Performance Assessment of a Wastewater Treatment Plant in a Textile Industry: A Case Study

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The wastewater discharged from the textile industries consists of various chemicals and dyes that can cause serious environmental issues. This study was carried out to assess the performance of a wastewater treatment plant operating in a textile industry in Colombo. The existing wastewater treatment plant in the industry is operated as an intermediate treatment process, which has two pathways as DAF method and Clarifier method including the units of equalization tank, cooling tank, DAF, clarifier tank, and filter press etc. The treatment process is carried out to meet the discharge requirements given by the BOI before sending it to the central wastewater treatment plant. The objectives of the study were to analyze the physico-chemical parameters of the wastewater at different locations of the treatment plant and to determine the removal efficiencies of physico-chemical parameters. Samples were collected at the points selected from different locations at the wastewater treatment plant for the measurements of color (red, yellow and blue), TDS, TSS, COD and heavy metals using standard methods. The temperature, pH, and electrical conductivity were measured onsite on a weekly basis. The removal efficiencies of COD, Fe, Cd and TSS were 68%, 71%, 57% and 75%, respectively. The results of the study show that the pH, temperature and COD of the effluent of the treatment plant meets the BOI discharge standards. However, the concentrations of TDS, TSS and color of the effluent of the wastewater treatment plant exceed the standard discharge limits to the central wastewater treatment plant. Therefore, the conclusion of the study was that the performance of the existing wastewater treatment plant is acceptable for pH, temperature, electrical conductivity and COD removal. Further, the treatment plant has to be improved specially at the point of adding $FeSO_4$ and decolorant and at the effluent discharging point. This is mainly to achieve a better performance in removing TDS, TSS to meet the required BOI standards and especially for the color removal since it affects the treatment performance of the central wastewater treatment plant.

Keywords: Color, COD, Performance assessment, Removal efficiency, Textile wastewater