



Innovative hybrid-upflow sludge blanket filtration (H-USBF) combined bioreactor for municipal wastewater treatment using response surface methodology

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ABSTRACT

In this study, the performance of the hybrid-upflow sludge blanket filtration bioreactor was studied for municipal wastewater treatment. The response surface methodology was used with three levels in order to investigate the effect of chemical oxygen demand (COD), biomass concentration, hydraulic retention time (HRT), and determining the optimal conditions. A ring-form moving bed packing was used in the bioreactor with a 50% filling ratio. The results showed that the concentration of COD, biomass concentration, and HRT were considerably more than other parameters and biomass concentration had the most effect on the performance of the system. Interaction among the factors was not significant. In addition, the results revealed that increasing of COD concentration led to decrease in the removal rate of COD and the removal percentage increased as the biomass concentration increased. Likewise, HRT had a direct correlation with the removal rate. Optimal levels for the removal of COD were obtained: about 98% for COD concentration levels 200 mg/L, a biomass concentration of 9,800 mg/L, and HRT 12 h.

Keywords: Wastewater treatment; Municipal wastewater; Hybrid growth; USBF; Response surface methodology

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