Environmental Engineering and Management Journal

July 2011, Vol.10, No. 7, 855-859
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

INFLUENCE OF DISINFECTION WITH CHLORINE DIOXIDE ON DISSOLVED ORGANIC MATTER AND BIOLOGICAL TOXICITY OF URBAN WASTEWATER

Lihua Cheng*, Xuejun Bi, Aihua He, Changqing Liu, Qi Wang, Zuliang Liao

School of Environmental & Municipal Engineering, Qingdao Technological University, 11 Fushun Road, Qingdao, 266033, PR China

Abstract

Chlorine dioxide (ClO_2) is widely used as disinfectant in tertiary sewage treatment process. In order to identify the impact of disinfection with ClO_2 on treated water quality, secondary effluent pretreated by coagulation was disinfected by ClO_2, and the characteristic of dissolved organic matter (DOM) and the biological toxicity of the water before and after disinfection were investigated. The results showed that ClO_2 could remove part of DOM and the removal rate of hydrophobic (HO) component by ClO_2 was higher than that of hydrophilic (HI) fraction, resulting in the ratio of HI/HO increased. ClO_2 could reduce the substitution degree of aromatic ring of DOM which could lead to the decrease of trihalomethane formation potential. After treated by ClO_2, amount of DOM in every molecular weight (MW) interval dropped, implying that micro-organisms regeneration potential decrease. Furthermore, ClO_2 could decrease the biological toxicity of urban wastewater. These findings may be useful in evaluating the feasibility of the ClO_2 disinfection of tertiary sewage treatment.

Key words: biological toxicity, chlorine dioxide, dissolved organic matter (DOM), molecular weight distribution, specific ultraviolet absorbance (SUVA)

Received: March, 2011; Revised final: July, 2011; Accepted: July, 2011

* Author to whom all correspondence should be addressed: e-mail: lihuacheng@qtech.edu.cn; Phone: +86-532-85071238; Fax: +86-532-85071238