Sources of Exposure

General Populations

- The most likely source of 1,2,3-trichloropropane exposure for the general population is contaminated drinking water.
- Exposure can also occur from inhaling 1,2,3-trichloropropane volatilized from household water during showering, bathing, and other household water uses.
- Exposure to contaminated air is also a source of exposure to 1,2,3-trichloropropane especially for populations living near facilities that manufacture or use 1,2,3-trichloropropane or near treatment or disposal facilities.

Occupational Populations

- Workers involved in the manufacture or use of 1,2,3-trichloropropane-containing products could be exposed via inhalation or dermal contact. However, manufacturing processes generally occur in closed and tightly sealed systems, which would greatly decrease the risk of exposure.

Toxicokinetics and Biomonitoring

Toxicokinetics

- Approximately 80% of an oral dose is absorbed through the gastrointestinal tract. No absorption data are available for inhalation or dermal routes, although absorption is presumed based on remote toxicity.
- Absorbed 1,2,3-trichloropropane is widely distributed throughout the body.
- 1,2,3-Trichloropropane is rapidly and extensively metabolized. It likely undergoes cytochrome P450-catalyzed dehalogenation reactions.
- 1,2,3-Trichloropropane and its metabolites are excreted via urine, feces, and exhaled breath. It is excreted within 2 days of a single oral or inhalation exposure.

NHANES Biomonitoring

- NHANES biomonitoring data are not available for 1,2,3-trichloropropane in the general population.

Biomarkers/Environmental Levels

Biomarkers

- No biomarkers of exposure to 1,2,3-trichloropropane have been identified in humans. A study in rats suggest that 1,2,3-trichloropropane can be measured in exhaled breath and urine.
- There are no biomarkers of effects that would be specific to 1,2.3-trichloropropane.

Environmental Levels

Air

- No data are available on levels of 1,2,3-trichloropropane in ambient air.

Soil and Water

- 1,2,3-Trichloropropane is not often detected in recently taken soil and water samples. It was detected in <10% of the public water samples collected in California; however, exposure levels were not reported.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2021. Toxicological Profile for 1,2,3-Trichloropropane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™ for 1,2,3-Trichloropropane $C_3H_5Cl_3$

(CAS# 96-18-4)

August 2021

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Chemical and Physical Information

1,2,3-Trichloropropane is a Manmade Chemical

- 1,2,3-Trichloropropane is a colorless liquid that has a mild and sweet smell.
- It is likely to evaporate fairly quickly.
- 1,2,3-Trichloropropane is used as a chemical intermediate in the production of polysulfone liquid polymers and dichloropropene, in the synthesis of hexafluoropropylene, and as a crosslinking agent in the synthesis of polysulfides.
- In the past, 1,2,3-trichloropropane was used as a solvent and extractive agent. There is no current information to indicate that it is still used for these purposes.

Routes of Exposure

- Inhalation – Possible route of exposure for general population living near facilities using 1,2,3-trichloropropane.
- Oral – Most likely route of exposure for the general population from consuming water that may contain small amounts of 1,2,3-trichloropropane.
- Dermal – Not likely a route of exposure for the general population.

1,2,3-Trichloropropane in the Environment

- In the atmosphere, 1,2,3-trichloropropane is degraded via reaction with photochemically-produced hydroxyl radicals. It has an estimated half-life of 15.3 days.
- 1,2,3-Trichloropropane in surface water is expected to rapidly volatilize.
- In natural water, it is expected to slowly hydrolyze.
- 1,2,3-Trichloropropane is expected to display high mobility in soil and has the potential to leach into groundwater.
- It is not expected to significantly bioconcentrate in fish and aquatic organisms.

Relevance to Public Health (Health Effects)

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

Minimal Risk Levels (MRLs)

Inhalation

- An acute-duration (≤14 days) inhalation MRL of 0.001 ppm was derived for 1,2,3-trichloropropane.
- No intermediate- or chronic-duration inhalation MRLs were derived for 1,2,3-trichloropropane.

Oral

- No acute-duration oral MRL was derived for 1,2,3-trichloropropane.
- An intermediate-duration (15–364 days) oral MRL of 0.03 mg/kg/day was derived for 1,2,3-trichloropropane.
- A chronic-duration (≥365 days) oral MRL of 0.01 mg/kg/day was derived for 1,2,3-trichloropropane.

Health Effects

- Almost all of the available information on the toxicity of 1,2,3-trichloropropane comes from studies in experimental animals.
- Studies in experimental animals have identified several targets of toxicity including the respiratory tract, liver, kidney, hematological system, and cancer.

Health Effects

- Inhalation exposure to 1,2,3-trichloropropane has resulted in damage to the nasal olfactory epithelium in rats and mice.
- Nasal, bronchiolar, and lung damage has also been observed in animals ingesting 1,2,3-trichloropropane.
- Liver effects, including increases in liver weight and bile duct hyperplasia, have been observed in animals following inhalation and oral exposure.
- Kidney effects in animals include increases in kidney weight, necrosis, and increased severity of chronic nephropathy.
- Anemia has been observed following inhalation and oral exposure.
- Neoplastic lesions have been observed in the forestomach, oral mucosa, liver, kidneys, clitoral gland, mammary gland, preputial gland, Harderian gland, and Zymbal's gland.
- The Department of Health and Human Services (HHS) categorized it as reasonably anticipated to be a human carcinogen. The U.S. Environmental Protection Agency (EPA) concluded that it is likely to be carcinogenic to humans.

Children's Health

- Children exposed to 1,2,3-trichloropropane would be expected to experience effects similar to those expected in adults.