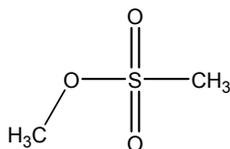


METHYL METHANESULFONATE

CAS No. 66-27-3

First Listed in the *Sixth Annual Report on Carcinogens*



CARCINOGENICITY

Methyl methanesulfonate is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1974, 1987, 1999). When administered in the drinking water, methyl methanesulfonate increased the incidence of lung tumors and thymic lymphomas in male mice. Male rats were exposed by whole-body inhalation to methyl methanesulfonate; administration resulted in nasal tumors in 47/80 treated animals versus 0/98 controls (IARC 1999). When administered by subcutaneous injection, methyl methanesulfonate induced local tumors in three male rats (two squamous cell carcinomas and one polymorphic cell sarcoma). In a similar study, methyl methanesulfonate induced three local sarcomas and one neuroblastoma in four male rats. When administered by a single intraperitoneal injection, methyl methanesulfonate induced one oligodendroglioma, one malignant neurofibroma, one astrocytoma, and a meningioma of the spinal cord in rats of both sexes. Prenatal exposure by a single intravenous injection on day 15 or day 21 of gestation induced five malignant neurinomas, one mixed glioma, and one oligodendroglioma in offspring of female rats.

No adequate human studies of the relationship between exposure to methyl methanesulfonate and human cancer have been reported (IARC 1974, 1987, 1999).

PROPERTIES

Methyl methanesulfonate is a colorless liquid with a boiling point of 203°C. It is soluble in water, dimethyl formamide, propylene glycol, ethanol, ether, and acetone, and is slightly soluble in nonpolar solvents (HSDB 2001, NTP 2001).

USE

Methyl methanesulfonate is used experimentally as a research chemical and as a catalyst in chemical synthesis (IARC 1974, 1999, Merck 1989, HSDB 2001). It has been tested as a cancer chemotherapeutic agent (HSDB 2001). The monoesters of methanesulfonic acid may be reversible insect and mammalian pest chemosterilants as well as possible human male contraceptives (IARC 1974).

PRODUCTION

Production of methyl methanesulfonate is limited to research purposes (IARC 1974, 1999). Methyl methanesulfonate is not produced commercially in the U.S., and no import and export data were available (IARC 1999, HSDB 2001). Chem Sources (2001) identified six U.S. suppliers of methyl methanesulfonate.

EXPOSURE

Exposure to methyl methanesulfonate appears to be limited to laboratory research personnel. If released to the environment, it will hydrolyze rapidly, and it has a vapor phase half-life of 69 days (HSDB 2001).

Potential exposure for the general population exists if methyl methanesulfonate is approved for the production of chemosterilants for insects and mammalian pests or as a human male contraceptive or cancer chemotherapeutic agent (IARC 1974). Methyl methanesulfonate is not known to occur in nature (IARC 1974).

REGULATIONS

EPA regulates methyl methanesulfonate under the Resource Conservation and Recovery Act (RCRA). It has established rules for hazardous spills and requirements for handling and disposal of methyl methanesulfonate wastes.

OSHA regulates methyl methanesulfonate under the Hazard Communication Standard and as a chemical hazard laboratories. Regulations are summarized in Volume II, Table 110.

REFERENCES

Chem Sources. Chemical Sources International, Inc. <http://www.chemsources.com>, 2001.

HSDB. Hazardous Substances Data Bank. Online database produced by the National Library of Medicine. Methyl methanesulfonate. Profile last updated February 2, 2001. Last review date, January 31, 1996.

IARC. International Agency for Research on Cancer. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Some Anti-thyroid and Related Substances, Nitrofurans and Industrial Chemicals. Vol. 7. 326 pp. Lyon, France: IARC, 1974.

IARC. International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Overall Evaluations of Carcinogenicity. Supplement 7. 440 pp. Lyon, France: IARC, 1987.

IARC. International Agency for Research on Cancer. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Re-Evaluation of Some Organic Chemicals, Hydrazine, and Hydrogen Peroxide. Vol. 71. 1589 pp. Lyon, France: IARC, 1999.

Merck. The Merck Index, Eleventh Edition. Rahway, NJ: Merck & Co., Inc., 1989.

Methyl Methanesulfonate (Continued)

NTP. National Toxicology Program. Chemical Repository. Methyl Methanesulfonate. Last updated August 13, 2001. (<http://ntp-server.niehs.nih.gov> and search 66-27-3).