United States Environmental Protection Agency | Prevention, Pesticides And Toxic Substances (7508W) | EPA-738-F-94-002 February 1994

R.E.D. FACTS

Methiocarb

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 years ago 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 imposes any regulatory controls that are needed to effectively manage 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 announces this and explains why in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED for methiocarb.

Use Profile

Methiocarb is an insecticide, acaricide and molluscicide. It is used to control snails, slugs, spider mites and insects on lawns, turf and ornamentals, around building foundations, and in ginseng gardens. Methiocarb has no remaining food uses; the use on ginseng has a 12-month preharvest interval and therefore is not considered a food use.

Methiocarb end-use products formulated as granulars and pellets/tablets are used on residential and commercially grown lawns, turfgrass and ornamentals, in commercial greenhouses and nurseries, around building foundations, and in ginseng gardens. A wettable powder formulation is used as a foliar spray for nursery and greenhouse ornamentals. A pressurized liquid is applied as a total release aerosol spray in commercial greenhouses.

Although the total volume of use is relatively low, methiocarb is considered an important tool for controlling slugs and snails in nurseries and greenhouses.

Regulatory History

Methiocarb was first registered as a pesticide in the U.S. in 1972. EPA issued a Registration Standard for methiocarb in March 1987 (NTIS #PB87-190898), requiring additional product chemistry, residue chemistry, ecological effects, environmental fate, toxicology, and occupational and residential exposure data. The methiocarb producers deleted all food uses from their product labels between 1989-92, so residue chemistry studies are no longer required. The technical producer is no longer supporting the commercial turf use of methiocarb. If end-use registrants do not support this use, it will have to be removed from product labels.

Currently, 22 pesticide products are registered which contain the active ingredient methiocarb. All methiocarb products for outdoor use except products with homeowner uses are classified as Restricted Use Pesticides, and may be applied only by or under the direct supervision of certified applicators.

Human Health Assessment

Toxicity

Methiocarb is among the carbamate family of chemicals; that is, it has the ability to inhibit the body's production of cholinesterase, an enzyme necessary for accurate transmission of nerve impulses.

In acute toxicity studies using laboratory animals, methiocarb has been shown to be highly toxic by the oral route and has been placed in Toxicity Category I (the highest of four levels) for acute oral effects. It is moderately toxic by the inhalation route and slightly toxic by the dermal route, and has been placed in Toxicity Categories II and III for these effects. Methiocarb is not an eye or skin irritant, and it does not cause delayed neurotoxicity.

Subchronic dermal toxicity studies using rabbits showed inconsistent results, but the range-finding study resulted in treatment-related deaths at the higher doses. In chronic feeding studies using rats and beagle dogs, methiocarb caused inhibition of red blood cell and plasma cholinesterase, but not brain cholinesterase. In the dog study, hind limb weakness and tremor occurred in the high dose group. Methiocarb is not carcinogenic in rats, and does not appear to have any mutagenicity potential. Administered by the dermal route, methiocarb is associated with developmental toxicity in rabbits. By the oral route, it is associated only with maternal toxicity in both rats and rabbits.

Although they are not part of the target data base for reregistration, acute and chronic neurotoxicity studies in rodents, now required for all carbamate pesticides, must be performed for methiocarb.

Dietary Exposure

Dietary exposure to methiocarb is not expected to occur since there are no remaining food uses. Ginseng is not considered a food use since current methiocarb labels require a 12-month preharvest interval. The

Agency will revoke all existing methiocarb tolerances (maximum food residue limits) set forth in 40 CFR 180.320.

Occupational and Residential Exposure

Methiocarb wettable powder products applied as foliar sprays can result in dermal and inhalation exposure to mixers, loaders and applicators. Use of the granular and total release aerosol products is expected to result in less applicator exposure than use of the foliar sprays.

Post-application exposure also may occur following most methiocarb applications. Examples include dermal exposure to residues on treated lawns, turf and soil following the granular applications, dermal exposure to foliage of commercially grown ornamentals following the wettable powder and pressurized liquid formulations, and inhalation exposure following application of total release aerosol sprays.

Methiocarb meets both the toxicity and the exposure criteria requiring mixer/loader/applicator exposure data and post-application reentry data. These studies will be required for reregistration of the commercial use of the wettable powder formulation to greenhouse- and nursery-grown ornamentals.

The Worker Protection Standard (WPS) converted the previous 24-hour worker reentry interval (where reentry with protective clothing is allowed) to a 24-hour restricted entry interval or REI (where entry is limited to performance of short term activities as defined in the WPS). Considering the toxicological concerns with methiocarb, EPA considers these additional protections essential to its decision that REIs will sufficiently mitigate risks to workers.

Human Risk Assessment

Since no food uses are registered, methiocarb poses no human dietary risks. Regarding acute toxicity, methiocarb is extremely toxic by the oral route but is moderately to slightly toxic by other routes of exposure. Methiocarb is a developmental toxicant, and workers and homeowners may be at risk for developmental effects from exposure to methiocarb during or after application.

For handlers of the wettable powder/foliar spray formulation of methiocarb using currently-required personal protective equipment (PPE), the estimated margin of exposure (MOE) for dermal and inhalation toxicity is estimated to be less than 100, the commonly accepted margin. However, with the use of additional PPE (coveralls), the MOE increases to well over 100. To achieve an acceptable MOE, therefore, EPA is requiring use of additional PPE.

EPA also is concerned about workers entering treated areas following application of methiocarb. To protect workers, the Agency is requiring a 25-day restricted entry interval (REI) following foliar applications of the wettable powder and pressurized liquid (total release aerosol) formulations to ornamental plants. After 10 days, workers may enter treated areas to

perform tasks, including hand labor tasks that involve contact with treated surfaces, provided each worker spends no more than 3 hours in each 24-hour period performing such tasks. PPE is not required during the 3-hour work period.

Because methiocarb has been identified as a developmental toxicant, EPA is requiring use of extra PPE by all applicators, handlers and early entry workers. These PPE requirements will not apply to homeowner users of methiocarb since their frequency and duration of exposure is less than that of occupationally exposed users.

Environmental Assessment

Environmental Fate

Methiocarb appears to be moderately persistent and relatively immobile in soil, and is not likely to contaminate ground water. A full assessment will be possible only when confirmatory hydrolysis, adsorption-desorption/leaching and terrestrial field dissipation studies are submitted.

Ecological Effects

Methiocarb is toxic to terrestrial mammals. It is very highly toxic to birds on an acute oral basis. In subacute studies, it is slightly toxic to waterfowl and practically non-toxic to upland game birds. Methiocarb is highly toxic to coldwater and warmwater fish, and very highly toxic to aquatic invertebrates. It also is very highly toxic to honey bees.

Ecological Effects Risk Assessment

Outdoor use of methiocarb is likely to have adverse effects on aquatic and terrestrial species. For all formulations of methiocarb used on all outdoor sites, acute and/or chronic levels of concern are exceeded for avian and mammalian species, aquatic invertebrates and other aquatic organisms. Although methiocarb is used in low volumes compared to other pesticides, it still could have major impacts in areas where there is concentrated outdoor use.

Methiocarb may pose a hazard to endangered species including many listed birds, mammals, insects, and aquatic organisms. The U.S. Fish and Wildlife Service will be consulted and a generic label statement may be required when EPA's Endangered Species Program is implemented.

EPA is requiring additional use precautions and maximum application rates on product labels, requiring additional confirmatory data, and negotiating with the registrants to maintain a production cap in an effort to decrease the environmental risks of methiocarb.

Additional Data Required

EPA is requiring the following additional generic data to confirm its risk assessment for methiocarb: estimation of dermal exposure for wettable powder formulation use in greenhouses and nurseries; estimation of inhalation exposure for wettable powder formulation use in greenhouses and nurseries; inhalation passive dosimetry for pressurized liquid formulation use in greenhouses; estimation of dermal exposure and soil dissipation for

granular formulations used on ornamentals; aquatic and estuarine organisms (fish/mollusk/shrimp) for all lawn and turf uses; aquatic invertebrate life cycle for all lawn and turf uses; fish early life stage for all lawn and turf uses; fish life cycle for all lawn and turf uses; hydrolysis for all outdoor uses; adsorption/desorption/leaching for all outdoor uses; terrestrial field dissipation for all lawn and turf uses; outdoor usage data (pounds used per year by site); foliar dislodgeable dissipation and dermal passive dosimetry for residential lawns and turf; and acute and subchronic neurotoxicity data (which are not part of the target data base for reregistration).

EPA is requiring product-specific data including product chemistry and acute toxicity studies, as well as revised labeling, for reregistration of pesticide products containing methiocarb.

Product Labeling Changes Required

All methiocarb end-use products must comply with EPA's current pesticide product labeling requirements. In addition:

Worker Protection Standard (WPS) - Any product whose labeling permits use in the production of an agricultural plant on any agricultural establishment (farm, forest, nursery or greenhouse) must comply with the labeling requirements of EPA's Worker Protection Standard (WPS). See PR Notice 93-7, "Labeling Revisions Required by the Worker Protection Standard (WPS)," and PR Notice 93-11, "Supplemental Guidance for PR Notice 93-7." Unless specifically directed in the RED, all statements required by the WPS and reflected in these two PR Notices must be included on product labeling.

Entry Restrictions - [See the RED for detailed instructions.] For uses within the scope of the WPS and products not primarily intended for home use:

- Wettable Powder Formulations - A 25-day restricted entry interval (REI) is required:

  "Do not enter or allow worker entry in treated areas during the restricted entry interval (REI) of 25 days, except, after 10 days, workers may enter treated areas to perform tasks including hand labor tasks that involve contact with treated surfaces provided each worker spends no more than 3 hours in each 24 hour period performing such tasks."

- Pressurized Liquid Formulations - A 25-day REI is required: (see statement above).

- Granular Formulations - A 24-hour REI is required, except for products intended primarily for home use.

Personal Protective Equipment (PPE) Requirements

[See the RED for detailed instructions.]

• For Products Not Primarily Intended for Home Use - The minimum PPE requirement is:

"Applicators and other handlers must wear:

--Coveralls over short-sleeved shirt and short pants

--Chemical-resistant or waterproof gloves…

--Chemical-resistant footwear plus socks

--Chemical-resistant headgear for overhead exposure

--Chemical-resistant apron when cleaning equipment, mixing, or loading…"

In addition, handlers must wear a respirator with an organic vapor cartridge TC-23C during early entry to greenhouses following treatment with the pressurized liquid for those tasks associated with ventilating the greenhouse. A dust mask must be worn while mixing/loading the wettable powder formulation.

Compare the PPE requirements set forth in the RED to the PPE requirements, if any, on current labeling and retain the more protective.

• For Products Intended for Home Use - Do not add any additional PPE requirements but retain any requirements already on current product labeling.

• For Entry During the Restricted Entry Period - See the RED for detailed instructions.

• For Uses Not Within the Scope of the WPS, and For Products Primarily Intended for Home Use - Do not add any new entry restrictions but retain any on current product labeling.

Lawn and Turf Uses

• If a registrant chooses to support lawn and turf uses, he must submit the data required in the RED.

• If a registrant chooses to support the residential lawn uses only, he must add the following statement to his product labels to remove the site from the scope of the WPS:

"Not for use on turf being grown for sale or other commercial use as sod, or for commercial seed production, or for research purposes."

• If a registrant does not support the residential lawn uses, he must delete the use from the product label and add the following statement:

"Do not use on turfgrass around residences or dwellings."

Restricted Use Pesticide - The following statement must appear on the labels of all end-use products for outdoor uses except products intended for use by homeowners:

"Restricted Use Pesticide

Due to Toxicity to Fish, Birds, and Aquatic Organisms

For retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification."

Use Rates and Number of Applications - The following number of applications must appear as the maximum application rate in the Directions for Use section of the label, to decrease aquatic risks:

- 75% Wettable Powder -

  "2 lbs 75% wettable powder per 50 gallons of water applied up to 2 times a year."

- Granular or Pelletized Bait -

  "Should not be applied more than twice a year."

Fish and Wildlife Protection - The following statements must appear on products for the following uses:

- Granular or Pelletized Bait for Snails and Slugs -

  "This product is toxic to fish and very highly toxic to birds and mammals. Do not apply directly to water, or to areas below the mean high water mark. Runoff from treated area may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates."

- 75% Wettable Powder Formulation -

  "This pesticide is toxic to fish and very highly toxic to birds and mammals. Do not apply directly to water, or to areas below the mean high water mark. Runoff from treated area may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates.

  "This product is very highly toxic to honey bees exposed to direct treatment or residues on blooming shrubs, flowers, weeds and trees. Do not apply this product or allow it to drift to blooming shrubs, flowers, weeds, or trees if bees are visiting the treatment area."

Regulatory Conclusion

The use of most currently registered pesticide products containing methiocarb in accordance with approved labeling, except the use of granular and pelletized formulations on residential lawns and turf, and except products for use by homeowners on ornamentals marketed in 20-25 pound bags, will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, uses of methiocarb on residential and commercial ornamentals (except large size products for use by homeowners on ornamentals), by homeowners around building foundations, in greenhouses, on commercially grown turfgrass, and on ginseng are eligible for reregistration.

These products will be reregistered once the required confirmatory generic data, product specific data and revised labeling are received and accepted by EPA. Products which also contain other active ingredients will be reregistered after the other active ingredients are determined to be eligible for reregistration.

EPA cannot make a reregistration eligibility decision regarding the residential lawn and turf use of methiocarb until appropriate postapplication reentry exposure, ecological effects and environmental fate data are submitted and evaluated.

The Agency similarly cannot make a reregistration eligibility decision regarding large size methiocarb products for use by homeowners on ornamentals, marketed in 20-25 pound bags, until soil dissipation and dermal exposure data are received and evaluated.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for methiocarb 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 Response and Program Resources Branch, Field Operations Division (7506C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

Following the comment period, the methiocarb RED document 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 methiocarb RED, or reregistration of individual products containing methiocarb, 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 8:00 am to 6:00 pm Central Time, Monday through Friday.