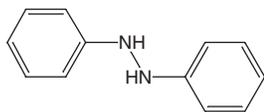


## Hydrazobenzene

### CAS No. 122-66-7

Reasonably anticipated to be a human carcinogen  
First Listed in the *Second Annual Report on Carcinogens* (1981)



### Carcinogenicity

Hydrazobenzene is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NCI 1978). When administered in the diet, hydrazobenzene induced hepatocellular and squamous cell carcinomas, squamous cell papillomas of the Zymbal gland, ear canal, and skin of the ear in male rats, mammary adenomas in female rats, and hepatocellular carcinomas in female mice (NCI 1978). When injected subcutaneously in sunflower seed oil, hydrazobenzene induced mammary microfollicular carcinomas and adenomas associated with fibroadenomas, liver adenomas, and sebaceous squamous cell carcinomas of the Zymbal gland in female rats, and rhabdomyosarcomas of the subcutaneous fat, liver adenomas and hemangiomas, and lung adenomas in mice of both sexes. When applied topically in benzene, hydrazobenzene induced increased incidences of lung and liver adenomas and hemangiomas in mice of both sexes (Pliss 1974). When injected intraperitoneally in tricapylin, hydrazobenzene induced pulmonary alveolar-bronchial adenomas in mice of both sexes (Maronpot 1986).

### Properties

Hydrazobenzene occurs as colorless crystals. Its molecular weight is 184.2, and it melts at 131°C and boils at 293°C at 760 mm Hg. It is insoluble in acetic acid, slightly soluble in benzene, and very soluble in ethanol and acetone. Hydrazobenzene reacts with hot mineral acid to produce benzidine (NCI 1978, HSDB 2000).

### Use

Hydrazobenzene has been used primarily in the dye manufacturing industry as the precursor of the dye intermediate benzidine. It is also utilized as an intermediate in the manufacture of pharmaceuticals such as sulfapyrazone and phenylbutazone (antiarthritic drugs). Some minor direct uses of hydrazobenzene are as an anti-sludging additive to motor oil, desuckering agent for tobacco plants, reductant in the reclamation of rubber, component of experimental organometallic polymers, component in photochromic resin compositions, and in polymerization reactions (CHIP 1981, HSDB 2000). It is also used in the manufacture of hydrogen peroxide and has been evaluated as an agent for insecticides (Spectrum 2001).

### Production

No information was available on current production of hydrazobenzene in the U.S.; however, 16 and 15 U.S. suppliers were identified in 1986 and 2001, respectively (Chem Sources 1986, 2001). U.S. imports of hydrazobenzene exceeded 22,000 lb in 1983 (USITC 1984). The TSCA (1979) Inventory identified one company producing 550,000 lb of hydrazobenzene and three companies importing 550,000 lb in 1977. Earlier data indicated seven producers and importers of hydrazobenzene, with domestic production of 373,000 lb annually and imports of 135,000 lb. Dye manufacturing facilities produce additional unknown quantities during reduction of nitrobenzene to hydrazobenzene; this reduction occurs prior to the rearrangement of hydrazobenzene to benzidine.

### Exposure

The primary routes of potential human exposure to hydrazobenzene are inhalation, ingestion, and dermal contact. The greatest potential for exposure to hydrazobenzene occurs in the benzidine-based dye industry and when the compound is used as an intermediate in the manufacture of certain pharmaceuticals. NIOSH (1984) conducted an occupational exposure survey in 1981 to 1983 and estimated that 977 U.S. workers, including 154 females, were potentially exposed to hydrazobenzene. The lack of hydrazobenzene use in consumer products results in little, if any, appreciable exposure of consumers to this compound; however, the general population could be exposed from ingesting contaminated fish or drinking water (HSDB 2000).

In a national survey, hydrazobenzene was detected in 1.2% of 1,205 effluent samples collected from wastewater treatment plants at a median concentration of 10 µg/L (HSDB 2000). Hydrazobenzene has been found in drinking water at levels of 1 µg/L (1 ppb). Hydrazobenzene will rapidly degrade in the atmosphere by a combination of air oxidation and photolysis (Spectrum 2001). It was determined that the half-life for the decomposition of 100 µg hydrazobenzene/L in a municipal sewage effluent was 60 minutes if oxygen was removed from the sewage, but only 15 minutes if the oxygen was not removed (CHIP 1981). Based on the EPA's Toxics Release Inventory (TRI) only 12 lb were released to the environment from two U.S. facilities in 1999 (TRI99 2001).

### Regulations

#### EPA

##### Clean Air Act

NESHAP: Listed as a Hazardous Air Pollutant (HAP)

##### Clean Water Act

Water Quality Criteria: Based on fish/shellfish and water consumption = 0.036 µg/L;  
based on fish/shellfish consumption only = 0.20 µg/L

##### Comprehensive Environmental Response, Compensation, and Liability Act

Reportable Quantity (RQ) = 10 lb

##### Emergency Planning and Community Right-To-Know Act

Toxics Release Inventory: Listed substance subject to reporting requirements

##### Resource Conservation and Recovery Act

Listed Hazardous Waste: Waste codes in which listing is based wholly or partly on substance - U109

Listed as a Hazardous Constituent of Waste

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