Environmental Engineering and Management Journal

December 2014, Vol.13, No. 12, 2929-2936
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

COD REMOVAL FROM SYNTHETIC WASTEWATER CONTAINING AZITHROMYCIN USING COMBINED COAGULATION AND A FENTON-LIKE PROCESS

Ahmad Reza Yazdanbakhsh[1], Amir Sheikh Mohammadi[1*], Mahdieh Sardar[1], Hatam Godini[2], Mohammad Almasian[3]

[1]*Shahid Beheshti University of Medical Sciences, School of Public Health, Department of Environmental Health Engineering Iran*
[2]*Lorestan University of Medical Sciences, School of Public Health, Department of Environmental Health Engineering, Iran*
[3]*Lorestan University of Medical Sciences, School of Medicine, Department of the English Language, Iran*

Abstract

In this study, the COD removal of Azithromycin from synthetic wastewater (produced to have a composition similar to industrial wastewater) using a Fenton-like (Fe^{+}/H_2O_2) system in combination with coagulation has been investigated. Chemical oxygen demand (COD) was selected as the main parameter to assess treatment efficacy in the current study ($COD_{\circ}$ = 390mg/Lequivalent to 200mg/LAzithromycin). First, the coagulation process was carried out on the synthetic wastewater and the optimum conditions were determined and calculated. According to the results of this experiment, Poly Aluminum Chloride (PAX-18) was selected as the most appropriate coagulant. The results of the coagulation process indicated that COD removal efficacy under the optimum conditions of PAX-18 100mg/Land pH 7.0 was 82.14%. Then, a Fenton-like oxidation process was performed on the effluent of the coagulation process. The optimum conditions were determined and calculated for the Fenton-like process: $[Fe^{+}]$ = 0.36 mM/l, $[H_2O_2]$= 0.38 mM/l, and [pH]=7.0. Finally, in combined treatment (coagulation and the Fenton-like process together), the COD removal rose to 96.89% under optimum conditions. The findings of this study demonstrate that the combined processes of coagulation and Fenton-like oxidation under optimum conditions can play an important role in the COD removal of Azithromycin from industrial wastewater.

Key words: antibiotic, Azithromycin, coagulation, Fenton-like process, wastewater

Received: March, 2011; Revised final: February, 2011; Accepted: March, 2012

[*] Author to whom all correspondence should be addressed: E-mail: amir.sheikh123@yahoo.com; Phone: +986614209971; Fax: +986614208176