

This fact sheet answers the most frequently asked health questions (FAQs) about 1,3-dinitrobenzene and 1,3,5-trinitrobenzene. 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. This information is important 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.

SUMMARY: Exposure to 1,3-dinitrobenzene and 1,3,5-trinitrobenzene may occur from contaminated water, food, air, and soil near an Army ammunitions plant or other chemical manufacturer. High levels of 1,3-dinitrobenzene affect the ability of blood to carry oxygen. Effects of 1,3,5-trinitrobenzene are expected to be similar. These substances have been found in at least 19 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are 1,3-dinitrobenzene and 1,3,5-trinitrobenzene?

(Pronounced 1,3-dī-nī'trō-bĕn'/zĕn' and 1,3,5-trī-nī'trō-bĕn'/zĕn')

1,3-Dinitrobenzene and 1,3,5-trinitrobenzene are synthetic substances that are used in explosives. Both substances are yellow crystal-like solids at room temperature. They may exist in air in very small amounts as dust or a vapor, and can dissolve in certain liquids. If either substance is put under very high heat, it will explode. They have no odor or taste.

What happens to 1,3-dinitrobenzene and 1,3,5-trinitrobenzene when they enter the environment?

- Both compounds are likely to break down in air, water, and soil very slowly.
- Both compounds are slightly soluble in water.
- 1,3-Dinitrobenzene evaporates slowly from water; 1,3,5-trinitrobenzene does not evaporate from water.
- Neither compound sticks to soil strongly, so they can move through soil into groundwater.
- These compounds are not likely to build up in fish or people.

How might I be exposed to 1,3-dinitrobenzene and 1,3,5-trinitrobenzene?

If you live or work near an Army ammunitions plant or other chemical manufacturer, you may be exposed to these compounds by drinking contaminated water, eating contaminated food, breathing contaminated air, or touching or eating contaminated soil.

How can 1,3-dinitrobenzene and 1,3,5-trinitrobenzene affect my health?

Waste discharges from Army ammunitions plants or other chemical manufacturers are the primary sources for release of both compounds to air, water, and soil.

1,3-Dinitrobenzene and 1,3,5-trinitrobenzene are suspected to cause similar health effects. Exposure to high concentrations of 1,3-dinitrobenzene can reduce the ability of blood to carry oxygen and can cause your skin to become bluish in color.

If you are exposed to 1,3-dinitrobenzene for a long time, you can develop a reduction (or loss) in the number of red blood cells (anemia). Other symptoms of 1,3-dinitrobenzene exposure include headache, nausea, and dizziness.

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

We do not know if there are any long-term health effects from exposure to 1,3-dinitrobenzene or 1,3,5-trinitrobenzene. We also do not know if these chemicals cause birth defects in humans.

Results of studies in animals show that effects of 1,3-dinitrobenzene and 1,3,5-trinitrobenzene on the blood are similar to the effects seen in people. Results from animal studies also show some other effects of 1,3-dinitrobenzene exposure, such as behavioral changes and male reproductive system damage.

We do not know if these compounds can cause birth defects in animals. We do not know if the effects seen in animals could also occur in people.

How likely are 1,3-dinitrobenzene and 1,3,5-trinitrobenzene to cause cancer?

The EPA has determined that these compounds are not classifiable as to their carcinogenicity in humans. This is because the ability of these compounds to produce cancer has not been studied in humans or animals.

Is there a medical test to show whether I've been exposed to 1,3-dinitrobenzene or 1,3,5-trinitrobenzene?

There is no routine medical test to show if you have been exposed to 1,3-dinitrobenzene or 1,3,5-trinitrobenzene. Tests have been used to detect 1,3-dinitrobenzene and its breakdown products in blood and urine of exposed animals, but these tests have not been used for people.

Has the federal government made recommendations to protect human health?

The EPA requires that spills or accidental releases into the environment of 100 pounds or more of 1,3-dinitrobenzene, and 10 pounds or more of 1,3,5-trinitrobenzene, must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) regulates levels of 1,3-dinitrobenzene in the workplace. The maximum allowable amount of 1,3-dinitrobenzene in workroom air during an 8-hour workday, 40-hour workweek, is 1 milligram per cubic meter (1 mg/m³).

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend an exposure limit of 1 mg/m³ 1,3-dinitrobenzene in workplace air over a 40-hour workweek.

Glossary

- Anemia: A decreased ability of the blood to transport oxygen.
Breakdown product: A substance that is formed when a chemical breaks down in the body.
Carcinogenicity: Ability to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or a gas.
Long-term: 365 days or longer.
Milligram (mg): One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for 1,3-dinitrobenzene/1,3,5-trinitrobenzene (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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.

