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MICROCYSTINS REMOVAL BY COAGULATION AND CHLORINATION UNDER LABORATORY CONDITIONS

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Abstract

Toxic cyanobacteria are an emerging and increasing threat to public water supplies across the world. As a result,it is essential to minimize the risk from toxic cyanobacteria and their metabolites, and the key is to be vigilant and monitor for cyanobacteria and cyanotoxins throughout the source water and the treatment plant. The present study aims to verify the validity of the traditional process of coagulation and chlorination to remove microcystins (MCs) in the Xinxiang water plant in China and to provide the plant with an optimal technical protocol for MC removal. The results indicate that coagulation by 10-15 mg L^{-1} of $FeSO_4 \cdot 7H_2O$ is almost completely ineffective for MC removal at pH 8.04. However, 1.2-4.8 mg L^{-1} of available chlorine can effectively degrade MC within 30 min. Joint application of coagulation and chlorination is effective for MC elimination, and an MC-removal rate of 91-97% can be achieved by pre-chlorination, coagulation, and post-chlorination. These results prove that the process of coagulation and chlorination, or pre-chlorination, coagulation, and post-chlorination, are valid for MC elimination in this plant. Based on these results, we suggest that the treatment of drinking water by pre-chlorination, coagulation, and post-chlorination should be preferred for MC removal at lower cost.

Key words: chlorination, coagulation, drinking water, microcystins, removal

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