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Proposed Registration Decision

PRD2015-04

Picoxystrobin

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Overview

Proposed Registration Decision for Picoxystrobin

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 Picoxystrobin (registration number 30469) and DPX-YT669 250FS Fungicide Seed Treatment, containing the technical grade active ingredient picoxystrobin, to control soil and seed-borne blackleg, seed borne *Alternaria* caused by *A. brassicae* in canola, rapeseed and mustards and the seedling disease complex (damping off, seedling blight, seed rot and root rot) caused by *Fusarium spp.* and *Rhizoctonia solani* in canola, rapeseed, mustards, corn and soybeans.

Picoxystrobin was previously registered in the end-use product Acapela Fungicide (registration number 30470) for foliar and soil applications to control a broad spectrum of fungal diseases in numerous crops. For the detailed review see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

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 provides detailed technical information on the human health, environmental and value assessments of picoxystrobin and DPX-YT669 250FS Fungicide Seed Treatment.

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 acceptable¹ 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 value² when used according to the label directions. Conditions of registration may include special precautionary measures on the product label to further reduce risk.

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."

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 Pesticides and Pest Management portion of Health Canada's website at healthcanada.gc.ca/pmra.

Before making a final registration decision on picoxystrobin as a seed treatment, the PMRA will consider any comments received from the public in response to this consultation document.³ The PMRA will then publish a Registration Decision⁴ on picoxystrobin, 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 of this consultation document.

What Is Picoxystrobin?

Picoxystrobin is a quinone outside inhibitor (QoI) class of fungicide that inhibits mitochondrial respiration. It is classified as a group 11 fungicide by the Fungicide Resistance Action Committee (FRAC). Picoxystrobin was previously registered in the end-use product Acapela Fungicide (registration number 30470) for foliar and soil applications to control a broad spectrum of fungal diseases in numerous crops. DPX-YT669 250FS Fungicide Seed Treatment is proposed to control soil and seed-borne disease in canola, rapeseed, mustards, corn and soybeans.

Health Considerations

Can Approved Uses of Picoxystrobin Affect Human Health?

Picoxystrobin is unlikely to affect your health when used according to label directions.

Potential exposure to picoxystrobin may occur through the diet (food and water) or when handling and applying the product or when entering treated sites. 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 uses for which the exposure is well below levels that cause no effects in animal testing are considered acceptable for registration.

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*.

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 pesticide products are used according to label directions.

In laboratory animals, the technical grade active ingredient picoxystrobin was of moderate acute toxicity by the inhalation route and was mildly irritating to the eyes; consequently, the hazard signal words “WARNING – POISON” and “EYE IRRITANT” are required on the label. It was of low acute toxicity orally and dermally. Picoxystrobin was non-irritating to the skin and did not cause an allergic skin reaction.

The acute toxicity of DPX-YT669 250FS Fungicide Seed Treatment, was low via the oral, dermal and inhalation routes of exposure. It was minimally irritating to the eyes, slightly irritating to the skin and did not cause an allergic skin reaction. No hazard signal words are required on the label.

Health effects in animals given repeated doses of picoxystrobin included irritation of the mucous membranes throughout the gastrointestinal tract (G.I.T). Picoxystrobin did not damage genetic material or cause cancer at doses that were relevant to human risk assessment. There was no indication that picoxystrobin caused damage to the immune system. Picoxystrobin did not cause birth defects in animals and there were no effects on reproduction. When picoxystrobin was given to pregnant or nursing animals, effects on the juvenile animal (decreased spleen weight) were observed at doses lower than those that were toxic to the mother, indicating that the young may be slightly more sensitive than the adult animal.

The risk assessment protects against the effects of picoxystrobin 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

Dietary risks from food and drinking water are not of health concern.

Aggregate chronic dietary intake estimates (food plus drinking water) revealed that the general population and children (1-2 yrs), the subpopulation which would ingest the most picoxystrobin relative to body weight, are expected to be exposed to less than 3% of the acceptable daily intake. Based on these estimates, the chronic dietary risk from picoxystrobin is not of health concern for all population sub-groups.

An aggregate acute dietary intake estimate (food and drinking water) for the highest exposed sub-population (all infants, <1 year old) used less than 1% (95th Percentile, deterministic) of the acute reference dose, which is not a health concern.

The *Food and Drugs Act* prohibits the sale of adulterated food, that is, food containing a pesticide residue that exceeds the established maximum residue limit (MRL). Pesticide MRLs are established for *Food and Drugs Act* purposes through the evaluation of scientific data under the *Pest Control Products Act*. Food containing a pesticide residue that does not exceed the established MRL does not pose an unacceptable health risk.

MRLs to cover residues of picoxystrobin in/on rapeseeds (canola), mustard seeds (oilseed type), soybean, field corn, sweet corn kernels plus cobs with husks removed, and popcorn grain have been specified based on residue data generated following foliar applications, for the detailed review see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*. The seed treatment use of picoxystrobin on these crops is not expected to result in residues exceeding the established MRLs. The MRL recommended for picoxystrobin on mustard seeds (condiment type) is 0.08 ppm.

Occupational Risks From Handling DPX-YT669 250FS Fungicide Seed Treatment

Occupational risks are not of concern when DPX-YT669 250FS Fungicide Seed Treatment is used according to the proposed label directions, which include protective measures.

Workers treating canola, rapeseed, mustard, soybean and corn seed with DPX-YT669 250FS Fungicide Seed Treatment in commercial seed treatment facilities and by commercial mobile treaters, and workers planting treated seed, can come into direct contact with picoxystrobin residues on the skin and through inhalation. Therefore, the label specifies that workers treating and handling treated seed must wear the following personal protective equipment (PPE). In commercial seed treatment facilities and commercial mobile treaters, workers mixing, loading, calibrating, treating, bagging, sewing, stacking, and forklifting treated seed must wear a long-sleeved shirt and long pants and chemical-resistant gloves. In addition, workers cleaning treatment equipment must wear coveralls over a long-sleeved shirt and long pants and chemical-resistant gloves. Workers planting treated seed must wear a long-sleeved shirt, long pants and chemical-resistant gloves. Closed transfer is required for treating seeds in commercial settings and a closed cab tractor is required when planting treated seed. Taking into consideration these label statements, the number of applications and the expectation of the exposure period for handlers and workers, the risk to these individuals is not a concern.

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 Picoxystrobin Is Introduced Into the Environment?

When used as a seed treatment, picoxystrobin poses a negligible risk to terrestrial and aquatic organisms.

Picoxystrobin can enter the environment by dislodging from treated seed surfaces during and after seeding. When picoxystrobin enters aquatic systems it does not dissolve readily in water and will tend to move into sediments. Picoxystrobin is broken down by microbes in soils, sediments and water; thus, it is not expected to persist in the environment. The name and chemical structure of environmental transformation products of picoxystrobin are listed in table 9 of the Proposed Registration Decision PRD2012-10, *Picoxystrobin*. Laboratory and field studies indicate that picoxystrobin and its transformation products are unlikely to move significantly downward through soils and reach groundwater. Picoxystrobin and its transformation products are not expected to carry over in important amounts into the next growing season. Picoxystrobin is not expected to accumulate in fish tissues. Picoxystrobin is not volatile and therefore not expected to be subject to long-range transport in the atmosphere.

Use of picoxystrobin as a seed treatment is expected to pose negligible risk to non-target terrestrial and aquatic organisms. No environmental risk was identified from exposure to the major transformation products of picoxystrobin.

Value Considerations

What Is the Value of DPX-YT669 250FS Fungicide Seed Treatment?

DPX-YT669 250FS Fungicide Seed Treatment, containing picoxystrobin, controls certain soil-borne and seed-borne diseases of canola, rapeseed, mustard, soybean and corn.

DPX-YT669 250FS Fungicide Seed Treatment controls certain soil-borne and seed-borne diseases (including damping-off, seedling blight, seed rot, and root rot caused by *Fusarium* spp., *Rhizoctonia solani*; soil-borne and seed-borne blackleg caused by *Leptosphaeria maculans*; and seed-borne *Alternaria* caused by *Alternaria brassicae*) of canola, rapeseed, mustard, soybean and corn. The registration of DPX-YT669 250FS Fungicide Seed Treatment will introduce a new active ingredient and an alternative product on the market to the growers.

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 DPX-YT669 250FS Fungicide Seed Treatment 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 picoxystrobin on the skin or through inhalation of spray mists, anyone mixing, loading and applying DPX-YT669 250FS Fungicide Seed Treatment must wear the following PPE: For commercial treaters (facilities and mobile treaters), workers mixing, loading, calibrating, treating, bagging, sewing, stacking, and forklifting treated seed must wear a long-sleeved shirt and long pants and chemical-resistant gloves. In addition, workers cleaning treatment equipment must wear coveralls over a long-sleeved shirt and long pants and chemical-resistant gloves. Workers planting treated seed must wear a long-sleeved shirt, long pants and chemical-resistant gloves. Closed transfer is required for treating seeds commercially and a closed cab tractor is required when planting treated seed.

Environment

Although the potential of picoxystrobin exposure to aquatic organisms is negligible, a statement informing users of the toxicity of picoxystrobin to aquatic organisms is required on the product label.

Next Steps

Before making a final registration decision on picoxystrobin as a seed treatment, the PMRA will consider any 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 picoxystrobin (based on the Science Evaluation 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

Picoxystrobin

1.0 The Active Ingredient, Its Properties and Uses

1.1 Identity of the Active Ingredient

For detailed information on the identity of picoxystrobin, please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

1.2 Physical and Chemical Properties of Picoxystrobin and the end-use product formulation.

For detailed information on the physical and chemical properties of picoxystrobin and the end-use product formulation, please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*. DPX-YT669 250FS Fungicide Seed Treatment is chemically equivalent to Acapela Fungicide.

1.3 Directions for Use

Canola, rapeseed, mustard (oil and condiment varieties):

Apply DPX-YT669 250FS Fungicide Seed Treatment at a rate of 20 to 40 ml of product per 100 kg of seeds, once as a seed treatment. Use the higher rate in areas with a history of high disease pressure, or where extended early season control is required and/or field conditions exist that favour seed and soil borne pathogens.

Soybean and Corn:

Apply DPX-YT669 250FS Fungicide Seed Treatment at a rate of 0.01 to 0.03 ml of product per seed, once as a seed treatment. Use the higher rate in areas with a history of high disease pressure, or where extended early season control is required and/or field conditions exist that favour seed and soil borne pathogens.

1.4 Mode of Action

Picoxystrobin fungicide is a quinone outside inhibitor (QoI) class of fungicide that inhibits mitochondrial respiration. It provides control of target fungi by blocking spore germination and inhibiting germ tube formation and mycelial growth. Picoxystrobin also induces spore collapse and death. As a Fungicide Resistance Action Committee Group 11 fungicide, it is classified as having a high risk for resistance, however when used as a seed treatment, this risk is lower since seed treatments are only applied once per season.

2.0 Methods of Analysis

For details on the methods of analysis, please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*

3.0 Impact on Human and Animal Health

3.1 Toxicology Summary

For details on the toxicity of picoxystrobin and the end-use product formulation (DPX-YT669 250FS Fungicide Seed Treatment is chemically equivalent to Acapela Fungicide), please refer to Proposed Registration Decision PRD 2012-10, *Picoxystrobin*.

3.1.1 Health Related Incident Reports

Since April 26, 2007, registrants have been required by law to report incidents to the PMRA, including adverse effects to Canadian health or the environment. Incidents were searched and reviewed for the active ingredient picoxystrobin. As of 28 August 2014, no incident reports involving picoxystrobin had been submitted to the PMRA.

3.2 Occupational and Residential Risk Assessment

3.2.1 Toxicological Endpoints

For details on the toxicological endpoints, please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

Occupational exposure to picoxystrobin is characterized as short- to intermediate-term in duration and is predominantly by the dermal and inhalation routes.

3.2.1.1 Dermal Absorption

Studies designed to estimate the dermal penetration of picoxystrobin were previously submitted and reviewed. The studies were found to be acceptable for estimating dermal absorption.

3.2.2 Occupational Exposure and Risk

Canola, rapeseed, mustard, corn and soybean can be treated with DPX-YT669 250FS Fungicide Seed Treatment in commercial seed treatment facilities and by commercial mobile treaters and planted using conventional seeding equipment.

3.2.2.1 Commercial Seed Treatment Exposure and Risk Assessment

Individuals have potential for exposure to picoxystrobin while treating seed in commercial seed treatment facilities and by commercial mobile treaters. Chemical-specific data for assessing human exposure during commercial seed treatment were not submitted. As such, surrogate exposure data were used to estimate risk to workers treating seed in commercial situations.

3.2.2.1.1 Canola, Rapeseed, Mustard, Corn and Soybean Seed

DPX-YT669 250FS Fungicide Seed Treatment is for use by commercial seed treaters capable of treating canola (including rapeseed and mustard), corn and soybean seeds. Worker exposure was assessed for treating seed with closed-transfer systems only.

For assessing exposure during seed treatment in commercial operations, a surrogate passive dosimetry study measuring the exposure of mixers, loaders, calibrators, baggers and cleaners at eleven small to large commercial facilities treating cereal seed with Jockey Fungicide was used. Thirty-seven trials were conducted with mixers, loaders, calibrators (7 operators) and baggers (22 operators) wearing a single layer and gloves, and cleaners (8 operators) wearing Tyvek coveralls over a single layer and gloves. Dermal exposure for each worker was measured by passive dosimetry using a combination of an inner whole body dosimeter, hand rinses, and face/neck wipes. Inhalation exposure for each worker was measured by means of a personal air sampling pump. Exposure values for mixers, loaders, calibrators and baggers were normalized for the amount of active ingredient handled. Exposure values for cleaners were normalized for the application rate used in the study. The arithmetic mean was used for all activities since there were an adequate number of replicates and the recoveries were sufficient.

The submitted dust-off study compared the dust generated from DPX-YT669 250FS Fungicide Seed Treatment (in tank-mix with a variety of other formulations) on canola with the surrogate study formulation on its respective crop seed (Jockey Fungicide on wheat). Based on dust generated per 100 kg of seed, canola had the highest dust produced followed by wheat and then corn with the least dust generated. No untreated controls were performed during the study.

Table 3.2.2.1.1 presents the risk estimates for the commercial seed treatment of canola (including rapeseed and mustard), corn and soybean seeds with DPX-YT669 250FS Fungicide Seed Treatment. The calculated MOEs were above the target MOE of 100. As such, there are no occupational risks of concern for treating canola (including rapeseed and mustard), corn and soybean seeds with DPX- T669 250FS Fungicide Seed Treatment in closed transfer commercial facilities when workers wear the personal protective equipment worn in the surrogate study. Given the high MOEs, it was determined that no additional confirmatory dust-off data was required.

Table 3.2.2.1.1 Risk Assessment for Commercial Treating of Seeds with Picoxystrobin

Proposed: Canola (Including Rapeseed and Mustard), Corn, Soybean. Surrogate: Jockey Fungicide Study on cereals							
Scenario - Canola ¹	kg ai handled/day	Unit Exposure		Exposure ^{3,5} (mg/kg bw/day)		MOE ⁴	
		Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
Single layer plus gloves							
	kg ai handled/day	ug/kg ai handled					
Treater/Applicator	6.7	0.88	0.016	7.4×10^{-5}	1.3×10^{-6}	1.4×10^7	6.4×10^6
Bagger/Sewer/Stacker		17.67	0.89	1.5×10^{-3}	7.5×10^{-5}	6.8×10^5	1.1×10^5
Coveralls over single layer							
	g ai/100 kg seed	ug/g ai/100 kg seed					
Cleaner	10	18.46	0.64	2.3×10^{-3}	8.0×10^{-5}	4.3×10^5	1.1×10^5
Cleaner + Treater ⁶		n/a	n/a	2.4×10^{-3}	8.1×10^{-5}	4.2×10^5	1.0×10^5

¹ Canola value used for calculation as it is the highest amount of active handled per day and highest application rate.

² Kg ai handled per day = kg seed treated per day × application rate (kg ai/kg seed).

³ For treater/applicators and bagger/sewer/stackers:

$$\text{Exposure (mg/kg bw/day)} = \frac{\text{Unit exposure (ug/kg ai handled per day)} \times \text{kg ai handled per day}}{80 \text{ kg bw} \times 1000 \text{ ug/mg}}$$

⁴ Dermal NOAEL = 1000 mg/kg bw/day; target dermal MOE= 100; Inhalation NOAEL = 8.5 mg/kg bw/day; target inhalation MOE= 100

⁵ For cleaning personnel, unit exposures are normalized for application rate. Exposure was calculated using the highest application rate proposed therefore:

$$\text{Exposure (mg/kg bw/day)} = \frac{\text{Unit exposure (ug ai/g ai/100 kg seed)} \times \text{application rate (g ai/100 kg seed)}}{80 \text{ kg bw} \times 1000 \text{ ug/mg}}$$

⁶ Cleaner task was < 1 hour per day therefore it was assumed other tasks such as treating may be performed.

3.2.2.2 Exposure and Risk Assessment for Workers Planting Treated Seed

Individuals have potential for exposure to DPX-YT669 250FS Fungicide Seed Treatment while planting treated seed. Chemical-specific data for assessing human exposure during planting of treated seed were not submitted. As such, surrogate exposure data were used to estimate risk to workers planting treated seed.

3.2.2.2.1 Canola, Rapeseed, Mustard, Corn and Soybean Seed

Commercially treated canola (including rapeseed and mustard), corn and soybean seed is generally bagged. During planting, workers load the treated seeds from bags into the planter. To address planting exposure from bagged seed, the Gaucho fungicide planting study was used as a surrogate. In the study, 15 replicates were monitored while planting treated corn seed from bags. The workers in the study loaded treated seed from bags into the planter and sowed the seed using a closed-cab tractor. Dermal exposure for each worker was measured by passive dosimetry using a combination of an inner whole body dosimeter, hand rinses, and face/neck wipes. The inner dosimeter was worn underneath worker clothing consisting of a single layer and chemical-resistant gloves. Inhalation exposure was monitored using personal air sampling pumps. The study was of good quality and had only minor limitations. As such, the arithmetic mean values from the study were adequate for risk assessment purposes.

The submitted dust-off study compared the dust generated from DPX-YT669 250FS Fungicide Seed Treatment (in tank mix with a variety of other formulations) on canola with the surrogate study formulation on its respective crop seed (Gaucho fungicide on corn). Based on dust generated per 100 kg of seed, canola had the highest dust produced followed by wheat and then corn with the least dust generated. No untreated controls were performed during the study.

Table 3.2.2.2.1 presents the risk estimates for the planting of canola (including rapeseed and mustard), corn and soybean seeds treated with DPX-YT669 250FS Fungicide Seed Treatment. The calculated MOEs were above the target MOE of 100. As such, there are no occupational risks of concern for planting treated canola (including rapeseed and mustard), corn and soybean seeds with DPX-YT669 250FS Fungicide Seed Treatment with closed-cab equipment when workers wear the personal protective equipment worn in the surrogate study. Given the high MOEs, it was determined that no additional confirmatory dust-off data was required.

Table 3.2.2.2.1 Exposure Estimates for Planting of Picoxystrobin Treated Seed Using a Closed-Cab Tractor

Exposure Scenario: Soybean	Amount of a.i. handled per day (kg) ¹	Unit Exposure (µg/kg a.i. handled)		Exposure (µg/kg bw/day) ²		MOE ³	
		Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
Closed-cab dermal and inhalation	0.551	1515.0	82.83	10.4	0.570	95,800	14,900
Closed-cab dermal, Open cab inhalation	0.551	1515.0	116.75	10.4	0.804	95,800	10,600

¹ Amount of a.i. handled was calculated by multiplying the amount of seed that could be planted per day (Maximum seed handled example: 9,000 kg soybean seed/day) by the application rate. Soybean seed was the highest amount handled per day.

² For planting exposure:

$$\text{Exposure } (\mu\text{g/kg bw/day}) = \frac{\text{Unit exposure } (\mu\text{g/kg ai handled per day}) \times \text{kg ai handled per day}}{80 \text{ kg bw}}$$

³ Dermal NOAEL = 1000 mg/kg bw/day; target dermal MOE= 100; Inhalation NOAEL = 8.5 mg/kg bw/day; target inhalation MOE= 100.

3.2.3 Bystander Exposure and Risk

Bystander exposure should be negligible since the potential for drift is expected to be minimal when planting treated seed.

3.3 Food Residues Exposure Assessment

3.3.1 Residues in Plant and Animal Foodstuffs

Picoxystrobin is currently registered for foliar application on various crops including canola, soybean and corn. Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for the residue definition for risk assessment and enforcement purposes, for the field trial data on various crops resulting from foliar applications, and for the frozen storage stability of picoxystrobin in plant and animal foodstuffs.

Based on foliar applications, MRLs for picoxystrobin were specified at 0.08 ppm for commodities of Crop Subgroup 20A (rapeseed subgroup), 0.05 ppm for dry soybeans, and 0.04 ppm for field corn, popcorn grain, and sweet corn kernels plus cob with husks removed. The seed treatment use of picoxystrobin on these crops at lower rates and longer PHIs are not expected to result in residues exceeding the established MRLs. Supervised residue trials with foliar applications conducted throughout North America using end-use products containing picoxystrobin in or on canola are sufficient to support the proposed maximum residue limit on mustard seeds (condiment type).

3.3.2 Exposure from Drinking Water

3.3.2.1 Concentrations in Drinking Water

Concentrations in drinking water as a result of seed treatment uses are expected to be less than those resulting from the registered use of picoxystrobin as a foliar application. Refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for more details on drinking water concentrations of picoxystrobin residues as a result of foliar application.

3.3.3 Dietary Risk Assessment

Acute and chronic dietary risk assessments were conducted using the Dietary Exposure Evaluation Model (DEEM-FCID™, Version 2.16), which uses updated food consumption data from the United States Department of Agriculture's Continuing Surveys of Food Intakes by Individuals, 1994-1996 and 1998.

3.3.3.1 Chronic Dietary Exposure Results and Characterization

The basic chronic dietary exposure from all supported picoxystrobin food uses (alone) for the general population, including infants and children, and all representative population subgroups is $\leq 0.7\%$ of the acceptable daily intake. Aggregate exposure from food and drinking water is

considered acceptable. The PMRA estimates that chronic dietary exposure to picoxystrobin from food and water is 1.0% (0.000483 mg/kg bw/day) of the ADI for the general population. The highest exposure and risk estimate is for children of 1-2 yrs old at 2.4% (0.001108 mg/kg bw/day) of the ADI. Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for details.

3.3.3.2 Acute Dietary Exposure Results and Characterization

The basic acute dietary exposure (food alone) from all supported picoxystrobin food uses is estimated to be 0.13% (0.000853 mg/kg bw/day) of the ARfD for the general population (95th percentile, deterministic). Aggregate exposure from food and drinking water is considered acceptable at 0.29% of the ARfD (0.001973 mg/kg bw/day) for the general population (95th percentile, deterministic). The highest exposure and risk estimate is for all infants (<1 year old) at 0.87% (0.005853 mg/kg bw/day) of the ARfD (95th percentile, deterministic). Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for details.

3.3.4 Aggregate Exposure and Risk

The aggregate risk for picoxystrobin consists of exposure from food and drinking water sources only. Aggregate risks were calculated based on acute and chronic endpoints.

3.3.5 Maximum Residue Limits

Table 3.3.1 Proposed Maximum Residue Limits

Commodity	Recommended MRL (ppm)
Mustard seeds (condiment type)	0.08

No revision is required for the current MRLs. Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for detailed discussion of the nature of the residues in animal and plant matrices, analytical methodologies, field trial data, and acute and chronic dietary risk estimates.

4.0 Impact on the Environment

For details on the impact on the environment, please see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

4.1 Fate and Behaviour in the Environment

For details on the fate and behaviour in the environment, please see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

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 concentrations (EECs) are concentrations of pesticide in various environmental media, such as food, water, soil and air. The EECs are estimated using standard models which 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).

Initially, a screening level risk assessment is performed to identify pesticides and/or specific uses that do not pose a risk to non-target organisms, and to identify those groups of organisms for which there may be a potential risk. The screening level risk assessment uses simple methods, conservative exposure scenarios (for example, direct application at a maximum cumulative application rate) and sensitive toxicity endpoints. A risk quotient (RQ) is calculated by dividing the exposure estimate by an appropriate toxicity value ($RQ = \text{exposure}/\text{toxicity}$), and the risk quotient is then compared to the level of concern (LOC = 1 for most species, 0.4 for pollinators and 2 for beneficial arthropods (predatory mite and parasitoid wasp)). If the screening level risk quotient is below the level of concern, the risk is considered negligible and no further risk characterization is necessary. If the screening level risk quotient is equal to or greater than the level of concern, then a refined risk assessment is performed to further characterize the risk. A refined assessment takes into consideration more realistic exposure scenarios (such as drift to non-target habitats) and might consider different toxicity endpoints. Refinements may include further characterization of risk based on exposure modelling, monitoring data, results from field or mesocosm studies, and probabilistic risk assessment methods. Refinements to the risk assessment may continue until the risk is adequately characterized or no further refinements are possible.

4.2.1 Risks to Terrestrial Organisms

The effects of picoxystrobin residues on terrestrial organisms have been previously reviewed and reported in the Proposed Registration Decision PRD2012-10, *Picoxystrobin*. A semi-field tunnel study to evaluate effects of two foliar applications of picoxystrobin on the brood of honey bees was submitted to satisfy PMRA data requirements for an acute laboratory study on honey bee larvae, as well as a chronic laboratory study on adult bees. The results of the semi-field tunnel study are presented in Appendix I, Table 1.

Statements are required on product labels for foliar application of picoxystrobin, to inform users of the toxicity of picoxystrobin to earthworms, and of the potential risks of picoxystrobin to beneficial arthropods (see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*). The need for these statements for the seed treatment application of picoxystrobin was assessed. A new risk assessment for honey bees was conducted for the seed treatment application of picoxystrobin. A new risk assessment was also conducted to determine whether treated seeds present unacceptable risk to birds and mammals that may eat the treated seed in the field after planting.

Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin* for the risk assessment of picoxystrobin residues on organisms other than earthworms, beneficial arthropods, honey bees, birds and mammals.

Earthworms: The maximum rate of application for seed treatment uses of picoxystrobin, 0.0075 mg a.i./seed, is estimated to be approximately equivalent to 4.2 g a.i./ha, a rate much lower than the seasonal maximum application rate of 875 g a.i./ha registered for foliar uses of picoxystrobin. The maximum rate of application for seed treatment use of picoxystrobin is also much lower than the rates at which significant worm mortalities were observed in field studies shortly after application (250 – 500 g a.i./ha; see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*). Based on this information, the seed treatment uses of picoxystrobin are expected to pose a negligible risk to earthworms and a hazard statement is not required on the label for DPX-YT669 250FS Fungicide Seed Treatment.

Beneficial arthropods: Laboratory and semi-field study results presented in the Proposed Registration Decision PRD2012-10, *Picoxystrobin* show that picoxystrobin is toxic to some predatory and parasitoid arthropods at rates of 250 and 500 g a.i./ha. The maximum rate of application for seed treatment uses of picoxystrobin, 0.0075 mg a.i./seed, is estimated to be approximately equivalent to 4.2 g a.i./ha. This rate is much lower than the in-field exposure estimates on plant surfaces for the registered foliar uses of picoxystrobin which range from 303 to 399 g a.i./ha for dry legumes and sweet corn, respectively (see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*).

The seed treatment uses of picoxystrobin are expected to pose a negligible risk to beneficial predatory and parasitoid arthropods. A label statement to mitigate risks to beneficial predatory and parasitoid arthropods is not required on the proposed label for DPX-YT669 250FS Fungicide Seed Treatment.

Bees: Acute oral and acute contact exposure to picoxystrobin does not result in treatment-related mortality in adult honey bees at doses up to 200 µg a.i./bee (see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*). The risk quotient for acute oral exposure is below the LOC, indicating that picoxystrobin is expected to pose a negligible risk to foraging worker bees.

In a semi-field tunnel study with picoxystrobin, two foliar applications, the second of which was made during full bloom and bee-flight of 250 or 500 g a.i./ha, did not result in significant effects on honey bee mortality, honey bee flight intensity, colony size, amount of brood, amount of food, colony condition and brood development. There was no effect on the behaviour of the

honey bees from the first (pre-flowering) application in both test item treatments. After the 2nd application (during flowering and bee-flight) intoxication symptoms were observed in the 250 and 500 g a.i./ha test item treatments on the day of the second application and the following day.

Exposure of honey bees from the seed treatment application of picoxystrobin at a maximum rate of approximately 4.2 g a.i./ha (0.0075 mg a.i./kg seed) on corn, soybean, canola, rapeseed and mustard seeds is expected to be much less than the exposure resulting from the two foliar applications of either 250 or 500 g a.i./ha in the semi-field tunnel study. The risk to bee colonies from the use of picoxystrobin as a seed treatment is expected to be minimal.

Foraging worker honey bees are not expected to be at risk from contact exposure to contaminated dust generated from seeding equipment following applications of picoxystrobin because of the low acute contact toxicity ($LD_{50} > 200 \mu\text{g a.i./bee}$) and results of a higher-tiered study.

The risk assessment for the seed treatment use picoxystrobin for bees is presented in Table 2 (Appendix I).

Birds and mammals: The screening level risk quotients for the seed treatment use of picoxystrobin do not exceed the level of concern for birds and mammals (Tables 3 to 6, Appendix I).

A risk to mammals from acute exposure via inhalation of Compound 26 (2-Methoxy-6-(trifluoromethyl)pyridine) is not expected for registered foliar uses of picoxystrobin (see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*). The maximum rate of application for picoxystrobin as a seed treatment (0.0075 mg a.i./seed, estimated to be a maximum of approximately 4.2 g a.i./ha) is much lower than the maximum yearly rate for foliar uses (875 g a.i./ha). Thus, a risk to mammals from acute exposure via inhalation of Compound 26 from seed treatment uses of picoxystrobin is not expected.

The seed treatment use of picoxystrobin is expected to pose negligible risk to birds and mammals.

4.2.2 Risks to Aquatic Organisms

For detailed review of the risks to aquatic organisms, see the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

Exposure of aquatic organisms through spray drift from seed treatment uses is not expected. The risk to aquatic organisms from run-off of picoxystrobin as a result of foliar uses was determined to be negligible in the Proposed Registration Decision PRD2012-10, *Picoxystrobin*. Because the application rates from seed treatment uses are less than 0.5% of the application rates from foliar uses, the risk to aquatic organisms from run-off of picoxystrobin as a result of seed treatment uses is also expected to be negligible.

4.2.3 Environmental Incident Reports

Environmental incident reports are obtained from two main sources, the Canadian pesticide incident reporting system (including both mandatory reporting from the registrant and voluntary reporting from the public and other government departments) and the United States Environmental Protection Agency's Ecological Incident Information System. Samples collected during the PMRA investigation of honey bee mortality incidents that occurred in Canada in 2013 were analyzed using an analytic method that included picoxystrobin. Picoxystrobin was detected at low levels in dead and live bees, comb pollen, brood honey and vegetation samples from July through to September, which would correspond with the active ingredient being applied through spray application. This active ingredient in non-toxic to bees and no link to the honey bee mortality reports was established. No environmental incident reports were found for picoxystrobin in the United States since the registration for foliar uses was granted in 2012. Specific information regarding the mandatory reporting system regulations that came into force on 26 April 2007 under the *Pest Control Products Act* can be found at <http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/incident/index-eng.php>.

5.0 Value

5.1 Effectiveness Against Pests

Fifty-two efficacy trials and a scientific rationale were submitted to support all proposed use claims.

Canola, rapeseed, and mustard (oil and condiment varieties)

Twenty-two field and laboratory trials conducted in Western Canada and the United States were reviewed to support the proposed claims on canola, rapeseed, and mustard. The trials demonstrated that application of DPX-YT669 250FS Fungicide Seed Treatment at a rate of 20 to 40 ml of product per 100 kg of seeds controlled damping-off, seedling blight, seed rot and root rot caused by *Rhizoctonia solani* and *Fusarium* spp.; seed-borne and soil-borne blackleg caused by *Leptosphaeria maculans*; and seed-borne *Alternaria brassicae* on canola, rapeseed, and mustard. Since *Alternaria brassicae* was the only pathogen tested, the claim of *Alternaria* spp. was supported for *Alternaria brassicae* only.

Soybean

Fourteen field and laboratory trials conducted in Western Canada and the United States were reviewed to support the claim of *Rhizoctonia solani* and *Fusarium* spp. on soybean. The trials demonstrated that application of DPX-YT669 250FS Fungicide Seed Treatment at a rate of 0.01 to 0.03 ml of product per seed controlled damping-off, seedling blight, seed rot and root rot caused by *Rhizoctonia solani* and *Fusarium* spp. on soybean.

Corn

Seven field and laboratory trials conducted in Canada and the United States as well as a scientific rationale were reviewed to support the claim of *Rhizoctonia solani* and *Fusarium* spp. on corn. The value information submitted demonstrated that application of DPX-YT669 250FS Fungicide Seed Treatment at a rate of 0.01 to 0.03 ml of product per seed controlled damping-off, seedling blight, seed rot and root rot caused by *Rhizoctonia solani* and *Fusarium* spp. on corn.

5.2 Non-Safety Adverse Effects

Assessments of percent visual phytotoxicity with DPX-YT669 250FS Fungicide Seed Treatment were performed in 18 of the 22 canola and mustard trials. Assessments of general phytotoxicity were performed in 8 corn trials. In addition, crop response was evaluated in 11 of 14 soybean trials. No visual phytotoxicity or negative impact on yield was observed with any of the proposed labeled rates of DPX-YT669 250FS Fungicide Seed Treatment on any of the tested crops.

5.3 Consideration of Benefits

5.3.1 Survey of Alternatives

There are fungicides currently registered on the labelled crops to control or suppress plant diseases registered on the DPX-YT669 250FS Fungicide Seed Treatment label. Refer to Table 8 for further information on alternative products.

5.3.2 Compatibility with Current Management Practices Including Integrated Pest Management

DPX-YT669 250FS Fungicide Seed Treatment can be used as part of a disease management plan. The use of integrated pest management (IPM) plans for the proposed crops would typically include disease monitoring, crop staging, and weather forecasting with the objective of maximizing marketable yield, minimizing the use of fungicide applications and minimizing the risk of disease resistance. DPX-YT669 250FS Fungicide Seed Treatment is compatible with current IPM strategies and it provides an alternative to currently registered fungicides.

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

The risk for resistance development for picoxystrobin (a QoI, Fungicide Group 11) is generally considered high. However, according to FRAC, the risk for resistance for this seed treatment is low due to the low pathogen and agronomic risks i.e. seed- and soil-borne pathogens are considered low risk; seed treatments are only applied once a year; and the uptake of QoI fungicides at registered dose rates from the seed or plant root to the upper parts of the plant is limited and it has minimal effect on foliar pathogens.

5.4 Supported Uses

All the proposed claims were supported with the exception that the seed-borne *Alternaria* spp. claim on canola, rapeseed and mustard is only being supported for the specific species *Alternaria brassicae* due to limited information. Please refer to Table 9 for a summary of supported use claims.

6.0 Pest Control Product Policy Considerations

6.1 Toxic Substances Management Policy Considerations

For details on pest control product policy considerations, please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*.

7.0 Summary

7.1 Human Health and Safety

The toxicology database submitted for picoxystrobin is adequate to define the majority of toxic effects that may result from exposure. There was no evidence of increased susceptibility of the young in reproduction or developmental toxicity studies. In short-term and chronic studies on laboratory animals, the primary target was the G.I. tract, resulting in irritation and reduced body weights. There was evidence of neurotoxicity. There was evidence of testicular oncogenicity in rats after longer-term dosing, but only in the presence of overt toxicity. The risk assessment protects against the toxic effects noted above by ensuring that the level of human exposure is well below the lowest dose at which these effects occurred in animal tests.

Workers treating seed commercially with DPX-YT669 250FS Fungicide Seed Treatment and workers planting treated seed are not expected to be exposed to levels of picoxystrobin that will result in an unacceptable risk when DPX-YT669 250FS Fungicide Seed Treatment is used according to label directions. The personal protective equipment on the product label is adequate to protect workers.

The proposed seed treatment use of picoxystrobin on canola, rapeseed, mustard, soybean and corn does not constitute a health risk of concern for chronic or acute dietary exposure (food and drinking water) to any segment of the population, including infants, children, adults and seniors. No revision is required for the current MRLs. The PMRA recommends that the following MRL be specified for residues of picoxystrobin.

Commodity	Recommended MRL (ppm)
Mustard seeds (condiment type)	0.08

7.2 Environmental Risk

The use of DPX-YT669 250FS Fungicide Seed Treatment containing the active ingredient picoxystrobin is not expected to result in increased environmental exposure to terrestrial or aquatic organisms compared to registered foliar application of picoxystrobin. The risk to non-target terrestrial and aquatic organisms from the seed treatment application of picoxystrobin is expected to be negligible.

7.3 Value

The value information submitted to register DPX-YT669 250FS Fungicide Seed Treatment is adequate to demonstrate value, including efficacy for use on the labelled crops and diseases.

Picoxystrobin has not been identified as a priority in the Canadian Grower Priority Database for uses that are being proposed. However there are three low priorities that have been identified for the control of root rot, seedling blight and damping off on corn but with biological products.

There are currently other group 11 fungicides and several other fungicides (groups 3, 4, 7, 12, M) registered for control of seedling disease complex on canola, soybean and corn. However, the addition of a new active ingredient, picoxystrobin, used as seed treatment will offer an alternative product on the market to the growers.

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 Picoxystrobin (registration number 30469) and DPX-YT669 250FS Fungicide Seed Treatment, containing the technical grade active ingredient picoxystrobin to control soil and seed-borne blackleg, seed borne *Alternaria* caused by *A. brassicae* in canola, rapeseed and mustards and the seedling disease complex (damping off, seedling blight, seed rot and root rot) caused by *Fusarium spp.* and *Rhizoctonia Solani* in canola, rapeseed, mustards, corn and soybeans.

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	microgram
µm	micrometre
µM	micromolar
µPa	microPascal
τ	lag time per event
1/n	exponent for the Freundlich isotherm
A	application
a.i.	active ingredient
AD	administered dose
ADD	absorbed daily dose
ADI	acceptable daily intake
APR	application rate
ARfD	acute reference dose
atm	atmosphere
bw	body weight
CI	confidence interval
cm	centimetre
C _{max}	maximum concentration
d	day(s)
DACO	data code
DA	dermal absorption
DAF	dermal absorption factor
DEEM	Dietary Exposure Evaluation Model
DER	data evaluation report
DU	dust
dw	dry weight
E	total dermal exposure
EC	emulsion
ED	exposure duration
EDE	estimated daily exposure
EEC	estimated environmental concentration
EP	end-use product
FA	fraction of absorbed water
Fc	food consumption
FDA	<i>Food and Drugs Act</i>
FIR	food ingestion rate
FOB	functional observation battery
FRAC	Fungicide Resistance Action Committee
FS	flowable suspension
Fw	fresh weight
g	gram
G	granular
gal	gallon
GAP	Good Agricultural Practice

GIT	gastrointestinal tract
GLP	Good Laboratory Practice
ha	hectare
hr	hour
IPM	integrated pest management
IRS	ingestion rate
ISO	International Organization for Standardization
kg	kilogram
km	kilometre
L	litre
LC ₅₀	lethal concentration 50%
LD ₅₀	lethal dose 50%
LOAEL	lowest observed adverse effect level
LOC	level of concern
LOD	limit of detection
LOEC	low observed effect concentration
LOQ	limit of quantitation
m	metre
MAS	maximum average score
Max	maximum
mg	milligram
Min	minimum
mL	millilitre
mm	millimetre
mmole	millimole
MOA	mode of action
MOE	margin of exposure
MRL	maximum residue limit
mw	molecular weight
n	number of field trials
N/A	not applicable
nm	nanometre
NMR	nuclear magnetic resonance
NOAEC	no observed adverse effect concentration
NOAEL	no observable adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
NOER	no observed effect rate
NR	not relevant or not required
obs	observation
P _{cw}	steady-state permeability coefficient of the stratum corneum
PD	pyridimidine radiolabel
PDA	photodiode array
PE	late postemergent
PES	post extraction solids
PF	protection factor from clothing

PFC	plaque-forming cell
pH	measure of the acidity or basicity of an aqueous solution
PHED	Pesticide Handlers Exposure Database
PHI	preharvest interval
pKa	dissociation constant
PMRA	Pest Management Regulatory Agency
PND	postnatal day
PO	postemergence
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PRD	Proposed Registration Decision
PRE	pre-emergence
PRVD	Proposed Re-Evaluation Decision document
QoI	quinone outside inhibitor
RA	risk assessment
RAC	raw agricultural commodity
RBC	red blood cell count
RD	residue definition
RED	Reregistration Eligibility Decision (USEPA)
REI	restricted entry interval
rel	relative
RQ	risk quotient
RRD	Re-Evaluation Decision document
RRE	re-arrangement ester
rRNA	ribosomal ribonucleic acid
RTI	retreatment interval
SC	suspension concentrate
SD	standard deviation
TC	transfer coefficient
TDAR	T-dependant antigen response
TDE	total dermal exposure
TGAI	technical grade active ingredient
TSMP	Toxic Substances Management Policy
USEPA	United States Environmental Protection Agency
USFDA	United States Food and Drug Administration
wk	week
wt	weight
yr	year

Appendix I Tables and Figures

Table 1 Toxicity of a 250 g/L Soluble Concentrate formulation of picoxystrobin to honey bee colonies in a semi-field tunnel study

Organism	Exposure	Study results	Reference
Honey bee colonies	Semi-field tunnel test, Picoxystrobin (DPX-YT669) 250 g/L SC formulation	<p><u>Treatments:</u> Picoxystrobin treatment groups T1 (2 × 250 g a.i./ha) and T2 (2 × 500 g a.i./ha); reference item group R (1 × 150 g fenoxycarb/ha); and tap water control group.</p> <p>There was no effect on honey bee mortality or honey bee flight intensity in both test item treatments T1 and T2. Regarding the behaviour of the honey bees, there was no effect of the first (pre-flowering) application in both test item treatments. After the 2nd application (during flowering and bee-flight) intoxication symptoms were observed in both test item treatments on the day of the application and the following day (DAA0aa and DAA1). There was no effect of the test item treatments on the colony size, amount of brood, amount of food and colony condition.</p> <p>Although the study author reported there was no statistically significant effect of the test item treatments on the brood development (brood index, compensation index and termination rate) in the observed individual brood cells, a slight treatment related reduction in brood index (0-15%) and compensation index (0-17%) was observed in T2 (2 × 500 g a.i./ha) compared to the control. This indicates that a slightly higher proportion of the brood failed in T2 compared to the control. These effects were much less than those observed in the reference treatment R (0-57% and 0-65%, respectively). The termination rate for T2 and R when compared to the control was 22% and 145%, respectively.</p>	2405537

Table 2 Risk assessment for honey bees based on the seed treatment uses of picoxystrobin

Organism	Exposure	Endpoint value ¹	EEC	RQ	Level of Concern
Bee	Oral, YF10267 (250 g/L SC formulation)	48-hr LD ₅₀ >200 µg a.i./bee	0.29 µg a.i./bee	<0.001	Not exceeded
	Semi-field tunnel test, Picoxystrobin (DPX-YT669) 250 g/L SC formulation applied to <i>Phacelia tanacetifolia</i>	<p>Two foliar applications of either 250 or 500 g a.i./ha (the second application was made during full bloom and bee-flight) in the semi-field tunnel study did not result in effects on honey bee mortality, honey bee flight intensity, colony size, amount of brood, amount of food and colony condition compared to the control group.</p> <p>After the 2nd application (during flowering and bee-flight) intoxication symptoms were observed in both test item treatments on the day of the application and the following day. The behaviour of the honey bees was normal afterwards.</p> <p>A slightly higher proportion of the brood failed in the 2 × 500 g a.i./ha treatment compared to the control but the effects were much less than those observed in the reference group.</p> <p>Exposure from a seed treatment application of picoxystrobin on corn, soybean, canola, rapeseed and mustard seeds (highest rate of 4.2 g a.i./ha; 0.0075 mg a.i./seed) is expected to be much less than exposure from the two foliar applications of 500 g a.i./ha (the second of which was made during full bloom and bee-flight) made during the semi-field tunnel study.</p> <p>The seed treatment uses of picoxystrobin are expected to pose minimal risk to honey bee colonies.</p>			

¹ Acute oral and acute contact study endpoints are from PRD2012-10, *Picoxystrobin*.

Table 3 Estimated exposure calculations for birds and mammals through the consumption of seeds treated with picoxystrobin

Crop	# seeds/g ¹	Generic body weight (g)	Food Ingestion Rate (g dw diet/day) ²	Estimated daily exposure (# seeds/day) ³	Maximum proposed rate (mg a.i./seed)	Estimated Dietary Exposure (mg a.i./kg bw/day) ⁴
Birds						
Corn	2.63	20	5.1	13.4	0.0075	5.0
		100	19.9	52.5		3.9
		1000	58.2	153		1.1

Soybean	5	20	5.1	25.4	0.0075	9.5
		100	19.9	99.7		7.5
		1000	58.2	290.8		2.2
Canola, rapeseed, mustard	182-529, depending on the variety	20	5.1	923-2700, depending on the variety	0.0002-0.0006, depending on the variety	25.3
		100	19.9	3627-10550, depending on the variety		19.9
		1000	58.2	10570-30770, depending on the variety		5.8
Mammals						
Corn	2.63	15	2.2	5.7	0.0075	2.9
		35	4.4	11.5		2.5
		1000	68.7	180.8		1.4
Soybean	5	15	2.2	10.9	0.0075	5.4
		35	4.4	21.8		4.7
		1000	68.7	343.6		2.6
Canola, rapeseed, mustard	182-529, depending on the variety	15	2.2	396-1150, depending on the variety	0.0002-0.0006, depending on the variety	14.5
		35	4.4	794-2310, depending on the variety		12.5
		1000	68.7	12490-36360, depending on the variety		6.9

¹ # seeds/g calculated based on the weight of 1000 seeds as per standard guidance (380 g for 1000 corn seeds, 200 g for 1000 soybean seeds, 2.0 g for 1000 canola – Polish seeds, 5.46 g for 1000 canola – Argentine OP seeds, 4.5 g for 1000 canola – Argentine SYN seeds, 5.5 g for 1000 canola – Argentine HYB seeds, and 1.89 g for 1000 canola – mustard seeds).

² Food Ingestion Rate; is based on equations from Nagy (1987):

For generic birds with body weight less than or equal to 200 g, the “passerine” equation was used: $FIR (g \text{ dry weight/day}) = 0.398(BW \text{ in g})^{0.850}$

For generic birds with body weight greater than 200 g, the “all birds” equation was used:

$$FIR (g \text{ dry weight/day}) = 0.648(BW \text{ in g})^{0.651}$$

For mammals, the “all mammals” equation was used:

$$FIR (g \text{ dry weight/day}) = 0.235(BW \text{ in g})^{0.822}$$

Food ingestion is calculated in terms of g dry weight of food per day. As a conservative estimate, treated seed is assumed to be equivalent to dry weight of food as minimal moisture is expected to be present in treated seeds ready for planting.

³ Estimated daily exposure in # seeds/day calculated as # seeds/g × FIR. Assumes that 100% of the diet is comprised of treated seeds.

⁴ Estimated Dietary Exposure in mg a.i./kg bw/day was calculated as (# seeds/day + organism weight) × mg a.i./seed

Table 4 Toxicity of picoxystrobin to birds and mammals expressed as a daily dose

	Dose-based endpoint	Endpoint value (mg a.i./kg bw/day) ¹	Uncertainty factor	Endpoint for risk assessment (mg a.i./kg bw/day)
Birds				
Acute oral	LD ₅₀	>486	10	>48.6
Acute dietary	5-d LD ₅₀	>1830	10	>183
Reproduction	NOEL	110.3	n/a	110.3
Mammals				
Acute oral	LD ₅₀	>5000	10	>500
Reproduction	NOEL	80	n/a	80

¹ Data from PRD2012-10, *Picoxystrobin*

Table 5 Screening level risk assessment for birds and mammals based on the picoxystrobin seed treatment application on corn

	Endpoint for risk assessment (mg a.i./kg bw/day) ¹	Estimated Dietary Exposure (mg a.i./kg bw/day)	RQ	Level of Concern
Small bird (0.02 kg)				
Acute	>48.6	5.0	<0.1	Not exceeded
Reproduction	110.3	5.0	0.05	Not exceeded
Medium bird (0.1 kg)				
Acute	>48.6	3.9	<0.08	Not exceeded
Reproduction	110.3	3.9	0.04	Not exceeded
Large bird (1 kg)				
Acute	>48.6	1.1	<0.02	Not exceeded
Reproduction	110.3	1.1	0.01	Not exceeded
Small mammal (0.015 kg)				
Acute	>500	2.9	<0.006	Not exceeded
Reproduction	80	2.9	0.04	Not exceeded
Medium mammal (0.035 kg)				
Acute	>500	2.5	<0.005	Not exceeded
Reproduction	80	2.5	0.03	Not exceeded
Large mammal (1 kg)				
Acute	>500	1.4	<0.003	Not exceeded
Reproduction	80	1.4	0.02	Not exceeded

¹Endpoints from PRD2012-10, *Picoxystrobin*

Table 6 Screening level risk assessment for birds and mammals based on the picoxystrobin seed treatment application on soybeans

	Endpoint for risk assessment (mg a.i./kg bw/day) ¹	Estimated Dietary Exposure (mg a.i./kg bw/day)	RQ	Level of Concern
Small bird (0.02 kg)				
Acute	>48.6	9.5	<0.2	Not exceeded
Reproduction	110.3	9.5	0.09	Not exceeded
Medium bird (0.1 kg)				
Acute	>48.6	7.5	<0.2	Not exceeded
Reproduction	110.3	7.5	0.07	Not exceeded
Large bird (1 kg)				
Acute	>48.6	2.2	<0.04	Not exceeded
Reproduction	110.3	2.2	0.02	Not exceeded
Small mammal (0.015 kg)				
Acute	>500	5.4	<0.01	Not exceeded
Reproduction	80	5.4	0.07	Not exceeded
Medium mammal (0.035 kg)				
Acute	>500	4.7	<0.009	Not exceeded
Reproduction	80	4.7	0.06	Not exceeded
Large mammal (1 kg)				
Acute	>500	2.6	<0.005	Not exceeded
Reproduction	80	2.6	0.03	Not exceeded

¹Endpoints from PRD2012-10, Picoxystrobin**Table 7 Screening level risk assessment for birds and mammals based on the picoxystrobin seed treatment application on canola, rapeseed and mustard**

	Endpoint for risk assessment (mg a.i./kg bw/day) ¹	Estimated Dietary Exposure (mg a.i./kg bw/day)	RQ	Level of Concern
Small bird (0.02 kg)				
Acute	>48.6	25.4	<0.5	Not exceeded
Reproduction	110.3	25.4	0.2	Not exceeded
Medium bird (0.1 kg)				
Acute	>48.6	19.9	<0.4	Not exceeded
Reproduction	110.3	19.9	0.2	Not exceeded
Large bird (1 kg)				
Acute	>48.6	5.8	<0.1	Not exceeded
Reproduction	110.3	5.8	0.05	Not exceeded
Small mammal (0.015 kg)				
Acute	>500	14.5	<0.03	Not exceeded
Reproduction	80	14.5	0.2	Not exceeded

	Endpoint for risk assessment (mg a.i./kg bw/day) ¹	Estimated Dietary Exposure (mg a.i./kg bw/day)	RQ	Level of Concern
Medium mammal (0.035 kg)				
Acute	>500	12.5	<0.02	Not exceeded
Reproduction	80	12.5	0.2	Not exceeded
Large mammal (1 kg)				
Acute	>500	6.9	<0.01	Not exceeded
Reproduction	80	6.9	0.09	Not exceeded

¹Endpoints from PRD2012-10, *Picoxystrobin*

Table 8 Registered Alternative Products (as of April, 2014)

CROP	DISEASE	ACTIVE / RESISTANCE GROUP NO.
Canola	Seedling disease complex (<i>Fusarium</i> spp., <i>Rhizoctonia solani</i>)	<ul style="list-style-type: none"> • <i>Bacillus subtilis</i>^x / 44 • Boscalid/7 • Pyraclostrobin/11 • Metalaxyl/4 • Trifloxystrobin/11 • Difenoconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Ipconazole/3 • Iprodione /2 • Thiram/M3 • Carbathiin/7
	Blackleg, soil-borne and seed-borne (<i>Leptosphaeria maculans</i>)	<ul style="list-style-type: none"> • Thiram/M3 • Carbathiin/7 • Iprodione /2 • Difenoconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Trifloxystrobin/11 • Pyraclostrobin/11 • Metalaxyl/4
	Alternaria seed-borne (<i>Alternaria</i> spp.)	<ul style="list-style-type: none"> • Metalaxyl/4 • Thiram/M3 • Carbathiin/7 • Difenoconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Pyraclostrobin/11
Rapeseed	Seedling disease complex (<i>Fusarium</i> spp., <i>Rhizoctonia solani</i>)	<ul style="list-style-type: none"> • <i>Bacillus subtilis</i>^x /44 • Metalaxyl/4 • Trifloxystrobin/11 • Thiram/M3 • Ipconazole/3

CROP	DISEASE	ACTIVE / RESISTANCE GROUP NO.
		<ul style="list-style-type: none"> • Carbathiin/7
	Blackleg, soil-born and seed-borne (<i>Leptosphaeria maculans</i>)	<ul style="list-style-type: none"> • Carbathiin/7 • Thiram/M3 • Metalaxyl/4 • Trifloxystrobin/11
	Alternaria seed-borne (<i>Alternaria</i> spp.)	<ul style="list-style-type: none"> • Carbathiin/7 • Thiram/M3 • Metalaxyl/4 • Trifloxystrobin/11
Mustard	Seedling disease complex (<i>Fusarium</i> spp., <i>Rhizoctonia solani</i>)	<ul style="list-style-type: none"> • Azoxystrobin/11 • <i>Bacillus subtilis</i>^x /44 • Iprodione/2 • Difenconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Carbathiin/7 • Thiram/M3 • Pyraclostrobin/11
	Blackleg, soil-born and seed-borne (<i>Leptosphaeria maculans</i>)	<ul style="list-style-type: none"> • Difenconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Iprodione/2 • Thiram/M3 • Pyraclostrobin/11 • Carbathiin/7
	Alternaria seed-borne (<i>Alternaria</i> spp.)	<ul style="list-style-type: none"> • Difenconazole/3 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • Pyraclostrobin/11
Soybeans	Seedling disease complex (<i>Fusarium</i> spp., <i>Rhizoctonia solani</i>)	<ul style="list-style-type: none"> • Azoxystrobin/11 • Fludioxonil/12 • Metalaxyl-M and S-isomer/4 • ^x <i>Bacillus subtilis</i>/44 • Captan/M4 • Pyraclostrobin/11 • Boscalid/7 • Metalaxyl/4 • Penflufen/7 • Prothioconazole/11 • Saponins of <i>Chenopodium quinoa</i>^x • Thiram/M3 • Carbathiin/7 • Fluxapyroxad/7
Corn	Seedling disease complex (<i>Fusarium</i> spp., <i>Rhizoctonia solani</i>)	<ul style="list-style-type: none"> • Azoxystrobin/11 • Captan/M4

CROP	DISEASE	ACTIVE / RESISTANCE GROUP NO.
		<ul style="list-style-type: none"> • Difenoconazole/3 • Metalaxyl-M and S-isomer/4 • Ipconazole/3 • Mancozeb/M3 • Metalaxyl/4 • Penflufen/7 • Prothioconazole/3 • Pyraclostrobin/11 • Triticonazole/3

^x Classify products into conventional or non-conventional pesticides.

Table 9 List of Supported Uses

Proposed label claim	Supported use claim
Damping-off, seedling blight, seed rot and root rot caused by <i>Fusarium</i> spp. and <i>Rhizoctonia solani</i> / canola, rapeseed, mustard (oil and condiment varieties) / 20-40 mL of DPX-YT669 250FS seed treatment per 100 kg seed	Accepted as proposed
Blackleg, soil-borne and seed-borne (<i>Leptosphaeria maculans</i>) / canola, rapeseed, mustard (oil and condiment varieties) / 20-40 mL of DPX-YT669 250FS seed treatment per 100 kg seed	Accepted as proposed
<i>Alternaria</i> , seed-borne (<i>Alternaria</i> spp.) / canola, rapeseed, mustard (oil and condiment varieties) / 20-40 mL of DPX-YT669 250FS seed treatment per 100 kg seed	Only <i>Alternaria brassicae</i> is supported.
Damping-off, seedling blight, seed rot and root rot caused by <i>Fusarium</i> spp. and <i>Rhizoctonia solani</i> / Soybean / 0.01 – 0.03 ml of DPX-YT669 250FS seed treatment per seed	Accepted as proposed
Damping-off, seedling blight, seed rot and root rot caused by <i>Fusarium</i> spp. And <i>Rhizoctonia Solani</i> / Corn / 0.01 – 0.03 ml of DPX-YT669 250FS seed treatment per seed	Accepted as proposed

References

A. List of Studies/Information Submitted by Registrant

1.0 Chemistry

Please refer to the Proposed Registration Decision PRD2012-10, *Picoxystrobin*

2.0 Human and Animal Health

PMRA

Document

Number Reference

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| 1772278 | 2009, Fluquinconazole and Prochloraz: Determination of operator exposure during cereal seed treatment with Jockey Fungicide in Germany, United Kingdom and France, DACO: 5.4 |
| 1571553 | 2007, Determination of operator exposure to imidacloprid during loading/sowing of Gaucho treated maize under realistic field conditions in Germany and Italy, SeedTropex Steering Group, DACO: 5.4 |
| 2405503 | 2011, Heubach Dust Test: DPX-HGW86 Containing Seed Treatment on Canola/Oilseed Rape. E.I. du Pont de Nemours and Company, INCOTEC Analytical Lab Europe B.V. Project Number DuPont-32668. Unpublished. |

3.0 Environment

PMRA

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| 2405537 | 2013, Picoxystrobin (DPX-YT669) 250 g/l SC: A semi-field study to evaluate effects of two applications on the brood of honey bees (<i>Apis mellifera</i> ; Hymenoptera, Apidae) in Phacelia Tanacetifolia in Germany 2012, DACO: 9.2.4.3 |
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| 2347027 | 2013, Biological assessment dossier for DPX-YT669 250FS - Canada, 2013, DACO: 10.1,10.2,10.2.1,10.2.2,10.2.3,10.2.3.1,10.2.3.4(C),10.3,10.3.1,10.3.2,10.3.2(B),10.3.3, 10.4,10.5,10.5.3 |
| 2368684 | 2013, response to clarification |

B. Additional Information Considered**i) Unpublished Information****1.0 Environment****PMRA****Document****Number Reference**

2306177 2014, Unpublished PMRA monitoring data for picoxystrobin detected in various matrices during a PMRA investigation of honey bee mortality incidents in Canada in 2013, DACO: 8.6