DIISOPROPYL SULFATE

Data were last evaluated in IARC (1992).

1. Exposure Data

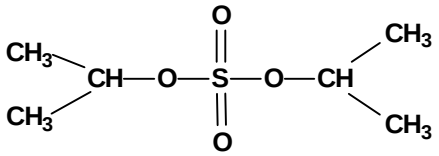
1.1 Chemical and physical data

1.1.1 *Nomenclature*

Chem. Abstr. Serv. Reg. No.: 2973-10-6

Chem. Abstr. Name: Sulfuric acid, bis(1-methylethyl)ester

1.1.2 *Structural and molecular formulae and relative molecular mass*



$C_6H_{14}O_4S$ Relative molecular mass: 182.24

1.1.3 *Physical properties* (for details, see IARC, 1992)

(*a*) *Boiling point*: 94°C at 931 Pa; 106°C at 2394 Pa (decomposes)

(*b*) *Melting point*: –19°C

(*c*) *Conversion factor*: $mg/m^3 = 7.45 \times ppm$

1.2 Production and use

Diisopropyl sulfate is an intermediate in the indirect hydration (strong- or weak-acid) process for the preparation of isopropanol from propylene. It has no other known industrial use. No data were available on levels of occupational exposure to diisopropyl sulfate (IARC, 1992).

2. Studies of Cancer in Humans

2.1 Cohort studies

Exposure to diisopropyl sulfate occurs in production of isopropanol (see this volume). An early cohort study of isopropanol manufacture using the strong-acid process at a

petrochemical plant in the United States showed a significant excess risk for nasal sinus cancer. An increased risk for cancer of the buccal cavity and pharynx was suggested in a cohort of workers at an isopropanol unit in the United States. A cohort study at an isopropanol plant in the United Kingdom indicated an increased risk for nasal cancer (based on one case only) and for brain tumours (IARC, 1992).

As described in the monograph on diethyl sulfate (see this volume), a cohort study at an isopropanol and ethanol manufacturing plant in the United States revealed an increased risk for laryngeal cancer. As also mentioned in the same monograph, a cohort study at a plant producing ethanol and isopropanol in the United States suggested an increased risk for cancers of the larynx, buccal cavity and pharynx in strong-acid workers (IARC, 1992).

2.2 Case–control studies

A subsequent case–control study nested in an expanded cohort at the aforementioned isopropanol and ethanol manufacturing plant in the United States indicated that the increased risk of laryngeal cancer was related to exposure to sulfuric acid; the risk persisted even after exclusion of workers in the ethanol and isopropanol units (IARC, 1992).

[No measurement of exposure to diisopropyl sulfate was available for the industrial processes investigated in the epidemiological studies. It is therefore difficult to assess the contribution of diisopropyl sulfate to the increased cancer risks. Furthermore, exposure to mists and vapours from strong inorganic acids, primarily sulfuric acid, probably plays a role in increasing these risks.]

3. Studies of Cancer in Experimental Animals

Diisopropyl sulfate was tested for carcinogenicity by subcutaneous injection in one strain of rats and by skin application in one strain of mice. It produced local sarcomas in rats and skin papillomas and carcinomas in mice. In a screening study in two strains of mice, an increased incidence of lung adenomas was observed following subcutaneous injection (IARC, 1992).

4. Other Data Relevant to an Evaluation of Carcinogenicity and its Mechanisms

No data were available to the Working Group.

5. Evaluation

There is *inadequate evidence* in humans for the carcinogenicity of diisopropyl sulfate.

There is *sufficient evidence* in experimental animals for the carcinogenicity of diisopropyl sulfate.

Overall evaluation

Diisopropyl sulfate is *possibly carcinogenic to humans (Group 2B)*.

6. Reference

IARC (1992) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 54, *Occupational Exposures to Mists and Vapours from Strong Inorganic Acids; and Other Industrial Chemicals*, Lyon, pp. 41–130, 229–235