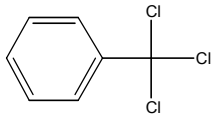
BENZOTRICHLORIDE
CAS No. 98-07-7
First Listed in the *Fourth Annual Report on Carcinogens*



CARCINOGENICITY

Benzotrichloride is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1982a,b, 1987, 1999). When administered by gavage, benzotrichloride induced squamous cell carcinomas of the forestomach and adenocarcinomas of the lung in female mice. Benzotrichloride was tested in three studies by skin application to female mice. It induced squamous cell carcinomas of the skin and lung in all three experiments, and upper digestive tract tumors (carcinomas of the lips, tongue, esophagus, or stomach) and lymphomas were observed in two of the three experiments. In a mouse-lung tumor bioassay, benzotrichloride increased the incidence of lung adenomas.

No data were available to evaluate the carcinogenicity of α-chlorinated toluenes, including benzotrichloride, in humans (IARC 1982a,b, 1987, 1999). There is evidence that employment in the production of chlorinated toluenes, which involves potential exposure to benzotrichloride as well as other chemicals, increases the risk of respiratory cancer.

PROPERTIES

Benzotrichloride is a clear, colorless to yellowish, oily liquid with a penetrating odor. It is insoluble in water and soluble in benzene, diethyl ether, and ethanol. Benzotrichloride is unstable and hydrolyzes to benzoic acid and hydrochloric acid in the presence of moisture (IARC 1999). It is available in the United States as a liquid containing 99% active ingredient.

USE

Benzotrichloride is used extensively as a chemical intermediate. Its most important derivatives are benzoyl chloride and substituted benzophenones used to stabilize plastics in the presence of ultraviolet light (SRI 1986, IARC 1999). It is also used as a dye intermediate in the preparation of eight dyes and pigments, including five produced in commercial quantities in the United States. Additionally, benzotrichloride is used to make benzotrifluoride, hydroxybenzophenone, antiseptics, and antimicrobial agents (IARC 1982a).

PRODUCTION

The 1997 *Directory of Chemical Producers* listed one producer of benzotrichloride (SRI 1997). Chem Sources (2001) identified eight current U.S. suppliers. From 1982 to 1990 and in 1992, the USITC identified two companies producing an unspecified amount of benzotrichloride (USITC 1983-1991, 1994). In 1991 and 1994, only one manufacturer was reported (USITC 1993, 1995). Currently, two significant U.S. producers of benzotrichloride with a capacity totaling 68 million lb were reported (Seper 2001). The latest production volume found was for western countries in 1988 when 69 million lb of the chemical were produced (IARC 1999). U.S. production volume for 1982 was 35 million lb (HSDB 2000).

In 1986, U.S. imports of benzotrichloride totaled 363,000 lb (HSDB 2000). In 1983, imports through the principal customs districts totaled 39,600 lb (USITC 1984b). The 1979 TSCA Inventory reported three companies with a total production of 30 million lb in 1977 (TSCA 1979). It was estimated that approximately 40 million lb of benzotrichloride are needed annually for the U.S. production of benzoyl chloride alone. Benzotrichloride has been produced commercially in the United States since at least 1919 (IARC 1982a).

EXPOSURE

The primary routes of potential human exposure to benzotrichloride are inhalation, ingestion, and dermal contact. Its exclusive use as a chemical intermediate results in minimal potential consumer exposure. Exposure to the chemical from industrial fugitive emissions is also expected to be very low due to its ability to hydrolyze rapidly in the presence of moisture. Consumer exposure to small amounts may occur during the use of pharmaceuticals made with benzotrichloride. Potential occupational exposure of workers could be significant due to releases in the work environment in the liquid or vapor form. A realistic exposure assessment is not possible because the number of workers, exposure levels, and releases to the environment are not documented (CHIP 1982). The National Occupational Exposure Survey (1981-1983) estimated that 171 workers potentially were exposed to benzotrichloride (NIOSH 1984). Potential occupational exposure can occur during the production, formulation, packaging, and application of antiseptics made with benzotrichloride or benzoyl chloride. Benzotrichloride has been identified in surface waters at unreported concentrations. It does not occur naturally (IARC 1982a). EPA's Toxic Chemical Release Inventory (TRI) estimated that 2,175 lb of benzotrichloride were released to the air by seven facilities that produced, processed, or used the chemical in the United States in 1999 (TRI99 2001).

REGULATIONS

Benzotrichloride is regulated by EPA under the Clean Air Act (CAA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Superfund Amendments and Reauthorization Act (SARA), and Toxic Substances Control Act (TSCA). Benzotrichloride is subject to reporting rules under CERCLA, RCRA, SARA, and TSCA. Benzotrichloride is designated as a hazardous constituent of waste under RCRA, and a reportable quantity (RQ) of 10 lb has been established under CERCLA. It is listed as an extremely hazardous substance under SARA for which emergency response plans must be prepared if the threshold planning quantity of 100 lb is reached.

ACGIH recommends a short term (15 minute) ceiling value at 0.1 ppm (0.8 mg/m^3); the potential for skin absorption was noted. OSHA regulates benzotrichloride under the Hazard

Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table 21.

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