

Sources of Exposure

Toxicokinetics and Normal Human Levels

Biomarkers/Environmental Levels

General Populations

- The primary route of exposure for the general population is inhalation of contaminated air, especially near source areas.
- Ingestion of contaminated drinking water is another potential route of exposure.
- Exposure also can occur through the use of consumer products such as paint removers, which may contain this compound.
- Ingestion of food sources contaminated with 1,1-dichloroethane is not an important exposure pathway.

Occupational Populations

- Exposure of workers can occur in the rubber and plastic, chemical and allied products, electrical equipment and supply, medical and other health services, miscellaneous business services, and oil and gas extraction industries.

Toxicokinetics

- Absorption of 1,1-dichloroethane occurs following exposure via all routes, but skin absorption is minimal due to the high volatility of the chemical
- Although no direct evidence is available, its high solubility in lipids suggests that the chemical will distribute to tissues according to their lipid content.
- 1,1-Dichloroethane is transformed primarily in the liver by cytochrome P450 enzymes.
- 1,1-Dichloroethane is eliminated from the body in the breath or is broken down into metabolites that are excreted in the breath or in the urine.

Normal Human Levels

- A national survey of 1,367 participants conducted in 2003-2004 concluded that the mean levels of 1,1-dichloroethane in the blood could not be determined with certainty because the portion of the data below the limit of detection (0.01 ng/L) was too high.

Biomarkers

- 1,1-Dichloroethane in blood, urine, breath, and body tissues is a biomarker for exposure to the chemical.

Environmental Levels

Air

- Concentrations ranging from ppt to ppm have been measured depending upon the location.

Sediment and Soil

- No quantitative data are available regarding levels of 1,1-dichloroethane in soils.

Water

- Analysis of 13,347 groundwater sources in California in 2003 found the chemical in 68 samples in a range of 0.51-30 ppb.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2015. Toxicological Profile for 1,1-Dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.



ToxGuide™

for

1,1-Dichloroethane



CAS# 75-34-3

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U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry
www.atsdr.cdc.gov

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Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

1,1-Dichloroethane is a liquid

- 1,1-Dichloroethane is a colorless, oily liquid with a sweet odor that does not occur naturally in the environment.
- It dissolves poorly in water
- It evaporates easily at room temperature and burns easily.
- In the past it was used as surgical anesthetic.
- Currently, it is used mostly as an intermediate in the manufacture of 1,1,1-trichloroethane.
- It is also used in limited amount as a solvent for cleaning and degreasing, and in the manufacture of plastic wrap, adhesive, and synthetic fiber.
- Other uses include fabric spreading, varnish and finish removers, organic synthesis, ore flotation, and as a fumigant and insecticide spray.

- Inhalation – Generally considered the main route of human exposure by breathing contaminated ambient or workplace air.
- Oral – Potentially important route of exposure via drinking water for those living near industrial facilities and waste sites.
- Dermal – Potentially significant route of occupational exposure, but skin absorption is minimal.

1,1-Dichloroethane in the Environment

- 1,1-Dichloroethane can be released into the air, water, and soil.
- It breaks down slowly in air and can be transported long distances in air.
- It breaks down slowly in water. It can evaporate from the water into the air.
- 1,1-Dichloroethane does not bind strongly to soil particles.
- Small amounts of 1,1-dichloroethane released to soil can evaporate into the air or move into groundwater.
- It is not expected to accumulate in body tissues from animals.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- No acute-, intermediate- or chronic duration inhalation MRLs were derived for 1,1-dichloroethane.

Oral

- No acute-, intermediate- or chronic duration oral MRLs were derived for 1,1-dichloroethane.

Health Effects

- High levels of 1,1-dichloroethane that cause anesthesia can cause irregular heartbeats.
- No other information is available in humans on the health effects associated with exposure to 1,1-dichloroethane.
- Kidney effects have been observed in cats exposed to 1,1-dichloroethane in air for long periods. However, kidney effects have not been observed in other animal species following long-term inhalation or oral exposure.
- The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) have not evaluated the carcinogenic potential of 1,1-dichloroethane. The EPA has determined that 1,1-dichloroethane is a possible human carcinogen.

Children's Health

- 1,1-Dichloroethane is expected to affect children in the same manner as adults.
- It is not known whether 1,1-dichloroethane can produce birth defects in humans.
- Minor skeletal problems were observed in the fetuses of rats breathing 1,1-dichloroethane; decreases in body weight were also observed in the mothers.