



# Acc4<sup>th</sup>ademic

## INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“INTEGRATING CLEANER PRODUCTION INTO SUSTAINABILITY STRATEGIES”

### **Application of Electrochemical Oxidation in the Treatment of Landfill Leachate and Evaluation of Toxicity in *Allium cepa***

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#### **Abstract**

The disposal of waste in landfills is a practice increasingly common in big cities, and it generates large volumes of leachate as a product of waste decomposition and rainwater percolation. This liquid is highly toxic and must be treated before its release in the environment. Due the problems presented by conventional systems, there is a growing need for procedures that offer higher treatment efficiency or can be integrated by conventional processes. In this regard, clean technologies, such as advanced oxidation processes (AOPs), are considered an excellent alternative for the removal of color and organic matter, as well as to increase the biodegradability of leachate. The aim of this study was both to evaluate the effectiveness of advanced oxidation process of electrochemical oxidation in leachate treatment and to assess the toxicity of the sample before and after treatment. The experiments were performed with 150L sample of leachate and used an electrochemical reactor consisting of electrodes DSA® (Ti/70Ti/30 RuO<sub>2</sub> De Nora ®), which were arranged parallel in batch regime. A current density of 10,04 mA.cm<sup>-2</sup> was applied for a period of 40h and 60h. The results indicate excellent removals of COD, BOD<sub>5</sub>, ammonia and phosphorus within the first 40 hours of treatment. However, the evaluation showed the toxicity remained unaltered, which points to the importance of this type of study as a complement to traditional analyzes. The advanced oxidation processes are considered a clean technology, mainly for neither requiring the addition of chemicals nor generating sludge treatment. Still, assessment of toxicity of the treated effluent is necessary, considering the possible generation of toxic byproducts.

**Keywords:** Leachate, Electrochemical Oxidation, Toxicity, *Allium cepa*.