

This fact sheet answers the most frequently asked health questions (FAQs) about hydrazine, 1,1-dimethylhydrazine, and 1,2-dimethylhydrazine. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Hydrazines are colorless liquids that are used in rocket fuels, chemical manufacturing, and as boiler water treatments. Exposure to hydrazines may cause nervous system effects, as well as liver and kidney damage. Hydrazines have been found in at least 8 of the 1,416 National Priorities List sites identified by the Environmental Protection Agency (EPA).

## What are hydrazines?

(Pronounced hī/drə zēnz')

Hydrazines are clear, colorless liquids with an ammonia-like odor. There are many kinds of hydrazine compounds, including hydrazine, 1,1-dimethylhydrazine, and 1,2-dimethylhydrazine. Small amounts of hydrazine occur naturally in plants. Most hydrazines are manufactured for use as rocket propellants and fuels, boiler water treatments, chemical reactants, medicines, and in cancer research. Hydrazines are highly reactive and easily catch fire.

## What happens to hydrazines when they enter the environment?

- Hydrazines can be released into the environment during their production or use, or from accidental spills.
- Hydrazines easily evaporate to the air, where they are broken down by reactions within minutes or hours.
- Hydrazines can also dissolve in water, where they usually break down into less toxic compounds within a few weeks.
- Hydrazines may build up in some fish living in contaminated water, but are not expected to remain at high levels over long periods of time.
- In soil, hydrazines may stick to particles and be changed within a few days to less harmful compounds.

## How might I be exposed to hydrazines?

- Breathing contaminated air in or near a facility that makes, processes, or uses hydrazines.
- Eating fish contaminated with hydrazines.
- Drinking or swimming in water that has been contaminated with hydrazines.
- Touching soil contaminated with hydrazines, such as near some military bases or hazardous waste sites.
- Breathing cigarette smoke indirectly or using tobacco products may expose you to small amounts of hydrazine or 1,1-dimethylhydrazine.
- Working in greenhouses where the chemical Alar is used may result in your being exposed to small amounts of 1,2-dimethylhydrazine.

## How can hydrazines affect my health?

Breathing hydrazines for short periods may cause coughing and irritation of the throat and lungs, convulsions, tremors, or seizures. Breathing hydrazines for long periods may cause liver and kidney damage, as well as serious effects on reproductive organs.

Eating or drinking small amounts of hydrazines may cause nausea, vomiting, uncontrolled shaking, inflammation of the nerves, drowsiness, or coma.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

### How likely are hydrazines to cause cancer?

Tumors have been seen in many organs of animals that were exposed to hydrazines by ingestion or breathing, but most tumors have been found in the lungs, blood vessels, or colon. 1,2-Dimethylhydrazine has caused colon cancer in laboratory animals following a single exposure.

The Department of Health and Human Services (DHHS) has determined that hydrazine and 1,1-dimethylhydrazine are known carcinogens.

The International Agency for Research on Cancer (IARC) has determined that hydrazine, 1,1-dimethylhydrazine, and 1,2-dimethylhydrazine are possible human carcinogens.

The EPA has determined that hydrazine, 1,1-dimethylhydrazine, and 1,2-dimethylhydrazine are probable human carcinogens.

The American Conference of Governmental Industrial Hygienists (ACGIH) currently lists hydrazine and 1,1-dimethylhydrazine as suspected carcinogens, but has recently recommended that the listing of hydrazine be changed to that of animal carcinogen, not likely to cause cancer to people under normal exposure conditions.

### Is there a medical test to show whether I've been exposed to hydrazines?

There are tests available to detect the presence of hydrazines or their breakdown products in the blood, urine, and feces. These tests must be done soon after exposure, before the compounds are broken down and eliminated from the body. These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment. These tests cannot be used to tell how much hydrazines you were exposed to or if any health effects will occur.

### Has the federal government made recommendations to protect human health?

The National Institute for Occupational Safety and Health (NIOSH) recommends that the levels of hydrazine and 1,1-dimethylhydrazine in workplace air not exceed 0.03 and 0.6 parts of compound per million parts of air (0.03-0.6 ppm), respectively, for a 2-hour period.

The Occupational Safety and Health Administration (OSHA) limits the amount of hydrazine and 1,1-dimethylhydrazine in workplace air to 1 and 0.5 ppm, respectively, for an 8-hour workday.

The Food and Drug Administration (FDA) has ruled that hydrazine cannot be added to water used for making steam which will contact food.

The EPA requires that spills or accidental releases into the environment of 1 pound or more of hydrazine or 1,2-dimethylhydrazine, or more than 10 pounds of 1,1-dimethylhydrazine be reported to the EPA.

### Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Ingest: To eat or drink something.

ppm: Parts per million.

### References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Hydrazines produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

