United States Environmental Protection Agency | Prevention, Pesticides And Toxic Substances (7508W) | EPA-738-F-94-020 EPA-738-R-94-023 September 1994

R.E.D. FACTS

Mevinphos

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 EPA reaches a decision regarding the eligibility of a pesticide for reregistration, the Agency announces this and provides opportunity for public comment. This fact sheet serves as and explains the Agency's Reregistration Eligibility Decision (RED) for mevinphos.

Use Profile

Mevinphos is an insecticide used on vegetables and fruits, predominantly lettuce and cole crops. It is a member of the organophosphate family of chemicals. Mevinphos is formulated as a ready-to-use liquid and concentrate. It is applied to foliage using aerial, boom spray and airblast equipment.

Regulatory History

Mevinphos was initially registered as a pesticide in 1957. EPA became concerned about its safety because of the high rate of related occupational poisonings during the 1970s. In 1978, EPA classified mevinphos as a Restricted Use Pesticide. Agency concerns about safety continued to grow through the 1980s.

In December 1991, based on concern about the toxicity of the pesticide parathion, EPA initiated the Acute Worker Risk Strategy (AWRS) project to identify and find regulatory solutions for other pesticides posing acute risks to agricultural workers. The information used to identify pesticides for this project was primarily human incident data. Using a methodology to rank the pesticides in terms of concerns, EPA identified five pesticides which warranted accelerated action. Mevinphos was one of the five. In May 1993, EPA representatives met with registrants of the five pesticides to discuss risk concerns and set timelines for submission of voluntary risk-reduction measures.

In November 1993, Amvac (the sole U.S. registrant of mevinphos) submitted proposed risk-reduction measures. EPA determined these measures to be inadequate to allay the Agency's concerns and met with Amvac in June of 1994 to discuss its remaining concerns. EPA and Amvac were unable to agree on a way to reduce risks.

On June 30, 1994, EPA was prepared to issue a Notice of Intent to Suspend all mevinphos registrations when Amvac submitted a request for voluntary cancellation. EPA accepted this request and on July 1, 1994, issued a Cancellation Order for all mevinphos registrations, effective immediately. The Agency subsequently published a Notice of Receipt of Request for Cancellation, Announcement of Cancellation Order, and FIFRA section 6(g) Notification for Mevinphos in the *Federal Register* on August 1, 1994.

Human Health Assessment

Toxicity

Regarding its mode of action, mevinphos is active by contact, inhalation and ingestion. The generally accepted biochemical mechanism of mevinphos's acute toxicity is through inhibition of the enzyme acetylcholinesterase (AChE). AChE breaks down acetylcholine (ACh), a compound that assists in transmitting signals through the nervous system. Mevinphos inhibits the AChE activity in the body. When AChE is inhibited at nerve endings, the inhibition prevents the ACh from being degraded and results in prolonged stimulation followed by paralysis of the nerves. If the dose is large enough, the nerves controlling breathing may be affected sufficiently that death occurs.

Physical signs and symptoms of mevinphos poisoning include headache, nausea, dizziness, blurred vision, excessive perspiration,

salivation, secretion of tears, vomiting, diarrhea, aching muscles, and a general feeling of severe malaise. Uncontrollable muscle twitching and fasciculations can occur. Severe poisoning can lead to convulsions, coma, pulmonary edema, muscle paralysis, and death by asphyxiation. Mevinphos poisoning also may cause various psychological, neurological and cognitive effects including confusion, anxiety, depression, irritability, mood swings, difficulty concentrating, short-term memory loss, persistent fatigue, blurred vision and, in severe poisoning cases, toxic psychosis resulting in bizarre behavior. Some of the symptoms may persist for weeks or months after the initial exposure and individuals who have been exposed may become more sensitive to additional exposures. Exposure to mevinphos may result in long-lasting neurotoxic effects in some individuals.

Mevinphos is extremely toxic to mammals by all routes of exposure and has been placed in Toxicity Category I, indicating the greatest degree of acute toxicity, for oral, dermal and inhalation effects. The lethal dose and lethal concentration levels for these routes of exposure fall well within the limits for Toxicity Category I, and are significantly lower than the lethal doses for the likely alternatives to mevinphos. Mevinphos has a steep dose response curve; that is, the difference between a nonlethal dose and a lethal dose is small.

Mevinphos is not a known carcinogen. In a chronic feeding/ carcinogenicity study using rats, the No Observed Adverse Effect Level (NOAEL) was 0.025 mg/kg/day, and the Lowest Effect Level (LEL) was 0.35 mg/kg/day for decreases in plasma and brain cholinesterase activity. Clinical signs were limited to cholinergic effects and included protruding eyes, tremors, anogenital staining, and excessive salivation.

There was no evidence of any developmental effect on the rat or rabbit fetus, even at doses that were toxic to the dams and does. Reproductive effects are unknown as data submissions have not been reviewed. Evidence suggests that mevinphos is a slight mutagen.

Dietary Exposure

The Agency's preliminary risk assessment for acute effects resulting from dietary exposure to mevinphos indicates a concern, particularly for infants and children. If better data are submitted to the Agency, the Agency would reassess risk.

Human Risk Assessment

Based on the above scientific determinations and other evaluations, such as human incident data, EPA determined mevinphos to be unsafe for any use. Because of this determination, the Agency was prepared to issue a Notice of Intent to Suspend all mevinphos registrations on June 30, 1994.

Environmental Assessment

Environmental Fate

The environmental fate database for mevinphos is incomplete. Information is available on the persistence and mobility of the parent compound but not for its degradates. Mevinphos primarily dissipates via microbial metabolism, which occurs quite rapidly (the half-life is approximately one day). Hydrolysis and photodegradation occur, but not as rapidly as metabolism.

Mevinphos degrades rapidly by microbial action with a half-life of about one day under aerobic conditions and about 12 days under anaerobic conditions. The amounts and nature of the degradates are not well characterized. Mevinphos is very mobile in soils, but is not expected to reach ground water due to its short half life.

Ecological Effects

Mevinphos is very highly toxic to avian species by the oral route of exposure, and slightly toxic to highly toxic by the dietary route. Available reproduction data are unacceptable.

In acute toxicity studies, mevinphos is very highly toxic to fish and aquatic invertebrates. Acceptable data on chronic effects are unavailable. Acceptable data regarding marine and estuarine toxicity also are unavailable.

Risks to Non-Target Species

In the late 1980s, the Fish and Wildlife Service's Office of Endangered Species determined that certain mevinphos uses could jeopardize the continued existence of endangered species or their critical habitat. Before cancellation, the mevinphos reregistration database was being completed. The information from that database would have been used by EPA to develop a program to reduce or eliminate endangered species' exposure to mevinphos to the point where use would not have jeopardized their existence.

Ecological Effects Risk Assessment

Although mevinphos's high toxicity has been known for some time and has generated concern, an incomplete database prevented EPA from further determining mevinphos's risk to wildlife.

Regulatory Conclusion

Mevinphos is not eligible for reregistration because all registrations have been canceled. However, because mevinphos is so acutely toxic that even a small exposure, whether by mistake, accident, or through routine activity, can cause serious poisonings, EPA would have found it ineligible for reregistration.

The August 1, 1994, Federal Register Notice of Receipt of Request for Cancellation, Announcement of Cancellation Order, and FIFRA section 6(g) Notification for Mevinphos, sets the last legal sale, distribution, and use dates. No person may sell or distribute existing stocks of canceled mevinphos products after December 31, 1994. Mevinphos may be applied, in accordance with prior-approved labeling, through February 28, 1995 (including commercial applicators). No person may use existing stocks of canceled pesticide products containing mevinphos after February 28, 1995.

According to Resource Conservation and Recovery Act (RCRA) regulations, mevinphos products will be classified as "solid waste," and potentially "hazardous waste," once a decision is made to discard them. They are then subject to RCRA requirements, in addition to any state and local requirements. Persons in possession of mevinphos waste are encouraged to contact state, local and federal authorities. The RCRA/Superfund Industrial Assistance Hotline is 800-424-9346.

Mevinphos products produced in the U.S., including existing stocks, may be exported to countries which permit mevinphos use. These stocks and products must comply with the labeling and purchaser acknowledgement requirements for unregistered pesticides under FIFRA section 17(a) (7 U.S.C. 136 o(a)) and the EPA's Export Policy and Procedures for Exporting Unregistered Pesticides in 40 CFR part 168 subpart D.

For More Information

EPA is accepting public comments on this Reregistration Eligibility Decision (RED) during a 60-day time period, as announced in a Notice of Availability published in the *Federal Register*. 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.

Electronic copies of the RED/fact sheet can be downloaded from the Pesticide Special Review and Reregistration Information System at 703-308-7224, and can be reached on the Internet via *FEDWORLD.GOV* and EPA's gopher server, *EARTH1.EPA.GOV.*

Following the comment period, the mevinphos RED 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 mevinphos RED, or the status of individual products containing mevinphos, contact the Special Review Branch, Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8010.

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 800-858-7378, between 8:00 am and 6:00 pm Central Time, Monday through Friday.