PhD Candidate Profile

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Funding body:

Area (field) of study: Photocatalysis.

Thesis Title: Evaluation of Advanced Oxidation Technologies (AOTs) and catalytic processes for the transformation of composting leachates, aimed at the production of biogas and hydrogen

Abstract:

The international and national authorities of social, politic and legislative character have paid attention in the management and treatment the leachates from municipal organic solid waste, due to negative impacts on water, soil and air, related to the high content of dissolved organic matter, macro and micro inorganic components, heavy metals and malodorous xenobiotic organic compounds. The treatment of these effluents using hybrids methodologies (Advanced Oxidation Technologies and anaerobic digestion) could be to promising alternative to decrease potential environmental problems and transform the liquids waste into high value-added products as biogas and hydrogen. It is so, that this doctoral proposal aims evaluate Advanced Oxidation Technologies (AOTs) and catalytic processes for the transformation of composting leachates, aim at the production of biogas and hydrogen. The work will be divided into 3 phases, the fist pretreatment of leachates with photocatalysis, photo Fenton and UV/H_2O_2, the second anerobic digestion the leachates treatment for production biogas and third photocatalytic reforming of biogas from leachate digestion using photocatalytic solids based on graphitic carbon nitride (gC_3N_4). It is expected that the combination of AOTs and digestion will allow these effluents to be transformed into high added value products such as biogas and H_2.

Collaborations:

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- Fundación Universitaria Juan de Castellanos

Publications:

Alexander Páez, Hugo A Rojas, Omar Portilla, Gabriel Sathicq, Carlos AM Afonso, Gustavo P Romanelli, José J Martínez (2017). Preyssler Heteropolyacids in the Self-Etherification of 5-Hydroxymethylfurfural to 5, 5′-[Oxybis (methylene)] bis-2-furfural Under Mild Reaction Conditions

José J Martínez, Luis A Páez, Luisa F Gutiérrez, Oscar H Pardo Cuervo, Hugo A Rojas, Gustavo P Romanelli, Jaime Portilla, Juan-Carlos Castillo, Diana Becerra (2020). Obtaining Protoanemonin through Selective Oxidation of D-Fructose and 5-(Hydroxymethyl) furfural in a Self-catalysed Reaction. Asian Journal of Organic Chemistry. Vol 9. Pp 2184-2190. DOI. 10.1002/ajoc.202000406

J.F. García Molano, J. D Parra Alba, L.A. Páez Guevara (2021). Characterization of composted organic solid fertilizer and fermented liquid fertilizer produced from the urban organic solid waste in Paipa, Boyacá, Colombia. International journal of recycling organic waste in agriculture. Vol 10. Pp 379-395. DOI 10.30486/ijrowa.2021.1901014.1083

L.A. Páez Guevara, J.F. García Molano, J. D Parra Alba and L Lozano Jacome (2022). Effect of phosphoric rock on the chemical, microbiological and enzymatic quality of poultry, equine and cattle manure compost mix. International journal of recycling organic waste in agriculture. Vol 1. Pp 10-15. DOI 10.30486/ijrowa.2022.1930622.1247