

Performance Assessment of Recycled Alum Sludge in the Treatment of Textile Industry Effluent in South Africa

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Abstract : Textile industry is considered as one of the most polluting sectors in terms of effluent volume of discharge and wastewater composition, such as dye, which represents an environmental hazard when discharged without any proper treatment. A study was conducted to investigate the capability of the use of recycled alum sludge (RAS) as an alternative treatment for the reduction of colour, chemical oxygen demand (COD), total dissolved solids (TDS) and pH adjustment from dye based synthetic textile industry wastewater. The coagulation/flocculation process was studied for coagulants of Alum:RAS ratio of, 1:1, 2:1, 1:2 and 0:1. Experiments on treating the synthetic wastewater using membrane filtration and adsorption with corn cobs were also conducted. Results from the coagulation experiment were compared to those from adsorption with corn cobs and membrane filtration experiments conducted on the same synthetic wastewater. The results of the RAS experiments were also evaluated against standard guidelines for industrial effluents treated for discharge purposes in order to establish its level of compliance. Based on current results, it can be concluded that reusing the alum sludge as a low-cost material pretreatment method into the coagulation/flocculation process can offer some advantages such as high removal efficiency for disperse dye and economic savings on overall treatment of the industry wastewater.

Keywords : alum, coagulation/flocculation, dye, recycled alum sludge, textile wastewater

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