The use polyaluminium chlorides with various basicity for removing of organic matter from water

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ABSTRACT

Application of coagulation process in surface water treatment allows for decrease in turbidity and colour of water, as well as organic matter content. The aim of this study was to evaluate the effectiveness of the coagulation process using pre-hydrolyzed salts, polyaluminium chlorides (general formula $\text{Al}_n(\text{OH})_m\text{Cl}_{3n-m}$) with different basicity, in reducing the level of pollution of surface water with organic substances. Apart from the typical indicators used to evaluate the content of organic compounds (total organic carbon [TOC], oxidisability [OXI], ultraviolet absorbance [UV$_{254}$]), the potential for trihalomethanes formation (THM-FP) was also determined. Under the conditions of the coagulation (pH 7.5–7.9, temperature of 20°C–22°C), the best results were obtained using highly alkaline polyaluminium chlorides, decrease in TOC, OXI and UV$_{254}$ by 32%–61% and slightly worse 24%–45% using medium alkaline. Using the low alkaline coagulant, 25%–46% removal of organic matter was obtained. Significant removal of organic compounds in the coagulation process resulted in a decrease in THM-FP value during water chlorination. THM-FP in purified waters was by 41%–65% lower than in untreated surface water subjected to chlorination. The concentration of CHCl$_3$ accounted for 86%–94% of the total THM content in the analyzed waters.

Keywords: Organic matter; Water treatment; Polyaluminium chlorides; Trihalomethanes formation potential