Consumer Factsheet on: DIOXIN (2,3,7,8-TCDD)

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Dioxin and how is it used?

Dioxin is an organic solid of white crystalline needles. Dioxin is not produced or used commercially in the US. It is a contaminant formed in the production of some chlorinated organic compounds, including a few herbicides such as silvex. It may also be formed during combustion of a variety of chlorinated organic compounds.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Dioxin
Tetradioxin

Why is Dioxin being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for dioxin has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.00003 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found dioxin to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: liver damage, weight loss, wasting of glands important to the body's immune system.

Long-term: Dioxin has the potential to cause the following effects from a lifetime exposure at levels above the MCL: a variety of reproductive effects, from reduced fertility to birth defects; cancer.

How much Dioxin is produced and released to the environment?

Dioxin is released to the environment in emissions from the incineration of municipal refuse and certain chemical wastes, in exhaust from automobiles powered by leaded gasoline, in emissions from wood burning in the presence of chlorine, in accidental fires involving transformers containing PCBs and chlorinated benzenes, and from the improper disposal of certain chlorinated chemical wastes. It has been released to the environment as a low level impurity in various pesticides.

What happens to Dioxin when it is released to the environment?

Dioxin is one of the most toxic and environmentally stable tricyclic aromatic compounds of its structural class. Due to its very low water solubility, most of the dioxin occurring in water will adhere to sediments and suspended silts. Similarly, it tends to adhere to soil if released to land, and is not likely to leach to ground water. Two processes which may be able to remove dioxin from water and soil are evaporation and breakdown by sunlight. Dioxin is generally resistant to microbial breakdown. Dioxin has a very great tendency to accumulate in aquatic life, from algae to fish.

How will Dioxin be Detected in and Removed from My Drinking Water?

The regulation for dioxin became effective in 1994. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if dioxin is present above 5 parts per trillion. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of dioxin so that it is consistently below that level. The following treatment methods have been approved by EPA for removing dioxin: Granular activated charcoal.

How will I know if Dioxin is in my drinking water?

If the levels of dioxin exceed the MCL, 0.00003 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 0.00003 ppb

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone book's government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPA's Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346