



# R.E.D. FACTS

## Lithium Hypochlorite

### 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 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 lithium hypochlorite.

### Use Profile

Lithium hypochlorite is an algicide, disinfectant, fungicide and food contact surface sanitizer. Its primary pesticidal use is to control algae, bacteria and mildew in swimming pool water systems, hot tubs and spas; approximately 2,000,000 pounds of the active ingredient were used for this purpose in 1989. It also is used to sanitize food and cheese processing plant equipment, dairies, and eating establishment equipment and utensils. Lithium hypochlorite is formulated as a ready-to-use liquid and a soluble solid concentrate. It is applied to swimming pool water using a skimmer basket, and to equipment or utensils by hand or through use of a dish washing machine. Lithium is an element that occurs naturally at low levels in food and drinking water.

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## **Regulatory History**

Lithium hypochlorite was first registered in the U.S. in 1963, and has been used chiefly as a sanitizer in swimming pools. The Food and Drug Administration (FDA) lists the chemical as a sanitizer on food contact surfaces (please see 21 CFR 178.1010). EPA's Office of Water regulates discharges into water systems through the National Pollutant Discharge Elimination System (NPDES) permit program.

EPA issued a Data Call-In (DCI) Notice in September 1992 requiring product chemistry and ecological effects data for lithium hypochlorite. Currently, 40 pesticide products are registered which contain this active ingredient, and no new uses are pending.

## **Human Health Assessment**

### **Toxicity**

In laboratory animal studies, technical grade lithium hypochlorite has been shown to be highly corrosive, placing it in Toxicity Category I (indicating the highest degree of acute toxicity) for both eye and skin irritation. It is moderately acutely toxic in acute oral and dermal toxicity studies, placing it in Toxicity Category III for oral toxicity and Toxicity Category IV for dermal toxicity. No mutagenic effects were seen in a battery of studies.

Studies on human use of lithium-containing drugs, including chronic use, have not shown any reason for concern over continued human exposure to lithium following its use as a pesticide. The medicinal exposures are at a much higher level than that which results from the compound's pesticide uses. Studies of people who swam in pools or bathed in spas treated with lithium hypochlorite/ chloride show no significant absorption of lithium through human skin. Accidentally swallowing pool or spa water should not increase exposure to lithium beyond that which occurs ordinarily through ingesting food and drink.

### **Dietary Exposure**

No dietary exposure is expected from the pesticide uses of lithium hypochlorite since no food or feed uses are registered.

### **Occupational and Residential Exposure**

During application of pesticide products that contain lithium hypochlorite, workers may experience dermal and inhalation exposure (for example, while hand-washing utensils). However, this exposure does not pose significant concerns except to the eye and skin of workers who handle concentrated or solid formulations. Appropriate label precautions requiring eye and skin protection will continue to mitigate these risks. Post-application exposure is considered minimal, as the exposure is to a diluted material.

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## Human Risk Assessment

Since lithium hypochlorite has no food or feed uses, dietary risk is not expected. The chemical causes severe irritation and is corrosive to eyes and skin, but exhibits only moderate acute oral and dermal toxicity. To protect applicators' eyes and skin, appropriate label precautions regarding use of protective clothing (including safety glasses or goggles and chemical-resistant gloves) continue to be required. No human health risk of concern is expected.

## Environmental Assessment

### Environmental Fate

Lithium hypochlorite, like all the hypochlorite salts, forms hypochlorous acid when dissolved in water; it is hypochlorous acid that exhibits actual pesticidal activity. Its mode of action is its oxidizing (sanitizing) effect on organic and inorganic contaminants. This disinfection by chlorination is achieved by maintaining a "free residual chlorine" concentration.

The major environmental/ecological concern would be if discharged effluent treated with hypochlorites showed free residual chlorine concentrations that exceeded those stipulated under NPDES permits. Since there are many forms of cations used to form hypochlorite salts (e.g., calcium, sodium, and lithium), it would be difficult to trace the source of contamination in cases where free residual chlorine concentrations are too high.

EPA conducted a Tier Ic Estimated Environmental Concentration (EEC) model to assess the residue levels of lithium hypochlorite in the receiving stream from several use sites. This model provides a reasonable worst case estimate of the maximum concentrations that may occur immediately downstream from an industrial point source discharge site under typical and high exposure scenarios. Results are discussed below.

### Ecological Effects

Lithium hypochlorite is considered slightly toxic to nontoxic to avian species, and it is not expected to be found in the environment at levels of concern. Therefore, risk to avian species is expected to be minimal. Toxicity to fish and aquatic invertebrates, however, is considered very high.

### Ecological Effects Risk Assessment

The results of the Tier Ic EEC stream flow screening model described above show that levels of concern would be exceeded during both high exposure and typical exposure scenarios for fish and aquatic invertebrates. Therefore, aquatic organisms may be at risk from typical use/exposure as well as from high use/exposure.

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The discharge of water containing residues of lithium hypochlorite is regulated by the NPDES permit program administered by EPA. Exposure and risk to freshwater aquatic organisms should be considered in determining acceptable levels for such permits so that toxic levels are avoided.

### **Endangered Species**

Both the typical and the high exposure scenarios described above exceed the levels of concern for endangered aquatic organisms. Effluent containing lithium hypochlorite should not be discharged into streams or waterways that endangered aquatic organisms are known to frequent. EPA is working with the U.S. Fish and Wildlife Service to develop a program to avoid jeopardizing the continued existence of identified species by the use of pesticides. When this program goes into effect, endangered species labeling will be required.

### **Additional Data Required**

The generic data base for lithium hypochlorite is substantially complete. The Agency is requiring product-specific data, including product chemistry and acute toxicity studies, as well as revised Confidential Statements of Formula (CSF) and revised labeling for reregistration.

### **Product Labeling Changes Required**

All end-use products containing lithium hypochlorite must comply with EPA's current pesticide product labeling requirements. In addition:

- **Effluent Discharge Statement** - All end-use (and manufacturing use) products that may be contained in an effluent discharged to the waters of the U.S. or municipal sewer systems must bear the following statement:

"This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of EPA."

### **Regulatory Conclusion**

The currently registered uses of lithium hypochlorite could pose risks to aquatic organisms under certain conditions as industrial effluent containing the parent chemical is released into receiving waters. However, the uses will not cause unreasonable adverse effects to humans or the environment, and are eligible for reregistration.

Products containing lithium hypochlorite as the sole active ingredient will be reregistered once the required product-specific data, CSF and revised labeling are received and accepted by EPA. Products also

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containing other active ingredients will be reregistered only after the other active ingredients also are determined to be eligible for reregistration.

## **For More Information**

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for lithium hypochlorite 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 lithium hypochlorite 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 lithium hypochlorite RED, or reregistration of individual products containing lithium hypochlorite, 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, between 8:00 am and 6:00 pm Central Time, Monday through Friday.