

Treatment of water contaminated with diazinon by electro-Fenton process: effect of operating parameters, and artificial neural network modeling

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ABSTRACT

This study investigates the influence of various parameters on the performance of electro-Fenton process for degradation of diazinon. Two dimensionally stable stainless steel electrodes were used for the sake of feasibility. Optimal conditions of current intensity (*I*), pH, Fe²⁺ amount, and initial diazinon concentration were deeply studied. Complete removal of diazinon was reached after 60 min of reaction at initial concentration of 2.5 mg/L. The favored current intensity was 300 mA using 20 mg/L of Fe²⁺. The kinetics of diazinon degradation was described by pseudo-first order pattern. In addition, an artificial neural network (ANN) model was developed to describe the relation between the operational parameters and diazinon degradation. The findings indicated that ANN provides reasonable predictive performance ($R^2 = 0.994$) accounting for training, validation, and test. A pure quadratic model was also developed, and implied correlation of ($R^2 = 0.896$) regarding the total variation of the diazinon degradation.

Keywords: Artificial neural network (ANN); Diazinon; Electro-Fenton; Stainless steel; Wastewater

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