

Performance and kinetic study on bioremediation of diazodye (reactive black 5) in wastewater using spent GAC-biofilm sequencing batch reactor

Abstract

Combinations of sequential anaerobic and aerobic process enhance the treatment of textile wastewater. The aim of this study was to investigate the treatment of diazo dye Reactive Black 5 (RB5)- containing wastewater using granular activated carbon (GAC)-biofilm sequencing batch reactor (SBR) as an integration of aerobic and anaerobic process in a single reactor. The GAC-biofilm SBR system demonstrated higher removal of COD, RB5 and aromatic amines. It was observed that the RB5 removal efficiency improved as the concentration of co-substrate in the influent increased. The alternative aeration introduced into the bioreactor enhanced mineralization of aromatic amines. Degradation of RB5 and co-substrate followed second-order kinetic and the constant (k_2) values for COD and RB5 decreased from 0.002 to 0.001 and 0.004 to 0.001 l/mg h, respectively, as the RB5 concentration increased from 100 to 200 mg/l in the GAC-biofilm SBR system.