

Chlorpyrifos Facts

EPA 738-F-01-006

February 2002

EPA has assessed the risks of chlorpyrifos and reached an Interim Reregistration Eligibility Decision (IRED) for this organophosphate (OP) pesticide. Provided that risk mitigation measures are adopted, chlorpyrifos fits into its own "risk cup"-- its individual, aggregate risks are within acceptable levels. Chlorpyrifos also is eligible for reregistration, pending a full reassessment of the cumulative risk from all OPs.

Used on a variety of food and feed crops, golf courses, as a non-structural wood treatment, and as an adult mosquitocide, chlorpyrifos residues in food and drinking water do not pose risk concerns. With mitigation eliminating virtually all homeowner uses, chlorpyrifos fits into its own "risk cup." With other mitigation measures, chlorpyrifos worker and ecological risks also will be below levels of concern for reregistration.

EPA's next step under the Food Quality Protection Act (FQPA) is to complete a cumulative risk assessment and risk management decision encompassing all the OP pesticides, which share a common mechanism of toxicity. The interim decision on chlorpyrifos cannot be considered final until this cumulative assessment is complete. Further risk mitigation may be warranted at that time.

EPA is reviewing the OP pesticides to determine whether they meet current health and safety standards. Older OPs need decisions about their eligibility for reregistration under FIFRA. OPs with residues in food, drinking water, and other non-occupational exposures also must be reassessed to make sure they meet the new FQPA safety standard.

The chlorpyrifos interim decision was made through the OP pilot public participation process, which increases transparency and maximizes stakeholder involvement in EPA's development of risk assessments and risk management decisions. EPA worked extensively with affected parties to reach the decisions presented in this interim decision document, which concludes the OP pilot process for chlorpyrifos.

Uses

Chlorpyrifos is an organophosphate insecticide, acaricide and miticide used to control foliage and soil-borne insect pests on a variety of food and feed crops. Approximately 10 million pounds are applied annually in agricultural settings. The largest agricultural market for chlorpyrifos in terms of total pounds ai is corn (~5.5 million).

Health Effects

Chlorpyrifos can cause cholinesterase inhibition in humans; that is, it can overstimulate the nervous system causing nausea, dizziness, confusion, and at very high exposures (e.g., accidents or major spills), respiratory paralysis and death.

Risks

Dietary exposures from eating food crops treated with chlorpyrifos are below the level of concern for the entire U.S. population, including infants and children. Drinking water risk estimates based on screening models and monitoring data from both ground and surface water for acute and chronic exposures are generally not of concern.

In June, 2000, the Agency entered into an agreement with the technical registrants to eliminate virtually all homeowner uses, except ant and roach baits in child resistant packaging.

Residential postapplication exposures may occur after termiticide use in residential structures. To mitigate risks from this use, the technical registrants agreed in June 2000 to limit termiticide treatments to 0.5% solution, and cancel all postconstruction uses. Pre-construction use will remain until 2005, unless acceptable exposure data are submitted that show that residential postapplication risks from this use are not a concern.

Occupational exposure to chlorpyrifos is of concern to the Agency. Exposures of concern include mixing/loading liquids for aerial/chemigation and groundboom application, mixing wettable powder for groundboom application, aerial application, and application by backpack sprayer, high-pressure handwand, and hand-held sprayer or duster. Generally, these risks can be mitigated by a combination of additional personal protective equipment and engineering controls, and by reductions in application rates. Additionally, the Agricultural Handler Task Force will be developing exposure data to better characterize the risk from certain uses (e.g., applying granulars by air).

Risk quotients indicate that a single application of chlorpyrifos poses risks to small mammals, birds, fish and aquatic invertebrate species for nearly all registered outdoor uses. Multiple applications increase the risks to wildlife and prolong exposures to toxic concentrations. To address these risks, a number of measures including reduced application rates, increased retreatment intervals, reduced seasonal maximum amounts applied per acre, and no-spray setback zones around water bodies will be needed.

Risk Mitigation

In order to support a reregistration eligibility decision for chlorpyrifos, the following risk mitigation measures are necessary:

To mitigate risks to agricultural workers PPE consisting of double layers, chemical resistant gloves, chemical resistant shoes plus socks, chemical resistant headgear for overhead exposure, chemical resistant apron when cleaning and mixing or loading and a dust/mist respirator are required for the following scenarios: mixing/loading liquids for groundboom and airblast application, loading granulars for ground application, tractor drawn granular spreader, and low pressure handwand.

engineering controls are required for the following scenarios: mixing wettable powder for groundboom application (water soluble packaging), mixing wettable powder for airblast application (water soluble packaging), and aerial application of sprays (enclosed cockpit). There are still some occupational risk scenarios that are still below the target MOE of 100, even with all feasible PPE or engineering controls. The risk assessments for these uses will be refined with additional data.

To mitigate ecological risks the technical registrants have agreed to label amendments which include the use of buffer zones to protect water quality, fish and wildlife, reductions in application rates, number of applications per season, seasonal maximum amounts applied, and increases in the minimum intervals for retreatment.

The mitigation measures prescribed in the IRED along with mitigation that is already being implemented as a result of the June, 2000, Memorandum of Agreement, will reduce risk to both terrestrial and aquatic species. For example, many of the reported incidents of wildlife mortality associated with chlorpyrifos use were related to residential lawn and termite uses and use on golf courses. The residential uses have been eliminated, the termiticide use is being phased out, and the application rate on golf courses has been reduced from 4 to 1 lb/ai/A. Additionally, no-spray buffers around surface water bodies, as well as rate reductions for agricultural uses will be implemented as a result of this IRED and will further reduce the environmental burden of chlorpyrifos.

The OP Pilot Public Participation Process

The organophosphates are a group of related pesticides that affect the functioning of the nervous system. They are among EPA's highest priority for review under the Food Quality Protection Act.

EPA is encouraging the public to participate in the review of the OP pesticides. Through a six-phased pilot public participation process, the Agency is releasing for review and comment its preliminary and revised scientific risk assessments for individual OPs. (Please contact the OP Docket, telephone 703-305-5805, or see EPA's web site, [Pesticide Reregistration Status](#).)

EPA is exchanging information with stakeholders and the public about the OPs, their uses, and risks through Technical Briefings, stakeholder meetings, and other fora. USDA is coordinating input from growers and other OP pesticide users.

Based on current information from interested stakeholders and the public, EPA is making interim risk management decisions for individual OP pesticides, and will make final decisions through a cumulative OP assessment.

Next Steps

Numerous opportunities for public comment were offered as this decision was being developed. In addition, the chlorpyrifos IRED has been issued with a public comment period (see [Pesticide Reregistration Status](#)).

When the cumulative risk assessment for all organophosphate pesticides is completed, EPA will issue its final tolerance reassessment decision for chlorpyrifos and may request further risk mitigation measures. The Agency will revoke the tomato tolerance and amend the grape and apple tolerances for chlorpyrifos. For all OPs, raising and/or establishing tolerances will be considered once a cumulative assessment is completed.