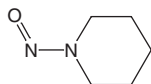


***N*-Nitrosopiperidine**

CAS No. 100-75-4

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



Carcinogenicity

N-Nitrosopiperidine is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1978, 1987). When administered in the diet, *N*-nitrosopiperidine induced squamous cell carcinomas of the forestomach, papillomas of the esophagus, hepatocellular adenomas and carcinomas, and liver hemangioendotheliomas in male mice. When administered in drinking water, *N*-nitrosopiperidine induced lung adenomas in mice of both sexes and esophageal carcinomas and hepatocellular carcinomas in rats. When administered orally, *N*-nitrosopiperidine induced hepatocellular carcinomas in monkeys. When administered by subcutaneous injection, the compound induced squamous cell carcinomas and other tumors of the nasal cavity and esophageal squamous cell carcinomas and papillomas in rats, and tumors of the nasal cavity, trachea, lung, tongue, palate, esophagus, forestomach, and liver in hamsters. When administered by intraperitoneal injection, *N*-nitrosopiperidine increased the incidence of adenomas of the lung in mice. When administered by intravenous injection, the compound induced carcinomas of the esophagus and pharynx in rats. When administered to pregnant hamsters, a low incidence of tumors of the upper respiratory tract was observed for the offspring and a high incidence of respiratory tract tumors was observed for the mothers (IARC 1978, 1987).

No adequate human studies of the relationship between exposure to *N*-nitrosopiperidine and human cancer have been reported (IARC 1978, 1987).

Properties

N-Nitrosopiperidine is a yellow oil. It is soluble in water, organic solvents, lipids, and hydrochloric acid. It decomposes when exposed to light, and is especially sensitive to ultraviolet light. When heated to decomposition, it emits toxic fumes of nitrogen oxides. It is oxidized by strong oxidants to the corresponding nitramine and it can be reduced to the corresponding hydrazine and/or amine. It is relatively resistant to hydrolysis, but can be reduced by hydrogen bromide in acetic acid (IARC 1978, HSDB 2001).

Use

N-Nitrosopiperidine is used as a research chemical; no other uses were identified (HSDB 2001).

Production

N-Nitrosopiperidine was first prepared in 1863 by the action of nitrogen dioxide on piperidine. Numerous patents have been issued for the production of *N*-nitrosopiperidine; however, there is no evidence that *N*-nitrosopiperidine has been manufactured on a commercial scale in the United States (IARC 1978). Synthetic production of nitrosamines is limited to small quantities, primarily as research chemicals (HEEP 1980). Chem Sources (2001) identified nine U.S. suppliers for *N*-nitrosopiperidine. No production, import, or export data were available.

Exposure

Due to the small quantities produced, potential exposure to *N*-Nitrosopiperidine appears to be limited. According to the Toxic

Chemical Release Inventory (TRI), environmental releases of *N*-nitrosopiperidine in 1999 were reported to be 14,756 lb. Three facilities reported releasing the chemical; however, approximately 99% of the total release was from one facility (TRI99 2001).

The general population may possibly be exposed to low concentrations of *N*-nitrosopiperidine from cigarette smoke and certain foods. Several researchers have reported trace amounts of *N*-nitrosopiperidine in cigarettes, but the chemical has not been found in all brands of cigarettes tested. Investigators have detected *N*-nitrosopiperidine concentrations as high as 64 µg/kg in meat and fish products such as bacon, bologna, wieners, and smoked cod; the presence of *N*-nitrosopiperidine in meat, cheese, and spices results from the use of sodium nitrite as a preservative (IARC 1978).

Regulations

EPA

Clean Water Act

Effluent Guidelines: Listed as a Toxic Pollutant (nitrosamines)

Water Quality Criteria: Based on fish/shellfish and water consumption = 0.0008 µg/L (nitrosamines); based on fish/shellfish consumption only 1.24 µg/L (nitrosamines)

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 - U179

Listed as a Hazardous Constituent of Waste

FDA

Action level for *N*-nitrosamines in rubber baby bottle nipples is 10 ppb

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