



# ChemicalWatch Factsheet

A Beyond Pesticides/ NCAMP Factsheet

## Chlorothalonil

Chlorothalonil is a broad-spectrum fungicide originally registered in 1966 by the Diamond Shamrock Corp. This chemical is widely used on field crops, such as peanuts, vegetables and fruit (including citrus) and on turf in chemical lawn care products. It can also be added to adhesives and grouts. This fungicide is registered for use against such plant diseases as powdery mildew, early and late blight, and various rots and molds. Chlorothalonil is a systemic chemical, meaning it is taken up by plants and thus cannot be washed off. It is not broken down by ultraviolet light, and has a relatively long residual activity. Nevertheless, product labels generally recommend repeated spraying on a set schedule.

Although chlorothalonil is not considered to be acutely toxic, there is concern that it can cause allergic reactions. In a unique case, Lt. George Prior, a young Naval Flight Officer, died in 1982 following repeated exposure to this pesticide on the Army-Navy Country Club golf course in Arlington, VA. Lt. Prior died in great pain of toxic, epidermal necrolysis, which is essentially a violent allergic reaction usually linked to chemical exposure. His symptoms began with flu-like dis-

comfort, including headache, fever and nausea. These were followed by the development of a rash, which eventually developed into a total body blistering of the skin, 80% of which was to slough off. Based on this case and other data, EPA considers chlorothalonil to be a skin sensitizer and a severe eye irritant. It recommends that applicators take precautions against skin contact, and notes that ex-

posure may result in eye redness, mild respiratory irritation, and skin rashes. Product labels require persons entering treated areas within 24 hours of application to wear protective clothing, however posting of this information is still not required on golf courses.

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that period. The major metabolite or breakdown product is 4-hydroxy-2,5,6-trichloroisophthalonitrile. The parent compound is mobile in sandy soil and the breakdown product is thought to be relatively mobile in all soils, so that both have the potential to enter ground and surface water. Chlorothalonil is known to be toxic at low levels to fish and to aquatic invertebrates. It also has adverse effects on their

reproductivity. The breakdown product is thought to be moderately toxic to birds. Grazing of livestock on treated areas is prohibited. According to EPA, neither chlorothalonil nor its major metabolite is mutagenic, cause birth defects in animals, or cause reproductive effects. There is a concern that chlorothalonil maybe

an oncogen, causing kidney tumors in one strain of mice and perhaps also in rats. Final decisions on this await review of new carcinogenicity studies being performed by the manufacturer. It should be noted that chlorothalonil is contaminated with small amounts of other chemicals of concern, namely hexachlorobenzene (liver toxin, teratogen, carcinogen) and pentachlorobenzonitrile.

### *chemicalWATCH Stats:*

**CAS Registry Number:** 1897-45-6

**Chemical Class:** Polychlorinated aromatic fungicide

**Use:** A broad-spectrum, non-systemic fungicide and mildewicide, with some activity as a bactericide, microbiocide, algacide, insecticide, and acaricide.

**Toxicity rating:** Highly Toxic

**Signal Words:** Caution, Warning, Danger

**Health Effects:** Chlorothalonil is listed as a likely human carcinogen. Inflammation of the eyelids as well as other skin sensitivities may also occur.

**Environmental Effects:** Highly toxic to fish and other aquatic organisms. It is moderately persistent and slightly to moderately mobile in soils.

### **Update: August 2007**

Chlorothalonil or 2,4,5,6-tetrachloroisophthalonitrile is registered on a wide variety of sites including field, vegetable, and orchard crops, turf, and as a mildewicide added to paint and other surface treatments. Although rodent studies have been deemed an inadequate tool to measure the human carcinogenic effects of chlorothalonil, it has been listed as a known human carcinogen in the state of California and as a possible carcinogen by the International Agency for Research on Cancer (IARC). The EPA revised its findings in 1996 and listed chlorothalonil as a "likely" carcinogen instead of a probable carcinogen.

The Reregistration Eligibility Decision (RED) for chlorothalonil was signed in April 1999. In the document, the EPA concluded that the ten-fold safety factor applied according to FQPA to account for special sensitivity to infants and children was not warranted for the chlorothalonil risk assessment, based on developmental and reproductive studies, and was removed. Registrants of chlorothalonil agreed to reduce the level of hexachlorobenzene in chlorothalonil technical and manufacturing-use products to 40 ppm by January 1, 2003. If this the target level is not achieved by January 1, 2008, registrations will be immediately canceled without opportunity for appeal. To protect residential handlers and children, products containing chlorothalonil were prohibited for use on home lawns.

According to EPA's ecological risk assessment, levels of concern, especially for aquatic organisms, were exceeded for a number of crops, including peanuts and potatoes. Marine/estuarine mollusks are particularly at risk. Turf use is also high risk. In addition, many chlorothalonil labels do not provide specific application rate maximums. To protect wildlife, the registrants have agreed to reduce individual and seasonal maximum application rates for many use sites. In addition, untreated buffers are required between estuarine/marine water bodies and agricultural crops treated with chlorothalonil.

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### *Chlorothalonil chemicalWATCH Factsheet Bibliography*

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- Condor, B. (1986). "Killer Courses." Golf Magazine, December issue.
- Ecotoxnet. (1996). Chlorothalonil. Pesticide Information Profiles. Extension Toxicology Network. <http://extoxnet.orst.edu/pips/chloroth.htm>
- Long, I.W. & M.R. Siegel. (1975). "Mechanism and fate of the fungicide chlorothalonil (2,4,5,6-tetrachloroisophthalonitrile) in biological systems. II. In vitro reactions." Chem.-Biol. Interactions. 10:383-394.
- National Cancer Institute. (1978). "Bioassay of chlorothalonil for possible carcinogenicity." Technical Report series No. 41. Department of Health, Education & Welfare. Bethesda, MD.
- Prior, L. (1986). Testimony presented at the National Coalition Against the Misuse of Pesticides (NCAMP)'s Fourth National Pesticide Forum. Washington, DC.
- Thomson, W.T. (1985). Agricultural Chemicals: Fungicides. Thomson Publications, Fresno, CA.
- UNEP. (1996). Environmental Health Criteria 183 – Chlorothalonil. International Programme On Chemical Safety. World Health Organization. Geneva
- US EPA. (1999). Reregistration Eligibility Document (RED)- Chlorothalonil. Office of Pesticide Programs, Washington DC
- U.S.-EPA. (1987). Draft health advisory: Chlorothalonil. Office of Drinking Water. Washington, DC.
- U.S.-EPA (1984). Guidance for the reregistration of pesticide products containing chlorothalonil as the active ingredient. Office of Pesticide Programs. Washington, DC.
- U.S.-EPA (1983). Chemical fact-sheet on chlorothalonil. Office of Pesticides Programs. Washington, DC.