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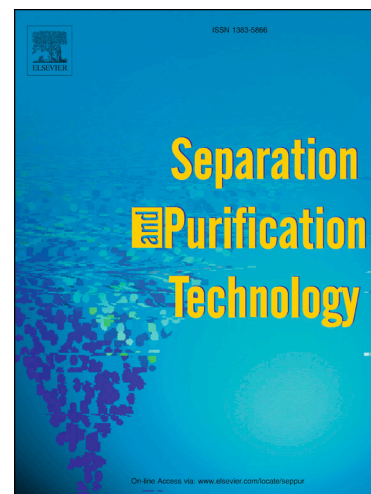
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## Fly ash based adsorbent for treating bleaching effluent of kraft process

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### Abstract:

The bleaching operation of a kraft pulping process generates a large amount of effluents with high organic loads. The affinity of biomass-based fly ash as a low-cost adsorbent for reducing lignin concentration, chemical oxygen demand (COD) and turbidity of the bleaching effluents prior to a biological treatment process was studied in this work. The results showed that the optimized conditions for obtaining the maximum removals of lignin (81.6 %) and COD (67.9 %) were the fly ash dosage of 6 wt.% in the effluent and the treatment time of 30 min and temperature of 30 °C. The results also showed that the settling rate of the fly ash in fly ash/effluent suspension systems increased as fly ash dosage increased. Charge neutralization played a key role at a low fly ash dosage (less than 2 wt.%) for removing lignocellulosic flocs smaller than 10 µm, while complexation of small flocs to larger ones (with the size of 30-500 µm) occurred at the higher fly ash dosage in the effluent. Coagulation and adsorption were the main phenomena for the removals of COD, lignin and turbidity at a higher fly ash dosage and a prolonged treatment time.

**Keywords:** fly ash, separation, sedimentation, bleaching effluents, coagulation, adsorption

### 1. Introduction

Wastewater effluents of a kraft pulping process originates from several sources, such as debarking, washing and screening, evaporation, and bleaching stages [1]. The organic load of the bleaching effluent accounts for 50 – 60 % of the total organic load in these effluents [2]. Wastewater treatment systems are major parts of the pulp and paper

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