United States Environmental Protection Agency | Office of Water 4601 | EPA 811-F-95-003v-T October 1995

National Primary Drinking Water Regulations

Methoxychlor

Chemical/ Physical Properties

CAS Number: 72-43-5

Color/ Form/Odor:
Colorless crystals with slightly fruity odor; *available as: wettable powder;* emulsifiable, dust and aerosol concentrates; oil solutions

M.P.: 89 ° C B.P.: N/A

Vapor Pressure: very low

Density/Spec. Grav.: 1.41 at 25° C

Octanol/Water Partition (Kow):
Log Kow = 4.83, 4.91 and 5.08

Solubility: 0.10 mg/L of water at 25° C; Slightly soluble in water

Henry's Law Coefficient:
1.6×10^{-5} atm-cu m/mole at 25° C

Odor/Taste Thresholds: odor threshold is 4.7 mg/L in water

Soil sorption coefficient:
measured Koc ranges from 9700 to 41,000 in sand to 80,000 to 100,000 in fine silt; low mobility in soil

Bioconcentration Factor:
BCFs of 1500 to 8500 in shellfish and algae, much lower in fish; expected to bioconcentrate in aquatic organisms.

Trade Names/Synonyms:
2,2-bis(p-methoxyphenyl)-1,1,1-trichloroethane, dianisyl trichloroethane, Dimethoxy-DDT, Methoxy-DDT, Chemform, Maralate, Methoxo, Methoxcide, Metox, Moxie

Drinking Water Standards

MCLG:	0.04 mg/L
MCL:	0.04 mg/L
HAL(child):	1 day: 0.05 mg/L
	Longer-term: 0.05 mg/L

Health Effects Summary

Acute: EPA has found methoxychlor to potentially cause central nervous system depression, diarrhea, and damage to liver, kidney and heart tissue from short-term exposures at levels above the MCL.

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, upto a 7-year exposure to 0.05 mg/L.

Chronic: Methoxychlor has the potential to damage liver, kidney and heart tissue and to retard growth from long-term exposure at levels above the MCL.

Cancer: There is no evidence that methoxychlor has the potential to cause cancer from lifetime exposures in drinking water.

Usage Patterns

Methoxychlor is preferred to DDT for use on animals, in animal feed, and on DDT-sensitive crops such as squash, melons, etc. Since methoxychlor is more unstable than DDT, it has less residual effect. Compared to DDT, methoxychlor, is more toxic to some insects & less toxic to others. It has been used extensively in Canada for the control of biting flies, and is also effective against mosquitoes and houseflies.

Available information indicates production of methoxychlor has decreased: from 3.7 million lbs. in 1978 to 700,000 lbs in 1982. In 1982 it was estimated that industries consumed methoxychlor as follows: 43 percent as an insecticide for livestock and poultry, 29 percent on alfalfa crops and 29 percent on citrus.

Release Patterns

Release of methoxychlor to the environment occurs due to its use as an insecticide for home and garden applications, livestock and poultry, alfalfa, soya beans, forests (Dutch Elm disease), ornamental shrubs, deciduous fruits and nuts, and vegetables Other sources of release may include loss during the manufacture, formulation, packaging, and disposal of methoxychlor.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, methoxychlor releases to land and water totalled only about 2000 lbs.

Environmental Fate

Methoxychlor does not tend to persist when released to soil or water, and does not accumulate in fish.

If released to soil, methoxychlor is expected to remain immobilized primarily in the upper layer of soil although a small percentage may migrate to lower depths, possibly into groundwater as suggested by the detection of me-

thoxychlor in some groundwater samples.

Measured soil sorption coefficient (Koc) values in various soil are as follows: 9700 to 41,000 in sand, 80,000 to 86,000 in coarse silt, 73,000 to 100,000 in medium silt, 80,000 to 100,000 in fine silt and 73,000 to 92,000 in clay. In another study, a Koc of 620 was found in a water-sediment system.

This range of Koc values suggests that methoxychlor would be moderately mobile to immobile in soil and adsorb significantly to suspended solids and sediments in water. Methoxychlor was found to migrate as much as 100 cm under conditions in which 95 to 97% of the residues remained in the top 10 cm of soil.

Under anaerobic soil/sediment conditions, biodegradation appears to be the dominant removal mechanism. In sediments, methoxychlor was found to have a half-life of >100 days under relatively aerobic conditions and < 28 days under anaerobic conditions. Half-lives in anaerobic soils are about 3 months. Methoxychlor may undergo indirect "sensitized" photolysis on the soil surfaces and it may undergo chemical hydrolysis in moist soils (half-life > 1 year).

If released to water, methoxychlor may be removed or transported by several different mechanisms. Methoxychlor may adsorb to suspended solids and sediments. It may undergo direct photolysis (half-life 4.5 months) or indirect "sensitized" photolysis (half-life <5 hours) depending upon the presence of photosensitizers. Based on the Henry's law constant, volatilization of methoxychlor may be significant (half-life 4.5 days from a shallow river).

Methoxychlor may also biodegrade in sediments, as mentioned above, but oxidation and chemical hydrolysis are not expected to be significant fate processes.

If released to the atmosphere, methoxychlor may exist in either vapor or particulate form. Methoxychlor may undergo reaction with photochemically generated hydroxyl radicals (estimated vapor phase half-life 3.7 hours) or physical removal by settling out or washing out in precipitation.

Significant bioconcentration has been measured in certain shellfish, insects, algae and fish, although fish are generally reported to metabolize methoxychlor fairly rapidly and do not accumulate it.

The most probable route of exposure to methoxychlor would be inhalation or dermal contact during home use of this insecticide, inhalation of airborne particulate matter containing methoxychlor or ingestion of food or drinking water contaminated with methoxychlor.

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 > 0.0001 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