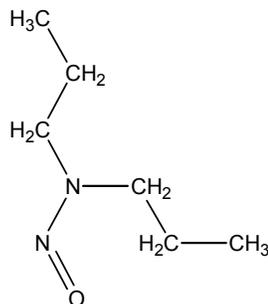


## ***N*-NITROSODI-*n*-PROPYLAMINE**

**CAS No. 621-64-7**

First Listed in the *Second Annual Report on Carcinogens*



### **CARCINOGENICITY**

*N*-Nitrosodi-*n*-propylamine is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1978, 1987). When administered to rats in the drinking water, *N*-nitrosodi-*n*-propylamine induced carcinomas of the liver and the tongue and papillomas and carcinomas of the esophagus. When administered to rats by subcutaneous injection, the chemical induced neoplasms of the nasal and/or paranasal cavity, liver tumors (mainly carcinomas), adenomas and carcinomas of the lung, and squamous cell papillomas of the esophagus. Subcutaneous injection also induced adenomas and one adenocarcinoma of the kidney in rats of each sex and neoplasms of the nasal and paranasal cavities, laryngobronchial tract, and lung in hamsters of both sexes (IARC 1978).

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

### **PROPERTIES**

*N*-Nitrosodi-*n*-propylamine is a yellow liquid that is soluble in water, alcohol, ether, other organic solvents, and lipids. It is stable when stored in the dark in neutral or alkaline aqueous solutions. This chemical is sensitive to light, especially ultraviolet light, and undergoes photolytic degradation. It is relatively resistant to hydrolysis, but can be oxidized to the corresponding nitramine or reduced to the corresponding hydrazine or amine; further, it can be reduced by hydrogen bromide in acetic acid (IARC 1978, ATSDR 1989). When heated to decomposition, it emits toxic fumes of nitrogen oxides (HSDB 2001).

### **USE**

There are no known commercial uses of *N*-nitrosodi-*n*-propylamine (IARC 1978). It is used in small quantities in laboratory research (ATSDR 1989, HSDB 2001)

## PRODUCTION

*N*-Nitrosodi-*n*-propylamine was first prepared in 1886, but it has never been produced in commercial quantities (IARC 1978, HSDB 2001). The 1979 TSCA Inventory identified two U.S. producers of *N*-nitrosodi-*n*-propylamine in 1977, with an estimated production of 500 lb (TSCA 1979). It has been detected at low concentrations (17 to 190 ppm) in the herbicides trifluralin, isopropalin, and oryzalin (IARC 1978, ATSDR 1989). There are at least 11 U.S. suppliers of laboratory quantities of *N*-nitrosodi-*n*-propylamine (Chem Sources 2001). No import or export data were found.

## EXPOSURE

*N*-Nitrosodi-*n*-propylamine has been detected in some samples of wastewater from chemical plants, extruded rubber products, cheese, alcoholic beverages, and the herbicides trifluralin, isopropalin, and oryzalin at low concentrations. The primary routes of potential human exposure to *N*-nitrosodi-*n*-propylamine are inhalation, ingestion, and dermal contact. Occupational exposure may occur through inhalation and dermal contact during herbicide application or production of extruded rubber parts (IARC 1978, HSDB 2001, ATSDR 1989). Air samples collected at agricultural fields before, during, and after application of trifluralin did not contain detectable levels of *N*-nitrosodi-*n*-propylamine. However, air samples collected at an automobile plant where workers were involved in the production of extruded rubber parts showed concentrations of 1.3 to 3.3  $\mu\text{g}/\text{m}^3$  (ATSDR 1989). No data were available on the number of people possibly exposed.

There is also some evidence that *N*-nitrosodi-*n*-propylamine may be formed in the upper gastrointestinal tract following ingestion of foods containing nitrites or secondary amines. Low levels (about 1 ng/cigarette) may occur in cigarette smoke (ATSDR 1989).

*N*-Nitrosodi-*n*-propylamine is not commonly detected in the environment and, if released, would not persist due to photochemical and biological degradation (ATSDR 1989). According to the Toxic Chemicals Release Inventory (TRI), a single facility released five lb in 1999 and two facilities released a combined total of 2,250 lb in 1998. Release information was not available for any other years (TRI99 2001).

## REGULATIONS

EPA regulates *N*-nitrosodi-*n*-propylamine under the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and Superfund Amendments and Reauthorization Act (SARA). Under CWA, EPA has established water quality standards for discharging this chemical from any point source. EPA has set the reportable quantity (RQ) of 10 lb for *N*-nitrosodi-*n*-propylamine under CERCLA. *N*-Nitrosodi-*n*-propylamine is subject to reporting and record-keeping requirements under RCRA and SARA.

OSHA regulates *N*-nitrosodi-*n*-propylamine under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table 129.

## REFERENCES

ATSDR. Agency for Toxic Substances and Disease Registry. Toxicological Profile for *N*-Nitrosodi-*n*-propylamine. (Final Report). Atlanta, GA: ATSDR, Public Health Service, U.S. Department of Health and Human Services. 1989. 88 pp. NTIS Accession No. PB90-180258.

Chem Sources. Chemical Sources International, Inc. <http://www.chemsources.com>, 2001.

HSDB. Hazardous Substance Data Bank. Online database produced by the National Library of Medicine. *N*-Nitrosodi-*n*-propylamine. Last updated August 9, 2001. Last review date January 31, 1998.

IARC. International Agency for Research on Cancer. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Some *N*-Nitroso Compounds. Vol. 17. 365 pp. Lyon, France: IARC, 1978.

IARC. International Agency for Research on Cancer. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs 1 to 42. Supplement 7. 440 pp. Lyon, France: IARC, 1987.

TRI99. Toxic Chemicals Release Inventory 1999. Data contained in the Toxic Chemical Release Inventory (TRI). Available from the U.S. Environmental Protection Agency Office of Environmental Information, <http://www.epa.gov/triexplorer/reports.htm>, 2001.

TSCA. Toxic Substances Control Act, Chemical Substance Inventory, 1979: public record.