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

EPA

National Primary Drinking Water Regulations

Dibromochloropropane

CHEMICAL/ PHYSICAL PROPERTIES

CAS NUMBER: 96-12-8

COLOR/ FORM/ODOR: Dense yellow liquid with pungent odor; MAY ALSO BE GRANULAR

M.P.: 5° C **B.P.:** 196° C

VAPOR PRESSURE: 0.8 mm Hg at 21° C

DENSITY/SPEC. GRAV.: 2.08 at 20° C

OCTANOL/WATER PARTITION (KOW): Log Kow = 2.43 (calculated)

SOLUBILITY: 1.23 g/L of water at 25° C; Slightly soluble in water

SOIL SORPTION COEFFICIENT: Log Koc = 2.01; high mobility

ODOR/TASTE THRESHOLDS: Taste threshold in water is 0.01 mg/L

BIOCONCENTRATION FACTOR: 11 (est.); low bioconcentration potential

HENRY'S LAW COEFFICIENT: 1.47×10^{-4} atm-cu m/mole;

TRADE NAMES/SYNONYMS: DBCP; BBC 12; Fumagon; Fumazone; Nemabrom; Nemafum; Nemagon; Nemanax; Nemapaz; Nemaset; Nemazon; Gro-Tone Nematode; Durham Nematocide EM 17.1

DRINKING WATER STANDARDS

MCLG: zero mg/L

MCL: 0.0002 mg/L

HAL(child): 1 day: 0.2 mg/L

10-day: 0.05 mg/L

HEALTH EFFECTS SUMMARY

Acute: EPA has found DBCP to potentially cause kidney and liver damage and atrophy of the testes.

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-day exposure of 0.2 mg/L or a ten-day exposure to 0.05 mg/L.

Chronic: DBCP has the potential to cause kidney damage and antifertility effects from long-term exposure at levels above the MCL.

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

USAGE PATTERNS

DBCP was once used as an unclassified nematocide for soil fumigation of cucumbers, summer squash, cabbage, cauliflower, carrots, snap beans, okra, aster, shasta daisy, ornamental turf (lawns), bermudagrass, centipedegrass, St Augustine grass, zoysia grass, ardisia, azalea, camellia, forsythia, gardenia, hibiscus, roses, and arborvitae.

Though it is also used as a chemical intermediate in the production of a flame-retardant, essentially all of its present use is as a soil fumigant.

RELEASE PATTERNS

In the past, release of DBCP to the environment occurred primarily from its fumigant and nematocide uses. In 1977, 831,000 pounds of DBCP was used in CA alone, mainly on grapes and tomatoes. In 1974, USA farmers applied 9.8 million pounds of DBCP on crops.

All registrations of end use products were cancelled in 1979 except for the use as a soil fumigant against nematodes on pineapples in Hawaii. This use was cancelled in 1985. The use of DBCP as a laboratory reactant is not expected to result in significant release to the environment.

ENVIRONMENTAL FATE

DBCP released to soil will likely volatilize or leach to groundwater. In a model soil assumed to contain 1,2-dibromo-3-chloropropane (DBCP) evenly distributed within the first 10 cm, the volatilization half-life of DBCP was estimated to be 1.2 days. The observed log soil sorption coefficient (Koc) of DBCP is 2.11 in an unspecified soil. In a soil containing 10% moisture, the log Koc of DBCP is 1.6. Modelling predicted that DBCP will adsorb so weakly that it will co-migrate with water through low organic content soil.

In alkaline soils, hydrolysis may be significant and biodegradation is possible but is expected to be slow

relative to volatilization and leaching to groundwater. Soil microorganisms (primarily Pseudomonas and Flavobacteria) dehalogenated DBCP at a rate of 20% in 1 week at pH 8.

In water, DBCP is expected to volatilize rapidly and hydrolyze slowly. Using measured values of the water solubility and vapor pressure of 1230 mg/l and 0.58 mm Hg, respectively, a Henry's Law constant of $1.47X10^{-4}$ atm-cu m/mol was estimated. The volatilization half-life values were 9.5 hr, 13.5 hr, and 224.2 days, respectively, for streams, rivers, and lakes.

Hydrolysis half-lives of 38 and 141 years have been reported at 25 and 15 deg C, respectively, at pH 7. In groundwater, DBCP is expected to persist due to its low estimated rate of hydrolysis (half-life= 141 years at 15 deg C). Biodegradation may occur, but is expected to be slow relative to the rate of volatilization. Sorption to sediments and bioconcentration are not expected to be significant fate processes.

In the atmosphere, vapor phase DBCP is expected to react with photochemically produced hydroxyl radicals with an estimated half-life of 12.19 days.

A bioconcentration factor for 1,2-dibromo-3-chloropropane of 11 was estimated from a measured water solubility of 1,230 ppm.

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 > 0.00002 mg/L

Analysis:

Reference Source	Method Numbers
EPA 600/4-88-039	504.1; 551

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