United States Environmental Protection Agency | Prevention, Pesticides And Toxic Substances (7508W) | EPA-738-F-93-026 December 1993

# R.E.D. FACTS

# Peroxy Compounds



## 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 Decision (RED) document. This fact sheet summarizes the information in the RED document for the Peroxy Compounds, including hydrogen peroxide, peroxyacetic acid, and potassium peroxymonosulfate sulfate.

## Use Profile

The peroxy compounds are microbiocides. When mixed with water and applied by spraying, fogging or immersing, they kill bacteria, fungi and viruses on hard surfaces including equipment, floors and walls, indoors in agricultural premises, food establishments, commercial/industrial locations, hospital/medical institutions, and bathrooms in residences. Hydrogen peroxide and peroxyacetic acid products are formulated as liquids, and the one registered product that contains potassium peroxymonosulfate sulfate is formulated as a solid soluble concentrate.

## Regulatory History

Hydrogen peroxide, peroxyacetic acid and potassium peroxymonosulfate sulfate products were first registered in the United States as pesticides as early as 1977, 1985 and 1968 respectively, for use as disinfectants, sanitizers and sterilants. Currently, 23 products are registered which contain peroxy compounds as active ingredients; 11 products contain hydrogen peroxide, 11 products contain peroxyacetic acid, and one product contains potassium peroxymonosulfate sulfate. Under a Memorandum of Understanding signed

by EPA and the Food and Drug Administration in June 1993, EPA has primary regulatory jurisdiction over the peroxy compounds.

## Human Health Assessment

### Human Toxicity

The three peroxy compounds are oxidizing agents. They can react, sometimes violently, with reducing agents, so in concentrated form they must be handled with care.

These compounds are corrosive and severely irritating to the eyes, skin and mucous membranes. They have been placed in Toxicity Category I, indicating the greatest degree of acute toxicity, for eye and dermal irritation. In contrast, they are not extremely toxic by the oral route, and are placed in Toxicity Category III for acute oral effects. It is because of their very reactive properties and moderately low oral toxicity that dilute concentrations of peroxy compounds have found wide applications and safe use as disinfectants.

Based on their chemical reactivity, the peroxy compounds are expected to have biological activity, particularly with molecules. Hydrogen peroxide, for example, is known to be mutagenic.

### Dietary Exposure

Hydrogen peroxide and peroxyacetic acid are used in dairy/cheese processing plants, on food processing equipment and in pasteurizers in breweries, wineries and beverage plants. Although food may come into contact with treated equipment, only trace amounts of the chemicals would remain on equipment, since both compounds degrade rapidly in air to form oxygen and water. No residues of these pesticides are expected to remain in food.

When potassium peroxymonosulfate sulfate is used to disinfect poultry houses, hatcheries and processing plants, it does not come into direct contact with animals or food. The animals or meat/eggs are removed before use, which is followed by a potable water rinse and drying time before the animals or food are reintroduced. This is considered a non-food use and no dietary exposure is expected to result.

### Occupational and Residential Exposure

Applicators/mixers may be exposed to hydrogen peroxide and peroxyacetic acid when these chemicals are applied as sprays, wipe/mop-on or immersion solutions, to disinfect industrial/commercial floors, food processing equipment, pasteurizers, medical equipment or residential bathroom surfaces. When potassium peroxymonosulfate sulfate is applied in poultry houses, hatcheries and processing plants by spraying, misting or fogging, dermal and inhalation exposure of applicators is expected. These exposures are of concern since the peroxy compounds are corrosive and severely irritating to the skin, eyes and mucous membranes. However, product labels require the use of protective equipment including protective clothing, rubber gloves, and goggles, a face shield or safety glasses. Labels also recommend thorough washing

(including clothing) with soap and water after handling. These measures sufficiently minimize exposure and risk to applicators/mixers.

### Human Risk Assessment

Essentially no dietary exposure occurs from use of the peroxy compounds, so no dietary or chronic risks are posed. These chemicals are corrosive and pose acute toxicity risks of severe eye and skin irritation to applicators and mixers. These risks are minimized, however, through use of protective equipment, as required by product labeling. Therefore, the risks to humans are considered negligible.

## Environmental Assessment

### Environmental Fate

The peroxy compounds are registered for indoor uses only. No direct environmental exposure is anticipated from their use as directed by product labeling.

### Ecological Effects

Because of their indoor use patterns, and because they rapidly degrade to oxygen, carbon dioxide, water or acetic acid, avian and aquatic toxicity studies were waived for hydrogen peroxide and peroxyacetic acid.

Potassium peroxymonosulfate sulfate is corrosive and is assumed to be highly toxic to birds on an acute oral basis. Avian dietary studies using the bobwhite quail indicate that the chemical is practically nontoxic to birds on a dietary basis. It is highly toxic to rainbow trout and moderately toxic to bluegill sunfish.

### Ecological Effects Risk Assessment

All use patterns for the three peroxy compounds are considered indoor. Risks to wildlife are considered minimal since exposure is extremely low or nonexistent when the pesticides are used according to label directions.

## Additional Data Required

EPA is requiring product-specific data including product chemistry and acute toxicity studies, revised Confidential Statements of Formula (CSF), and revised product labeling for reregistration of products containing the peroxy compounds.

## Product Labeling Changes Required

The labeling of all end-use products containing the peroxy compounds must comply with EPA's current pesticide labeling requirements. In addition:

- **Personal Protective Equipment (PPE) Requirements**

  Labels of all end-use products for commercial, industrial and medical uses must require mixers and applicators to use protective equipment including protective clothing, rubber gloves, and goggles, a face shield or safety glasses. Labels also must recommend washing (including clothing) with soap and water after handling these pesticides.

- **Dilution Water pH Requirement**

Labels of products containing potassium peroxymonosulfate sulfate and sodium chloride salts must specify the appropriate pH range of dilution water, to ensure optimum and safe use.

## Regulatory Conclusion

The use of registered products containing the peroxy compounds will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration. These products will be reregistered once the required product-specific data, Confidential Statements of Formula and revised labeling are received and accepted by EPA. Products also containing other active ingredients will be reregistered only when the other active ingredients are eligible for reregistration.

## For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for the Peroxy Compounds 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 document 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 Peroxy Compounds RED document 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 Peroxy Compounds RED, or reregistration of individual products containing peroxy compounds, please contact the Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000.

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, 8:00 am to 6:00 pm Central Time, Monday through Friday.