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Reduction of Trihalomethanes Forming Potential by Adsorption of Natural Organic Matter on Ionic Exchange Resins

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ABSTRACT

In a sanitation process of drinking water, carbon from the organic matter reacts with chlorine, forming by-products, among which are trihalomethanes (THM). These substances are carriers of mutagenic and carcinogenic potential and hence should be removed in drinking water treatment. Since the natural organic matters are precursors of THM formation, their removal from the water decreases the concentration of THMs. The THM forming potential is the most reliable indicator in evaluation of organic matter removal during drinking water treatment processes. The results have shown that the reaction producing THMs follows second order kinetics. The second order rate constant ranged from 0.024 M⁻¹s⁻¹ to 0.065 M⁻¹s⁻¹ at 22 ° C and pH = 8.2 for 96 hours. The removal of 78.4% of natural organic matter, by adsorption on anionic exchange resins, resulted in the THM forming potential reduction by 63.1%. Various fractions of natural organic matter differ in their reactivity with chlorine, which is important when it comes to selection of the adsorption medium in the drinking water treatment processes.

KEYWORDS

Natural Organic Matter, Trihalomethanes, Disinfection by Chlorine, Ground Water

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