

Gaseous Emissions During Static Enhanced Aeration Composting Process

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Abstract

Proper organic waste management contributes to sustainable cities. Composting is an environmentally friendly method for organic solid waste (SW) recycling towards sustainable SW management. It reduces carbon emission from waste sector and considered one of the climate change mitigation measures. If used for agricultural purposes, it can improve soil quality, increase soil water holding capacity and increase moisture retention time in the soil thus support resilience and adaptation capacity to climate change. However, gaseous emissions during the composting process are unavoidable and depends, to the large extent, on the climatic conditions and management of the composting process. The emissions of gases during the composting process for static aerated composting system is scarce under Palestinian climate. Therefore, this study focuses on the assessment of gaseous emissions during static aerated composting systems. Two static aerated composting experiments were conducted using organic refuse mixed of fruit and vegetable waste, animal manure, sawdust, and wood chips from trees' trimming. Two different air flow rates, 7.1m³/hour/m³ and 15m³/hour/m³ of raw materials were used for experiments 1 and 2, respectively. The operational parameters as well as gaseous emissions were monitored and recorded throughout the composting process. The results showed that the emissions of CH₄, CO₂, and H₂S were in the range of 2.4-5.2%, 0.1-13.2%, and 0-4ppm for experiment 1, and 2-4%, 0.5-8.1%, and 0-5ppm for experiment 2, respectively. The results don't show significant variations in gaseous emissions for the two different aeration rates especially for CH₄ and H₂S, while larger variation was noticed in CO₂ emissions.