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INFORMATION PROFILES ON POTENTIAL OCCUPATIONAL HAZARDS

Jane E. Hoecker
Patrick R. Durkin
Arnold Hanchett
Leslie N. Davis
William M. Meylan
Stephen J. Bosch

Center for Chemical Hazard Assessment
Syracuse Research Corporation
Merrill Lane
Syracuse, New York 13210

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National Institute for Occupational Safety and Health
5600 Fishers Lane, Room 1-58
Rockville, Maryland 20857

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15. Supplementary Notes

16. Abstracts Information profiles on potential occupational hazards of a series of chemical compounds and industrial processes are presented in the form of data sheets describing chemical structures, biological effects, human effects, exposure limits, prevailing standards, etc. Chemical compounds covered are: benzyl chloride; carbon black; furfuryl alcohol; hexachlorocyclopentadiene; hexafluoroacetone; hydrogene chloride gas; methyl chloride; 2-butanone peroxide; oxalic acid; ozone; talc; vinyl cyclohexene dioxide; wood dust; boron and its compounds; brominated aromatic compounds; cobalt and its compounds; fumigants; glycidyl ethers; inorganic azides; inorganic chromium compounds; iron and its compounds; manganese and its compounds; mercaptans; nitriles; nitrobenzenes; nitrophenols; nitrotoluenes; organic anhydrides; organoarsenic compounds; organoisocyanates; organolead compounds; organomercury compounds. Industrial processes covered are: iron and steel foundries; manufacture and use of cement; printing industry; roofing industry; slaughtering and rendering plants; welding and brazing.

17. Key Words and Document Analysis. 17a. Descriptors

Industrial hygiene
Oxidizers
Industries
Toxicology
Organic compounds
Inorganic compounds
Metals
Nitrocompounds
Industries
Halohydrocarbons

17b. Identifiers/Open-Ended Terms

Exposure limits
Air quality control
Dust control
Heavy metals

17c. COSATI Field/Group 06/J

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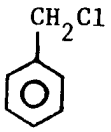
INDIVIDUAL CHEMICAL COMPOUNDS

BENZYL CHLORIDE (α-chlorotoluene)

1. Chemical Structure



2. Chemical Abstracts Service Number

100-44-7

3. Registry of Toxic Effects of Chemical Substances Number

XS89250

4. Production Figures and Economic Trends in Production

Production of benzyl chloride was reported at 80 million lbs. in 1972 (USITC, 1972). Currently, about 89 million lbs. (SRC estimate) are produced based upon an 84% utilization of capacity (Carlson and Erskine, 1973).

The growth rate for benzyl chloride is expected to be 4% per year through 1979 (Chem. Prof., 1975).

5. Uses

Uses for benzyl chloride are as follows (Chem. Prof., 1975):

n-Butyl benzyl phthalate	67%
Benzyl alcohol	13%
Quaternary amines	12%
All other	8%
	100%

6. Number of Companies Producing and Using

The four manufacturers producing benzyl chloride are Monsanto Co., Stauffer Chem. Co., Tenneco, Inc., and UOP, Inc. at four different locations (SRI, 1977).

More than 90% of production is captively used by three of the producing companies (SRC estimate).

7. Biological Effects of Exposure

a) Target Organs

Benzyl chloride is highly irritating to the eyes, ears, nose, and throat and can cause lung edema (Smyth, 1956). On dermal applications, this

Table 1. Acute Toxicity of Benzyl Chloride

Organism	Route	LD_{50} or LC_{50}	Reference
Rat	oral	1231 mg/kg	NIOSH, 1976
	subcutaneous	1000 mg/kg	Druckrey et al., 1970
	inhalation	150 ppm x 2 hr.	Mikhailova, 1964
Mouse	oral	1624 mg/kg	NIOSH, 1976
	inhalation	80 ppm x 2 hr.	Mikhailova, 1964

chemical is a strong sensitizing agent in guinea pigs (Von Oettingen, 1955). Mikhailova (1964) reports that exposure to benzyl chloride can cause leucopenia.

b) Acute Effects

Information on the acute toxicity of benzyl chloride is summarized in Table 1. In addition, Flury and Zernik (1931) found that inhalation of 16 ppm benzyl chloride for eight hours is dangerous to cats. In a paper not reviewed for this report, Kurlzandskii and coworkers (1975) have discussed acute toxicity data on benzyl chloride.

In acute in vitro exposures, benzyl chloride has been found to be moderately toxic to Ehrlich-Landschutz diploid ascites tumor cells (Holmberg and Malmfors, 1974).

c) Subchronic Effects

No information has been encountered on the subchronic toxicity of benzyl chloride.

d) Chronic Effects

i) Carcinogenicity - Subcutaneous injections of rats with benzyl chloride over a period of 51 weeks has resulted in the development of local sarcomas with lung metastases. At weekly doses of 40 mg/kg, tumors developed in 3 of 14 treated animals within 500 days. At weekly doses of 80 mg/kg, sarcomas developed in 6 of 8 treated animals within 500 days (Druckrey et al., 1970; Preussmann, 1968). However, in mice given 8 to 12 intraperitoneal injections, three times per week, for total doses of 600 mg/kg, 1500 mg/kg, and 2,000 mg/kg, the tumor incidence was not significantly different from control animals after 24 weeks (Poirier et al., 1975).

ii) Mutagenicity - At treatment levels of 2 mg/plate, benzyl chloride is mutagenic to strains TA98 and TA100 of Salmonella typhimurium (McCann et al., 1975).

iii) Teratogenicity - No studies have been encountered on the teratogenicity of benzyl chloride.

iv) Other Chronic Studies - The hazards of chronic inhalation poisoning by benzyl chloride have been discussed by Kurlyandskii and Ordynskii (1973). This paper has not been reviewed for this profile.

e. Human Effects

Exposures to benzyl chloride at 16 ppm for one minute are reportedly intolerable to man (Flury and Zernik, 1931). At 32 ppm, benzyl chloride causes severe irritation to the eyes and respiratory tract (Von Oettingen, 1955).

8. Threshold Limit Value

The TLV for benzyl chloride is 1 ppm (ACGIH, 1971). This value is apparently based on the reports of Flury and Zernik (1931) and Smyth (1956).

9. Other Standards

In the U.S.S.R., the maximum allowable concentration of benzyl chloride in the workplace is 0.1 ppm (Winnell, 1975).

Benzyl chloride must have a corrosive material label during transport (D.O.T., 1976).

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