



R.E.D. FACTS

Zinc Salts

Pesticide Reregistration

All pesticides sold or used 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 undue hazards to human health or the environment.

When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Document, or RED. This fact sheet summarizes the information in the RED for zinc salts.

Use Profile

Zinc salts include three pesticide active ingredients: zinc chloride, zinc oxide, and zinc sulfate monohydrate (or zinc sulfate). Zinc salts are used as herbicides to control the growth of moss on structures, walkways, patios and lawns in rainy areas, primarily in the Northwestern U.S. Zinc oxide also is an industrial preservative, incorporated into carpet fibers to inhibit bacterial and fungal spoilage, and a bacteriostat, applied as a pressure treatment to preserve cut lumber. Other, more significant, non-pesticidal uses of zinc salts in the U.S. include use in fertilizers, animal feed, dry cell batteries, and as galvanizers.

Zinc is an element necessary to all forms of life. It is a normal part of metabolism in all living organisms. Zinc is widely distributed in plants, animals and soils, and is normally present in food.

Regulatory History

Pesticide products containing zinc salts were first registered in the U.S. in 1973. At present, 10 such products are registered. Nine of these products contain zinc salts as their only active ingredient; one also contains another active ingredient.

Human Health Assessment

Not all the toxicity data usually required for pesticide reregistration were necessary to assess the human health risks of the zinc salts because much of this information was available in scientific literature available to the general public.

Toxicity

Zinc chloride is corrosive to the eyes and skin. It has been placed in Toxicity Category I (indicating the highest degree of toxicity) for these effects. Zinc sulfate also has been placed in Toxicity Category I because it can cause severe eye irritation. Zinc oxide is of relatively low acute toxicity.

There was no evidence of toxicity in a subchronic feeding study in which humans were fed zinc sulfate each day for up to three months.

Regarding effects on metabolism, zinc is an essential element in human nutrition and is part of the nutrition of all plants and animals. It is an essential component of several enzymes involved in human metabolism, and is present in every cell. In laboratory feeding studies, most of the zinc eaten by test animals was excreted. Ingesting large amounts of zinc salts does cause changes in metabolism; however, people usually are not exposed to such large amounts of zinc through the diet.

Concerning chronic toxicity, when laboratory rats and dogs were fed large doses of zinc sulfate, changes in blood composition were observed. Similarly, pregnant rats fed high doses of zinc oxide had increased stillbirths, and effects on the growth of their young were observed. Some mutagenicity studies using zinc oxide and zinc chloride showed positive results.

Dietary Exposure

Zinc salts as pesticides have no food uses. The Food and Drug Administration lists zinc salts as "generally recognized as safe" for use in food as dietary supplements and as nutrients.

Occupational and Residential Exposure

Although there is the potential for significant eye, inhalation and dermal exposure among mixers, loaders and applicators of zinc salt products, EPA finds no reason to expect that reasonable use of these pesticides will constitute any hazard beyond ordinary exposure to zinc salts. The Agency believes that the use of these pesticides does not represent an unreasonable hazard to these workers. Zinc salt labels must continue to reflect any eye or skin hazards, and must continue to recommend appropriate protective equipment including protective eyewear, long-sleeved shirts and long-legged pants, rubber gloves, and boots.

Human Risk Assessment

EPA has no reason to expect that appropriate use of pesticide products containing zinc salts will constitute any hazard beyond that presented by ordinary exposure to zinc from non-pesticidal sources. Although some positive mutagenicity studies have been reported, there is no indication that such effects result in normal living organisms from everyday exposure. The Agency has no significant exposure concerns other than those addressed by existing label precautions for eye and skin protection of mixers, loaders and applicators.

Environmental Assessment

Environmental Fate

Any toxicity associated with zinc can be attributed to the presence of "free" zinc, and not to total zinc concentration. When zinc salt pesticides are used outdoors, the zinc in these products binds to and is immobilized in soil. Use of these products, therefore, does not significantly increase the amount of "free" zinc in the environment.

Ecological Effects

Zinc is relatively non-toxic to bird populations and is used as a feed additive for animals. Considering the limited, outdoor use patterns of the zinc salts, and considering that relatively small amounts are used, it is unlikely that toxic amounts of zinc will be available to birds or other non-target animal and insect populations. Although some studies show that zinc may be highly toxic to aquatic organisms, other studies do not. The assessment of the risk posed to aquatic organisms resulting from the industrial preservative (carpet fiber) use is under the purview of the Agency's Office of Water. Therefore, EPA finds that the zinc salts products as registered pose no unreasonable risk to the environment.

Environmental Assessment

EPA has concluded that adding zinc to the environment through use of currently registered pesticides that contain zinc salts will not result in a significant increase in "free" zinc. Further, little exposure to non-target species is expected, due to the small-scale outdoor use of these products. EPA finds that the registered zinc salt pesticides pose no unreasonable risk to the environment.

Additional Data Required

EPA is requiring additional generic studies on physical chemistry as confirmatory data. In addition, product-specific studies on product chemistry and acute toxicology must be submitted prior to reregistration.

Product Labeling Changes Required

The labels of the zinc salt products must comply with EPA's current pesticide labeling requirements. In addition, the industrial preservative product must bear the following ecotoxicity statement:

"This pesticide is toxic to fish and aquatic invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of U.S. EPA."

Regulatory Conclusion

- The registered pesticidal uses of zinc salts are not likely to cause unreasonable adverse effects in people or the environment, and are eligible for reregistration.

- Registered products containing one of the zinc salts as the sole active ingredient will be reregistered once EPA receives and accepts confirmatory generic data, product-specific data and amended labeling.

- The registered product containing one of the zinc salts as well as another active ingredient will be reregistered once EPA receives and accepts confirmatory generic data, product-specific data and amended labeling, and once EPA completes an eligibility decision on the other active ingredient.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Document (RED) for zinc salts 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 or to submit written comments, please contact the Public Response and Program Resources Branch, Field Operations Division (7506C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

In the future, the zinc salts RED 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 zinc salts or about EPA's pesticide reregistration program, please contact the Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000. For information about reregistration of individual zinc salts products, please contact the Registration Division (7505C), OPP, US EPA, Washington, DC 20460, telephone 703-305-7830.

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, 24 hours a day, seven days a week, or fax your inquiry to 806-743-3094.