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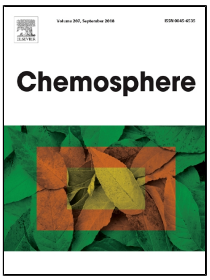

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Enhancement in biological treatment of pulping wastewater by fly ash

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Abstract

Sequential batch reactor (SBR) is a simple and flexible activated sludge process for industrial wastewater treatment. Also, biomass-based fly ash is a fairly plentiful and low-cost waste available in the pulp and paper industry. For treating wastewater of the pulping industry through a more efficient and economic approach, the integration of fly ash in the SBR process was investigated in this work. In this study, fly ash dosages of 0.2 wt.% and 0.6 wt.% were maintained in SBR1 and SBR2 systems, respectively, for treating the wastewater of the pulping industry. The findings indicated that adding fly ash to the bioreactors improved the settling and flocculation affinity of activated sludge without having any significant effect on the performance and the stability of the biological process. Lignin and color removals were 90.9% and 95% in SBR1 and 92.9% and 97.5% in SBR2, while the removals in the control reactor were 85.3% and 91.5%, respectively. The alkaline ions, such as Ca^{2+} and Mg^{2+}, leached out from fly ash, which improved the sludge's properties, and this leaching reduced 22.1% and 40.5% of alkali consumptions in SBR1 and SBR2,