DECOLORIZING OF REACTIVE DYES WASTEWATER VIA DOWN-FLOW HANGING SPONGE (DHS) SYSTEM

Ahmed Tawfik¹,²*, Dina Zaki³, Magdy Zahran⁴

¹Egypt-Japan University of Science and Technology (E-Just); Environmental Engineering Department; P.O. Box 179 – New Borg El Arab City – Postal Code 21934 - Alexandria – Egypt.
²National Research Center, Water Pollution Research Dept., El-Behouth St., Dokki, Giza, Egypt
³Central Laboratory for Environmental Quality Monitoring, National Water Research Center, El-Kanater, Cairo, Egypt
⁴Helwan University, Faculty of Science, Department of Chemistry, Ain-Helwan, P. Box 11795, Cairo, Egypt

Abstract

This study was carried out to assess the efficiency of down-flow hanging sponge (DHS) system for decolorizing the reactive dyes wastewater. The reactor was operated at different hydraulic retention times (HRTs) of 1.7, 3.5 and 6 h., and organic loading rates (OLRs) of 3.6, 2.2 and 1.3 g COD/l.d., respectively. The results obtained indicated that increasing the HRT from 1.7 to 3.6 h., significantly increased color and CODt removal efficiencies from 81±6.7 to 91.7 ±8.7% and from 24.2 ±6.7 to 72±12.7% respectively. At an HRT of 3.5 h., the DHS system provided a residual CODt value of 217±140 mg/l and BOD5t of 80.3±46 mg/l in the treated effluent. However, CODt and BOD5t removal efficiencies were significantly dropped at increasing the HRT up to 6.0 h., and reducing the OLR to 1.3 g COD/l. d. This was mainly due to a high salinity (20.9±0.4 gCl/l) in the influent wastewater which negatively affected on the decolourization process in the DHS system. Nevertheless, the reactor achieved relatively high removal efficiencies of color (81±6.7%) and turbidity (88±7.9%) as well.

Key words: color, DHS, HRTs, OLRs, reactive dyes wastewater

Received: November 2012; Revised final: June, 2013; Accepted: July, 2013

* Author to whom all correspondence should be addressed: E-mail: ahmed.tawfik@ejust.edu.eg; tawfik8@hotmail.com Phone: +2-034599520; Fax: +2-034599520