Technical Factsheet on: o-DICHLOROBENZENE

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: 0.6 mg/L
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HAL: 1 to 10 day: 9 mg/L; Longer-term: 9 mg/L

Health Effects Summary

Acute: EPA has no data on the acute toxicity of o-dichlorobenzene which is relevant to the drinking water context.

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 9 mg/L.

Chronic: EPA has found o-dichlorobenzene to potentially cause damage to the nervous system, liver, kidneys and blood cells from long-term exposure at levels above the MCL.

Cancer: There is inadequate evidence to state whether or not o-dichlorobenzene has the potential to cause cancer from lifetime exposures in drinking water.

Usage Patterns

Production of o-dichlorobenzene has decreased since the 1970's: from 54.6 million lbs. in 1975 to an estimated 43 million lbs. in 1991. In 1987 it was estimated that industries consumed o-dichlorobenzene as follows: Organic synthesis (mainly for herbicides), 90%; toluene diisocyanate processing solvent, 5%; solvent and miscellaneous uses, 5%.

The greatest use of o-dichlorobenzene is as a chemical intermediate for making agricultural chemicals, primarily herbicides.

Other present and past uses include: solvent for waxes, gums, resins, wood preservatives, paints; insecticide for termites and borers; in making dyes; as a coolant, deodorizer, degreaser.

Release Patterns

1,2-Dichlorobenzene's use in manufacturing and solvents may be significant sources of discharges into water. Dichlorobenzenes also enter the water systems (raw and contaminated water) from the use of 1,2-DCB as a deodorant in industrial wastewater treatment. Chemical waste dump leachates and direct manufacturing effluents are reported to be the major source of pollution of the chlorobenzenes (including the dichlorobenzenes) to Lake Ontario. The major source of 1,2-dichlorobenzene emission to the atmosphere has been reported to be solvent applications which may emit 25% of annual production to the atmosphere.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, o-dichlorobenzene releases to land and water totalled over 240,000 lbs., of which nearly 172,000 lbs. was to land. These releases

were primarily from organic chemicals manufacturing industries which use it as an intermediate in herbicide production. The largest releases occurred in New Jersey.

Environmental Fate

If released to soil, 1,2-dichlorobenzene can be moderately to tightly adsorbed. Experimental Koc values of 280 to 320 were determined in silt loam soils containing less than 2 percent organic matter. In equilibrium batch studies, a relatively strong adsorption of 1,2-dichlorobenzene to collected aquifer material was observed. However, the detection of 1,2-dichlorobenzene in various groundwaters indicates that leaching can occur. Volatilization from soil surfaces may be an important transport mechanism. It is possible that 1,2-dichlorobenzene will be slowly biodegraded in soil under aerobic conditions. Chemical transformation by hydrolysis, oxidation or direct photolysis are not expected to occur in soil.

If released to water, adsorption to sediment will be a major environmental fate process based upon extensive monitoring data in the Great Lakes area and Koc values. Analysis of Lake Ontario sediment cores has indicated the presence and persistence of 1,2-dichlorobenzene since before 1940. 1,2-Dichlorobenzene is volatile from the water column with an estimated half-life of 4.4 hours from a model river one meter deep flowing 1 m/sec with a wind velocity of 3 m/sec at 20 deg C; adsorption to sediment will attenuate volatilization. It has been suggested that the three dichlorobenzene isomers may undergo slow biodegradation in natural water. The dichlorobenzenes are not expected to be biotransformed in anaerobic water conditions found in aquifers.

1,2-Dichlorobenzene is not expected to undergo significant hydrolysis in environmental waters. It is reported to be resistant towards oxidation by peroxy radicals in aquatic media. In an isooctane solvent, 1,2-dichlorobenzene absorbs virtually no radiation above 300 nm; therefore, direct photolysis in the environment should not be significant.

If released to air, 1,2-dichlorobenzene will exist predominantly in the vapor-phase and will react with photochemically produced hydroxyl radicals at an estimated half-life rate of 24 days in a typical atmosphere. Direct photolysis in the troposphere is not expected to be important. The detection of 1,2-dichlorobenzene in rainwater suggests that atmospheric removal via wash-out is possible.

In a study of a representative green alga, the log10 bioconcentration factors (BCF) for 1,2-dichlorobenzene was 4.17. Experimental BCF values of 66-560 have been reported and 1,2-dichlorobenzene has been detected in trout from Lake Ontario. General population exposure to 1,2-dichlorobenzene may occur through oral consumption of contaminated drinking water and food (particularly fish) and through inhalation of contaminated air since 1,2-dichlorobenzene has been detected in widespread ambient air.

Chemical/Physical Properties

CAS Number: 95-50-1

Color/ Form/Odor: Colorless liquid with pleasant, aromatic odor

M.P.: -17 C B.P.: 180.5 C

Vapor Pressure: 1.47 mm Hg at 25 C

Octanol/Water Partition (Kow): Log Kow = 3.38

Density/Spec. grav: 1.31 g/L at 20 C

Solubility: 0.14 g/L of water at 25 C; Slightly soluble in water

Soil sorption coefficient: Koc measured at 280 to 320 for loam soils; low to moderate mobility in soil

Odor/Taste Thresholds: N/A

Bioconcentration Factor: BCF measured at 270 to 560 in fish; expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: 0.0012 atm-cu m/mole at 20 C

Trade Names/Synonyms: ortho Dichlorobenzol, Dilantin, Dowtherm E, Chloroben, Dilatin DB

Other Regulatory Information

Monitoring:

--For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

--Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	**Method Numbers**
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	**Land**
TOTALS (in pounds)		**75,967**	**171,663**
Top Five States*			
NJ	19,602	165,661	
WV	39,653	0	
OR	7,260	0	
SC	1,502	4,628	
TX	1,418	1,000	
Major Industries			
Industrial Organics		15,416	98,092
Cyclic crudes, dyes		7,639	67,418
Alkalis, chlorine		38,029	0
Paper mills		7,260	0
Gum, wood chems.		250	4,378

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

For Additional Information

EPA can provide further regulatory or 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