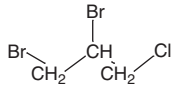
1,2-Dibromo-3-Chloropropane
CAS No. 96-12-8

Reasonably anticipated to be a human carcinogen
First Listed in the *Second Annual Report on Carcinogens* (1981)



Carcinogenicity

1,2-Dibromo-3-chloropropane is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1977, 1979, 1987, 1999, NTP 1982). When administered by gavage, 1,2-dibromo-3-chloropropane induced squamous cell carcinomas of the forestomach in rats and mice of both sexes, and carcinomas of the mammary gland in female rats (NCI 1978). When rats were exposed by inhalation, 1,2-dibromo-3-chloropropane increased the incidences of adenocarcinomas and carcinomas or squamous cell carcinomas of the nasal cavity and squamous cell papillomas of the tongue in both sexes, and adrenal cortical adenomas and squamous cell papillomas or carcinomas of the pharynx in females. When mice were exposed by inhalation, the compound increased the incidences of carcinomas and squamous cell carcinomas of the nasal cavity in males; carcinomas, adenocarcinomas, and squamous cell carcinomas of the nasal cavity in females; and alveolar/bronchiolar adenomas or carcinomas of the lung of both sexes (NTP 1982).

Since 1,2-dibromo-3-chloropropane was reviewed for listing in the *Second Annual Report on Carcinogens* (1981), the International Agency for Research on Cancer (IARC) has reviewed four cohort studies and one population-based case-control study on populations exposed to 1,2-dibromo-3-chloropropane (IARC 1999). An excess of lung cancer was found in two of the four cohort studies of workers exposed to 1,2-dibromo-3-chloropropane. Excesses of liver and biliary tract cancer were found in the third cohort study and excesses of cervical cancer and melanoma and leukemia (non-significant) were observed in the fourth cohort study. However, in some of the studies, the cohort also was exposed to other compounds besides 1,2-dibromo-3-chloropropane. The case-control study reported that exposure to 1,2-dibromo-3-chloropropane was associated with a non-significantly increased risk of gastric cancer and leukemia. IARC (1999) concluded that there was inadequate evidence to evaluate the carcinogenicity of 1,2-dibromo-3-chloropropane.

Properties

1,2-Dibromo-3-chloropropane is a dark amber to dark brown liquid (colorless when pure) with a pungent odor. It is slightly soluble in water and miscible in aliphatic and aromatic hydrocarbon solvents. Technical-grade 1,2-dibromo-3-chloropropane was available in the United States containing not less than 95% of the pure chemical. Commercial formulations include an emulsifiable concentrate containing 70.7 to 87.8%, a solution containing 47.2%, granules containing 5.25 to 34%, or fertilizer mixtures containing 0.6 to 5% 1,2-dibromo-3-chloropropane (HSDB 2000).

Use

EPA banned all uses of 1,2-dibromo-3-chloropropane in 1985 (EPA 1988). Prior to the ban, it was used as a pesticide that was registered by EPA as a soil fumigant to control nematodes during growth of field crops, vegetables, fruits and nuts, greenhouse and nursery crops, and turf. In 1977, EPA suspended all registrations for the use of products containing the compound except for use on pineapples in Hawaii; this exception was revoked in 1985. In 1974, U.S. farmers applied 9.8 million lb of 1,2-dibromo-3-chloropropane to crops. In 1977, 831,000 lb of 1,2-dibromo-3-chloropropane was used in California alone, primarily on grapes and tomatoes (IARC 1979). 1,2-Dibromo-3-chloropropane is now used only as an intermediate in organic synthesis and for research purposes (ATSDR 1992).

Production

1,2-Dibromo-3-chloropropane was first produced commercially in the United States in 1955 (IARC 1979); however, the chemical is no longer commercially manufactured in the United States (ATSDR 1992). Chem Sources (2001) identified eight U.S. suppliers of the compound. In 1989, one supplier was listed for domestic research purposes (ATSDR 1992). In 1977, three companies producing 1,000 lb of 1,2-dibromo-3-chloropropane were identified, along with one importer (no volumes provided) (TSCA 1979). Estimates of annual production during 1974 and 1975 were 18 million to 20 million lb, respectively (IARC 1999). Since its use as a fumigant and nematocide was cancelled, significant amounts of imports are unlikely. Exports, too, are negligible since the compound is not manufactured in the United States (ATSDR 1992).

Exposure

Widespread exposure of the general population and of workers to 1,2-dibromo-3-chloropropane is not likely, since use of the chemical as a soil fumigant was banned in 1985. Exposure of the general population to 1,2-dibromo-3-chloropropane may occur with ingestion of previously contaminated drinking water and food. Because the areas in which 1,2-dibromo-3-chloropropane was used as a soil fumigant were limited in size and number, and since 1,2-dibromo-3-chloropropane is moderately volatile and is degraded in moist soil, this type of exposure is probably minimal (IARC 1979, ATSDR 1992).

Due to a lack of recent comprehensive monitoring data, the average daily intake of 1,2-dibromo-3-chloropropane cannot be determined. A National Occupational Hazard Survey (NOHS) conducted for NIOSH between 1972 and 1974 estimated that 9,682 workers were exposed to 1,2-dibromo-3-chloropropane in 1972. These data, however, are no longer valid to predict current worker exposure because of the 1985 ban on the use of 1,2-dibromo-3-chloropropane as a soil fumigant and because it is likely that only small amounts are used for chemical synthesis and research purposes. 1,2-Dibromo-3-chloropropane was not included in the National Occupational Exposure Survey (NOES) conducted by NIOSH in 1983-1984 (ATSDR 1992).

Regulations

EPA

Clean Air Act
- NESHAP: Listed as a Hazardous Air Pollutant (HAP)

Comprehensive Environmental Response, Compensation, and Liability Act
- Reportable Quantity (RQ) = 1 lb

Emergency Planning and Community Right-To-Know Act
- Toxics Release Inventory: Listed substance subject to reporting requirements

Federal Insecticide, Fungicide, and Rodenticide Act
- All registrations have been cancelled

Resource Conservation and Recovery Act
- Listed Hazardous Waste: Waste codes in which listing is based wholly or partly on substance - U066
- Listed as a Hazardous Constituent of Waste

Safe Drinking Water Act
- Maximum Contaminant Level (MCL) = 0.0002 mg/L

FDA

Maximum permissible level in bottled water = 0.0002 mg/L

OSHA

Permissible Exposure Limit (PEL) = 0.001 ppm

Guidelines

NIOSH

Listed as a potential occupational carcinogen

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