PhD Candidate Profile

Name:
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Research Group (if relevant):
N/A

Research Centre (if relevant):
N/A

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Chemical department, DCNE

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Funding body:
CONACYT

Area (field) of study:
Tannery wastewater treatment by Electrochemical advanced oxidation process

Thesis Title:
Towards the actual treatment of tannery wastewater: control of operating parameters and effective degradation of dyes through a hybrid electrocoagulation-electroperoxicoagulation process

Abstract:
The aim of this study is to optimize the treatment of tannery wastewater in order to upgrade the re-use of water. Firstly using a commercial dye that contents Acid black 210, by later apply model to real tannery wastewater, this was done thru continuous electrocoagulation (EC) reactor with carbon steel as electrodes. A second stage is to apply Electrochemical Advanced Oxidation Process (EAOP), mainly electro-peroxidation as a second treatment after EC in order to re-use treated water in the RTE process. The optimized results for first process were dye removal efficiency (74 %), operational costs (0.074 dollar/m^3), electrical energy consumption (1.8 kWh/m^3), iron consumption costs (0.04 kg/m^3), efficiency of removal per mg Fe dissolved (3.1 dye mg L^{-1}//C), total dissolved solids (57 %), conductivity (50 %), specific electrical energy consumption (0.00097 kWh/m^3), and 3.5 pH increment. Operating parameters were optimized resulted in pH (3), current density (24 mA/m^2), initial dye concentration (125 mg L^{-1}), NaCl concentration (705 mg L^{-1}), and inlet flow rate (176 mL min-1). Higher number of independent variables give us a closer real scenario. Removals agree with previous research, besides in this study very good results

in operational costs were obtained. Using no hydrodynamic features, a first kinetic order model adjusted better in this study when operating parameter are not adequate, kinetic behavior differs from normal. A peroxicoagulation process is applied after EC process, where carbon iron electrode is used as anode and carbon based electrode is used as cathode to improve H_2O_2 generation.

Collaborations:

N/A

Publications:

Corona-Bautista, M., Picos-Benítez, A., Villaseñor-Basulto, D., Bandala, E., & Peralta-Hernández, J. (2021). Discoloration of azo dye Brown HT using different advanced oxidation processes. *Chemosphere*, *267*, 129234. doi: 10.1016/j.chemosphere.2020.129234

Bravo-Yumi, N., Villaseñor-Basulto, D., Pérez-Segura, T., Pacheco-Álvarez, M., Picos-Benitez, A., Rodriguez-Narvaez, O., & Peralta-Hernández, J. (2021). Comparison and statistical analysis for post-tanning synthetic wastewater degradation using different electrochemical processes. *Chemical Engineering And Processing - Process Intensification*, *159*, 108244. doi: 10.1016/j.cep.2020.108244

Villaseñor-Basulto, D., Pedavoah, M., & Bandala, E. (2019). Plant Materials for the Synthesis of Nanomaterials: Greener Sources. *Handbook Of Ecomaterials*, 105-121. doi: 10.1007/978-3-319-68255-6_88

Villaseñor-Basulto, D., Astudillo-Sánchez, P., del Real-Olvera, J., & Bandala, E. (2018). Wastewater treatment using Moringa oleifera Lam seeds: A review. *Journal Of Water Process Engineering*, *23*, 151-164. doi: 10.1016/j.jwpe.2018.03.017

Presentations:

XLIII SIMPOSIO JACOBO GÓMEZ LARA. Guanajuato, Mexico, 12-14 June 2019.