

2,3,7,8-TCDD

What is 2,3,7,8-TCDD?

2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) is a solid chemical compound that has no color or odor. TCDD is in a group of 75 different polychlorinated dioxins. It is one of the most harmful to humans and other mammals.

Where can 2,3,7,8-TCDD be found and how is it used?

2,3,7,8-TCDD production is banned in the United States. It is only made by industry for research purposes. 2,3,7,8-TCDD may be formed during the chlorine bleaching process at pulp and paper mills. 2,3,7,8-TCDD can also be formed during waste and drinking water treatment. It can occur in the manufacture of certain organic chemicals. 2,3,7,8-TCDD can be released into the air from burning processes used by municipal solid waste and industrial plants.

How can people be exposed to 2,3,7,8-TCDD?

You could be exposed to 2,3,7,8-TCDD through:

- **Breathing** low levels of 2,3,7,8-TCDD in the air. You can also be exposed by breathing dust containing 2,3,7,8-TCDD, or if you work where 2,3,7,8-TCDD formed as a waste product. Breathing exposure can occur if you live near plants or waste sites where 2,3,7,8-TCDD is burned. Exposure can also occur if you work in a waste or water treatment plant.
- **Eating** meat, dairy products, and fish containing 2,3,7,8-TCDD. 2,3,7,8-TCDD may be present at much lower levels in fruits and vegetables. Although levels of 2,3,7,8-TCDD in most foods are low, levels may be higher in food from polluted areas.
- **Drinking** water containing 2,3,7,8-TCDD. This is unlikely because 2,3,7,8-TCDD is usually not found in water. It has sometimes been found in groundwater from areas with 2,3,7,8-TCDD pollution. It can sometimes be found in human milk, cow's milk, goat's milk, and infant formula, so infants can be exposed.
- **Touching** substances that may contain 2,3,7,8-TCDD. Examples are pesticides and herbicides, which are used to kill insects or weeds.

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How does 2,3,7,8-TCDD work and how can it affect my health?

Once in your body, 2,3,7,8-TCDD can be found in most tissues. The highest amounts are found in the liver and body fat. It can be stored in the body for many years. Most people have some level of dioxin in their systems. 2,3,7,8-TCDD has been named as a substance that may cause cancer. Several studies of workers exposed to high levels of 2,3,7,8-TCDD suggest that 2,3,7,8-TCDD may increase the risk of cancer.

Exposure to high levels of 2,3,7,8-TCDD may cause liver damage. Most of the effects are considered mild and can be reversed. In some people, these effects may last for many years. Exposure to high levels may also cause a small increase in the risk of diabetes. It is not known if exposure to 2,3,7,8-TCDD is harmful to human reproduction or development, but animal studies suggest this could be a concern.

The skin displays several warnings of 2,3,7,8-TCDD exposure. People exposed to levels of 2,3,7,8-TCDD at least 10 times higher than usual levels found in the environment had several effects. One effect is a severe skin disease called chloracne, which usually causes a form of acne on the face and upper body. Chloracne is harder to cure than common acne and can cause skin to be disfigured. In milder cases, the acne sores heal several months after exposure ends. In more severe cases, the sores may last for many years after exposure. Other effects to the skin include red rashes, discolored skin, and excessive body hair.

How is 2,3,7,8-TCDD poisoning treated?

There is no specific treatment just for 2,3,7,8-TCDD poisoning. A physician may remove 2,3,7,8-TCDD from the body through diet and medication. Treatment of chloracne may include treatment with Retin-A.

What should I do if exposed to 2,3,7,8-TCDD?

- **If you touch 2,3,7,8-TCDD**, clean the skin with mineral oil as soon as possible to remove the compound. Clean the area for at least 10 minutes. Get medical help.
- **If you get 2,3,7,8-TCDD in your eyes**, flush immediately with large amounts of water. Get medical help right away.
- **If you breathe 2,3,7,8-TCDD**, move to fresh air. If breathing has stopped, mouth-to-mouth resuscitation should be given. Get medical help quickly.
- **If you swallow 2,3,7,8-TCDD**, get medical help right away.

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What factors limit use or exposure to 2,3,7,8-TCDD?

For most people, exposure to 2,3,7,8-TCDD is through eating food containing 2,3,7,8-TCDD. Since 2,3,7,8-TCDD builds up in fat, eating a low-fat diet will limit exposure. You can also limit exposure by avoiding areas near hazardous waste sites.

At work, reduce exposure by following health and safety rules. Avoid all possible contact with 2,3,7,8-TCDD. Wear protective clothing.

Is there a medical test to show whether I've been exposed to 2,3,7,8-TCDD?

A blood test can show if there are higher levels of 2,3,7,8-TCDD in the blood. This may show if you have been exposed in the past.

Technical information for 2,3,7,8-TCDD

CAS Number: 1746-01-6

Chemical Formula: C₁₂H₄Cl₄O₂

Carcinogenicity (EPA): The EPA has determined that 2,3,7,8-TCDD is a possible human carcinogen when considered alone and a probable human carcinogen when considered in association with phenoxy herbicides and/or chlorophenols.

MCL (Drinking Water): The MCL for 2,3,7,8-TCDD is 0.00000003 mg/L.

OSHA Standards: There is no OSHA standard.

NIOSH Standards: There is no NIOSH standard.

Resources

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. *Toxicological profile for chlorinated dibenzop-dioxins (CDDs)*. Atlanta, GA: U.S. Department of Health and Human Services.

<https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=366&tid=63>

American Conference of Governmental Industrial Hygienists (ACGIH). 2003. *Guide to Occupational Exposure Values*. Cincinnati, OH.

NIOSH Pocket Guide to Chemical Hazards. 2003. Atlanta, GA: U.S. Department of Health and Human Services.

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