



Electromagnetic treatment-doubled electrocoagulation of humic acid in continuous mode using response surface method for its optimisation and application on two surface waters

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Received 29 August 2008; Accepted in revised form 27 April 2010

ABSTRACT

This study concerns electromagnetic treatment-doubled electrocoagulation of humic acid (HA) using response surface method and raw waters of two Dams (Ghrib and Boukerdene). This paper has two principal aims to achieve: firstly, enhance the efficiency of removal of HA by electrocoagulation (EC) adopting the following approach: EC in series using two electrocoagulators (BI-EC, doubled EC) and BI-EC assisted by electromagnetic (EM) field or in other words EM treatment (EMT) followed by EC in series (EMT-BIEC); secondly, substitute coagulation process (which is used in water treatment chain) with BI-EC or EMT-BIEC process in performing tests on raw waters (Boukerdene and Ghrib Dam's, Algeria) using different electrodes (Al, Fe and stainless steel). According to the obtained results, BI-EC and EMT-BIEC processes are globally efficient in HA removal and water treatment. Indeed, removal of microorganisms and reduction of turbidity, conductivity and organic matter (OM) suggest that these processes would be used on an industrial scale for drinking water treatment especially for EMT-BIEC process using Al electrodes. EMT contribution does not seem constantly efficient for these two raw waters especially for their OM removal. However, for HA solution, EMT alone achieve a medium reduction (52% at pH 3, 25% at 12 and 30% at 7) and behaves similarly to EC.

Keywords: Humic acid; Electrocoagulation; Electromagnetic; Drinking water; Response surface method; Moses effect

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