



PUBLIC HEALTH STATEMENT

1,2-DICHLOROPROPANE

CAS#: 78-87-5

Division of Toxicology

December 1989

This Public Health Statement is the summary chapter from the Toxicological Profile for 1,2-dichloropropane. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™ is also available. 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. For more information, call the ATSDR Information Center at 1-888-422-8737.

1.1 WHAT IS 1,2-DICHLOROPROPANE?

1,2-Dichloropropane is a colorless liquid belonging to a class of chemicals called volatile organic compounds (VOCs). It has a chloroform-like odor and evaporates quickly at room temperature. It is a man-made chemical and people are probably responsible for all releases of 1,2-dichloropropane into the environment. 1,2-Dichloropropane is now used in the United States only in research and industry.

Before the early 1980s, 1,2-dichloropropane was used in farming as a soil fumigant and was found in some paint strippers, varnishes, and furniture finish removers. Most of the 1,2-dichloropropane released into the environment finally ends up in the air or groundwater.

When applied to soil in one experiment, all but 1% dispersed in 10 days. Breakdown in both the air and groundwater is slow. The rate at which a chemical breaks down is usually explained by how long it takes for half the chemical to disappear (half-life).

The half-life of 1,2-dichloropropane in air is not known exactly, but it is longer than 23 days, which means that 1,2-dichloropropane can spread to areas far from where it is released. In groundwater, the half-life of 1,2-dichloropropane is estimated to be between 6 months and 2 years.

1.2 HOW MIGHT I BE EXPOSED TO 1,2-DICHLOROPROPANE?

Air levels of 1,2-dichloropropane are usually quite low. In city areas of the United States, the average amount in air is about 22 parts per trillion (ppt). 1,2-Dichloropropane is found in a few drinking water supplies, and most of those are from groundwater sources. A nationwide survey of groundwater supplies showed that 1.4% of these supplies contained 1,2-dichloropropane levels at around 1 part per billion (ppb). The highest amount of 1,2-dichloropropane in the survey was 21 ppb. Private wells in farming areas where 1,2-dichloropropane was once used as a soil fumigant have the greatest risk for contamination.

Occupational exposure to 1,2-dichloropropane may result during its production, its use in chemical reactions and as an industrial solvent, and evaporation from wastewater that contains the chemical. Workers involved in cleaning up hazardous waste or spill sites that contain 1,2-dichloropropane may also be exposed. A national survey conducted by the National Institute for Occupational Safety and Health (NIOSH) in 1981-1983 estimated that 2119 workers outside of the farming sector were exposed to 1,2-dichloropropane.

Use of this chemical has recently decreased very much, however, so that the number of exposed

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workers may now be much lower. According to industry spokesmen, levels of exposure among exposed workers range from less than 1 part per million (ppm) to less than 25 ppm, depending on the industry. 1,2-Dichloropropane was found in 26 of the 1177 hazardous waste sites on the National Priority List (NPL) and gases from these sites may contain low levels of 1,2-dichloropropane.

1.3 HOW CAN 1,2-DICHLOROPROPANE ENTER AND LEAVE MY BODY?

1,2-Dichloropropane can enter the body if a person breathes air or drinks water contaminated with it, or if a person's skin comes in contact with it. If 1,2-dichloropropane is present at a waste site near homes that use wells as a source of water, the well water could be contaminated. A route of major exposure in the past was by accidentally or intentionally drinking cleaning products that contained 1,2-dichloropropane, but these cleaning materials are no longer produced in the United States.

Experiments with animals have shown that when 1,2-dichloropropane enters the body through eating or drinking, it is quickly removed in the urine and feces and by the lungs when the animal breathes out. 1,2-Dichloropropane may enter the lungs of workers exposed where it is used indoors as a solvent.

If 1,2-dichloropropane is released at a waste site and evaporates into the air, a person may breathe in 1,2-dichloropropane for a short time before it disperses. When the chemical was a part of some paint strippers, varnishes, and furniture finish removers, exposure of the skin through contact with these products occurred; however, the amount of

1,2-dichloropropane that entered through the skin is unknown. Soil around a waste site may be contaminated with 1,2-dichloropropane, but it is not known how much 1,2-dichloropropane enters the body through the skin upon contact with contaminated soil.

1.4 HOW CAN 1,2-DICHLOROPROPANE AFFECT MY HEALTH?

Drinking 1,2-dichloropropane by humans (i.e., drinking cleaning solutions) has produced poisoning. At these high levels of exposure, effects include dizziness, headache, nausea, injury to the liver and kidneys, anemia, coma and, ultimately, death. Breathing high levels of 1,2-dichloropropane by humans, as in deliberate breathing of vapors from cleaning solutions, produces similar effects. No reports have been made of any health effects in humans following low-level exposure to 1,2-dichloropropane for either short or long time periods.

In animal experiments, low amounts of 1,2-dichloropropane breathed in over short- and long-term periods result in damage to the liver, kidney, and respiratory systems, while high amounts resulted in death. Short-term exposure to high levels of vapors also causes irritation to the eyes and throat. When 1,2-dichloropropane is given by mouth to animals over shorter long-term periods, damage to the liver and kidneys is seen at low doses, and death occurs at high doses.

1,2-Dichloropropane breathed or eaten for a short time has not been reported to produce cancer in humans, but long-term exposure by mouth in animals has produced evidence of liver cancer in mice and breast cancer in female rats. The

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significance of the animal cancer studies to humans is not well understood. Irritation of the skin after contact with 1,2-dichloropropane has been seen in both humans and rabbits.

1,2-Dichloropropane has not been shown to cause birth defects in humans or animals, but a delay in the growth of bones has been seen in fetal rats following exposure of the mother rats.

1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 1,2-DICHLOROPROPANE?

Tests are available to detect 1,2-dichloropropane in the urine and the blood. The available methods can predict the concentration of 1,2-dichloropropane in the air from levels in the urine, but not from levels in the blood. The levels of 1,2-dichloropropane in the urine, however, cannot predict specific health effects. The method for testing the urine is simple, but because special equipment is needed, the test is not yet routinely available. Because 1,2-dichloropropane leaves the body quickly, it is best to test for it soon after exposure.

1.6 WHAT LEVELS OF EXPOSURE HAVE RESULTED IN HARMFUL HEALTH EFFECTS?

Information is not available on the levels of 1,2-dichloropropane that have resulted in harmful effects in people. In animals, high levels (greater than 400 ppm) in air have resulted in death and lower levels in air have resulted in anemia and respiratory damage. Animals that ate 1,2-dichloropropane for short-term exposures at levels ranging from 2,000 to 10,000 ppm showed effects on the central nervous system, weight loss, anemia,

and liver and testicular damage. These same effects were noted in animals from long-term exposure to 960 to 5,000 ppm 1,2-dichloropropane in food.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The EPA has set a Maximum Contaminant Level (MCL) of 0.005 parts per million (0.005 ppm) for 1,2-dichloropropane in drinking water. The EPA recommends that the level of 1,2-dichloropropane in lakes and streams should be limited to 0.52 parts per billion (0.52 ppb) to prevent possible human health effects from drinking contaminated water or eating contaminated fish. Any release to the environment greater than 1,000 pounds of 1,2-dichloropropane must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) set a workplace air concentration limit of 75 ppm for an 8-hour workday, 40-hour workweek.

The federal recommendations have been updated as of July 1999.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

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Information line and technical assistance:

Phone: 888-422-8737

FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1989. Toxicological profile for 1,2-dichloropropane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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