Environmental Engineering and Management Journal

March 2025, Vol. 24, No. 3, 513-527
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu
http://doi.org/10.30638/eemj.2025.041

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REVIEW OF MUNICIPAL ORGANIC WASTE COMPOSTING: METHODS, PROCESS PARAMETERS, AND CLIMATE BENEFITS

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Abstract

The risk of environmental pollution is increasing due to the growing generation of municipal solid waste following population growth and containing high organic fraction, which adds more pressure on the environmental system. This waste stream significantly contributes to the global warming as well as climate change due to greenhouse gas (GHG) emissions. Therefore, the diversion and recycling of this waste stream through composting is one of the best options in waste management strategies to reduce GHG emissions. Compost is considered an environmentally friendly and viable option for waste recycling to reduce environmental impacts. This review focuses on the different composting methods, parameters, and benefits of climate change mitigation and adaptation. Although, these were widely reported in the literature, but reporting was segregated in different studies, therefore, this research critically reviewed these topics and combined them in one study to ease reference for different professionals, academics, and researchers. The study highlighted eight composting methods: windrow composting, pile composting, in-vessel composting, vermicomposting, Indian Bangalore composting, sheet composting, Indore composting, and Berkley composting. In addition, identified six critical parameters in composting including: C/N ratio, temperature, pH, moisture content, oxygen, and particle size. Further, the study highlighted the benefit of compost to climate change mitigation through the replacement of chemical fertilizer by compost which can reduce GHG emissions, and increase soil carbon sequestration. Moreover, the study highlighted the importance of compost in climate change adaptation by improving soil water-holding capacity, reducing soil erosion, and compensating for the loss of soil biodiversity, which all support food security.

Key words: adaptation, composting methods; composting parameters; climate change; mitigation; organic waste

Received: July, 2023; Revised final: August, 2024; Accepted: September, 2024; Published in final edited form: March, 2025

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