Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

TREATMENT OF AN AZO DYE-CONTAINING WASTEWATER IN INTEGRATED ANAEROBIC-AEROBIC MSBR AT DIFFERENT HRTS

Maryam Hasani Zonoozi, Mohammad Reza Alavi Moghaddam[G], Reza Maknoon

Civil and Environmental Engineering Department, Amirkabir University of Technology, Hafez Ave., Tehran15875-4413, Iran

Abstract

In this study, application of integrated anaerobic-aerobic membrane sequencing batch reactor (MSBR) for treatment of an azo dye-containing wastewater was investigated. For this purpose, three lab-scale MSBR systems were operated at various hydraulic retention times (HRT) of 48, 24 and 16 h with constant value of solid retention time (SRT) for all reactors. The treatment performance and the decolorization kinetic of the systems as well the fouling rate of the membranes were evaluated during the experiment period. Based on the results, COD removal efficiency was not significantly influenced by HRT, while the decolorization efficiencies declined considerably by decreasing the HRT. Incomplete decolorization of the dye, even during the longest anaerobic stage (HRT of 48 h), revealed that a longer anaerobic period was still required for complete decolorization of the selected dye. Decolorization profiles of all MSBRs followed zero-order kinetics. These profiles experienced faster descending rates at lower HRTs. Lower HRTs of 16 and 24 h resulted in higher TMP (transmembrane pressure) rising rates. The most acceptable performance of the MSBR system from the viewpoint of decolorization efficiency and membrane fouling was obtained for the MSBR operating at the highest HRT (48 h).

Key words: azo dye-containing wastewater, hydraulic retention time, integrated membrane sequencing batch reactor

Received: September, 2013; Revised final: January, 2015; Accepted: February, 2015

[*]Author to whom all correspondence should be addressed: e-mail: alavim@yahoo.com, alavi@aut.ac.ir; Phone: 0098-21-64543008, 0098-912-2334600; Fax: 0098-21-66414213