



# CIEEMAT'20

## VI Congresso Ibero-Americano de Empreendedorismo, Energia, Meio Ambiente e Tecnologia

### Livro de Resumos

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# VI Congresso Ibero-Americano de Empreendedorismo, Energia, Meio Ambiente e Tecnologia

## Livro de Resumos



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**VALORIZATION OF COMPOST OBTAINED FROM THE MECHANICAL AND  
BIOLOGICAL TREATMENT OF MUNICIPAL SOLID WASTE: CATALYSTS FOR WET  
PEROXIDE OXIDATION OF LANDFILL LEACHATES**

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## **ABSTRACT**

Since humanity started living in communities and towns, the generation of solid waste has largely increased and, in 2017, each European citizen generated 480 kg of municipal solid waste (MSW). The main concern with MSW is its management and final destination since in many cases MSW is just thrown in landfills. In mechanical and biological plants, MSW is first sorted into discarded, recyclable, and organic waste streams. This organic fraction goes to the biological treatment stage, generating biogas, and as by-products, leachate, and compost are obtained, the compost being mainly used as an agriculture fertilizer. However, the amount of compost produced is higher than its demand, resulting in an excess that is currently accumulated in landfills. This work deals with the valorization of compost to produce hydrochars, and pyrochars, through hydrothermal carbonization (HTC) and pyrolysis, respectively, with suitable properties as catalysts for the catalytic wet peroxide oxidation of the landfill leachate. Up to seven catalysts were synthesized under several conditions, 2 from HTC and 5 from pyrolysis. The catalysts were characterized to determine the ash content and elemental analysis. All materials were assessed in the degradation of  $H_2O_2$ , leading to its complete degradation after 2 h of reaction time. Some selected catalysts were further tested in the CWPO of the landfill leachate



(TOC = 27 g L<sup>-1</sup> , COD = 60 g L<sup>-1</sup> , 38.8 mS/cm, and 5 g L<sup>-1</sup> of chloride ions) under the following operating conditions: C Catalyst = 1.8 g L<sup>-1</sup> ; T = 80 °C; C H<sub>2</sub>O<sub>2</sub> = 85.7 g L<sup>-1</sup> and pH from 3.0 to 7.3.

**Keywords:** municipal solid waste; valorization; wastewater treatment; landfill leachate; carbon-based catalysts.

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