Environmental Engineering and Management Journal *July 2018, Vol.17, No. 7, 1521-1529*
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

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EFFICIENCY OF AN ELECTROCOAGULATION TREATMENT OF WATER CONTAMINATED BY HYDROCARBONS IN A CONTINUOUS MODE POWERED BY PHOTOVOLTAIC SOLAR MODULES

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Abstract

The aim of this study is the treatment of liquid effluents from a petroleum industry (NAFTAL /Algeria) by an electrochemical treatment process (electrocoagulation). The electrocoagulation has proved to be useful for the treatment of wastewater, but in order to enhance its ecological characteristic we found it would be essential to carry out our experiments with ecological energy derived from a photovoltaic solar module, which would contribute to sustainability objectives. The electrocoagulation process in a continuous mode using anodes (aluminum and iron) and a graphite cathode was studied. Changes in the Chemical Oxygen Demand were analyzed which stated the efficiency of the method. The current density, the duration of treatment, the pH and the amount of electrolyte added in order to optimize these operating parameters lead to a better reduction of the pollution load. After 1h of electrolysis, optimum conditions were: current density of 100 A/m^2, with initial pH 7.4 and a flow rate of $3.94.10^{-3}$ L/s. More than 94% of COD were removed with an aluminum anode.

Key words: COD removal, electrocoagulation, electrode, petroleum oil, photovoltaic energy

Received: January, 2014; Revised final: July, 2014; Accepted: September, 2014; Published in final edited form: July 2018

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