Abstract

This research study aims to evaluate removal efficiency of various physicochemical parameters of pharmaceutical effluents of an integrated coagulation-ozonation process, using five different types of coagulants. Additionally, kinetic analysis of chemical oxygen demand (COD) removal was calculated to assess the treatment mechanism. As well as, overall energy consumption cost was assessed. For this purpose, design of a medium-scale physical treatment plant was studies to treat pharmaceutical effluents. Two types of wastewater samples as raw wastewater and treated wastewater were collected from the industry. And five different types of coagulants as; PAC Anionic Polymer A60, PAC Cationic Polymer 8085, BWD-01 Decoloring Agent, Polyacrylamide Cationic Polymer, Polyacrylamide Anionic Polymer were used for coagulation process. In order to assess the removal efficiency of each coagulant, wastewater quality parameters such as COD, total dissolved solids (TDS), turbidity, salinity, pH and electrical conductivity were analyzed for each coagulant after coagulation as well as ozonation. The reaction kinetics were studies to evaluate the reaction mechanism in ozonation process. However, overall integrated coagulation-ozonation process resulted in maximum removal efficiency of physicochemical parameters were as 99% turbidity removal and 96% COD removal. Moreover, performance of each coagulant was analyzed to obtain optimum dose range of each coagulant. From all five coagulants BWD-01 Decoloring Agent has proven to be the most effective coagulant in this treatment process. As, maximum removal efficiency was observed at 1.2 g/L dose of BWD-01 Decoloring Agent. The result of order of removal efficiencies after integrated coagulation-ozonation treatment process as; BWD-01 Decoloring Agent > PAC Cationic Polymer 8085 > PAC Anionic Polymer A60 > Polyacrylamide Cationic Polymer > Polyacrylamide Anionic Polymer. Therefore, integrated coagulation-ozonation wastewater treatment seems to be an effective approach for eco-friendly environment and that can make industry to recycle and reuse wastewater.