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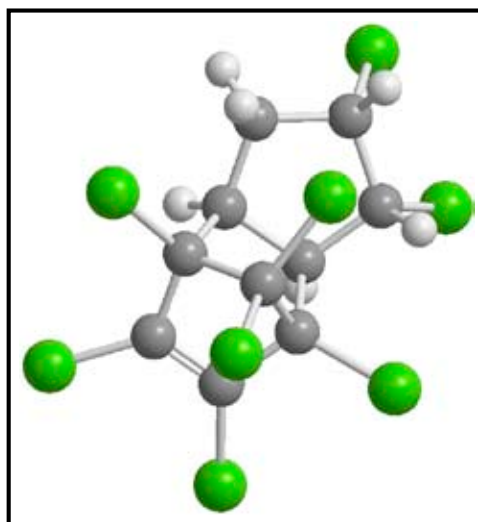
Some of the information in the following fact sheet (scroll down) is out-of-date. The National Pesticide Information Center (NPIC) is not currently planning to update this fact sheet. However, it remains available for historical purposes.

NPIC has started a *NEW* set of fact sheets. If you would like to be notified when NPIC releases new publications, send an email to npicupdates@ace.orst.edu with "subscribe" in the subject line.

Check out our new technical fact sheet on [resmethrin](#)!

Please call NPIC with any questions you have about pesticides at **1-800-858-PEST (7378)**.

Molecular Structure - Chlordane



NPTN General Fact Sheets are designed to answer questions that are commonly asked by the general public about pesticides that are regulated by the U.S. Environmental Protection Agency (US EPA). This document is intended to be helpful to professionals and to the general public for making decisions about pesticide use.

National

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Chlordane

(General Fact Sheet)

Please refer to the **Technical Fact Sheet** for more technical information.

The Pesticide Label: Labels provide directions for the proper use of a pesticide product. *Be sure to read the entire label before using any product.* A signal word on each product label indicates the product's potential hazard.

CAUTION - low toxicity

WARNING - moderate toxicity

DANGER - high toxicity

What is chlordane?

- Chlordane is a pesticide first registered in the United States in 1948 (1). In 1988, all chlordane uses, except its use for fire ant control in power transformers, were voluntarily canceled in the United States (2).
- Chlordane was used against insects on food and non-food agricultural crops, residential lawns and gardens, and in buildings. It was particularly used against termites in a variety of buildings, including homes (2, 3).
- Chlordane is a mixture of over 50 closely related chemicals. Variations in the makeup of chlordane can result in differences in toxicity (2, 4). It is a thick clear to amber liquid. It may be odorless or exhibit a mildly irritating odor (2).
- Chlordane still can be legally manufactured in the United States, but it can only be sold to or used by foreign countries. Although chlordane can be used to control fire ants in the United States, no products are currently registered for this use (5, 6).

Why were uses of chlordane canceled?

- Chlordane uses were canceled based on concerns regarding its potential to cause cancer and its slow break down in the environment (2, 5).

How does chlordane work?

- Chlordane affects the nervous system. It does this by blocking important chemical signals and enzymes resulting in overstimulation (7).

Exposure: Effects of chlordane on human health and the environment depend on how much chlordane is present and the length and frequency of exposure. Effects also depend on the health of a person and/or certain environmental factors.

How toxic is chlordane?

Animals

- Chlordane is moderately toxic if ingested (3). See boxes on **Laboratory Testing, Toxicity Category, and LD50/LC50**.
- Chlordane is moderately toxic if the skin is exposed (8). Chlordane is irritating to the skin and eyes (9).
- Chlordane ranges from very low to moderately toxic if inhaled (10).

Laboratory Testing: Before pesticides are registered by the U.S. EPA, they must undergo laboratory testing for short-term (acute) and long-term (chronic) health effects. Laboratory animals are purposely fed high enough doses to cause toxic effects. These tests help scientists judge how these chemicals might affect humans, domestic animals, and wildlife in cases of overexposure. When pesticide products are used according to the label directions, toxic effects are not likely to occur because the amount of pesticide that people and pets may be exposed to is low compared to the doses fed to laboratory animals.

Humans

- In humans, exposure to chlordane may cause headaches, nausea, vomiting, poor balance, tremors, and mental confusion. Exposure to high chlordane levels can result in the sudden onset of convulsions. Convulsions may also occur up to 48 hours following a high level exposure. Convulsions may or may not be preceded by other symptoms. Convulsions can recur periodically several days after exposure (11).

Does chlordane breakdown and leave the body?

Animals

- Researchers determined from multiple animal studies that chlordane accumulates in fat. Following exposure, chlordane levels are initially highest in the kidneys and liver. Chlordane and its breakdown products then move to fat (2).
- Scientists fed single doses of chlordane to rats and noted that it was absorbed and distributed throughout the animals. Most of the chemical was eliminated from the rat, primarily in the feces, within 7 days. Scientists did detect low levels of chlordane in several tissues, primarily fat (12).
- In a 56-day study where rats were fed chlordane in their food, researchers observed that the concentration of chlordane in fat was three-fold higher than the chlordane in the food, indicating that chlordane does accumulate in the body (12).

Toxicity Category (Signal Word) (13)

	High Toxicity (Danger)	Moderate Toxicity (Warning)	Low Toxicity (Caution)	Very Low Toxicity (Caution)
Oral LD50	Less than 50 mg/kg	50 - 500 mg/kg	500 - 5000 mg/kg	Greater than 5000 mg/kg
Dermal LD50	Less than 200 mg/kg	200 - 2000 mg/kg	2000 - 5000 mg/kg	Greater than 5000 mg/kg
Inhalation LC50	Less than 0.05 mg/l	0.05 - 0.5 mg/l	0.5 - 2 mg/l	Greater than 2 mg/l
Eye Effects	Corrosive	Irritation persisting for 7 days	Irritation reversible within 7 days	Minimal effects gone within 24 hrs
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation

LD50/LC50: A common measure of acute toxicity is the lethal dose (LD50) or lethal concentration (LC50) that causes death (resulting from a single or limited exposure) in 50 percent of the treated animals. LD50 is generally expressed as the dose in milligrams (mg) of chemical per kilogram (kg) of body weight. LC50 is often expressed as mg of chemical per volume (e.g., liter (L)) of medium (i.e., air or water) the organism is exposed to. Chemicals are considered highly toxic when the LD50/LC50 is small and practically non-toxic when the value is large. However, the LD50/LC50 does not reflect any effects from long-term exposure (i.e., cancer, birth defects, or reproductive toxicity) that may occur at levels below those that cause death.

Does chlordane cause reproductive or birth defects?

Animals

- Scientists fed young male and female rats a diet containing chlordane after weaning. The rats had difficulty mating and producing healthy litters (14).
- Scientists injected mice with chlordane once a week for 3 weeks. Female mice had reduced fertility (15). *Note: This is not a normal route of chlordane exposure for humans.*
- When scientists fed pregnant rats chlordane by stomach tube, they observed no evidence of toxicity to the offspring (2).

Humans

- Reproductive and birth defects in humans are unlikely, based on estimated exposure levels (9).

Does chlordane cause cancer?

Animals

- Multiple studies show that mice fed chlordane develop liver cancer (2).

Humans

- The U.S. EPA categorizes chlordane as a probable human carcinogen (group B2) (16). This means that chlordane has been shown to cause cancer in laboratory animals, but there is inadequate or no evidence that it may cause cancer in humans. See box on **Cancer**.
- Chlordane has been implicated in some cases of human cancer (17).

Cancer: The U.S. EPA has strict guidelines that require testing of pesticides for their potential to cause cancer. These studies involve feeding laboratory animals large *daily* doses of the pesticide over most of the lifetime of the animal. Based on these tests, and any other available information, EPA gives the pesticide a rating for its potential to cause cancer in humans. For example, if a pesticide does not cause cancer in animal tests at large doses, then the EPA considers it unlikely the pesticide will cause cancer in humans. Testing for cancer is not done on human subjects.

What happens to chlordane in the environment?

- Chlordane breaks down slowly in the environment and can accumulate in living organisms (1). It does not readily breakdown by water or light (4).
- The soil half-life for chlordane is estimated at 350 days but can range from 37 days to 3500 days (18). See the box on **Half-life**.
- Studies show that chlordane has a low potential to move in soil. Despite its low potential to move in soil, researchers have detected chlordane in groundwater (4).

Half-life is the time required for half of the compound to degrade.

1 half-life = 50% degraded
2 half-lives = 75% degraded
3 half-lives = 88% degraded
4 half-lives = 94% degraded
5 half-lives = 97% degraded

Remember that the amount of chemical remaining after a half-life will always depend on the amount of the chemical originally applied.

What effects does chlordane have on wildlife?

- Chlordane is moderately toxic to birds, highly toxic to fish, and toxic to bees (19).

For more information contact: NPTN

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NPTN at <http://nptn.orst.edu/> EXTTOXNET at <http://ace.orst.edu/info/exttoxnet/>

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