Chlordane
(General Fact Sheet)
Please refer to the Technical Fact Sheet for more technical information.

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).
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).

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).

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).

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.

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

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.
• 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).

**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).

**What effects does chlordane have on wildlife?**

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

Date reviewed: January 2001

**For more information contact:** NPTN  
Oregon State University, 333 Weniger Hall, Corvallis, Oregon 97331-6502.  
Phone: 1-800-858-7378  Fax: 1-541-737-0761  Email: nptn@ace.orst.edu  
NPTN at http://nptn.orst.edu/  EXTOXNET at http://ace.orst.edu/info/extoxnet/
References


NPIC is sponsored cooperatively by Oregon State University and the U.S. Environmental Protection Agency. Data presented through NPIC documents are based on selected authoritative and peer-reviewed literature. The information in this profile does not in any way replace or supersede the restrictions, precautions, directions or other information on the pesticide labeling or other regulatory requirements.