Short Communication

Evaluating the Effectiveness of Electrocoagulation (EC) Process in Reducing the COD of Simulated urban Runoffs

Mojtaba Afsharnia¹, Mehdi Saeidi^{2,*}

¹ Department of Environmental Health Engineering, School of Public Health, Gonabad University of Medical Sciences, Gonabad, Iran.

² Department of Environmental Health Engineering School of Health, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.

*E-mail: saeedi_mahdi@yahoo.com

doi: 10.20964/2018.06.08

Received: 31 December 2017 / Accepted: 29 January 2018 / Published: 10 May 2018

A large scale of precipitation amounts in urban areas becomes runoff because of increasing proportion of impermeable surfaces relative to natural permeable surfaces. The runoff leads to numerous concerns in urban areas by carrying pollutants from urban surfaces, creating a major source of contaminants. Further concerns were raised on the quality of runoffs by observing their negative impacts on the river and lakes in the downstream and surrounding areas of the city, especially in the early rainfalls that occur after a period of no rainfall. The increased runoff contamination can cause organic shock in conventional wastewater treatment systems, such as activated sludge. The electrocoagulation (an electrochemical process) is an effective and rapid method for treating water-soluble salts. The present study was conducted to investigate the effects of reaction time, voltage and pH on reducing the COD levels of runoff collected from surfaces of highly trafficked urban streets in Torbat-e Heydarieh, Iran. The results of this study showed that this process was able to remove the COD, BOD and turbidity with maximum efficiency of 80, 82 and 92% in optimal conditions (reaction time of 60 min, pH of 10.4, voltage of 30 volts). However, this maximum removal was different for varied samples collected before humps, areas near to squares and the border of main streets. Investigating the reaction time variable determined that a large part of COD was removed in the first 15 minutes at 10 volts. In addition, the highest level of metal consumption was reported to be 0.9 g/cm at 20 volts. This study showed that the electrocoagulation can be used as a pre-treatment method for urban runoffs before delivery to conventional wastewater treatment processes or receiving waters.

Keywords: runoff, electrocoagulation, COD

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