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R.E.D. FACTS

Metribuzin

Pesticide Reregistration

All pesticides sold or distributed in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides which were first registered before November 1, 1984, be reregistered to ensure that they meet today's more stringent standards.

In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers, describing the human health and environmental effects of each pesticide. The Agency edevelops any mitigation measures or regulatory controls needed to effectively reduce each pesticide's risks. EPA then reregisters pesticides that can be used without posing unreasonable risks to human health or the environment.

When a pesticide is eligible for reregistration, EPA explains the basis for its decision in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED document for reregistration case 0181, metribuzin.

Use Profile

Metribuzin is a herbicide used to selectively control certain broadleaf weeds and grassy weed species on a wide range of sites including vegetable and field crops, turf grasses (recreational areas), and non-crop areas. Formulations include wettable powder, emulsifiable concentrate, water dispersible granules (dry flowable), and flowable concentrate. Metribuzin is applied by various methods including aerial, chemigation, and ground application.

Regulatory History

Metribuzin was first registered as a pesticide in the U.S. in 1973. EPA issued a Registration Standard for metribuzin in July 1985 (PB86-174216). Data Call-Ins (DCIs) were issued in 1991 and 1995 requiring additional product chemistry, environmental fate and groundwater, and ecological effects data. Currently 86 metribuzin products are registered.

On August 3, 1996, the Food Quality Protection Act of 1996 (FQPA) was signed into law. FQPA amends both the Federal Food, Drug, and Cosmetic Act (FFDCA), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The FQPA amendments went into effect immediately and were considered during this reregistration decision.

Human Health Assessment

Toxicity

In studies using laboratory animals, metribuzin generally has been shown to be of low acute toxicity. It is slightly toxic by the oral and inhalation routes and has been placed in Toxicity Category III (the second lowest of four categories) for this effect. It is practically non-toxic by the dermal route of exposure and has been placed in Toxicity Category IV (the lowest of four categories).

A 21-day dermal toxicity study and a 21-day inhalation toxicity study were used to assess subchronic toxicity. In the dermal toxicity study, minimal systemic changes were noted at the highest dose level and no dermal irritation was noted at any dose level. In the inhalation study, systemic toxicity was observed at 720 mg/m^3 air (0.720 mg/L), and was based on clinical signs of toxicity, increased liver enzyme activities, and increased organ weights. Results of three developmental toxicity studies and one reproduction study suggest that although metribuzin is not considered a developmental toxicant it is associated with developmental toxicity effects. There was a lack of evidence for carcinogenicity in the following studies: 1) a mouse study in which there were no increases in tumor incidences at dosing levels up to 438 mg/kg/day for males and 567 mg/kg/day for females; 2) a rat study in which the observed pituitary adenomas and carcinomas were not statistically significant at dosing levels up to 14.36 mg/kg/day for males and 20.38 mg/kg/day for females; and 3) another rat study which indicated no evidence for carcinogenicity at dosing levels up to 42.2 mg/kg/day for males and 53.6 mg/kg/day for females. Available data also suggest that metribuzin is not mutagenic.

Dietary Exposure

People may be exposed to residues of metribuzin through the diet. Tolerances were reassessed for metribuzin and three of its primary metabolites. Tolerances have been established in 40 CFR 180.332 for the following commodities: asparagus; barley, grain; barley, straw; carrots; corn, fodder; corn, forage; grass; grass, hay; lentils (dried); lentils, forage; peas; peas (dried), peas, forage; peas, vine hay; sainfoin, hay; soybeans; soybeans, forage; soybeans, hay; sugarcane; tomatoes; wheat forage; wheat, grain; and wheat straw. Additional confirmatory information are needed before several established tolerances for animal commodities can be reassessed. When these tolerances for animal commodities are reassessed, a separate dietary exposure assessment will be made.

Occupational Exposure

Based on current use patterns, handlers (mixers, loaders, and applicators) may be exposed to metribuzin during and after normal use of liquid, wettable powder, and dry-flowable formulations. Since minimal systemic changes were noted at the highest dose level in a 21-day dermal toxicity study, a short-term or intermediate term dermal risk assessment was

not required. However, an inhalation risk assessment is required based on clinical signs of toxicity, increased liver enzyme activities, and increased organ weights observed in a 21-day inhalation study. Based on the use patterns and potential exposures, ten exposure scenarios for handlers were identified and assessed for metribuzin.

Human Risk Assessment

Metribuzin generally is of low acute toxicity, and although it does show developmental effects in animal studies, it is not considered a developmental toxicant. It has been classified as a Group D chemical, not classifiable as to human carcinogenicity. Many food and feed crop uses are registered; however, dietary exposure to metribuzin residues in food and feed are not of concern. Also, the cancer risk posed to the general population is not of concern.

Of greater concern is the inhalation exposure risk posed to metribuzin handlers, particularly mixers/loaders/applicators, and field workers. This concern was identified for mixing and loading wettable powders for aerial and chemigation applications at 6 lbs active ingredient (ai)/acre. Exposure and risk to workers will be mitigated by the use of PPE required by the WPS, as well as additional risk mitigation measures described below. Post-application reentry workers will be required to observe a 12-hour Restricted Entry Interval.

The Agency has reassessed metribuzin food and feed related tolerances under the standards of the FQPA and determined that, based on available information, there is a reasonable certainty that no harm will result to infants and children or to the general population from aggregate exposure to metribuzin residues. The only type of exposures evaluated were dietary and drinking water routes, since significant non-occupational exposures are unlikely with metribuzin use.

The Agency believes that the acute and chronic total dietary (food source and drinking water source) risks from metribuzin are minimal. The total acute dietary (food and drinking water source) risk assessment was performed for the sub-population females (13+ years). The MOE was 1200 (rounded to two significant digits). Metribuzin's acute dietary MOE greatly exceeds 100; therefore, the Agency considers the MOE to be sufficiently protective for acute total dietary risk.

EPA has also assessed the chronic dietary risk posed by metribuzin. For the overall U.S. population and 22 subgroups, exposure from all current metribuzin tolerances represents 36% of the Reference Dose (RfD), or amount believed not to cause adverse effects if consumed daily over a 70-year lifetime. 1% of the RfD is reserved for exposure to residues of metribuzin in drinking water; therefore, the total chronic dietary risk is 37% of the RfD for the general population. The exposure level of residues of metribuzin in food commodities in the most highly exposed subgroup, children (1-6 years), is 75% of the RfD. For this subgroup, 4% of the RfD

is reserved for exposure to residues of metribuzin in drinking water; therefore, total chronic dietary risk is 79% of the RfD. It appears that total chronic dietary risk from food and drinking water sources is low.

EPA does not have, at this time, available data to determine whether metribuzin has a common mechanism of toxicity with other substances or how to include this pesticide in a cumulative risk assessment. Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, metribuzin does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that metribuzin has a common mechanism of toxicity with other substances.

Environmental Assessment

An evaluation of the estimated exposure of metribuzin to the environment and the toxicity of metribuzin to nontarget organisms is required to assess the potential risk to the environment posed by metribuzin use.

Exposure of metribuzin to the environment is assessed by reviewing fate lab and field tests, and estimating terrestrial residues and aquatic concentrations with the use of models. Toxicity of metribuzin to nontarget organisms is extrapolated from lab studies conducted on a few species of birds, mammals, aquatic organisms, and plants.

Environmental Fate

Based on available data, the primary routes of degradation of metribuzin and its primary degradates are microbial metabolism and photolytic degradation on soil. These compounds will be available for leaching to ground water and runoff to surface water in many use conditions because they are not volatile. Once in ground water, metribuzin is expected to persist due to its stability to hydrolysis and the lack of light penetration. Conversely, residues of metribuzin are not likely to persist in clear, well-mixed, shallow surface water with good light penetration since parent metribuzin degrades rapidly by aqueous photolysis.

Ecological Effects

Laboratory study results indicate that metribuzin is moderately toxic to avian species on an acute oral basis, practically non-toxic to avian species on a subacute dietary basis, slightly toxic to small mammals on an acute oral basis, practically non-toxic to bees on an acute contact basis, slightly toxic to practically non-toxic to freshwater fish on an acute basis, moderately to slightly toxic to aquatic invertebrates on an acute basis, slightly toxic to estuarine/marine fish and invertebrates on an acute basis, and highly toxic to nontarget plants.

Ecological Effects Risk Assessment

There is potential acute and chronic risk concern for avian species, including endangered species, for metribuzin application rates of 4 pounds

(lb) active ingredient (ai) per acre or higher. Also acute and chronic risks are likely for mammalian species, including endangered species, for rates of 1 lb ai/acre or higher. Additionally, risks are likely for nontarget terrestrial and aquatic plant species, including endangered species, for rates of 0.5 lb ai/acre or higher.

Although presently there are ground water advisories on metribuzin product labels, the Agency is still concerned with potential ground water contamination from metribuzin use. Data currently available to the Agency indicate that metribuzin and its degradates are very mobile and highly persistent, and thus have the potential to contaminate ground water and surface water; however, the persistence of parent metribuzin in surface water may be lessened by its susceptibility to photolytic degradation. Metribuzin use could adversely affect ground-water quality, especially in vulnerable areas. Detections have been reported in the "Pesticides in Ground Water Database" (EPA, 1992) and other studies. These ground water contamination concerns are enhanced by metribuzin's widespread use patterns.

Risk Mitigation

To lessen the risks to birds, mammals, and nontarget plants posed by metribuzin, EPA is taking the following risk mitigation measures.

- prohibiting aerial application on asparagus and tomatoes;
- reducing the application rate of metribuzin being applied to sugarcane via aerial and chemigation methods from 6.0 lb ai/acre to 2.0 lb ai/acre;
- adding specific spray drift labeling requirements.

To lessen the potential risks to humans posed by metribuzin, EPA is taking the following risk mitigation measures.

- reducing the application rate of metribuzin being applied to sugarcane via aerial and chemigation methods from 6.0 lb ai/acre to 2.0 lb ai/acre;
- prohibiting the use of low-pressure or high volume hand wand equipment.

To reduce the likelihood of metribuzin and its primary degradates contaminating ground and surface water, EPA is taking the following risk mitigation actions.

- specifying on the label Best Management Practices;
- determining areas that are vulnerable to ground-water contamination by metribuzin and recommending risk mitigation measures.

Additional Data Required

EPA is requiring the following additional generic studies for metribuzin to confirm its regulatory assessments and conclusions:

1) magnitude of residue studies (alfalfa and field corn trials, and field rotational crop studies, additional field trials for field corn and potatoes, and data for wheat aspirated grain fractions; 2) processing studies for sugarcane and wheat; 3) certified limits (GLN 62-2) and analytical methods to verify

certified limits (GLN 62-3) for three impurities related to the active ingredient in the 90% technical; 4) storage stability data for animal commodity samples from the previously evaluated poultry and ruminant feeding studies; 5) confined rotational crop and field rotational crop studies; and 6) additional ground water information.

The Agency also is requiring product-specific data including product chemistry and acute toxicity studies, revised Confidential Statements of Formula (CSFs), and revised labeling for reregistration.

Product Labeling Changes Required

All metribuzin end-use products must comply with EPA's current pesticide product labeling requirements and with the following. For a comprehensive list of labeling requirements, please see the metribuzin RED document.

- For tomatoes and asparagus uses: "Aerial application is prohibited."
- For aerial application on sugarcane: "To assure that spray will not adversely affect adjacent sensitive nontarget plant, apply this product by aircraft at a minimum upwind distance of 400 ft from sensitive plants."
- For all uses: "Low-pressure and high volume hand wand equipment is prohibited."
- For the aerial and chemigation application methods of metribuzin on sugarcane: A "maximum application rate of 2.0 lb ai/acre" is specified.
- Specific spray drift label requirements are added.
- Best Management Practices to help reduce ground and surface water contamination.

Regulatory Conclusion

The use of currently registered products containing metribuzin in accordance with approved labeling will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration under the conditions specified in this RED.

Metribuzin products will be reregistered once the required product-specific data, revised Confidential Statements of Formula, and revised labeling are received and accepted by EPA.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for metribuzin during a 60-day time period, as announced in a Notice of Availability published in the Federal Register. To obtain a copy of the RED document or to submit written comments, please contact the Pesticide Docket, Public Information and Record Integrity

Branch, Informantion Resources and Services Division (7506C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

Electronic copies of the RED and this fact sheet are available on the Internet. See http://www.epa.gov/REDs.

Printed copies of the RED and fact sheet can be obtained from EPA's National Center for Environmental Publications and Information (EPA/NCEPI), PO Box 42419, Cincinnati, OH 45242-2419, telephone 1-800-490-9198; fax 513-489-8695.

Following the comment period, the metribuzin RED document also will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 703-487-4650.

For more information about EPA's pesticide reregistration program, the metribuzin RED, or reregistration of individual products containing metribuzin, please contact the Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000.

For information about the health effects of pesticides, or for assistance in recognizing and managing pesticide poisoning symptoms, please contact the National Pesticides Telecommunications Network (NPTN). Call toll-free 1-800-858-7378, from 6:30 am to 4:30 pm Pacific Time, or 9:30 am to 7:30 pm Eastern Standard Time, seven days a week.