

US EPA ARCHIVE DOCUMENT



I.R.E.D. FACTS

Methyl Parathion

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. To implement provisions of the Food Quality Protection Act of 1996, EPA considers the special sensitivity of infants and children to pesticides, as well as aggregate exposure of the public to pesticide residues from all sources, and the cumulative effects of pesticides and other compounds with common mechanisms of toxicity. The Agency develops any mitigation measures or regulatory controls needed to effectively reduce each pesticide's risks. EPA then reregisters pesticides that meet the safety standard of the FQPA and 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 interim RED (IRED) document for reregistration case 0153, Methyl Parathion.

Use Profile

Methyl parathion is used to control many types of pests, including mites, thrips, weevils, aphids, and leafhoppers. Methyl parathion is used on row crops such as alfalfa, almonds, barley, dried beans, cabbage, corn, cotton, grass forage/ fodder/hay, hops, lentils, oats, onion, pastures, dried peas, pecans, rangeland, rape seed (canola), rice, rye, soybeans, sugar beets, sunflower, sweet potatoes, walnuts, wheat, white potatoes, and yams.

Methyl parathion is formulated as a microencapsulate (ME) (20.9% a.i.) and as an emulsifiable concentrate (EC) (ranges from 27.59 to 52.7% a.i.). The EC products contain a stenching agent to deter indoor misuse. Methyl parathion is formulated with other active ingredients.

Methyl parathion can be applied by aerial, ground and airblast equipment or through irrigation equipment.

Regulatory History

Methyl parathion was first registered in 1954 for use as an insecticide/acaricide. In December 1986, the Agency published Guidance for the Reregistration of Pesticide Products Containing Methyl Parathion. Some label changes to enhance worker safety were imposed by this document and several Data Call Ins were issued to support continued registration. In 1996, agreement was reached with the registrants producing the EC formulation to make various changes designed to end illegal home use of methyl parathion. These changes included tracking of all containers and reuseable/returnable closed containers for all EC products. On August 2, 1999, a Memorandum of Agreement was signed by methyl parathion registrants and EPA to voluntarily cancel a number of crop uses to address dietary concerns and to commit to conducting studies to refine potential occupational risk concerns.

Currently, twelve methyl parathion products are registered along with 13 Special Local Needs Labels.

Human Health Assessment

Toxicity

Methyl parathion is an organophosphorous (OP) pesticide. The OPs as a class are characterized by the effect of acetyl-cholinesterase inhibition. Methyl parathion is very toxic by oral, dermal, and inhalation routes (Toxicity Category 1), but is not a strong eye or dermal irritant and is not a skin sensitizer (Toxicity Categories 3 and 4).

The toxicity endpoints selected for the human health risk assessment are based primarily on neurotoxic effects, including neuropathology and acetyl cholinesterase (ChE) inhibition. Additional effects of chronic exposure include retinal degeneration and sciatic nerve degeneration. No evidence of carcinogenicity was seen in any study.

Dietary Exposure

People may be exposed to residues of methyl parathion through the diet. Tolerances or maximum residue limits have been established for several commodities (please see 40 CFR 180.122). EPA is not proposing to alter tolerance levels at this time. A complete tolerance reassessment will be completed when the organophosphate cumulative assessment has been finalized.

Based on current labels, at the 99.9th percentile, the dietary risk, food only, is below levels of concern for all population subgroups, including the most exposed population subgroup, children age 6-12, at 77% of the aPAD.

The chronic dietary risk estimate is below the Agency's level of concern and is estimated to be less than 8% of the cPAD for all population subgroups.

These fractions of the allowable PAD are considered to be an acceptable dietary exposure risk.

Occupational and Residential Exposure

Based on current use patterns, handlers (mixers, loaders, and applicators) may be exposed to methyl parathion during and after applications in agricultural settings. Biomonitoring data for mixers and loaders showed that closed mixing and loading systems provided adequate protection from exposure to methyl parathion for large applications of the ME formulation and all applications of the EC formulation.

There is some concern for workers entering fields after applications.

FQPA Considerations

Methyl parathion can be used on food/feed crops and therefore a dietary (food plus water) assessment was conducted for the FQPA analysis. There are no residential uses; therefore the aggregate assessment consists of exposures from the diet. The (food alone) dietary assessment is highly refined, using all available monitoring, processing and cooking factors. Dietary exposures from methyl parathion in food alone are considered to be within the risk cup.

Estimates of exposure from residues in drinking water are based on monitoring data from a cotton growing region and are slightly above the aPAD for some populations. These monitoring data are thought to be from use of methyl parathion on cotton. Maximum rates have been reduced for many crops; in particular, the maximum allowable seasonal rate for applications to cotton has been reduced from 30 lbs ai/A to 4 lbs ai/A; single maximum application rates have been reduced from 3 lbs ai/A to 1 lb ai/A. These reductions are expected to result in lowered concentrations of residues in water and no further mitigation is required at this time.

The FQPA 10X database safety factor was retained for methyl parathion based on lack of a developmental neurotoxicity study (DNT) and suggestions of fetal and neonate susceptibility in registrant submitted studies and in open literature citations. The DNT has been submitted to the Agency and is under review. Pending results of that review, the Agency may reduce or eliminate this safety factor for the FQPA assessment if the study warrants this change.

Environmental Assessment

Environmental Fate

The major routes of dissipation for methyl parathion are microbial degradation, aqueous photolysis, hydrolysis, and incorporation into soil organic matter. Methyl parathion degrades rapidly with a half-life of less than 5 days in soil and water.

Methyl parathion is mobile to relatively mobile in soil; thus, runoff and leaching could be potential routes of dissipation. However, the low persistence of methyl parathion is expected to limit the extent of off-site movement. Volatilization is another route of dissipation, and while laboratory studies with methyl parathion

indicate low volatility, methyl parathion has been detected in air and rain samples across the United States.

Ecological Effects

Methyl parathion is highly toxic to very highly toxic to all non target terrestrial species on a acute basis from single oral doses, dermal exposures and from short term dietary exposure. Methyl parathion is moderately to highly toxic to fish and very highly toxic to aquatic invertebrates.

Environmental Risk Characterization

In general, ecological risk assessment indicates that methyl parathion may pose risks to birds, mammals, non-target insects, fish and aquatic invertebrates. Methyl parathion use may result in acute and chronic risk of adverse effects to birds. These effects include direct mortality, as well as sub-lethal effects such as reproduction effects, changes in maternal care and viability of young birds, anorexia, increased susceptibility to predation, and greater sensitivity to environmental stress. Estimated environmental concentrations suggest that levels of concern for acute risk to freshwater fish are exceeded only at the highest use rate, although there is high uncertainty in this analysis.

Extensive field incident data indicate that methyl parathion poses risks to honey bees.

Benefit Assessments

Benefit assessments were conducted for methyl parathion use on: field and sweet corn, walnuts, cotton, soybeans, sweet potatoes, sunflowers, and rice. High benefits were shown for soybeans, sweet potatoes and rice; and moderate benefits were shown for sunflowers. For sweet corn, high benefits were shown in control of silk fly, and therefore, use is retained for this pest only. For field corn, walnuts, and cotton, benefits are considered to be low, but the alternatives also have serious ecological risks, and little risk reduction would be attained by promoting a shift to these alternative pesticides.

Formal benefit assessments were not conducted for methyl parathion use on crops where reported usage was low. Consultations with USDA indicated benefits for use on alfalfa, barley, grass, oats, onions, rape seed, rye, and potatoes. These crops have low use, primarily focused on certain pests in isolated areas of the country. These uses could be considered to be of high benefit for those areas, and therefore use is retained.

Benefit assessments are available on the EPA website and in the docket for methyl parathion.

Risk Mitigation Several mitigation measures are being required to reduce risks of methyl parathion to workers and non-target organisms.

1. Deletion of use on cabbage, dried beans, dried peas, hops, lentils, pecans, and sugar beets.
2. Use on sweet corn is limited to control of silk fly. References to all other pests will be deleted from the sweet corn instructions on the labels.
3. Methyl parathion may not be mixed/loaded or otherwise handled in areas prone to runoff or movement into aquatic environments or wetlands, except for aquatic applications such as applications to rice.
4. Closed delivery (mixing/loading and transfer) systems are required for aerial applications of the ME formulation. These systems are currently employed for all applications of the EC formulation.
5. Engineering controls such as a closed cab are required for all applications.
6. Use of human flaggers is prohibited.
7. Applicator biomonitoring studies must be submitted to confirm that the closed systems are adequately protective for applicators.
8. Maximum Single and Maximum Seasonal Rates are reduced for many of the uses.
9. Re-entry intervals for postapplication workers range from 3-6 days for EC applications and 9-31 days for the ME Formulation.

**Additional Data
Required**

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

- Applicator Biomonitoring Studies for EC and Microencapsulated Formulation for each Application Method. (Guideline OPPTS 875.1500)
- Residue Analytical Method (Guideline OPPTS 860.1340)
- Magnitude of Residues Crop Field Trial Data for the EC Formulation -- wheat forage, wheat hay (Guideline OPPTS 860.1500)
- Magnitude of Residues Crop Field Trial Data for the Microencapsulated Formulation -- rice straw (Guideline OPPTS 860.1500)
- Magnitude of Residues, meat/milk/poultry/eggs (Guideline OPPTS 860.1480)
- Anaerobic Aquatic Metabolism. (Guideline OPPTS 835.4400)
- Field Volatility (Guideline OPPTS 835.8100)
- Terrestrial Field Dissipation for the ME Formulation (Guideline OPPTS 835.6100)
- Estuarine and Marine Fish Early Life Stage Test (Guideline OPPTS 850.1400)
- Vegetative Vigor (Guideline OPPTS 850.4150)
- Seedling Emergence (Guideline OPPTS 850.4100)

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 methyl parathion end-use products must comply with EPA's current pesticide product labeling requirements. For a comprehensive list of labeling requirements, please see the methyl parathion IRED document.

**Regulatory
Conclusion**

EPA has determined that products containing methyl parathion are eligible for reregistration except for use on the following crops: cabbage, dried beans, dried peas, hops, lentils, pecans, and sugar beets. The use of eligible methyl parathion products in accordance with labeling specified in this RED will not pose unreasonable adverse effects to humans or the environment. These products will be reregistered once the required confirmatory generic data, product specific data, CSFs, and revised labeling are received and accepted by EPA. Products which contain active ingredients in addition to methyl parathion will be reregistered when all of their other active ingredients also are eligible for reregistration.

**For More
Information**

EPA is requesting public comments on the interim Reregistration Eligibility Decision (IRED) document for methyl parathion 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 Records Integrity Branch, Information Resources and Services Division (7502C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

Electronic copies of the IRED and this fact sheet are available on the Internet. See <http://www.epa.gov/pesticides/reregistration/status.htm>.

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

Following the comment period, the methyl parathion IRED also will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 1-800-553-6847, or 703-605-6000.

For more information about EPA's pesticide reregistration program, the methyl parathion IRED, or reregistration of individual products containing methyl parathion, please contact the Special Review and Reregistration Division (7508C), 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 Pesticide Information Center (NPIC). 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. Their internet address is <http://npic.orst.edu>.