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EXPLOITATION OF AN ANAEROBIC UP-FLOW COLUMN REACTOR (AUF CR) USING ACTIVATED SLUDGE BIOMASS FOR THE DECOLORIZATION OF DYES AND COD REDUCTION FROM TEXTILE WASTEWATER

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Abstract

The aims of this study were to investigate the performance of anaerobic up-flow column reactor (AUF CR) and immobilized activated sludge biomass (ASB) potential for the adsorption of dye disperse Blue-K₂RL (Db-K₂RL) and removal of chemical oxygen demand (COD) from textile wastewater (TWW). AUF CR with ASB at flow rate of 50 mL h⁻¹ and hydraulic retention time (HRT) of 10 h showed 95% dye adsorption at pH 4 and 87% COD reduction at pH 6 while non-activated sludge (NAS) showed only 60% of adsorption and 83% of COD reduction at pH 8. ASB at 100 mg L⁻¹ and 10 mg L⁻¹ of dye concentrations resulted maximum adsorption of 98% and COD reduction of 85%, while with NAS these were only 66% and 81% at 10 g L⁻¹. ASB exhibited optimum adsorption of 98% at 100 mg L⁻¹ and 10 mg L⁻¹ of dye concentrations with 2 g L⁻¹ of glucose and NAS showed adsorption of 30% and COD reduction of 83% at 6 g L⁻¹ of glucose. Maximum decolorization and COD reduction capacities of ASB were 78% and 97%, respectively. Overall, ASB potential in terms of adsorption and COD reduction was far better than NAS for AUF CR. The results indicate that ASB is a sustainable technology for the adsorption of dye and COD reduction from industrial wastewater and wastewater treatment plants using AUF CR reactor.

Key words: ASB and NAS, COD, decolorization, dye DB- K₂RL, TWW

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