 — 2.86 9 — 2.80
Dissociation constant (pK_a)	10.88
Stability (temperature, metal)	The test substance was determined to be stable at normal and elevated (54°C) temperatures, stable when in contact with the metals iron and aluminum, and stable when in contact with the metal ions from iron (II) acetate and aluminum acetate solutions.

End-Use Product—DuPont Altriset Termiticide

Property	Result
Colour	White
Odour	Slight alcohol odour
Physical state	Slightly viscous liquid
Formulation type	Suspension
Guarantee	200 g/L

Property	Result
Container material and description	High density polyethylene (HDPE) or Polyethylene terephthalate (PET)
Density	1.094 g/mL
pH of 1% dispersion in water	7.8
Oxidizing or reducing action	The test substance was not found to be an oxidizer or a reducer
Storage stability	Stable after accelerated storage at 54°C after 2 weeks. Stable for one year under commercial storage conditions.
Corrosion characteristics	No corrosion to the container material was observed during one year commercial storage
Explodability	The product is not explosive

1.3 Directions for Use

DuPont Altriset Termiticide is a new commercial class product for use against subterranean termites in buildings (pre- and post-construction), non-edible fruit and nut trees, and other locations listed on the label. The product is usually diluted to provide a final concentration of 0.05% chlorantraniliprole. For vertical treatments where the soil will not accept the full label application volume, the product may be applied at a concentration of 0.1% chlorantraniliprole at half the volume to control subterranean termites. It may also be used in conjunction with a foaming agent (for example, for application to masonary voids). Further information on applying this product is located on the registered label.

1.4 Mode of Action

Chlorantraniliprole is an insecticide with a novel mode of action (MOA) for subterranean termite control. It affects the ryanodine receptors in insect muscles causing paralysis and ultimately insect death. Chlorantraniliprole belongs to MOA Group 28, which are ryanodine receptor modulators according to the Insecticide Resistance Action Committee classification.

2.0 Methods of Analysis

2.1 Methods for Analysis of the Active Ingredient

The methods provided for the analysis of the active ingredient and the impurities in Rynaxypyr Technical Insecticide have been validated and assessed to be acceptable for the determinations.

2.2 Method for Formulation Analysis

The method provided for the analysis of the active ingredient in the formulation has been validated and assessed to be acceptable for use as an enforcement analytical method.

2.3 Methods for Residue Analysis

High-performance liquid chromatography methods with tandem mass spectrometry developed and proposed for data generation and enforcement purposes. These methods fulfilled the requirements with regards to selectivity, accuracy and precision at the respective method limit of quantitation. Acceptable recoveries (70–120%) were obtained in plant and animal matrices and environmental media.

3.0 Impact on Human and Animal Health

3.1 Toxicology Summary

A detailed review of the toxicological database for chlorantraniliprole was previously conducted in 2007 and published in the Evaluation Report ERC2008-03, *Chlorantraniliprole*. The database is complete, consisting of the full array of toxicity studies currently required for hazard assessment purposes. The studies were carried out in accordance with currently accepted international testing protocols and Good Laboratory Practices. The scientific quality of the data is high and the database is considered adequate to define the majority of the toxic effects that may result from exposure to chlorantraniliprole.

The toxicological database for chlorantraniliprole indicates a low overall level of toxicity. In repeated-dose studies in laboratory animals, the primary target organs were the liver and adrenal gland; findings were considered largely adaptive in nature or observed at doses at, or approaching, the limit dose of testing. There was no evidence of carcinogenicity, reproductive toxicity, developmental toxicity, neurotoxicity or immunotoxicity. On the basis of the information assessing potential sensitivity of the young, the PCPA factor was reduced to 1-fold.

The end-use product DuPont Altriset Termiticide is toxicologically equivalent to the registered end-use product DuPont Coragen Insecticide and the acute profile was previously published in ERC2008-03. DuPont Altriset Termiticide was of low acute toxicity via the oral, dermal, and inhalation routes of exposure. It was non-irritating to the skin and minimally irritating to the eyes and was not a dermal sensitizer.

The toxicological endpoints for use in the human health risk assessment were published in ERC2008-03. At that time, however, dermal and inhalation long-term endpoints were not established. These endpoints have now been set and are summarized along with the previously established endpoints in Appendix I, Table 1.

Incident Reports
Since 26 April 2007, registrants have been required by law to report incidents, including adverse effects to health and the environment, to the PMRA. Information on the reporting of incidents can be found on the Pesticides and Pest Management portion of Health Canada's website. Incidents were searched and reviewed for the active ingredient chlorantraniliprole. As of 16 January 2013, there were a total of four incident reports involving this active ingredient—one domestic animal, two environmental and one packaging failure incident report.

The domestic animal incident occurred in the United States and involved the death of a chicken. The death was not considered to be related to the reported pesticide exposure. None of the incidents were considered to impact the current risk assessment. Detailed information can be found on the PMRA Public Registry.

3.1.1 PCPA Hazard Characterization

As stated previously, and reported in ERC2008-03, the PCPA factor was reduced to 1-fold on the basis of the overall information assessing potential sensitivity of the young.

3.2 Occupational and Residential Risk Assessment

3.2.1 Toxicological Endpoints

For long-term exposures via the dermal and inhalation routes, the NOAEL (no observed adverse effect level) of 158 mg/kg bw/day from the 18-month feeding study in mice was selected. Eosinophilic foci accompanied by hepatocellular hypertrophy and increased liver weight were observed at the lowest observed adverse effect level of 915 mg/kg bw/day. This endpoint was selected as there were no route-specific (dermal and inhalation) studies of the appropriate duration, and there was evidence of increased toxicity with increased duration of dosing from intermediate- to long-term exposure. The target margin of exposure (MOE) is 100, which includes uncertainty factors of 10-fold for interspecies extrapolation and 10-fold for intraspecies variability.

Pest control operator exposure to DuPont Altriset Termiticide is characterized as long-term in duration and is predominantly through dermal and inhalation routes. Following application, adults and children in treated homes have potential for long-term inhalation exposure to chlorantraniliprole vapours.

3.2.1.1 Dermal Absorption

No dermal absorption data were submitted for DuPont Altriset Insecticide.

3.2.2 Occupational Exposure and Risk

A quantitative risk assessment for mixer/loader/applicator was conducted for the proposed termiticide uses of chlorantraniliprole. Risk estimates for pest control operators were found to be acceptable provided the product was applied according to label directions.

3.2.2.1 Mixer/loader/applicator Exposure and Risk Assessment

Exposure to workers mixing, loading and applying the product is expected to be long-term in duration and to occur primarily by the dermal and inhalation routes. Exposure estimates were derived for mixers/loaders/applicators applying the product using mechanically pressurized handheld equipment, manually pressurized handwands or backpack sprayers. A mixer/loader only exposure scenario was determined to be acceptable when applied with rodding (i.e. closed application system). The exposure estimates are based on mixers/loaders/applicators wearing long-sleeved shirt, long pants and chemical resistant gloves.

Dermal and inhalation exposure estimates for workers were generated using the Pesticide Handlers Exposure Database (PHED), version 1.1, because chemical-specific data for assessing human exposures during pesticide handling activities were not submitted (Table 3.2-1). PHED is a compilation of generic mixer/loader and applicator passive dosimetry data that facilitates the generation of scenario-specific exposure estimates.

Table 3.2-1 PHED Dermal and Inhalation Unit Exposure Estimates for Workers Mixing, Loading and/or Applying DuPont Altriset Termiticide

Scenario	Exposure (in µg/kg a.i. handled) [1]	
	Dermal Exposure	Inhalation Exposure
M/L Open Pour	51.14	1.6
M/L/A Mechanically-pressurized handheld equipment	5585.49	151
M/L/A Manually-pressurized handwand	943.37	45.2
M/L/A Backpack	5445.85	62.1

[1] All dermal unit exposure values are for single layer with gloves. For inhalation, all values are for light activity except for backpack which assumes moderate activity.

Dermal exposure was estimated by combining the unit exposure values with the amount of product handled per day and the dermal absorption value of 100%. Inhalation exposure was estimated by combining the unit exposure values with the amount of product handled per day and 100% inhalation absorption. Exposure was normalized to mg/kg bw/day by using 80 kg adult body weight.

Exposure estimates were compared to the toxicological endpoints (no observed adverse effects levels) to obtain the MOE; the target MOE is 100 (Table 3.2-2). In all scenarios the combined calculated MOE value exceeded the target MOE value.

Table 3.2-2: Mixer/Loader/Applicator Dermal and Inhalation Exposure Estimates and Risk

M/L/A Scenario	ATPD (L/day)	Dermal Exposure (mg/kg bw/day) [a]	Inhalation Exposure mg/kg bw/day) [a]	Combined MOE [b]
Mechanically pressurized handheld equipment	454	3.50×10^{-2}	9.46×10^{-4}	4400
Manually pressurized handwand	150	1.95×10^{-3}	9.36×10^{-5}	77200
Backpack	150	1.13×10^{-2}	1.29×10^{-4}	13900
M/L Open Pour Rodding Only	454	3.20×10^{-4}	1.00×10^{-5}	478000

[a] Dermal/Inhalation Exposure Estimates = [PHED Exposure (µg /kg a.i. handled) × Max a.i. Concentration (0.1%) × Specific Gravity (g/mL) × area treated per day (ATPD) (L/day) × Absorption Factor] ÷ Body Weight (80 kg)
Absorption factors: dermal and inhalation - 100%.

[b] Combined MOE = $\frac{\text{NOAEL (mg/kg bw/day)}}{\text{Dermal Exposure (mg/kg bw/day) + Inhalation Exposure (mg/kg bw/day)}}$

3.2.2.2 Exposure and Risk Assessment for Workers Entering Treated Areas

Worker re-entry into treated areas is not expected to be of concern.

3.2.3 Residential Exposure and Risk Assessment

3.2.3.1 Handler Exposure and Risk

Although applied in residential areas, DuPont Altriset Termiticide is a commercial product and, therefore, no residential applicator risk assessment is required.

3.2.3.2 Postapplication Exposure and Risk

Individuals (adults, youth and toddlers) residing in treated homes can be exposed to chlorantraniliprole vapours. While a long-term hazard was identified, residential exposure is expected to be negligible and is not of concern based on the low vapour pressure of DuPont Altriset Termiticide.

3.2.3.3 Bystander Exposure and Risk

Due to the location of application of termiticides, bystander exposure is expected to be minimal and is not of concern.

4.0 Impact on the Environment

4.1 Fate and Behaviour in the Environment

Please refer to the ERC2008-03 for detailed information on the fate and behaviour of chlorantraniliprole in the environment.

4.2 Environmental Risk Characterization

The environmental risk assessment integrates the environmental exposure and ecotoxicology information to estimate the potential for adverse effects on non-target species. This integration is achieved by comparing exposure concentrations with concentrations at which adverse effects occur. Estimated environmental exposure concentrations are concentrations of pesticide in various environmental media, such as food, water, soil and air. The estimated environmental exposure concentrations are estimated using standard models that take into consideration the application rate(s), chemical properties and environmental fate properties, including the dissipation of the pesticide between applications. Ecotoxicology information includes acute and chronic toxicity data for various organisms or groups of organisms from both terrestrial and aquatic habitats including invertebrates, vertebrates, and plants. Toxicity endpoints used in risk assessments may be adjusted to account for potential differences in species sensitivity as well as varying protection goals (i.e. protection at the community, population, or individual level).

The environmental risk assessment for chlorantraniliprole was mainly qualitative as the proposed use patterns of the end-use product DuPont Altriset Termiticide will result in limited environmental exposure. The exposure cannot be quantified using standard scenarios, as the use of the product will not result in significant deposition of the active ingredient on soil, water or plants.

4.2.1 Risks to Terrestrial Organisms

Please refer to the ERC2008-03 for detailed information on the toxic effects of chlorantraniliprole to terrestrial organisms. According to the environmental risk assessment conducted based on agriculture uses, chlorantraniliprole and its transformation products present a negligible risk to wild mammals, birds, earthworms, terrestrial plants. The screening level risk assessment of agricultural uses suggested that the level of concern for *Coccinella septemunctata* L., *Episyrphus balteatus* and *Orius laevigatus* was exceeded. As the commercial uses of this termiticide are in localized small areas, less exposure of chlorantraniliprole to non-target terrestrial organisms is anticipated than in agricultural uses. Therefore, chlorantraniliprole and its transformation products are expected to present negligible risk to non-target terrestrial organisms.

4.2.2 Risks to Aquatic Organisms

Please refer to the ERC2008-03 for detailed information on the toxic effects of chlorantraniliprole to aquatic organisms. Chlorantraniliprole is very highly toxic to various aquatic invertebrates; hence, an environmental hazard label statement is required to address the concern. As the commercial uses as termiticide only result in localized small areas being treated, the risk to non-target aquatic organisms will be negligible.

5.0 Value

5.1 Effectiveness Against Pests

5.1.1 Acceptable Efficacy Claims

A combination of efficacy data, foreign reviews from the United States and Australia and published literature were used to support the value of DuPont Altriset Termiticide. Three laboratory trials were used as supplementary information to confirm that DuPont Altriset Termiticide resulted in mortality of subterranean termites at the 0.05% concentration. A five-year field study conducted in the United States using ground boards and concrete slabs demonstrated that a 0.05% concentration resulted in subterranean termite control for 2–5 years. Published literature from the United States Environmental Protection Agency and university extension documents supported the application rates for DuPont Altriset Insecticide. An operational treatment conducted in the United States and use history demonstrated the value of using DuPont Altriset Termiticide with a foaming agent. Foaming agents increase the ability of DuPont Altriset Termiticide to penetrate into hard to reach areas, such as voids and thus increase the efficacy of the treatment.

5.2 Sustainability

5.2.1 Survey of Alternatives

Permethrin (MOA 3) is the only active ingredient registered as a soil-applied termiticide to control subterranean termites as a pre- and post-construction treatment. It is also registered to control termites in trees. Chlorfenapyr (MOA 13) has recently been proposed for registration against subterranean termites as a pre- and post-construction treatment for structures (Proposed Registration Decision PRD2013-01, *Chlorfenapyr*).

There are other active ingredients registered for subterranean termites, but they are not soil applied, and their use patterns are more limited. Lambda-cyhalothrin (MOA 3) is registered against termites in trees, stumps, utility poles and fences. Propoxur (MOA 1) is limited to use against termites in localized areas of wood in structures. Disodium octoborate tetrahydrate is registered as a remedial treatment of infested wood and as a long-term protective or preventive treatment of wood in existing or new construction. There are other active ingredients registered as wood preservatives (for example, elemental copper) and fumigants (for example, methyl bromide) against termites.

5.2.2 Compatibility with Current Management Practices Including Integrated Pest Management

Current management practices for subterranean termites involve a variety of approaches such as monitoring, reducing moisture in the wood, minimizing contact of wood with the soil, using treated wood for construction, removal of termite food sources and barrier treatments. DuPont Altriset Termiticide can be used in conjunction with alternative control methods.

5.2.3 Information on the Occurrence or Possible Occurrence of the Development of Resistance

Resistance management strategies, as stated on the label, are recommended to avoid the development of resistance to DuPont Altriset Termiticide. Strategies include rotation of termiticides with different modes of action and practices to prevent termite infestations. DuPont Altriset Termiticide offers a new mode of action to use against subterranean termites in Canada and will contribute to resistance management.

6.0 Pest Control Product Policy Considerations

6.1 Toxic Substances Management Policy Considerations

The Toxic Substances Management Policy (TSMP) is a federal government policy developed to provide direction on the management of substances of concern that are released into the environment. The TSMP calls for the virtual elimination of Track 1 substances [those that meet all four criteria outlined in the policy, i.e., persistent (in air, soil, water and/or sediment), bio-accumulative, primarily a result of human activity and toxic as defined by the *Canadian Environmental Protection Act*].

During the review process, chlorantraniliprole was assessed in accordance with the PMRA Regulatory Directive DIR99-03[5] and evaluated against the Track 1 criteria. The PMRA has reached the following conclusions:

Chlorantraniliprole does not meet Track 1 criteria, and is not considered a Track 1 substance. See Appendix I, Table 2, for comparison with Track 1 criteria.

6.2 Formulants and Contaminants of Health or Environmental Concern

During the review process, contaminants in the technical and formulants and contaminants in the end-use products are compared against the *List of Pest control Product Formulants and Contaminants of Health or Environmental Concern* maintained in the *Canada Gazette*[6]. The list is used as described in the PMRA Notice of Intent NOI2005-01[7] and is based on existing policies

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5 DIR99-03, *The Pest Management Regulatory Agency's Strategy for Implementing the Toxic Substances Management Policy.*

6 *Canada Gazette*, Part II, Volume 139, Number 24, SI/2005-114 (2005-11-30) pages 2641–2643: *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern* and in the order amending this list in the *Canada Gazette,* Part II, Volume 142, Number 13, SI/2008-67 (2008-06-25) pages 1611-1613. *Part 1 Formulants of Health or Environmental Concern, Part 2 Formulants of Health or Environmental Concern that are Allergens Known to Cause Anaphylactic-Type Reactions and Part 3 Contaminants of Health or Environmental Concern.*

7 NOI2005-01, *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern under the New Pest Control Products Act.*

and regulations including: DIR99-03 and DIR2006-02[8], and taking into consideration the Ozone-depleting Substance Regulations, 1998, of the *Canadian Environmental Protection Act* (substances designated under the Montreal Protocol). The PMRA has reached the following conclusions:

The end-use product, DuPont Altriset Termiticide has, as a component, the preservative 1,2-benzisothiazoline-3-one, which contains low levels of the Track 1 contaminants polychlorinated dibenzodioxins and furans, which are identified in the *Canada Gazette*. As the use of this preservative was recently re-evaluated and found to be acceptable, and because the input of dioxins into the environment from pesticides is being managed as outlined in the PMRA Regulatory Directive DIR99-03 for the implementation of the TSMP, the Agency's position is that no further action is required.

7.0 Summary

7.1 Human Health and Safety

The toxicology database for chlorantraniliprole indicates a low overall level of toxicity. In repeated-dose studies in laboratory animals, the primary target organs were the liver and adrenal gland; findings were considered largely adaptive in nature or observed at doses at, or approaching, the limit dose of testing. There was no evidence of carcinogenicity, reproductive toxicity, developmental toxicity, neurotoxicity, immunotoxicity, or sensitivity of the young.

Mixer, loader and applicators are not expected to be exposed to levels of chlorantraniliprole that will result in unacceptable risk when DuPont Altriset Termiticide is used according to label directions. The recommended personal protective equipment on the product label is adequate to protect pest control operators.

7.2 Environmental Risk

Commercial use of chlorantraniliprole as a termiticide has negligible risk to non-target organisms due to limited exposures.

7.3 Value

DuPont Altriset Termiticide offers a new mode of action to control subterranean termites in structures either as a pre-construction or post-construction treatment and in other locations listed on the label such as poles, non-bearing fruit and nut trees, and the surrounding soil under firewood and under logs. It can be used in conjunction with other pest management practices such as wood preservatives and physical barriers.

[8] DIR2006-02, *Formulants Policy and Implementation Guidance Document*.

8.0 Proposed Regulatory Decision

Health Canada's PMRA, under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of Rynaxypyr Technical Insecticide and DuPont Altriset Termiticide, containing the technical grade active ingredient chlorantraniliprole, to control subterranean termites in various sites.

An evaluation of available scientific information found that, under the approved conditions of use, the product has value and does not present an unacceptable risk to human health or the environment.

List of Abbreviations

µg	micrograms
°C	degrees Celsius
a.i.	active ingredient
ADI	acceptable daily intake
ATPD	area treated per day
bw	body weight
CAS	chemical abstracts service
cm	centimetres
DT_{50}	dissipation time 50% (the dose required to observe a 50% decline in concentration)
g	gram
HDPE	high density polyethylene
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram
K_{ow}	*n*-octanol–water partition coefficient
L	litre
mg	milligram
mL	millilitre
M/L	mixer/loader
M/L/A	mixer/loader/applicator
MOA	mode of action
MOE	margin of exposure
nm	nanometre
NOAEL	no observed adverse effect level
Pa	Pascals
PCPA	*Pest Control Product Act*
PHED	Pesticide Handlers Exposure Database
PET	polyethylene terephthalate
p*Ka*	dissociation constant
PMRA	Pest Management Regulatory Agency
TSMP	Toxic Substances Management Policy
UV	ultraviolet

Appendix I Tables and Figures

Table 1 Toxicology Endpoints for Use in Health Risk Assessment for Chlorantraniliprole

Exposure Scenario	Study	Point of Departure and Endpoint	[1]Target MOE
Acute dietary	Not required as no endpoint of concern attributable to a single dose was identified.		
Chronic dietary, all populations	18-month mouse feeding oncogenicity study	NOAEL = 158 mg/kg bw/day Increased liver weight, hepatocellular hypertrophy and increased incidence of eosinophilic foci cellular alteration in the liver.	100
ADI = 1.58 mg/kg bw/day			
Short- and Intermediate-term dermal and inhalation	Not required due to low overall level of concern for effects that were observed only at very high doses following short- to intermediate-term exposure.		
Long-term dermal[2]	18-month mouse feeding oncogenicity study	NOAEL = 158 mg/kg bw/day Increased incidence of eosinophilic foci, hepatocellular hypertrophy, liver weights	100
Long-term inhalation[3]	18-month mouse feeding oncogenicity study	NOAEL = 158 mg/kg bw/day Increased incidence of eosinophilic foci, hepatocellular hypertrophy, liver weights	100

[1] MOE refers to a target MOE for occupational and residential assessments.
[2] Since an oral NOAEL was selected, a dermal absorption factor of 100% was used in a route-to-route extrapolation.
[3] Since an oral NOAEL was selected, an inhalation absorption factor of 100% (default value) was used in route-to-route extrapolation.

Table 2 Toxic Substances Management Policy Considerations—Comparison to TSMP Track 1 Criteria

TSMP Track 1 Criteria	TSMP Track 1 Criterion value		Chlorantraniliprole
Toxic or toxic equivalent as defined by the *Canadian Environmental Protection Act*[1]	Yes		Yes
Predominantly anthropogenic[2]	Yes		Yes
Persistence[3]	Soil	Half-life ≥182 days	Aerobic DT_{50}: 886 days Anaerobic DT_{50}: 208 days
	Water	Half-life ≥182 days	Hydrolysis pH 4: stable pH 7: stable pH 9: DT_{50}: 10 days (25°C); 50 days (15°C)
	Water Sediment	Half-life ≥365 days	Aerobic DT_{50}: 125–231 days (25°C, total system) Anaerobic DT_{50}: 42 days (25°C, total system)

TSMP Track 1 Criteria	TSMP Track 1 Criterion value		Chlorantraniliprole
	Air	Half-life ≥2 days or evidence of long range transport	Not available
Bioaccumulation[4]	*Log* K_{ow} ≥ 5		*Log* K_{ow}: 2.762.86
	Bioconcentration factor ≥5000		Bioconcentration factor: 13 (whole fish)
	Bioaccumulation factor ≥5000		Not available
Is the chemical a TSMP Track 1 substance (all four criteria must be met)?			No, does not meet TSMP Track 1 criteria.

[1]All pesticides will be considered toxic or toxic equivalent for the purpose of initially assessing a pesticide against the TSMP criteria. Assessment of the toxicity criterion may be refined if required (i.e. all other TSMP criteria are met).
[2]The policy considers a substance "predominantly anthropogenic" if, based on expert judgement, its concentration in the environment medium is largely due to human activity, rather than to natural sources or releases.
[3] If the pesticide and/or the transformation product(s) meet one persistence criterion identified for one media (soil, water, sediment or air) than the criterion for persistence is considered to be met.
[4]Field data (for example, bioaccumulation factors) are preferred over laboratory data (for example, bioconcentration factors) which, in turn, are preferred over chemical properties (for example *log* K_{ow}).

References

A. List of Studies/Information Submitted by Registrant

1.0 Human and Animal Health

2108976 2011, Use Description and Scenario for DuPont Altriset Termiticide. DACO 5.2

2.0 Value

2108977 2011, Efficacy Summary for DuPont Altriset Termiticide, DACO: 10.1,10.2.1,10.2.2,10.2.3.1,10.2.3.2,10.2.3.3,10.3.1,10.3.2,10.4,10.5.1,10.5.2,10.5.3,10.5.4
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2108993 2009, Product Performance: Final Field Evaluation of Chlorantraniliprole (DPX-E2Y45) Against Subterranean Termites, DACO: 10.2.3.3(D)
2142790 2011, OPPTS - 810-3600, DACO: 10.2.3.2,10.2.3.3
2142792 2011, Termiticide Efficacy Results 2010, DACO: 10.2.3.2,10.2.3.3
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2142795 2004, DPX-E2Y45 as potential termiticide AI for subterranean termites Petri dish method, DACO: 10.2.3.2
2142797 2004, DPX-E2Y45 as potential termiticide AI for subterranean termites tube method, DACO: 10.2.3.2
2142799 2011, DACO: 10.6
2142801 2011, DACO: 10.6
2153514 2009, Product Performance: Evaluation of Chlorantraniliprole (DPX-E2Y45) 18.4% SC Against Termites, DACO: 10.2.3.2,10.2.3.3
2153509 2009, DACO: 12.5
2153510 2009, DACO: 12.5
2153512 2010, DACO: 12.5

B. Additional Information Considered

i) Published Information

1.0 Value

2177778	DACO: 10.6
2177779	DACO: 10.6
2177780	DACO: 10.6
2253108	DACO: 10.6
2278151	DACO: 10.2.2,10.5.2
2278153	DACO: 10.2.2,10.5.2
2272660	DACO: 12.5
2272675	DACO: 12.5