



**“Gheorghe Asachi” Technical University of Iasi, Romania**



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## **ENVIRONMENTAL PROFILE OF ANAEROBIC AND SEMI-AEROBIC LANDFILLS WITHIN SUSTAINABLE WASTE MANAGEMENT: AN OVERVIEW**

**Anna Mazzi<sup>1\*</sup>, Michela Sciarrone<sup>1</sup>, Roberto Raga<sup>2</sup>**

<sup>1</sup>University of Padova, Department of Industrial Engineering, via Marzolo 9, 35131, Padova, Italy

<sup>2</sup>University of Padova, Department of Civil, Environmental and Architectural Engineering, via Marzolo 9, 35131, Padova, Italy

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### **Abstract**

The new perspective of circular economy accelerates the efforts to increase reuse and recycling of products and reduce the need of resources. Although the quantity of waste reaching the end-of-life has decreased, landfills can't be eliminated from the waste management systems (WMS) since the current treatment processes still produce unrecyclable materials. Anaerobic landfills have great environmental impacts due to the long-term emissions, therefore, to reach a more sustainable waste management less impacting alternatives are being implemented. Semi aerobic landfills can reduce the environmental burdens by enhancing waste stabilization with natural air flow inside the landfill body through the leachate collection pipes. The presence of aerobic areas implies biogas with less methane and leachate with lower pollutant concentrations. The research goal is to deepen the evidence that the semi-aerobic landfills are environmentally preferable to traditional anaerobic landfills, by considering the scientific information published in international peer-reviewed journals from 2000 to 2022. To obtain comprehensive answers to the research question, papers using the life cycle assessment (LCA) methodology are included in the review, with the aim of understanding what the environmental profiles of traditional and semi-aerobic landfill are when all life cycle phases are considered. The results clarify what the main contributions to environmental impacts of these two types of landfills are. The review only partially demonstrates the environmental convenience of semi-aerobic landfill. Instead, it reveals a lack of papers analyzing the comparison between different landfill technologies, suggesting new research perspectives to optimize the sustainability of final treatment solutions in WMS.

**Key words:** environmental impact, life cycle assessment, semi-aerobic landfill, waste management systems

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\* Author to whom all correspondence should be addressed: E-mail: [Anna.Mazzi@unipd.it](mailto:Anna.Mazzi@unipd.it)