



# R.E.D. FACTS

## Iron 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 iron salts.

### Use Profile

The iron salts consist of three pesticide active ingredients that are eligible for reregistration: Iron (III) sulfate, Iron (II) sulfate monohydrate, and Iron (II) sulfate heptahydrate.

Iron salts are registered for use as herbicides to control moss on lawns, turf, ornamental herbaceous plants, woody shrubs and vines. Registered products are formulated as soluble concentrates and granulars. They are applied by sprinkler can, hose-end sprayer, spreader, or by hand.

The major use of iron salts in the United States is non-pesticidal, as a fertilizer micronutrient. Iron salts also are used as an electrolyte in dry cell batteries, as an animal feed additive, as a galvanizer and as an emulsion-breaker. They have further uses in water purification and sewage treatment, and in textile dyeing and calico printing.

### Regulatory History

Iron salts first were registered as pesticides in 1962. In addition to the current outdoor moss control uses, iron salts were registered previously for use inside households, and in and around commercial, institutional and industrial premises.

At present, a total of 13 products are registered containing iron salts as sole or one of several active ingredients; one product contains Iron (III)

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sulfate, nine contain Iron (II) sulfate monohydrate, and three contain Iron (II) sulfate heptahydrate.

A fourth active ingredient, Iron II ammonium sulfate, is not being supported for reregistration and so is not covered in this RED.

## **Human Health Assessment**

### **Toxicity**

Iron salts are present normally in the environment. Iron is the fourth most abundant element and the second most abundant metal in the earth's crystal rocks. Iron occurs in a wide variety of minerals, and is present in foods naturally and through added ingredients.

The iron salts are of low acute toxicity through oral, dermal and inhalation routes of exposure. They have been placed in Toxicity Category III for these effects. Although a mutagenicity study using microorganisms showed positive results, it is unlikely that such effects would result in humans or other mammals at the levels of exposure expected from the use of iron salts as pesticides. Other toxicity studies normally required for reregistration were not necessary to evaluate the risks of the iron salts.

### **Dietary Exposure**

Dietary exposure is not expected to result from use of the iron salts as pesticides. No food or feed-related uses are registered, and no tolerances (maximum residue limits) or exemptions from the requirement of a tolerance are established. Further, the iron salts are generally recognized as safe (GRAS) by the Food and Drug Administration for use as a flavoring agent and nutrient supplement in foods (please see 40 CFR 180.2(a)).

### **Occupational and Residential Exposure**

The potential for mixer, loader and applicator exposure exists when liquid or granular iron salts products are applied to lawns, turf and other outdoor sites using spreaders, sprinkler cans or by hand. However, these inorganic salts are of little concern from a toxicity perspective. Any exposure of mixers, loaders or applicators is considered inconsequential.

### **Human Risk Assessment**

The risks to people from dietary, occupational and residential exposure to iron salts pesticides are considered negligible. It is general knowledge that these compounds are of low toxicity. They are intentionally added to foods as flavoring agents and nutrient supplements, and they have an inherent function in the metabolic systems of humans and domestic animals.

## **Environmental Assessment**

### **Environmental Fate**

The environmental fate and transport of iron salts is dominated by three processes: the conversion of Iron (II) to Iron (III), the formation of

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insoluble oxides and hydroxides that also are well known components of soils, and the distinct surface chemistry of the iron salts that causes their adsorption with other soil components, forming larger soil particles.

Use of the iron salts produces iron oxides and hydroxides that are no different from those normally found in soils, and which give them their brown and red colors. Although certain bacteria can reduce Iron (III) to the more mobile Iron (II), this is rapidly immobilized.

Therefore, the use of iron salts as herbicides to control moss is not expected to contribute significantly to the chemistry and fate of the compounds existing naturally in the environment. No unreasonable effects are expected from the use of these pesticide products as directed.

### **Ecological Effects**

In dietary acute toxicity studies, iron salts are practically nontoxic to bird species and are nontoxic or slightly toxic to rats. Iron (II) sulfate heptahydrate, the most toxic form of the iron salts compounds, is moderately toxic to aquatic invertebrates and slightly toxic to fish.

No adverse effects to avian, mammalian or aquatic populations are anticipated from the use of iron salts. Iron is one of the earth's most abundant elements, and it is immobilized at the pH range of 5-9. Runoff to aquatic systems is unlikely since the parent compounds convert very rapidly to less soluble forms in the environment. Furthermore, the oxidized iron compounds bind tightly to soil under turf.

No adverse effects to endangered species are anticipated from the use of iron salts.

### **Additional Data Required**

EPA is requiring additional physical chemistry studies as confirmatory data and to complete the generic data base for iron salts. Product-specific product chemistry studies and revised labeling also are required for reregistration. These additional studies are being required through Data Call-Ins issued in conjunction with the iron salts RED.

### **Product Labeling Changes Required**

The labels of all registered iron salts products must comply with EPA's current pesticide labeling requirements. In addition, to protect surface waters, end-use product labels must bear the following Environmental Hazards statement:

"Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate."

### **Regulatory Conclusion**

● The three pesticide active ingredients discussed in the iron salts RED will not result in unreasonable adverse effects to human health or the environment, and all registered products containing these active ingredients

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are eligible for reregistration. These products will be reregistered once the required generic and product-specific data and revised labeling are received and accepted by EPA.

- Registered products containing iron salts as well as other active ingredients will be reregistered once the other active ingredients also are determined to be eligible for reregistration.

### **For More Information**

EPA is requesting public comments on the Reregistration Eligibility Document (RED) for iron 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 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.

Following the comment period, the iron 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 iron 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 iron salts products, please contact Joanne Miller, Product Manager, 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, between 8:00 am and 6:00 pm Central Time, Monday through Friday.