Investigation of diazinon toxicity of water treated with electrochemical process using *Daphnia magna*

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Received 20 September 2016; Accepted 27 June 2017

**ABSTRACT**

Diazinon is an organic phosphorus insecticide with extensive application in agriculture but it contaminates soil and water. The aim of this research was to examine detoxification performance of the electrochemical process to treat water contaminated with diazinon using bioassay tests. This was a batch system experimental study using *Daphnia magna* as the bio-index; divided into two equal groups (with/without electrochemical process application). The electrochemical process was applied for a contact time of 15 min and at the current density 9.55 mA cm\(^{-2}\). Consequently, mortality was counted for *D. magna* in each group during a monitoring period of 168 h. Probit analysis was applied to analyze the experimental data. The results showed that the electrochemical process had a noticeable effect on elimination of diazinon toxicity; LC\(_{50}\) values for the exposure times 24, 48, 72, 96, 120, 144, and 168 h were 3.5, 3.2, 2.6, 2.0, 1.2, 0.3, and 0.3 mg L\(^{-1}\) for the groups without electrochemical process treatment and 5.2, 4.6, 3.5, 2.5, 2.4, 2.1, and 1.8 mg L\(^{-1}\) for the groups that received electrochemical process treatment, respectively. Therefore, electrochemical process caused a decline in toxicity. Although, the electrochemical process could properly decrease the 96-h toxicity and completely eliminate the diazinon pesticide, results of long-term monitoring (168 h) revealed that effectiveness of the electrochemical process on complete elimination of toxicity is not confirmed with certainty.

**Keywords:** Diazinon; Electrochemical process; Toxicity; *Daphnia magna*