

This fact sheet answers the most frequently asked health questions (FAQs) about HMX. 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.

HIGHLIGHTS: HMX is an explosive. People who work at facilities that make HMX may be exposed to it. In one human study, no adverse effects were reported in workers exposed to unknown concentrations of HMX. Animal studies indicate that HMX may be harmful to the liver and central nervous system if it is swallowed or gets on the skin. HMX has been found in at least 10 of the 1,416 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is HMX?

HMX is an acronym for High Melting explosive. It is also known as octogen and cyclotetramethylene-tetranitramine, as well as by other names. It is a colorless solid that dissolves slightly in water. Only a small amount of HMX will evaporate into the air; however, it can occur in air attached to suspended particles or dust. The taste and smell of HMX are not known.

HMX does not occur naturally in the environment. It is made from other chemicals known as hexamine, ammonium nitrate, nitric acid, and acetic acid. HMX explodes violently at high temperatures. Because of this property, HMX is used in various kinds of explosives, rocket fuels, and burster chargers. A small amount of HMX is also formed in making cyclotrimethylene-trinitramine (RDX), another explosive similar in structure to HMX.

What happens to HMX when it enters the environment?

- Most of the HMX that entered the environment was released into waste water from places that made or used HMX.
- A small amount of HMX can be released to the air as dust or ash from facilities that burn waste contaminated with HMX.

- Some HMX may be released to soil as a result of accidental spills, the settling of HMX-containing dust particles from the air, or the disposal of waste that contains HMX in landfills.
- Dust particles containing HMX may be carried by the wind for some distance.
- In surface water, HMX does not evaporate or bind to sediments to any large extent. Sunlight breaks down most of the HMX in surface water into other compounds, usually in a matter of days to weeks.
- HMX is likely to move from soil into groundwater, particularly in sandy soils.
- It is not known if plants, fish, or animals living in contaminated areas build up levels of HMX in their tissues.

How might I be exposed to HMX?

There is no information on how often you might be exposed to HMX in the environment or to how much. Most people, however, probably won't be exposed to HMX from the environment.

People who work at facilities that make or use HMX or RDX may be exposed to HMX. These workers may be exposed by inhaling dusts that contain HMX or by getting HMX-containing liquids on their skin.

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

People who live near facilities that make or use HMX, or near hazardous waste sites that contain HMX may also be exposed if a release occurs. For these residents, exposure (if any) is most likely to occur from contaminated groundwater.

How can HMX affect my health?

Information on the adverse health effects of HMX is limited. In one human study, no adverse effects were reported in workers who breathed HMX. However, the concentrations of HMX in the workplace air were not reported in this study, and only a small number of workers and effects were investigated.

Studies in rats, mice, and rabbits indicate that HMX may be harmful to your liver and central nervous system if it is swallowed or gets on your skin.

It is not known if HMX can affect the ability to have children, or if it can cause birth defects.

How likely is HMX to cause cancer?

There is no information available as to whether or not HMX can cause cancer in animals or people. The Environmental Protection Agency (EPA) has determined that HMX is not classifiable as to its human carcinogenicity.

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

You can find out if you have been exposed to HMX by having your blood, urine, or feces tested for HMX. Since HMX is poorly absorbed after it is swallowed, the levels of HMX in your blood and urine are likely to be lower than those in your feces. For best results, tests for HMX should be done within a few days after you are exposed.

These tests cannot tell you how much HMX you have

been exposed to or predict whether or not you will have any health effects. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA recommends that the concentration of HMX in an adult's drinking water be less than 0.4 milligrams per liter (0.4 mg/L) for a lifetime. EPA regulates waste containing HMX as hazardous and has set restrictions on its disposal in landfills.

The Department of State regulates the exportation of HMX, and the Department of Transportation (DOT) regulates its transportation.

The Bureau of Alcohol, Tobacco, and Firearms (ATF) regulates the importation, manufacture, distribution, and storage of HMX.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Dissolve: To disappear gradually.

Evaporate: To change into a vapor or a gas.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for HMX 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.

