

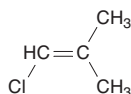
Dimethylvinyl Chloride

CAS No. 513-37-1

Reasonably anticipated to be a human carcinogen

First listed in the *Sixth Annual Report on Carcinogens* (1991)

Also known as 1-chloro-2-methylpropene



Carcinogenicity

Dimethylvinyl chloride is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity from studies in experimental animals.

Cancer Studies in Experimental Animals

Oral exposure to dimethylvinyl chloride caused tumors in mice and rats at several different tissue sites. Administration of dimethylvinyl chloride by stomach tube caused forestomach cancer (squamous-cell carcinoma) in both sexes of both species, preputial-gland cancer (squamous-cell carcinoma) in male mice, nasal-cavity cancer (carcinoma and adenocarcinoma) in rats of both sexes, and oral-cavity cancer (squamous-cell carcinoma) in male rats. It also increased the combined incidence of benign and malignant tumors (squamous-cell papilloma and carcinoma) of the oral cavity in females and the esophagus in males (NTP 1986).

Since dimethylvinyl chloride was listed in the *Sixth Annual Report on Carcinogens*, one additional study in mice has been identified. In female Tg.AC mice (a transgenic mouse strain that carries the *v-Ha-ras* oncogene), exposure to dimethylvinyl chloride by stomach tube caused benign forestomach tumors (papilloma) (Cannon *et al.* 2000).

Cancer Studies in Humans

No epidemiological studies were identified that evaluated the relationship between human cancer and exposure specifically to dimethylvinyl chloride.

Properties

Dimethylvinyl chloride is a halogenated alkene that is a structural analogue of vinyl chloride monomer. It exists as a clear, colorless to brown liquid at room temperature (IARC 1995). It is slightly soluble in water, soluble in alcohol, ether, and acetone, and very soluble in chloroform. Dimethylvinyl chloride is flammable and polymerizes easily (Akron 2009). Physical and chemical properties of dimethylvinyl chloride are listed in the following table.

Property	Information
Molecular weight	90.6 ^a
Specific gravity	0.92 at 20°C/4°C ^a
Boiling point	68°C at 754 mm Hg ^a
Log K_{ow}	2.58 ^b
Water solubility	1 g/L at 25°C ^b
Vapor pressure	158 mm Hg at 25°C ^a

Sources: ^aHSDB 2009, ^bChemIDplus 2009.

Use

Dimethylvinyl chloride is not used commercially, but is used for research purposes. It has been used in organic syntheses and as a chemical intermediate for the production of isobutylene compounds for laboratory use (IARC 1995, HSDB 2009).

Production

Dimethylvinyl chloride is not produced for commercial use in the United States (HSDB 2009). In 2009, no commercial producers were identified worldwide, but dimethylvinyl chloride was available from seven suppliers, including four U.S. suppliers (ChemSources 2009). Dimethylvinyl chloride is a by-product in the production of 3-chloro-2-methylpropene from isobutylene (NTP 1986, HSDB 2009).

Exposure

Inhalation is the primary route of potential human exposure to dimethylvinyl chloride. In 1982, it was detected at concentrations ranging from 90 to 670 $\mu\text{g}/\text{m}^3$ in ambient-air samples collected near industrial complexes and chemical-waste-disposal sites (IARC 1995). In air, dimethylvinyl chloride will exist in the vapor phase and is expected to degrade with a half-life of about 21 hours by reaction with photochemically produced hydroxyl radicals or 26 hours by reaction with atmospheric ozone, or to be removed by wet deposition. In water, dimethylvinyl chloride is not expected to adsorb to sediment or to bioconcentrate, but is expected to volatilize rapidly, with a half-life of 2.9 hours in a model river and 3.8 days in a model lake. Dimethylvinyl chloride is expected to have high mobility in soil and to volatilize from either moist or dry soil.

Occupational exposure may occur during the production of 3-chloro-2-methylpropene, of which dimethylvinyl chloride is an unintended by-product. The U.S. Environmental Protection Agency estimated that 8 to 12 workers potentially were exposed to dimethylvinyl chloride during the production of 3-chloro-2-methylpropene (EPA 1985, HSDB 2009).

Regulations

No specific regulations or guidelines relevant to reduction of exposure to dimethylvinyl chloride were identified.

References

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