

Drinking Water and Trihalomethanes

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Abstract

Disinfection processes can result in the formation of both organic and inorganic disinfection by-products (DBPs). The most well known of these are the organochlorine by-products such as trihalomethane (THM) compounds and haloacetic acids (HAAs), related to chlorination. The formation of THMs during the chlorination process represents a serious health problem, as they significantly increase the possibility of the risk of several types of cancers. In this article we present the factors affecting on THMs formation in drinking water. This article also provides the removal technologies for the THMs and their precursors.

Key Words: Trihalomethane, DBPs, Chlorination, Disinfection.

1. Introduction

The main reason for water disinfection is to prevent the spread of waterborne disease, through the inactivation of microbial pathogens. Partly due to its low cost, chlorine is the commonest chemical disinfectant used in the production of drinking water [1]. Another beneficial feature is its stability, which means a disinfectant residual is maintained in the distribution system, thus preventing bacterial re-growth. In addition to its activity as a disinfectant, chlorine also reacts with organic and inorganic molecules present in water. Reactions with organic molecules can give rise to disinfection by-products (DBPs), many of which are harmful or potentially harmful to human health [2].

While the most common form of chemical disinfection in Ireland is chlorination, other methods of disinfection are increasingly being used. Some of the more common methods, other than chlorination, are chloramination, chlorine dioxide and ozone. Alternative disinfection methods also have the potential to produce disinfection by-products.

Factors which influence DBP formation include:

1. Type of disinfectant used;
2. Concentration of disinfectant used;
3. Concentrations of organic matter and other DBP precursors in water to be disinfected;
4. Water temperature;