

Иностранные языки. Английский язык

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Тезис

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The harmful effects of chlorine in water

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Water is one of the main substances necessary for organisms on our planet. But in order for people to safely consume water extracted from open reservoirs or from the underground, it must be cleaned of harmful microorganisms. One of the methods of water purification is chlorination. Chlorination is the process of adding chlorine to drinking water to disinfect it. In small quantities, exposure to chlorine gas or liquid can be poisonous. Chlorine is available as compressed elemental gas, sodium hypochlorite solution (NaOCl) or solid calcium hypochlorite (Ca(OCl)₂). Adding chlorine to drinking water has become standard since the beginning of the 20th century. Water chlorination significantly reduced the number of infectious diseases. Disinfecting drinking water ensures it is free of the microorganisms that can cause serious diseases, such as cholera and typhoid fever. To this day, chlorine remains the most commonly used drinking water disinfectant. Unfortunately, we do not simply use chlorine, because it is the safest and most effective means of disinfection, rather because it is the cheapest method.

Over the years, researchers have found that people who are exposed to chlorinated water over long periods of time, have a greater risk of cancer. Drinking chlorine contaminated water and swimming in chlorinated pools increases the risk of respiratory problems, such as asthma. Chlorine added to your water supply can pose serious threats to your cardio-vascular health.

Chlorine reacts with the organic matters, naturally present in water. This chemical reaction forms a group of chemicals known as disinfection by-products. The most common of these by-products are trihalomethanes (THMs), which include chloroform. Hundreds of these disinfection byproducts (DBPs) have been identified, many of which have harmful health effects. There is a balance between the use of chlorine-based additives to kill harmful organisms in drinking water and the levels of harmful chemicals created as byproducts in the disinfection process. Levels of unwanted disinfection byproducts in drinking water are difficult to predict. Levels of THMs can increase as the water moves from the treatment plant through the distribution system to the tap. Other factors that influence levels of DBPs include water temperature, the amount of organic material present in the water, chlorine dose, contact time, and bromide ion concentration.

Finding a balance between the risks from harmful microorganisms, and the risks from high levels of DBPs requires management actions at key points in the waters' journey from source to tap.

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