



Characterization and pretreatment of dyeing wastewater from the cotton and polyester textile industry in Egypt

Azza I. Hafez*, Maaly. A. Khedr, Hanaa Ali, Rania Sabry

Chemical Engineering and Pilot-Plant Department, National Research Center, Cairo, Egypt
Tel. +20233370933; Fax +20233370931; email: hafez.a@hotmail.com

Received 9 September 2009; accepted 12 July 2010

ABSTRACT

The Al-Alamia Dye Company in Cairo, Egypt faces a variety of problems due to unhealthy conditions resulting from the discharge of dye wastewater into sewer systems. These dyes not only cause enormous environmental pollution problems, but they also interfere with treatment system operations. From study the characterization of the dye wastewater resulting from the company, a physiochemical pretreatment for the wastewater dye effluents as a pretreatment step prior to membrane separation was suggested. The aim of the present work is to characterize the dye wastewater resulting from the dye processes of cotton and polyester and evaluate a proposed physiochemical treatment process for reducing pollution prior to membrane separation. Physiochemical analyses of composite samples for both cotton and polyester wastewater dyes were investigated. The characteristics of the cotton dye wastewater proved high TDS concentration (5,400–14,000 mg/L) and low COD concentration (154–684 mg/L). The analyses of the polyester dye wastewater proved low TDS concentration (350–2,561 mg/L) and high COD concentration (354–3,051 mg/L). A remarkable suspended solids concentration (SS) and heavy metals for both polyester and cotton dye wastewater were determined. The pretreatment proved that aluminum sulfate with 200 mg/L dose is the optimum for reducing SS concentration and COD concentration for cotton wastewater dyeing. Also it was found that a 600 mg/L does of ferric chloride is the optimum for reducing the SS and COD concentration for polyester wastewater dyeing.

Keywords: Textile dyeing; Reactive dyes; Dispersed dyes; Pretreatment; Heavy metals

*Corresponding author