Chlorine Dioxide

Chlorine dioxide (ClO_2) is a chemical compound consisting of one chlorine atom and two oxygen atoms. It is a reddish to yellowish-green gas at room temperature that dissolves in water. It is used for a variety of antimicrobial uses, including the disinfection of drinking water. Chlorine dioxide gas is usually produced onsite from sodium chlorate or sodium chlorite.

Uses & Benefits

Powerful Disinfection in Water Treatment

Chlorine dioxide is a disinfectant. When added to drinking water, it helps destroy bacteria, viruses and some types of parasites that can make people sick, such as *Cryptosporidium parvum* and *Giardia lamblia*. The Environmental Protection Agency (EPA) regulates the maximum concentration of chlorine dioxide in drinking water to be no greater than 0.8 parts per million (ppm).

Industrial/Manufacturing Uses

Chlorine dioxide chemistry is used in a wide variety of industrial, oil and gas, food and municipal applications:

Food and Beverage Production
Chlorine dioxide can be used as an antimicrobial agent in water used in poultry processing and to wash fruits and vegetables.

Paper Processing
Chlorine dioxide is used to chemically process wood pulp for paper manufacturing.

Medical Applications
In hospitals and other healthcare environments, chlorine dioxide gas helps to sterilize medical and laboratory equipment, surfaces, rooms and tools. Researchers have found that at appropriate concentrations, chlorine dioxide is both safe and effective at helping to eliminate *Legionella* bacteria in hospital environments. *Legionella pneumophila* bacteria can cause Legionnaires' disease, a potentially deadly type of pneumonia.

Chlorine dioxide is **not a cure or treatment** for medical ailments, including but not limited to autism, HIV, malaria, hepatitis viruses, influenza, common colds, and cancer. Claims that the ingestion of chlorine dioxide, often advertised as "Miracle Mineral Solution" or MMS, will cure these or other ailments are false. The U.S. Food and Drug Administration (FDA) advises MMS should not be consumed.

Safety Information

Chlorine dioxide is used to disinfect drinking water around the world. According to U.S. Centers for Disease Control and Prevention, chlorine dioxide is added to drinking water to protect people from harmful bacteria and other microorganisms. EPA recognizes chlorine dioxide use as a drinking water disinfectant, and it is included in the World Health Organization's (WHO) Guidelines for Drinking-water Quality.

In its pure form, chlorine dioxide is a hazardous gas but most people are "not likely" to breathe

air containing dangerous levels of chlorine dioxide as it rapidly breaks down in air to chlorine gas and oxygen. For workers who use chlorine dioxide, the U.S. Occupational Safety and Hazard Administration (OSHA) regulates the level of chlorine dioxide in workplace air for safety. OSHA has set a Permissible Exposure Limit (PEL) for chlorine dioxide at 0.1 parts per million (ppm), or 0.3 milligrams (mg) per cubic meters (m3) for workers using chlorine dioxide for general industrial purposes. OSHA also has a PEL for chlorine dioxide for the construction industry. Chlorine dioxide is always made at the location where it is used.

Answering Questions

How is chlorine dioxide used in water treatment?

According to EPA, chlorine dioxide is used “in public water-treatment facilities, to make water safe for drinking.” When chlorine dioxide is added to drinking water, it helps destroy bacteria, viruses and some types of parasites that can make people sick, such as *Cryptosporidium parvum* and *Giardia lamblia*.

Is chlorine dioxide a miracle cure for numerous diseases and illnesses?

No. Claims that chlorine dioxide is a treatment or cure for medical ailments such as autism, HIV, malaria, hepatitis viruses, influenza, common colds, cancer, or other diseases/ailments are not backed by science. Consumption of chlorine dioxide solutions, such as MMS, can cause nausea, vomiting, diarrhea, and severe dehydration. These products should not be consumed or given to someone to consume. The sale of these products as miracle cures is dangerous and has resulted in criminal convictions.

Does chlorine dioxide remove odor?

In water, chlorine dioxide is used to remove unpleasant tastes and odors, as well as to kill algae and bacteria that produce some bad tastes and odors. It is also used in some personal hygiene products. For example, chlorine dioxide can be used in mouthwashes and dentistry products as an oxidizing biocide compound to treat bad breath.