

ABSTRACT

Waste minimisation can be effected through programmes such as waste reduction at source, recycling and reclamation; and careful control of manufacturing procedures with emphasis on wastage reduction and safety. This study focuses on waste reduction through recycling of waste water for reuse within a paint manufacturing plant. Currently, the effluent stream emanating from the plant's waste water treatment plant (WWTP) contains BOD, COD and suspended solids, concentrations of which are above legislative limits imposed by the Department of Environment (DOE).

The possibility of recycling waste water emanating from a paint factory's waste water treatment plant was evaluated. The existing waste water treatment facility provides preliminary, primary and secondary treatment. The present study focuses on further treatment of the effluent via coagulation - flocculation processes prior to membrane applications.

In recent years, polymer applications in industrial wastewater treatment have become very important due to the increased pollutant removal efficiencies, easier sludge disposal, economy in chemicals consumption and other advantages. Polymers are used either as coagulants or coagulant aids for the aggregation of colloidal particles.

Coagulation - flocculation efficiencies were studied using a combination of alum and lime with and without addition of a polyelectrolyte. Optimum dose of coagulant and coagulant aid were determined based on removal efficiencies measured in terms of turbidity and COD. Increased turbidity removal efficiency of 99.6% was observed from effluent treated with alum, lime and polyelectrolyte. Considerable reduction of organic and inorganic loads were also recorded. Maximum removal efficiency of 74% COD was documented.

The performance of a cross-flow membrane filtration (CMF) unit was evaluated using pre-treated and untreated effluent from the WWTP. Pre-treated effluent increased the limiting flux by 100%. The study also showed that CMF was able to remove all microbiological contaminants in the waste water.