

GRANULAR ACTIVATED CARBON-BIOFILM CONFIGURED SEQUENCING BATCH REACTOR TREATMENT OF C.I. ACID ORANGE 7

Abstract

The aim of this study is to investigate the mineralization of C.I. Acid Orange 7 (AO7) by biological process in oxygen limited condition under GAC-biofilm configured sequencing batch reactor (SBCR) operation. The granular activated carbon (GAC) used was immobilized with azo dye-degrading microbes through attachment by immersing the GAC into anaerobic bioreactor treating dye-containing wastewater for more than 200 days. The SBCR system was fed with 2 l of AO7-containing wastewater and was operated in FILL, REACT, DRAW and IDLE periods in a time ratio of 3:20:0.45:0.15 for a cycle time of 24 h. Nearly complete mineralization of AO7 was achieved with the biological system working at initial AO7 concentration of 625 mg/l, dissolved oxygen (DO) below 0.25 mg/l and without the presence of external carbon sources. Reductive environment was well developed in the phases with the addition of external carbon sources, and this had improved the decolorization rate but deteriorated chemical oxygen demand (COD) removal efficiency.

Keywords: Acid Orange 7; Granular activated carbon; Decolorization; Biological process; Biofilm