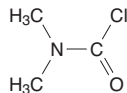


Dimethylcarbamoyl Chloride

CAS No. 79-44-7

Reasonably anticipated to be a human carcinogen

First listed in the *Second Annual Report on Carcinogens* (1981)



Carcinogenicity

Dimethylcarbamoyl 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

Dimethylcarbamoyl chloride caused tumors in mice at two different tissue sites and by several different routes of administration. In female mice, dermal exposure to dimethylcarbamoyl chloride caused benign and malignant skin tumors (papilloma and carcinoma), and exposure by subcutaneous or intraperitoneal injection caused tumors at the injection site (sarcoma) (IARC 1976). Since dimethylcarbamoyl chloride was listed in the *Second Annual Report on Carcinogens*, an additional study in rodents has been identified. Dimethylcarbamoyl chloride administered by inhalation caused cancer of the nasal tract (carcinoma) of rats and hamsters (IARC 1987).

Cancer Studies in Humans

The data available from epidemiological studies are inadequate to evaluate the relationship between human cancer and exposure specifically to dimethylcarbamoyl chloride. The only available study had very small numbers of exposed workers (IARC 1976).

Properties

Dimethylcarbamoyl chloride is an alkyl carbamoyl chloride that exists at room temperature as a clear, colorless liquid. It hydrolyzes rapidly in water (IARC 1976). Physical and chemical properties of dimethylcarbamoyl chloride are listed in the following table.

Property	Information
Molecular weight	107.5 ^a
Density	1.17 g/mL at 25°C ^a
Melting point	-33°C ^a
Boiling point	167°C ^a
Log K_{ow}	-0.72 ^b
Water solubility	459 g/L at 25°C ^b
Vapor pressure	1.95 mm Hg at 25°C ^a
Vapor density relative to air	3.73 ^a

Sources: ^aHSDB 2009, ^bChemIDplus 2009.

Use

Dimethylcarbamoyl chloride has been used primarily as a chemical intermediate in the production of dyes, pharmaceuticals, pesticides, and rocket fuel (IARC 1999, HSDB 2009).

Production

Dimethylcarbamoyl chloride has been produced since 1961 (IARC 1999). In 2009, it was produced commercially by one manufacturer in Europe and two manufacturers in India (SRI 2009) and was available from 17 suppliers worldwide, including 8 U.S. suppliers (ChemSources 2009). No data on U.S. imports or exports of dimethylcarbamoyl chloride were found. Under the U.S. Environmental Pro-

tection Agency's Toxic Substances Control Act Inventory Update Rule, production plus imports of dimethylcarbamoyl chloride totaled between 10,000 and 500,000 lb in 1990; no other inventory update reports were filed (EPA 2004).

Exposure

Potential routes of human exposure to dimethylcarbamoyl chloride are inhalation, ingestion, and dermal contact. Dimethylcarbamoyl chloride has been released to the environment as a result of its manufacture and use as an intermediate in the manufacture of pesticides and drugs (HSDB 2009). According to EPA's Toxics Release Inventory, environmental releases of dimethylcarbamoyl chloride have remained between 98 and 366 lb since 1997, with most releases to air and the remainder to off-site non-hazardous-waste landfills. In 2007, one facility released 260 lb of dimethylcarbamoyl chloride; most (255 lb) was released to an off-site hazardous-waste landfill, and the remainder to air (TRI 2009). Dimethylcarbamoyl chloride is not expected to persist in the environment, because it hydrolyzes rapidly in water and moist soil (HSDB 2009). Significant potential human exposure to dimethylcarbamoyl chloride is restricted to chemical workers, pesticide formulators, dye makers, and pharmaceutical workers.

Regulations

Department of Transportation (DOT)

Dimethylcarbamoyl chloride is considered a hazardous material, and special requirements have been set for marking, labeling, and transportation of this material.

Environmental Protection Agency (EPA)

Clean Air Act

National Emission Standards for Hazardous Air Pollutants: Listed as a hazardous air pollutant.

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.

Resource Conservation and Recovery Act

Listed Hazardous Waste: Waste code for which the listing is based wholly or partly on the presence of dimethylcarbamoyl chloride = U097.

Listed as a hazardous constituent of waste.

Guidelines

American Conference of Governmental Industrial Hygienists (ACGIH)

Threshold limit value – time-weighted average (TLV-TWA) = 0.005 ppm.

Potential for dermal absorption.

National Institute for Occupational Safety and Health (NIOSH)

Listed as a potential occupational carcinogen.

References

- ChemIDplus. 2009. *ChemIDplus Advanced*. National Library of Medicine. <http://chem.sis.nlm.nih.gov/chemidplus/chemidheavy.jsp> and select Registry Number and search on CAS number. Last accessed: 5/09.
- ChemSources. 2009. *Chem Sources - Chemical Search*. Chemical Sources International. <http://www.chemsources.com/chemonline.html> and search on dimethylcarbamoyl chloride. Last accessed: 5/09.
- EPA. 2004. *Non-confidential IUR Production Volume Information*. U.S. Environmental Protection Agency. <http://www.epa.gov/oppt/iur/tools/data/2002-vol.html> and search on CAS number. Last accessed: 4/21/05.
- HSDB. 2009. *Hazardous Substances Data Bank*. National Library of Medicine. <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB> and search on CAS number. Last accessed: 4/22/09.
- IARC. 1976. Dimethylcarbamoyl chloride. In *Some Carbamates, Thiocarbamates and Carbazides*. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, vol. 12. Lyon, France: International Agency for Research on Cancer. pp. 77-84.
- IARC. 1987. Dimethylcarbamoyl chloride. In *Overall Evaluations of Carcinogenicity*. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, suppl. 7. Lyon, France: International Agency for Research on Cancer. pp. 199-200.
- IARC. 1999. Dimethylcarbamoyl chloride. In *Re-evaluation of Some Organic Chemicals, Hydrazine, and Hydrogen Peroxide*. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, vol. 71. Lyon, France: International Agency for Research on Cancer. pp. 531-543.

Report on Carcinogens, Fourteenth Edition

SRI. 2009. *Directory of Chemical Producers*. Menlo Park, CA: SRI Consulting. Database edition. Last accessed: 4/22/09.

TRI. 2009. *TRI Explorer Chemical Report*. U.S. Environmental Protection Agency. <http://www.epa.gov/triexplorer> and select Dimethylcarbamoyl Chloride. Last accessed: 6/2/09.