

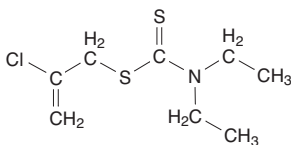
Sulfallate

CAS No. 95-06-7

Reasonably anticipated to be a human carcinogen

First listed in the *Third Annual Report on Carcinogens* (1983)

Also known as *N,N*-diethylthiocarbamic acid 2-chloroallyl ester or 2-chloroallyl diethyl(dithiocarbamate)



Carcinogenicity

Sulfallate 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 sulfallate caused tumors in two rodent species and at several different tissue sites. Dietary administration of sulfallate caused cancer of the mammary gland (adenocarcinoma) in female rats and mice, cancer of the forestomach (squamous-cell carcinoma) in male rats, and benign lung tumors (alveolar/bronchiolar adenoma) in male mice (IARC 1983, NCI 1980). Since sulfallate was listed in the *Third Annual Report on Carcinogens*, an additional study in mice has been identified. In male and female strain A mice (a strain with a high spontaneous incidence of lung cancer), intraperitoneal injection of sulfallate increased the number of lung tumors per animal (Maronpot *et al.* 1986).

Cancer Studies in Humans

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

Properties

Sulfallate is a chlorinated dithiocarbamate derivative that exists as an amber oil at room temperature (NCI 1980, HSDB 2009). It is very slightly soluble in water and soluble in acetone, benzene, chloroform, ethyl acetate, ethyl alcohol, kerosene, and most other organic solvents. It is hydrolyzed by alkalis (IARC 1983). Physical and chemical properties of sulfallate are listed in the following table.

| Property | Information |
|----------------------------------|---|
| Molecular weight | 223.8 ^a |
| Specific gravity | 1.088 at 25°C ^a |
| Boiling point | 128°C to 130°C ^a |
| Log K_{ow} | 3.15 ^b |
| Water solubility | 0.100 g/L at 25°C ^a |
| Vapor pressure | 2.2×10^{-3} mm Hg at 20°C ^a |
| Dissociation constant (pK_a) | 13.30 ^c |

Sources: ^aHSDB 2009, ^bChemIDplus 2009, ^cAkron 2009.

Use

Sulfallate was first introduced as a herbicide in 1954 (IARC 1983). Its primary use in the United States was as a pre-emergent selective herbicide to control certain annual grasses and broadleaf weeds around vegetable and fruit crops (HSDB 2009). Sulfallate was also used to control weeds among shrubbery and ornamental plants. All sulfallate products were discontinued by the manufacturer in the early 1990s (EPA 1998, HSDB 2009).

Production

Commercial production of sulfallate in the United States was first reported in 1955 (IARC 1983). About 100,000 lb of sulfallate was used in the United States in 1975 and 1978 (HSDB 2009). No data on current U.S. production, imports, or exports of sulfallate were found. In 2009, sulfallate was available from eight suppliers worldwide, including seven U.S. suppliers (ChemSources 2009).

Exposure

Because sulfallate is no longer used in the United States, the potential for exposure is low. In the past, the general population may have been exposed to sulfallate through ingestion of residues in food crops, and rural residents may have been exposed through inhalation or dermal contact after spraying applications. Sulfallate was identified in vegetables in the 1978 to 1982 and 1988 to 1989 pesticide monitoring programs conducted by the U.S. Food and Drug Administration (HSDB 2009).

If released to air, sulfallate will remain in the vapor phase and react with photochemically produced hydroxyl radicals, with a half-life of 4 hours (HSDB 2009). If released to water, sulfallate will adsorb to sediment and suspended particles or will volatilize. If released to soil, it will be moderately mobile and will remain in surface soil for about six weeks. If sulfallate remains in surface soil, it may be carried with eroding soil from agricultural land into surface water.

The potential for occupational exposure through inhalation and dermal contact existed during the manufacture, formulation, and application of sulfallate (HSDB 2009). The potential for exposure was greatest for agricultural workers during application.

Regulations

Environmental Protection Agency (EPA)

Resource Conservation and Recovery Act

Listed as a hazardous constituent of waste.

References

- Akron. 2009. *The Chemical Database*. The Department of Chemistry at the University of Akron. <http://ull.chemistry.uakron.edu/erd> and search on CAS number. Last accessed: 6/2/09.
- 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: 6/2/09.
- ChemSources. 2009. *Chem Sources - Chemical Search*. Chemical Sources International. <http://www.chemsources.com/chemonline.html> and search on 2-chloroallyl diethylthiocarbamate. Last accessed: 6/2/09.
- EPA. 1998. *Status of Pesticides in Registration, Reregistration, and Special Review (aka Rainbow Report)*. U.S. Environmental Protection Agency. <http://www.epa.gov/oppsrrd1/Rainbow/98rainbo.pdf>.
- 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: 6/02/09.
- IARC. 1983. Sulfallate. In *Miscellaneous Pesticides*. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, vol. 30. Lyon, France: International Agency for Research on Cancer. pp. 283-291.
- Maronpot RR, Shimkin MB, Witschi HP, Smith LH, Cline JM. 1986. Strain A mouse pulmonary tumor test results for chemicals previously tested in the National Cancer Institute carcinogenicity tests. *J Natl Cancer Inst* 76(6): 1101-1112.
- NCI. 1980. *Bioassay of Sulfallate for Possible Carcinogenicity*. Technical Report Series no. 115. DHEW (NIH) Publication No. 78-1370. Bethesda, MD: National Institutes of Health. 62 pp.