

This fact sheet answers the most frequently asked health questions (FAQs) about dichloropropenes. 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 is important you understand this information because these substances 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: Exposure to 1,3-dichloropropene occurs mainly in farms where it is used to treat crops or in factories where it is made. Exposure to other dichloropropenes is much more limited. Dichloropropenes cause irritation at the point of contact. Ingestion of high amounts of 1,3-dichloropropene can cause severe stomach damage. 1,2-, 1,3-, and 2,3-dichloropropene have been found in at least 5, 112, and 3 of the 1,678 current or former National Priority List sites, respectively, identified by the Environmental Protection Agency (EPA).

What are dichloropropenes?

Dichloropropenes are synthetic chemicals made of a chain of three carbon atoms with a double bond connecting the first two carbons. Two chlorine atoms are attached at varying positions on this carbon chain generating five different types (or isomers) of dichloropropene molecules. The names of the isomers are 1,1-dichloropropene; 1,2-dichloropropene; 1,3-dichloropropene; 2,3-dichloropropene; and 3,3-dichloropropene.

1,3-Dichloropropene is a colorless liquid with a sweet smell. It dissolves in water and evaporates easily. It is used mainly in farming as a pesticide. Much less is known about the other dichloropropenes. 2,3-Dichloropropene is used in industry to make other chemicals. No uses were found for 1,1-, 1,2-, or 3,3-dichloropropene.

Because 1,3-dichloropropene is produced and used in much higher amounts than the other isomers and because it is released to the environment as a pesticide, most of the data available are for 1,3-dichloropropene. Therefore, the focus of this summary is the 1,3-dichloropropene isomer.

What happens to dichloropropenes when they enter the environment?

- 1,3-Dichloropropene in soil is likely to be broken down by microorganisms.
- It dissolves in water and breaks down slowly in water.
- Some 1,3-dichloropropene in water and soil evaporates rapidly into the air where it is broken down by sunlight.

- Some 1,3-dichloropropene in soil may travel deeper into the ground and reach groundwater.
- We do not know whether 1,3-dichloropropene accumulates in fish. Studies in other animals show that it leaves the body within 2 days.
- Other dichloropropene isomers are expected to behave similarly to 1,3-dichloropropene in the environment, but specific information is not available.

How might I be exposed to dichloropropenes?

- Breathing air contaminated with 1,3-dichloropropene or touching it during its use to treat farm crops.
- Breathing contaminated workplace air or air around hazardous waste sites that contain it.
- Drinking contaminated water or touching contaminated soil where it is produced or used, or near hazardous waste sites that contain it.
- 1,1-, 1,2-, 2,3-, and 3,3-dichloropropene are not commonly detected in air, surface water, drinking water, soil, or food.
- Higher amounts of 2,3-dichloropropene may be released from facilities that produce or use this chemical. Thus, people living near these facilities may be exposed to higher levels of this chemical.

How can dichloropropenes affect my health?

Dichloropropenes cause irritation at the point of contact. Humans who breathed 1,3-dichloropropene suffered nausea, vomiting,

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irritation of the skin, eyes, and throat; breathing difficulties, headache, and fatigue. These effects generally occurred at exposure levels that were much higher than the background levels found in air or water. Rats and mice that inhaled 2,3-dichloropropene repeatedly for about 2 weeks had damage to the lining of the nose, and mice had damage to the lung. Similar effects were seen in rats and mice after prolonged inhalation of 1,3-dichloropropene.

A man who accidentally ingested 1,3-dichloropropene died with severe damage to his stomach and surrounding organs, but little else is known about the effects of ingesting these substances in humans. Animal studies have reported damage to the stomach lining, lung congestion, difficulty walking, and effects on the liver and kidneys from ingesting high levels of 1,3-dichloropropene.

A few workers who had skin contact with pesticides containing 1,3-dichloropropene developed blisters and an allergic reaction on their skin.

How likely are dichloropropenes to cause cancer?

Evidence for the carcinogenicity of 1,3-dichloropropene in humans is inadequate, but results from several cancer bioassays provide adequate evidence of carcinogenicity in animals. The Department of Health and Human Services (DHHS) has determined that 1,3-dichloropropene may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that 1,3-dichloropropene is possibly carcinogenic to humans. The EPA has classified 1,3-dichloropropene as a probable human carcinogen.

How can dichloropropenes affect children?

Children can be exposed to dichloropropenes the same way adults might be exposed, breathing air or drinking water that contains the chemicals. Since children drink more water than adults relative to their body weight, they may have higher exposures from well water.

The effects of dichloropropenes have not been studied in children, but children would likely experience the same effects seen in adults exposed to these chemicals. We do not know whether children differ from adults in their susceptibility to health effects from exposure to dichloropropenes.

We do not know whether dichloropropenes can cause birth defects in humans. Pregnant rats that inhaled 1,3-dichloropropene gave birth to fewer pups or pups with lower body weight. This occurred at exposures high enough to be toxic to the mothers.

How can families reduce the risks of exposure to dichloropropenes?

- Stay away from agricultural areas that have been treated with dichloropropenes.
- Workers who handle dichloropropenes should remove contaminated clothing and wash before coming in contact with family members.
- Always wash fruits and vegetables before consuming them.
- Children should be encouraged to wash their hands after playing near treated soil and discouraged from putting their hands in their mouths.

Is there a medical test to determine whether I've been exposed to dichloropropenes?

Tests are available that measure 1,3- or 2,3-dichloropropene or their breakdown products in blood and urine. Blood levels of breakdown products from 1,3-dichloropropene could be used to predict how much 1,3-dichloropropene has been breathed. However, tests for 1,3- or 2,3-dichloropropene in the blood and urine would only be useful for recent exposures, because dichloropropenes leave the body within 1 to 2 days. These tests cannot determine whether adverse health effects will occur.

Has the federal government made recommendations to protect human health?

The EPA requires that spills of 100 pounds or more of 1,3- or 2,3-dichloropropene to the environment be reported to the Agency. EPA also established a health advisory level for 1,3-dichloropropene of 0.03 milligrams per liter (mg/L) that should not be exceeded in order to protect children's health.

The National Institute for Occupational Safety and Health (NIOSH) recommends that workers be exposed to no more than an average of 1 part per million (4.54 mg per cubic meter) of 1,3-dichloropropene over a 10-hour workday.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Dichloropropenes (Draft for Public Comment). Atlanta, GA: U.S. Department of Public 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 and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, 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.

