

Sources of Exposure

Toxicokinetics and Biomonitoring

Biomarkers/Environmental Levels

General Populations

- The general population can be exposed to N-nitrosodi-n-propylamine in sodium nitrite-treated foods (e.g., certain cheeses, cured meats and fish) and certain alcoholic beverages.
- Exposure can also occur from *in vivo* generation during digestion of nitrite- or secondary amine-containing foods or drugs.
- Low level exposure may occur through inhalation of cigarette smoke.
- There is no evidence of general population exposure through ingestion of contaminated drinking water or through dermal contact.
- Typical N-nitrosodi-n-propylamine exposure levels have not been quantified.

Occupational Populations

- Occupational exposure may occur in industries involved in the production and use of N-nitrosodi-n-propylamine, such as the rubber-processing industry.
- Workers at hazardous waste sites could potentially be exposed to this compound by inhalation and dermal contact.

Toxicokinetics

- N-Nitrosodi-n-propylamine is absorbed following oral and dermal exposure, and presumably following inhalation exposure; however, no data are available on the extent of absorption (bioavailability).
- There are limited data on the distribution of N-nitrosodi-n-propylamine. Studies of related nitrosoamines suggest that it would be widely distributed.
- The primary pathway of metabolism of N-nitrosodi-n-propylamine is hydroxylation at the α carbon. This pathway ultimately results in the formation of propionaldehyde, 1-propanol, and 2-propanol metabolites.
- N-Nitrosodi-n-propylamine is primarily excreted in the urine as metabolites.

NHANES Biomonitoring

- There are no data regarding levels of N-nitrosodi-n-propylamine in the general population.

Biomarkers

- No biomarkers of exposure have been identified for N-nitrosodi-n-propylamine.

Environmental Levels

Air

- There are no recent monitoring data for air levels of N-nitrosodi-n-propylamine in the United States.

Water

- There are no recent monitoring data for water levels of N-nitrosodi-n-propylamine in the United States.

Sediment and Soil

- There are no monitoring data for levels of N-nitrosodi-n-propylamine in the sediment or soil in the United States.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2019. Toxicological Profile for N-Nitrosodi-n-propylamine. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™ for N-Nitrosodi-n-propylamine



CAS # 621-64-7

February 2019

U.S. Department of Health and
Human Services
Public Health Service
Agency for Toxic Substances
and Disease Registry
www.atsdr.cdc.gov



Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

N-Nitrosodiphenylamine

- N-Nitrosodi-n-propylamine belongs to a group of chemicals referred to as nitrosoamines.
- It is a yellow liquid at room temperature.
- N-Nitrosodi-n-propylamine is produced in small, laboratory-scale quantities for research purposes.
- It is also produced inadvertently during certain manufacturing processes, occurring as an impurity in some dinitroaniline pesticides and during manufacture of some extruded rubber products.

- Inhalation – Likely route of exposure for the occupational populations and general population.
- Oral – Likely route of exposure for the general population.
- Dermal – Possible route of exposure for occupational population.

N-Nitrosodiphenylamine in the Environment

- N-Nitrosodi-n-propylamine should exist almost entirely in the vapor phase in the atmosphere.
- If N-nitrosodi-n-propylamine were applied to warm, moist soil surfaces, most of the nitrosamine would be expected to volatilize.
- In soil, N-nitrosodi-n-propylamine is expected to be highly mobile and it has the potential to leach into shallow groundwater.
- In the atmosphere, N-nitrosodi-n-propylamine vapor would be rapidly degraded by direct photolysis and/or reaction with photochemically-generated hydroxyl radicals.
- In soil and water, degradation of N-nitrosodi-n-propylamine likely occurs by photolysis on the surfaces and by microbes below the surface.
- Bioaccumulation in aquatic organisms is not expected.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- No acute- (≤ 14 days), intermediate- (15–364 days), or chronic (≥ 365 days) duration inhalation MRLs were derived for N-nitrosodi-n-propylamine.

Oral

- No acute- (≤ 14 days), intermediate- (15–364 days), or chronic (≥ 365 days) duration oral MRLs were derived for N-nitrosodi-n-propylamine.

Health Effects

- There is little information regarding health effects of N-nitrosodi-n-propylamine in humans.
- Evidence of liver damage, including necrosis and increased pentobarbital-induced sleep time, have been observed in laboratory animals following acute-duration exposure.
- Forestomach, nasal, lung, and liver tumors have been observed in laboratory animals following intermediate-duration oral exposure.
- The U.S. Department of Health and Human Services categorized N-nitrosodi-n-propylamine as reasonably anticipated to be a human carcinogen, the U.S. Environmental Protection Agency (EPA) categorized it as a probable human carcinogen (Group B2), and the International Agency for Research on Cancer categorized it as possibly carcinogenic to humans (Group 2B).

Children's Health

- It is not known if children are more sensitive to N-nitrosodi-n-propylamine exposure than adults.