Performance Analysis of Composting Systems for Small Scale Use

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EXTENDED ABSTRACT

The objective of this analysis was to evaluate small-scale composting performance using large-scale standards. Results will determine functionality of small-scale system as an approach to solid waste management.

The testing of and analysis was completed on four systems, varying restrictions of air availability and turning of the compostable material. Specifically, these four systems were dynamic flow-through, dynamic closed, static flow-through, and static closed composting systems. The efficiency of using macro-organisms to accelerate the degradation of compostable materials was also tested and analyzed using a vermi-composting system. Parameters used for the evaluation of these systems were moisture content, temperature, pH, electro-conductivity, and visual analysis. A thermometer was used to measure compost temperatures, and a slurry was developed to determine each system sample's moisture content, pH, and electro-conductivity values.

The systems tested in this experiment did not yield satisfactory results in consideration with large scale composting standards for several composting parameters. Temperatures correlated greatly with the surrounding temperature instead of rising to an expected range of 37-60^{o}C for effective composting processes. Also, most systems has moisture content levels above the necessary 25-40% to compost under effective aerobic conditions. Visually, certain systems, such as the static flow-through composting unit, showed homogeneity among the solid waste and most closely resembled stable compost. Small-scale composting methods may follow different guidelines for creating mature compost than large-scale processes. These systems may be effective, but not by using current composting standards as a benchmark for success.