

ABSTRACT

Chemical treatment like coagulation and flocculation are being used worldwide to reduce the pollution load from the industrial and municipal waste water. This study was designed to see the effectiveness of coagulation and flocculation process using Alum, Lime, Ferric Chloride and Ferric Sulfate as coagulants and SF-110, SF-120, SF-261 and SF-150 as flocculants for the treatment of effluent from the paper and board mill. Optimum doses of coagulants and flocculants were also investigated for reduction in TSS, TDS, COD and turbidity using jar-test experiments. Six coagulant doses (100, 120, 140, 160, 180 and 200ppm) and three flocculant doses (4, 6 and 8ppm) were used in factorial combinations. Each coagulant was used with four flocculants and their results were compared in terms of TSS and turbidity reduction. Three combinations from each coagulant group, showing maximum TSS and turbidity reduction were selected and again passed through the jar-test. Alum/SF-261 at 160ppm and 4ppm, respectively was found to be a significantly better combination than the others for all the studied parameters ($p < 0.05$). At this dose, TSS reduction was 97.4%, TDS reduction was 45.8%, COD reduction was 80.3% and recovered fiber was 5.87g/liter of the effluent. Chemical treatment reduced 37.4% more TSS, 28.4% more COD and recovered 35.6% more fiber from the effluent than natural settling method. Optimum dose of Alum/SF-261 increased the recovery of fiber that can generate 1.4 times more revenue as compared to natural settling method. It can be concluded from this study that coagulation and flocculation using Alum/SF-261 can be economically and environmentally suitable pre-treatment option for paper and board mill wastewater before biological treatment.