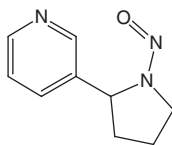


***N*-Nitrosornicotine**

CAS No. 16543-55-8

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



Carcinogenicity

N-Nitrosornicotine is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1978, 1985, 1987). When administered in the drinking water, *N*-nitrosornicotine induced esophageal carcinomas and papillomas and carcinomas of the nasal cavity in rats of both sexes, nasal cavity adenocarcinomas in female rats, and papillomas of the nasal cavity and trachea in hamsters of both sexes. When administered in the diet, *N*-nitrosornicotine induced esthesioneuroepitheliomas and squamous cell carcinomas of the nasal cavity, and squamous cell carcinomas of the esophagus in male rats. When administered by subcutaneous injection, *N*-nitrosornicotine induced olfactory neuroblastomas, rhabdomyosarcomas, esthesioneuroepitheliomas, squamous cell and anaplastic carcinomas, spindle cell sarcomas, and lung adenomas in rats of both sexes and tracheal papillomas in hamsters of both sexes. Intraperitoneal injection of *N*-nitrosornicotine induced multiple pulmonary adenomas in mice of both sexes, lung adenomas in female mice, and nasal cavity tumors and tracheal papillomas in male hamsters (IARC 1985).

No adequate human studies of the relationship between exposure to *N*-nitrosornicotine and human cancer have been reported (IARC 1978, 1985, 1987).

Properties

N-Nitrosornicotine is a yellow, oily liquid that solidifies at cold temperatures. Its molecular weight is 177.2, its melting point is 47°C, and its boiling point is 154°C. When heated to decomposition, it emits toxic fumes of nitrogen oxides. *N*-Nitrosornicotine can be reduced to the corresponding hydrazine with lithium aluminum hydride (HSDB 2001, IARC 1985).

Use

The only use identified for *N*-nitrosornicotine is as a research chemical (IARC 1985).

Production

N-Nitrosornicotine is not produced commercially in the United States. Chem Sources (2001) identified one U.S. supplier of *N*-nitrosornicotine. *N*-Nitrosornicotine may be synthesized in small quantities primarily for use in research (HEEP 1980). No import or export data were available.

Exposure

N-Nitrosornicotine has been found in a variety of tobacco products (chewing tobacco, snuff, cigarettes, and cigars), in mainstream and sidestream smoke from cigars and cigarettes, in saliva of chewers of betel quid with tobacco, and in saliva of oral-snuff users. Some of the *N*-nitrosornicotine in saliva appears to be formed endogenously from nitrite in saliva and tobacco alkaloids. Thus, there is widespread exposure to *N*-nitrosornicotine among users of tobacco products and those exposed to sidestream smoke. *N*-Nitrosornicotine is reported to be produced by nitrosation of nicotine during the curing,

ageing, processing, and smoking of tobacco. About half of the *N*-nitrosornicotine originates in the unburnt tobacco, whereas the remainder is formed during burning. *N*-Nitrosornicotine has been found in cigarettes at concentrations of 0.3 to 9 mg/kg, in snuff products at 12 to 29 mg/kg, in chewing tobacco at 3.5 to 90.6 mg/kg, and in cigarette smoke at 0.14 µg/cigarette (IARC 1978, 1985).

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)

Emergency Planning and Community Right-To-Know Act

Toxics Release Inventory: Listed substance subject to reporting requirements

Resource Conservation and Recovery Act

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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