

Evaluation of integrated anaerobic-aerobic biofilm reactor for degradation of azo dye methyl orange

Abstract

This study was to investigate the mineralization of wastewater containing methyl orange (MO) in integrated anaerobic-aerobic biofilm reactor with coconut fiber as bio-material. Different aeration periods (3. h in phase 1 and 2; 3, 6 and 15. h in phase 3; 24. h in phase 4 and 5) in aerobic chamber were studied with different MO concentration 50, 100, 200, 200 and 300. mg/L as influent from phase 1-5. The color removals estimated from the standard curve of dye versus optical density at its maximum absorption wavelength were 97%, 96%, 97%, 97%, and 96% and COD removals were 75%, 72%, 63%, 81%, and 73% in phase 1-5, respectively. The MO decolorization and COD degradation followed first-order kinetic model and second-order kinetic model, respectively. GC-MS analysis indicated the symmetrical cleavage of azo bond and the reduction in aromatic peak ensured the partial mineralization of MO.

Keywords

Biofilm; Color removal; Integrated anaerobic-aerobic; Kinetic model; Methyl orange