

Technical Factsheet on: CHLORDANE

[List of Contaminants](#)

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: Zero mg/L

MCL: 0.002 mg/L

HAL(child): 1 day: 0.06 mg/L; 10-day: 0.06 mg/L

Health Effects Summary

Acute: EPA has found chlordane to potentially cause central nervous system effects - including irritability, excess salivation, labored breathing, tremors, convulsions, deep depression - and blood system effects such as anemia and certain types of leukemia.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day, a one- to ten-day exposure to 0.06 mg/L.

Chronic: Chlordane has the potential to damage liver, kidneys heart lungs spleen and adrenal glands from long-term exposure at levels above the MCL.

Cancer: There is some evidence that chlordane may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

The amount of chlordane used annually in the US prior to 1983 was estimated in 1985 to be greater than 3.6 million pounds. It was used on corn, citrus, deciduous fruits and nuts, vegetables; for home, garden and ornamentals; lawns, turf, ditchbanks and roadsides. It was applied directly to soil or foliage to control a variety of insect pests including parasitic roundworms and other nematodes, termites, cutworms, chiggers, leafhoppers. After July 1, 1983 the only approved use for chlordane in the USA was for underground termite control. As of April 14, 1988, however, all commercial use of chlordane in the US has been cancelled. The only commercial use of chlordane products still permitted is for fire ant control in power transformers.

Release Patterns

Chlordane has been released into the environment primarily from its application as an insecticide.

Environmental Fate

If released to soil, chlordane may persist for long periods of time; under field conditions, the mean degradation rate has been observed to range from 4.05-28.33%/yr with a mean half-life of 3.3 years. Chlordane is expected to be generally immobile or only slightly mobile in soil, however, its detection in various groundwaters in NJ and elsewhere indicates that movement to groundwater can occur. Chlordane can volatilize significantly from soil surfaces on which it has been sprayed, particularly moist soil surfaces; however, shallow incorporation into soil will greatly restrict volatile losses. Although sufficient biodegradation data are not available, it has been suggested that chlordane is very slowly biotransformed in the environment which is consistent with the long persistence periods observed under field conditions.

If released to water, chlordane is not expected to undergo significant hydrolysis, oxidation or direct photolysis. The volatilization half-life from a representative environmental pond, river and lake are estimated to be 18-26, 3.6-5.2 and 14.4-20.6 days, respectively. However, adsorption to sediment significantly attenuates the importance of volatilization. Biodegradation does not seem to be an important process. Sensitized photolysis in the water column may be possible. Adsorption to sediment is expected to be a major fate process based on soil adsorption data, estimated Koc values (15,500-24,600), and extensive sediment monitoring data. The presence of chlordane in sediment core samples suggests that chlordane may be very persistent in the adsorbed state in the aquatic environment.

Bioconcentration in fish is expected to be important based on experimental BCF values which are generally above 3,200, although there is some evidence that accumulation is reversible over time in the absence of further exposures. In contrast to other organochlorine pesticides, chlordane and its degradation products do not appear to be extensively concentrated in the higher members of the terrestrial food chain, ie, homeotherms.

If released to the atmosphere chlordane will be expected to exist predominately in the vapor phase. Chlordane will react in the vapor-phase with photochemically produced hydroxyl radicals at an estimated half-life rate of 6.2 hr suggesting that this reaction is the dominant chemical removal process. The detection of chlordane in remote atmospheres (Pacific and Atlantic Oceans; The Arctic) indicates that long range transport occurs.

It has been estimated that 96% of the airborne reservoir of chlordane exists in the sorbed state which may explain why its long range transport is possible without chemical transformation. The detection of chlordane in rainwater and its observed dry deposition at various rural locations indicates that physical removal via wet and dry deposition occurs in the environment.

Chemical/ Physical Properties

CAS Number: 57-74-9

Color/ Form/Odor: Viscous liquid, colorless to amber, with a slight chlorine-like aromatic odor

M.P.: 103-108 C B.P.: 175 C

Vapor Pressure: 1×10^{-5} mm Hg at 25 C

Octanol/Water Partition (Kow): Log Kow = 2.78

Density/Spec. Grav.: 1.59-1.63 at 25 C

Solubility: 0.0001 g/L of water at 25 C; Insoluble in water

Soil sorption coefficient: log Koc estimated at 4.19 to 4.39; very low mobility in soil

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: 1.3×10^{-3} atm-cu m/mole (gamma-chlordane)

Bioconcentration Factor: log BCF=3.6 to 4.6 in fish; significant bioconcentration in aquatic organisms.

Trade Names/Synonyms: Velsicol 1068, Aspon-chlordane, Belt, Chlorindan, Chlor-Kil, Cortilan-Neu, Dowchlor, Oktachlor, Oktaterr, Synklor, Tat Chlor 4, Topiclor, Toxichlor, Intox 8, Gold Crest C-100, Kilex, Kypchlor, Niran, Termi-Ded, Prentox, Pentiklor.

Other Regulatory Information

Monitoring For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- If no detections during initial round:

2 quarterly per year if serving >3300 persons;

1 sample per 3 years for smaller systems

Triggers - Return to Initial Freq. if detect at > 0.0002 mg/L

Analysis:

Reference Source Method Numbers

EPA 600/4-88-039 505; 508; 508.1; 525.2

Treatment- Best Available Technologies:

Granular Activated Charcoal

For Additional Information:

EPA can provide further regulatory and other general information:

EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:

Toxic Substance Control Act Information Line - 202/554-1404

Toxics Release Inventory, National Library of Medicine - 301/496-6531

Agency for Toxic Substances and Disease Registry - 404/639-6000

National Pesticide Hotline - 800/858-7378