



R.E.D. FACTS

Sulfur

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 from pesticide producers and reviews a complete set of studies showing 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 sulfur.

Sulfur

The element sulfur is a ubiquitous, natural component of the environment. Currently, sulfur is registered by EPA for use as an insecticide, fungicide and rodenticide on several hundred food and feed crop, ornamental, turf and residential sites. It is also used as a fertilizer or soil amendment for reclaiming alkaline soils. Sulfur is applied in dust, granular or liquid form, and is an active ingredient in nearly 300 registered pesticide products. All registered uses of sulfur are eligible for reregistration.

Regulatory History

Sulfur has been known and used as a pesticide since very early times, and has been registered for pesticidal use in the United States since the 1920s. EPA issued a Registration Standard for sulfur in December 1982. The only data requirement imposed at that time was a proposal for crop reentry intervals. No additional generic data have been required since then.

**Health
Effects**

All of EPA's toxicology data requirements for sulfur have been satisfied for a number of years. Sulfur is known to be of low toxicity, and poses very little if any risk to human health.

Acute Effects

Short-term studies show that sulfur is of very low acute oral toxicity and does not irritate the skin (it has been placed in Toxicity Category IV, the least toxic category, for these effects). Sulfur also is not a skin sensitizer. However, sulfur can cause some eye irritation, dermal toxicity and inhalation hazards (it has been placed in Toxicity Category III for these effects).

Chronic Effects

Chronic exposure to elemental sulfur at low levels is generally recognized as safe. Epidemiological studies show that mine workers exposed to sulfur dust and sulfur dioxide throughout their lives often had eye and respiratory disturbances, chronic bronchitis and chronic sinus effects. However, no known risks of oncogenic, teratogenic, or reproductive effects are associated with the use of sulfur. Also, sulfur has been shown to be non-mutagenic in microorganisms.

**Routes
Of Exposure**

We are all exposed to sulfur, since this element is ubiquitous in the environment. Sulfur in its various forms represents about 1.9 percent of the total weight of the earth. Most terrestrial and aquatic environments contain high levels of sulfur.

Through the Diet

People may be exposed to small amounts of sulfur through the food supply. However, since sulfur does not pose any relevant toxic effects, no dietary risk assessment was performed. Sulfur is generally recognized as safe, as noted in 40 CFR 180.2(a), so no tolerances (or residue limits) need be established for residues of sulfur in or on food or feed commodities.

During Application

People can be exposed to sulfur while mixing, loading or applying the pesticide, and while working among treated crops. Based on incidents of skin and eye irritation reported among field workers in California, EPA has determined that a hazard exists for workers reentering fields following foliar application of sulfur dust. Therefore, a 24-hour reentry interval and protective clothing requirements must be added to the labeling of all outdoor use sulfur products.

Environmental Hazards

All the environmental fate and ecological effects data requirements are satisfied for sulfur. This ubiquitous substance does not cause unreasonable adverse effects in the environment when used according to approved labeling, and poses little or no hazard to non-target organisms.

Environmental Fate

In the 1982 Registration Standard, all environmental fate data requirements were waived for sulfur based on the fact that it is a natural component of the environment. The use of elemental sulfur as a pesticide or a soil amendment is not an environmental concern because it becomes incorporated into the natural sulfur cycle.

Ecological Effects

In six studies on ecological effects (involving bobwhite quail, two fish species, daphnia, mysid shrimp and honey bees), sulfur has been shown to be practically non-toxic to the species tested. Thus, although there is potential for non-target organisms to be exposed to sulfur, little hazard to these species is expected to result.

Additional Data Required

The generic data base supporting the reregistration of products containing sulfur has been reviewed and determined to be complete. No further generic data are required to support reregistration. Some product-specific data are being required, as described in Appendix D to the Reregistration Eligibility Document.

Product Labeling Changes Required

All end-use outdoor sulfur product labels must bear an updated water contamination warning, and a 24-hour reentry statement and protective clothing requirements to protect handlers and field workers from adverse skin and eye effects. Please see the Reregistration Eligibility Document for the exact wording of these required label statements.

Regulatory Conclusion

* The studies available to EPA indicate that the element sulfur is of low toxicity, and its use as a pesticide poses very little known hazard to people and nontarget species.

* Sulfur dust can cause eye and skin irritation to people who handle the pesticide or come into contact with treated foliage during field work. Therefore, a 24-hour reentry interval and protective clothing requirements

must be included on all outdoor sulfur product labels.

* The pesticide sulfur can be used without causing unreasonable adverse effects in people or the environment. Therefore, all pesticide products containing sulfur as the sole active ingredient are eligible for reregistration.

* EPA will reregister individual products containing sulfur once product specific data and revised product labeling are submitted to and accepted by the Agency.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Document for sulfur 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, U.S. EPA, Washington, D.C. 20460, telephone 703-557-4436, or Fax #703-557-1884. Please note that after the comment period closes, the RED will be available from NTIS, at the address and telephone number below.

To obtain a copy of the December 1982 Registration Standard for sulfur, please contact the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA. 22161, telephone 703-487-4650. Request document #PB86-102043.

For more information about sulfur or about EPA's pesticide reregistration program, please contact the Special Review and Reregistration Division (7508W), Office of Pesticide Programs, U.S. EPA, Washington, D.C. 20460, telephone 703-808-8000, or Fax #703-308-8005.

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.