

Accepted Manuscript

Title: Electrocatalytic oxidative treatment of real textile wastewater in continuous reactor: Degradation pathway and disposability study

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PII: S0304-3894(17)30942-1
DOI: <https://doi.org/10.1016/j.jhazmat.2017.12.044>
Reference: HAZMAT 19076

To appear in: *Journal of Hazardous Materials*

Received date: 8-9-2017
Revised date: 11-12-2017
Accepted date: 14-12-2017

Please cite this article as: Kaur P, Kushwaha JP, Sangal VK, Electrocatalytic oxidative treatment of real textile wastewater in continuous reactor: Degradation pathway and disposability study, *Journal of Hazardous Materials* (2010), <https://doi.org/10.1016/j.jhazmat.2017.12.044>

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ELECTROCATALYTIC OXIDATIVE TREATMENT OF REAL TEXTILE WASTEWATER IN CONTINUOUS REACTOR: DEGRADATION PATHWAY AND DISPOSABILITY STUDY

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HIGHLIGHTS

- Real textile wastewater was treated by continuous electrocatalytic oxidation
- Ti/RuO₂ electrode was used as anode
- Optimum retention time was found to be 157.6 min with 124 min steady state time
- Various chloro species and [•]OH radicals degraded/transformed the pollutants
- Toxicity bioassay test revealed extended exposure time to 100% mortality for treated wastewater

ABSTRACT

Electrocatalytic treatment of real textile wastewater was investigated in continuous electrochemical reactor using dimensionally stable Ti/RuO₂ anode. Effects of various parameters such as: elapsed time, current, pH, retention time on the COD removal, color removal and specific energy consumed were evaluated. Central Composite Design under RSM was used for experimental design, data analysis, optimization, interaction analysis between the various electrochemical parameters and steady state time analysis. GC-MS and UV spectrophotometric analysis of the untreated and treated wastewater were conducted to identify the oxidized and transformed/degraded compounds during the oxidation process, and a suitable degradation mechanism was proposed. Treated wastewater may contain toxic chlorinated compounds due to mediated oxidation by various hydrolyzed chlorine species. Therefore, disposability of treated wastewater was assessed by conducting toxicity bioassay test.

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