



“Gheorghe Asachi” Technical University of Iasi, Romania



TREATMENT OF PAPERMAKING TOBACCO SHEET WASTEWATER BY ELECTROCOAGULATION AND BIODEGRADABILITY ENHANCEMENT

Xiangjuan Ma^{1*}, Yang Gao¹, Hanping Huang², Jingfeng Ding¹, Huilong Xia¹

¹Zhejiang Gongshang University, School of Environmental Science and Engineering, Hangzhou 310018, China

²Department of Production and Management, Hangzhou Liqun Environment-protecting Paper Co., Ltd, Hangzhou 310018, China

Abstract

Papermaking tobacco sheet wastewater exhibits high content of fine suspended solids (SS), intensive color and low biodegradability. Through the process of electrocoagulation (EC) using aluminum anode and stainless steel net cathode, the performance of wastewater treatment and the evolution of the main components in wastewater were examined. Maintaining the pH of wastewater, with 40 mA/cm² of current density, 2.5 g/L of NaCl for a reaction of 6 min duration, 66.1% of the total chemical oxygen demand (COD_t), 95.7% of turbidity, 91.7% of color and 97.5% of SS were removed. The corresponding aluminum anode and energy consumption for per kg COD removed were calculated as 39.56 g and 0.62 kWh, respectively. As the main recalcitrant components of wastewater, 40.5% of nicotine, 21.4% of β-nicotyrine, and 47.5% of solanone were removed respectively. On the contrary, the process of EC proved to be unsuccessful in removing the organic acids such as oleic acid and palmitic acid. It was however observed that, the BOD₅ on COD_t ratio of wastewater increased from 0.075 to 0.426, indicating that the effluent was more suitable for biological treatment. Thus, electrocoagulation has proven to be an instrumental alternative for the pretreatment of papermaking tobacco sheet wastewater.

Key words: aluminum anode, biodegradability, electrocoagulation, papermaking tobacco sheet wastewater, stainless steel net cathode

Received: October, 2012; Revised final: March, 2014; Accepted: March, 2014
