Memorandum Supporting Decision to Approve Registration for the New Active Ingredient, Pyridate

Approved by: Ed Messina Digitally signed by EDWARD MESSINA Date: 2020.09.02 16:36:36 -04'00'

Ed Messina Esq., Acting Director
Office of Pesticide Programs
US Environmental Protection Agency

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I. SUMMARY

This memorandum supports the decision of the U.S. Environmental Protection Agency (referred hereafter as EPA or the Agency) to register under 3(c)(5) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), one technical product and four end-use products for the active ingredient, pyridate. Pyridate is a phenyl-pyridazine herbicide which inhibits photosynthesis at photosystem II site B (i.e. Group 6 according to the Weed Science Society of America (WSSA)). The products being registered contain uses for postemergence control of annual broadleaf weeds in *Brassica* head and stem vegetables, cabbage, chickpea, field corn, collards, peanuts, and mint, plus preplant burndown in field corn.

II. REQUESTED ACTION

On January 3, 2017, the EPA received an application from Belchim Crop Protection (EPA Company Number: 91746) for registration of the herbicide, pyridate (CAS No. 55512-33-9), for use in *Brassica* head and stem vegetables (crop subgroup 5A), cabbage, chickpea (garbanzo bean), collards, field corn, mint, and peanuts.

Pyridate was previously registered for use in the United States; however, all FIFRA Section 3 pyridate product registrations were cancelled in 2004 due to the registrant's failure to pay the required annual maintenance fee (October 27, 2004; 69 FR 62666; FRL-7683-7). The initial registrant (Syngenta Crop Protection, Inc.) subsequently requested that EPA cancel all pyridate product registrations and terminate all use of the pesticide,[1] and EPA issued a cancellation order granting the requested cancellation to terminate uses (November 21, 2007; 72 FR 65573; FRL-8339-3). Because pyridate previously had food use registrations, and those tolerances remain in place under 40 Code of Federal Regulations 180, no new tolerance petition was necessary for this requested action. More recently, several states have obtained FIFRA Section 18 emergency use exemptions for weed control in mint.

As required by FIFRA section 3(c)(4), EPA issued a notice of receipt for this application and the general public was given 30 days to comment on the application. Only one comment was received. On July 10, 2020 EPA published a proposed decision on the registration of pyridate, and the general public was given 30 days to comment on the decision and supporting documents. Seven comments were received. EPA has considered and responded to all comments in the document "*Response to Public Comments on the Notice of Receipt of Application for Registration of Pyridate, submitted by Belchim Crop Protection, and on EPA's "Memorandum Supporting Proposed Decision to Approve Registration for the New Active Ingredient, Pyridate,"* which can be found at regulations.gov in docket ID number EPA-HQ-OPP-2017-0432.

[1] Pyridate Final Work Plan (FWP) For Registration Review (August 2007), https://archive.epa.gov/oppsrrd1/registration_review/web/pdf/pyridate_workplan.pdf

USE PROFILE

All four pyridate end-use products are identical in labeling and formulation; they are all emulsifiable-concentrate formulations and contain 56.1% pyridate by weight. The labels allow application as a pre-plant burndown broadcast spray for field corn only, and for all uses as a post-emergence broadcast spray through ground equipment at a maximum single application rate of 0.94 lb ai/A. The labels indicate that for optimum control of weeds, apply pyridate to actively growing weeds by the 4-leaf stage.

III. EVALUATION

In evaluating a pesticide registration application, the EPA assesses a wide variety of exposure information (i.e., where and how the pesticide is used) and environmental-fate (i.e., how the chemical will move in the environment) and toxicity studies (i.e., effects on humans and other non-target organisms) to determine the likelihood of adverse effects (i.e., risk) from exposures associated with the proposed use of the product. Risk assessments are developed to evaluate the environmental fate of the compound as well as how it might affect a wide range of non-target organisms including humans, terrestrial and aquatic wildlife (plants and animals). In addition, a biological and economic benefits assessment (benefits vs. risk) may be conducted. On the basis of these assessments, the EPA evaluates and approves language for each pesticide label to ensure the directions for use and safety measures are appropriate to mitigate any potential risk. In this way, the pesticide label communicates essential limitations and mitigations that are necessary for public safety. It is a FIFRA violation to use a pesticide in a manner inconsistent with its labeling.

A. Assessment of Risks to Human Health

The EPA requires a wide range of studies in order to assess a pesticide use scenario. The EPA has evaluated the available toxicity data for pyridate and considered its validity, completeness, and reliability as well as the relationship of the results of the studies to human risk. The EPA has also considered available information concerning the variability of the sensitivities of major identifiable subgroups of consumers, including infants and children. For the registered uses of pyridate, the database of studies required to support the assessment of risk to human health is complete.

More details on the human health risk assessment are in the document entitled *Pyridate. Human Health Risk Assessment for the Renewal of the Section 3 Registration for Use on Brassica Head and Stem Vegetables, Cabbage, Chickpea, Corn, Collards, Peanuts, and Mint*, which can be found at regulations.gov in docket ID number EPA-HQ-OPP-2017-0432.

1. Toxicology Profile

Pyridate is classified as having low acute toxicity. It exhibits low acute toxicity via oral (Toxicity Category III), inhalation (Toxicity Category IV), and dermal (Toxicity Category III) routes. It is non-irritating to the eye (Toxicity Category IV). It is slightly irritating to the skin (Toxicity Category III) and is positive for dermal sensitization.

The available toxicity database for pyridate indicates that the nervous system is the toxicological target in studies where pyridate was administered via gavage or capsules, with the dog and the rat showing similar levels of sensitivity once bodyweight scaling is considered. The neurotoxic effects were associated with the peak plasma concentrations, occurred within a few hours of treatment, and were resolved in less than 24 hours of the bolus dose from gavage or capsule administration. The neurobehavioral effects do not appear to be accumulative or progressive since the effects in the subchronic dog study occurred at approximately the same dose where effects were seen in the chronic dog study and were generally resolved within 6 hours of treatment. No evidence of neurotoxicity was observed in the studies where pyridate was administered via the diet following subchronic or chronic dietary exposure. Effects observed following dietary exposure were generally limited to systemic toxicity, primarily reductions in bodyweight. Additionally, there were no effects seen at the limit dose in the dermal toxicity study.

There was no evidence of increased susceptibility to the fetus or offspring in the available developmental and reproduction toxicity studies. Developmental (missing and unossified sternebrae and decreased bodyweight in fetuses) and offspring effects (decreased bodyweights) were seen in the presence of maternal toxicity. An increased incidence of abortions was also noted in the developmental toxicity study in rabbits at the highest dose tested.

Once a pesticide's toxicological profile is determined, EPA identifies toxicological points of departure (POD) and levels of concern to use in evaluating the risk posed by human exposure to the pesticide. For hazards that have a threshold below which there is no appreciable risk, the toxicological POD is used as the basis for derivation of reference values for risk assessment. PODs are developed based on a careful analysis of the doses in each toxicological study to determine the dose at which no adverse effects are observed (the NOAEL) and the lowest dose at which adverse effects of concern are identified (the LOAEL). Uncertainty/safety factors are used in conjunction with the POD to calculate a safe exposure level - generally referred to as a population-adjusted dose (PAD) or a reference dose (RfD) - and a safe margin of exposure (MOE). For non-threshold risks, the Agency assumes that any amount of exposure will lead to some degree of risk. Thus, the Agency estimates risk in terms of the probability of an occurrence of the adverse effect expected in a lifetime.

The POD for acute dietary exposures, as well as short and intermediate-term inhalation exposures, is based on clinical signs indicative of potential neurotoxicity including emesis and ataxia. The POD for chronic dietary exposures is based on decreased bodyweight observed in the chronic study in rats. Inhalation exposure is considered to be equivalent to oral exposure. No short- and intermediate-term dermal endpoints were selected as there were no adverse effects/hazards observed in the route-specific dermal toxicity study up to the limit dose, and no reproductive/developmental hazard was seen in the toxicity database. The level of concern (LOC) for occupational inhalation risk is an MOE less than 100. For all exposure scenarios, a 100-fold uncertainty factor (UF) (10X for interspecies extrapolation and 10X for intraspecies variation) was applied. Pyridate is classified as "not likely to be carcinogenic to humans."

The Food Quality Protection Act (FQPA) Safety Factor (SF) was reduced to 1X for all exposure scenarios for the following reasons: the toxicology database for pyridate is complete, dietary and residential exposure analyses are unlikely to underestimate exposure, and there was no evidence

of increased offspring susceptibility in the pyridate toxicological database. There is evidence of neurotoxicity following bolus dosing of pyridate; however, the selected endpoints are protective of the observed effects.

2. Dietary (Food + Water) Risks

The human health dietary risk assessment addresses exposures that individuals receive through food consumption and drinking water. Humans may be exposed to pyridate in food and drinking water since pyridate may be applied directly to growing crops and following harvest, and application may result in pyridate reaching surface and ground sources of drinking water. High-end assumptions such as modeled, high-end estimates of residues in drinking water, assuming 100% crop treated (CT) and tolerance-level residues, were used to assess dietary risk.

The acute dietary risk estimates are below the Agency's LOC (<100% aPAD) at the 95th exposure percentile for the general U.S. population (9.9% of the aPAD) and for all infants (<1-year-old) (31% of the aPAD), the most highly exposed population subgroup. The chronic dietary risk estimates utilized 4.9% of the cPAD for the general U.S. population and 13% of the cPAD for all infants (<1-year-old), the most highly exposed population subgroup. Actual exposures are likely to be lower since they are based on the assumption that all of the labeled crops are treated, and residues are based on upper-bound tolerance values. Pyridate was classified as "not likely to be carcinogenic to humans;" therefore, a cancer dietary assessment was not performed.

3. Residential Handler Risks

Residential handler/post-application exposures to pyridate are not anticipated for the registered crop use sites.

4. Aggregate Risk

In accordance with FQPA, the Agency must consider and aggregate pesticide exposures and risks from three major sources: food, drinking water, and residential exposures. In an aggregate assessment, exposures from relevant sources are added together and compared to quantitative estimates of hazard, or the risks themselves can be aggregated. Since there are no residential exposures expected for pyridate, all aggregate exposures are equivalent to dietary exposure estimates. EPA estimated that there are no risks of concern from dietary exposure; therefore, there is no aggregate risk concerns.

5. Cumulative Risk

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

6. Occupational Handlers Risks

Based on the anticipated use patterns and current labeling, types of equipment and techniques that can potentially be used, occupational handler exposure is expected from the registered uses. The quantitative exposure/risk assessment developed for occupational handlers is based on the following scenarios:

- Mixing/Loading liquids for groundboom application to typical and high-acreage crops.
- Applying liquids for groundboom equipment to typical and high-acreage crops.
- Mixing/Loading/Applying liquids for mechanically pressurized handwands to typical acreage crops.

All occupational handler scenarios for the registered uses resulted in inhalation risk estimates that are greater than the LOC of 100 and not of concern, with the lowest MOE at 2,900 for mixer/loaders/applicators for mechanically-pressurized handgun applications to typical acreage field crops. A dermal endpoint was not selected for dermal exposure; therefore, a quantitative dermal assessment is not required.

Occupational post-application short- and intermediate-term exposures may occur from the pyridate applications to *Brassica* head and stem vegetables, cabbage, chickpea, corn, collards, peanuts, and mint. The post-application inhalation exposures for occupational handlers were not of concern (MOEs 2,900-97,000, with LOC $\leq$ 100). The post-application dermal exposures for occupational workers are not of concern as a dermal endpoint was not selected; therefore, a quantitative dermal exposure assessment was not conducted. Under the registered uses, the label required occupational personal protective equipment (PPE) is adequate and not of concern (long-sleeved shirt and long pants, chemical-resistant gloves made of barrier laminate or butyl rubber $\geq$ 14 mils, chemical-resistant footwear plus socks, and protective eyewear.) The 12-hour REI listed on the labels is considered protective of post-application exposure.

Based on the Agency's current practices, a quantitative non-cancer occupational post-application inhalation exposure assessment was not performed for pyridate at this time. If new policies or procedures are put into place, then the Agency may revisit the need for a quantitative occupational post-application inhalation exposure assessment for pyridate.

B. Assessment of Environmental and Ecological Risks

The ecological risk assessment evaluates the proposed uses of pyridate based on the submitted toxicology and environmental fate data, proposed uses, application rates and methods, and current exposure models and how it may affect aquatic and terrestrial animals and plants. The environmental fate database is complete. For purposes of this risk assessment, the ecological effects database is complete for all taxa for pyridate.

More details on the ecological risk assessment are in the document entitled *Pyridate: Ecological Risk Assessment for Section 3 New Chemical Registration*, which can be found at regulations.gov in docket ID number EPA-HQ-OPP-2017-0432.

1. Environmental Fate and Exposure Summary

Neither pyridate nor its degradate pyridafol is considered to be volatile due to the vapor pressure of 7.49×10^{-9} torr for pyridate and 4.29×10^{-10} torr for pyridafol. For pyridate, due to the rate of dissolution and the rate of hydrolysis being of the same order of magnitude, the solubility of pyridate in water was affected by the pH and no exact solubility value at pH 5 and 7 can be given. The solubility was reported in the range between 0.32 to 1.67 mg/L. In water, pyridate rapidly hydrolyzes to pyridafol, which is then stable to hydrolysis. Pyridate dissipates in the environment mainly through aqueous photolysis, (half-life of 7.2 days at pH 7.3) which may occur in clear shallow water, aerobic soil metabolism (half-life of 5.77 days), anaerobic soil metabolism (half-life less than 1 day), aerobic aquatic metabolism (half-life of 1.34 and 2.14 days), and anaerobic aquatic metabolism (half-life of 0.808 and 0.822 days).

The estimated organic carbon partition coefficient (K_{oc}) for pyridate was 223,807 L/kg_{oc}, which characterizes pyridate as immobile in soil. The low mobility of the parent pyridate is also supported by a predicted K_{oc} value of 18,350 (hardly mobile). For the degradate pyridafol, the estimated K_{oc} was in the range of 18 to 140 L/kg_{oc} for adsorption and 37 to 1487 L/kg_{oc} for desorption; whereas, the predicted K_{oc} values were 334.8 or 2732 L/kg_{oc}. This range of K_{oc} indicates pyridafol is mobile or moderately mobile.

Under field conditions, pyridate dissipated with a half-life of 3.81 to 8.99 days, mainly attributed to transformation to pyridafol. The most pyridafol was present in the top soil layer (0-15 cm) within the first week in all but one tested site. Residues of pyridate and its transformation product pyridafol did not leach below the 15-30 cm soil depth at four terrestrial field dissipation study sites. These field dissipation data are relatively consistent with estimated environmental fate properties based on laboratory degradation and mobility studies.

2. Ecological Risk Summary

Ecological risk characterization integrates the results of the exposure and ecotoxicity data to evaluate the likelihood of adverse ecological effects. The means of integrating the results of exposure and ecotoxicity data is called the quotient method. For this method, risk quotients (RQs) are calculated by dividing exposure estimates by ecotoxicity values, both acute and chronic (RQ = Exposures/Toxicity). RQs are then compared to the EPA's levels of concern (LOCs). The LOCs are criteria used by the EPA to indicate potential risk to non-target organisms. The criteria indicate whether a pesticide, when used as directed, has the potential to cause adverse effects to non-target organisms.

Ecological effects data are used to estimate the toxicity of pyridate to surrogate species. In a risk assessment, the stressors of concern are those chemicals that may exert adverse effects on non-target organisms. Collectively, the stressors of concern are known as the Residues of Concern (ROC). The ROC assessed included parent pyridate and the major degradate, pyridafol.

Pyridafol is also a pyridazine herbicide and is considered to have the same mode of action as the parent. The degradate was generally less toxic to animals, represented in the data by fish and aquatic invertebrates; however, aquatic non-vascular plants showed similar sensitivity to pyridafol

as to parent. Therefore, for animals only the pyridate parent was assessed. In the aquatic and terrestrial plant assessment, pyridafol was considered to be a ROC along with the parent due to its structural similarity to the parent molecule, as well as their similar toxicity to algae.

Based on risk assessment estimates for the registered uses and rates, there were no RQs exceeding the LOC for aquatic invertebrates, fish, or birds. Pyridate formulations can be very highly toxic to aquatic invertebrates on an acute exposure basis, however, the potential for acute or chronic adverse effects on invertebrates from water column exposure is considered low for the registered uses. Fish acute toxicity endpoints for pyridate tended to be above the solubility limit. At the labelled application rates, there are no acute or chronic risk LOC exceedances for fish. Freshwater fish toxicity data were used as surrogates for estuarine/marine fish and the risk conclusions are the same as freshwater fish because the anticipated exposures are also similar. Pyridate is slightly toxic to birds on an acute oral exposure basis, but practically non-toxic to birds on a sub-acute dietary exposure basis. For acute exposures for birds, both dietary and dose-based RQs (<0.01-0.28) are below the acute risk LOC (0.5). Chronic RQ values (0.02-0.38) are also below the chronic risk LOC (1).

Pyridate is practically non-toxic to mammals on an acute oral exposure basis. Oral dose-based RQs (<0.01-0.049) do not exceed the acute risk LOC (0.5). The mammalian chronic risk LOC (1) is exceeded for all uses at the maximum application rate of 0.94 lb ai/A for all size classes of mammals consuming plants (RQs up to 9.1) and arthropods (RQs up to 3.5), but not mammals consuming fruits, pods, and seeds. These risk estimates were based on very conservative screening-level assumptions, such as assuming that a mammal would forage for food exclusively on a pyridate treated field.

There were no acute risk LOC exceedances for bees, but there were chronic risk exceedances for bees assuming screening level exposures. The estimated RQs exceed the chronic risk LOC for adult bees (RQs up to 1.4) based on a 33% increase in mortality and for larval bees (RQs up to 71) based on a 46% decrease in adult bee emergence. However, these LOC exceedances were based on exposure to active pyridate through pollen and nectar, which is not likely to occur. First, pyridate is a contact herbicide and does not have systemic activity that could lead to residues in the pollen when the plant flowers. Instead, pyridate is absorbed rapidly by plant leaves. It does not offer any residual weed control, which further suggests that, even if it was to translocate to pollen and nectar, it would unlikely be in an active form and therefore not impact foragers. In addition, several of the registered uses do not rely on bees for pollination. For those uses that are considered to be typically pollinator-attractive, including *Brassica* head and stem vegetables, cabbage, chickpea (garbanzo bean), collards, field corn, mint, and peanuts, not all the crop area would attract bee pollinators as the crops are not likely to be blooming during pyridate applications. Only a small acreage of US grown cabbages and other *Brassica*, cauliflowers, and broccoli are grown for seed, while the majority would be harvested before blooming. None of the other registered crops clearly require bee pollination, so they would not have managed bee populations associated.

For plants, dicotyledonous plants (dicots) were more sensitive to pyridate than monocotyledonous plants (monocots). RQs (up to 1.5) for terrestrial dicots in semi-aquatic areas exposed to both runoff and drift only slightly exceed the LOC (1). The LOC was not exceeded for monocots or

dicots in dry areas not exposed to runoff (RQs <0.1-0.4). For non-vascular aquatic plants only, RQs (up to 3.2) exceed the LOC. This risk was triggered when assuming exposure to both parent pyridate and its degradate, pyridafol. The LOC is not exceeded when considering exposure to parent pyridate only.

3. Synergy

Some chemical companies have made claims in patents that certain combined mixtures of pesticides elicit greater than additive (GTA) effects, meaning that when the chemicals are mixed, the combined effect is greater than the sum of the individual effects of each chemical. The EPA's ecological risk assessment for pyridate did not find evidence of synergy; however, as part of the process to verify possible GTA claims, the registrant submitted to EPA the results of a search of the U.S. Patent and Trademark Office database for any patents that included the following keywords: pyridate, calculated value, growth inhibition rate, and Colby. EPA's review of these patents did not identify any that met all the established criteria as described by the Agency's approaches for GTA review. Therefore, the EPA does not have any evidence to suggest risk concerns about environmental effects relating to GTA effects of pesticides with pyridate at this time.

More details on the synergy patent search review, including reference to the criteria considered in the GTA claims review, are in the document entitled *Screening of Patent Information Search Results for Pyridate Patent Claims*, which can be found at regulations.gov in docket ID number EPA-HQ-OPP-2017-0432.

IV. DISCUSSION OF BENEFITS

More details on the benefits assessment are in the document entitled *Benefits Review for the Proposed Registration of Pyridate Herbicide for Use in Chickpeas, Collards, Field Corn, Mint, Peanuts, and Brassica Head and Stem Vegetables*, which can be found at regulations.gov in docket ID number EPA-HQ-OPP-2017-0432. Pyridate is expected to provide a useful weed control tool for the registered uses, as well as help prevent resistance development. Postemergence herbicide options for chickpea growers are limited. In California, no postemergence broadleaf herbicides are registered for chickpea that cause no damage to crop foliage. Pyridate is to be applied to actively growing broadleaf weeds and can be applied over the top of chickpeas. Before its cancellation, pyridate was the sole postemergence herbicide recommended for control of broadleaf weeds in chickpea in the northern Great Plains.

There are few postemergence herbicides, none of which is a WSSA Group 6 herbicide, registered for control of broadleaf weeds in collards. The registration of pyridate would provide an additional mode of action to counter herbicide resistance and aid weed management programs in collards. Corn for grain is grown on more than 90 million acres in North America. Pyridate may provide a postemergence control tool against some difficult to control weeds, including the top 3 problematic broadleaf weeds in corn (common waterhemp, redroot pigweed, and common lambsquarters), with only slight to no phytotoxicity in corn. Pyridate has been used in mint, a perennial crop, to control redroot pigweed through emergency exemptions under FIFRA Section 18 in multiple states in the

U.S. The approval of these emergency exemptions indicates that there are not adequate alternative effective control options, and pyridate would provide an important tool for growers in these states to control redroot pigweed without damaging the mint crop. Pyridate would be the only over the top herbicide for control of emerged weeds in mint crops. Pyridate can be effective against redroot pigweed and Palmer amaranth, two of the top three problematic broadleaf weeds in peanuts, while not causing visible foliar injury or yield reduction in peanuts. Pyridate is the only Group 6 herbicide recommended for use to reduce the risk of developing herbicide-resistant weeds for commercial vegetables, and it would be an additional option for growers to use when needed for resistance and weed management in *Brassica* head and stem vegetables.

IV. REGULATORY DECISION

In accordance with FIFRA, the EPA only registers a pesticide when it determines that it will not cause unreasonable adverse effects on humans or the environment, while taking into account the economic, social, and environmental costs and benefits of the use of the pesticide. Under FIFRA, the EPA is charged with balancing risks posed by the use of a pesticide against its benefits. The EPA must determine if the benefits in light of its use outweigh the risks in order for the EPA to register a pesticide.

The Agency has not identified any dietary, residential, aggregate, or occupational risks of concern for potential human health exposure from the use of pyridate. Furthermore, pyridate is not likely to result in risks of concern to non-target animals including fish, aquatic invertebrates, birds, mammals, terrestrial invertebrates, or the taxa they represent (e.g., reptiles, amphibians). Although some chronic LOCs are exceeded for mammals that may be in the treated areas, these were conservative risk estimates using screening-level (worst case) assumptions. For example, it is assumed that animals would forage for food exclusively in the treated area, which is likely to overestimate actual potential exposure. Additionally, this assumption is unlikely to apply to the majority of the mammals that are outside of the treatment area or the drift zone. It is also noted that, if further refinements that included more realistic exposure scenarios were conducted, such as assuming a more varied diet that did not rely on a single food source, these risks would likely fall below the Agency's chronic risk LOC. Regarding the risk to bees foraging on pollen/nectar on the treated site, exposure to bees is expected to be low. Pyridate may not be present in pollen and nectar of treated plants, based on the fact that it is a contact herbicide. It is absorbed rapidly by the leaves of plants, and it does not offer any systemic activity that would typically result in residues in pollen. Furthermore, based on the use patterns, it is unlikely that larval or adult bees will be exposed to pyridate at levels that would exceed the chronic risk LOC, as applications are unlikely during blooming. The potential risk to non-target terrestrial and nonvascular aquatic plants are not unreasonable when considered against the benefit of an additional MOA which would help delay the further development of herbicide resistance and to control broadleaf weeds with no or minimal crop damage. Pyridate may control some difficult to control and economically important weeds such as redroot pigweed and Palmer amaranth. Pyridate is also the only over the top herbicide for control of emerged weeds in chickpeas and mint. Therefore, the EPA is granting an unconditional registration of pyridate under Section 3(c)(5) of FIFRA.

A. Label Requirements

The following statements are included in the pyridate labeling in addition to other precautions, restrictions, and directions for use:

Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high-water mark. Do not contaminate water when disposing of equipment wash water or rinsate.

Surface Water Advisory:
This product may impact surface water quality due to runoff of rainwater. This is especially true for poorly draining soils and soils with shallow ground water.

This product is classified as having high potential for reaching aquatic sediment via runoff for several days after application. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of pyridate from runoff water and sediment. Runoff of this product will be reduced by avoiding applications when rainfall or irrigation is expected to occur within 48 hours. Sound erosion control practices will reduce this product's potential to reach aquatic sediment via runoff.

Do not allow spray to drift onto adjacent land or crops. When drift may occur, do everything possible to reduce spray drift, including:
• Do not spray if wind speeds are gusty or become 10 mph or greater.
• Use extreme caution when conditions favor drift (high temperatures, low relative humidity).
• Do not apply during a temperature inversion. If an inversion is suspected, consult the local weather service before applying
• These practices can further reduce drift:
a. Use spray nozzles that provide medium-coarse droplets (250-400 microns VMD). Nozzles that produce extremely small droplets are more likely to cause spray drift.
b. Apply as close to target plants as practical while maintaining a good spray pattern for adequate spray coverage.

Sensitive areas
The pesticide must only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

• DO NOT apply this product through any type of irrigation equipment
• DO NOT apply this product by aerial application

For optimum control of weeds, apply to actively growing weeds by the 4-leaf stage. Scout fields often to determine the exact timing for application.

Corn may be treated up to the 8-leaf stage of corn growth, with a pre-harvest interval of 68 days. Peanuts may be treated from cracking to 68 days before harvest.

Chickpeas (garbanzo beans) have a pre-harvest interval of 60 days.
Collards, cabbage and the brassica head and stem vegetables (subgroup 5A) should be treated before reaching the 6-leaf stage and have a pre-harvest interval of 45 days.
Mint has a pre-harvest interval of 49 days.

Concerning herbicide resistance management, the registrant has included the WSSA MOA category identifier and also best management practices for minimizing the development of resistant weeds.

V. SUPPORTING DOCUMENTS

All supporting documents can be found in docket ID number EPA-HQ-OPP-2017-0432 at regulations.gov.

EPA. 06272020. Screening of Patent Information Search Results for Pyridate Patent Claims. DP452330 and DP452342.

EPA. 04292020. Pyridate: Comparison of Hazard Profile for Alternative Herbicides. DP457468.

EPA. 08082019. Pyridate. Human Health Risk Assessment for the Renewal of the Section 3 Registration for Use on Brassica Head and Stem Vegetables, Cabbage, Chickpea, Corn, Collards, Peanuts, and Mint. DP439020.

EPA. 06152020. Benefits Review for the Proposed Registration of Pyridate Herbicide for Use in Chickpeas, Collards, Field Corn, Mint, Peanuts, and Brassica Head and Stem Vegetables. DP450056.

EPA. 06292020. Pyridate: Ecological Risk Assessment for Section 3 New Chemical Registration. DP438979.

Product Labels:
91746-6 (Pyridate Technical)
91746-4 (BCP258H_2 Herbicide)
91746-1 (BCP258H_3 Herbicide)
91746-2 (BCP258H_4 Herbicide)
91746-5 (Tough 5 EC Herbicide)