Substrate composition and moisture in composting source-separated human faeces and food waste

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Abstract

The composting of a faeces/ash mixture and food waste in relative proportions of 1:0, 1:1 and 1:3 was studied in three successive experiments conducted in Kampala, Uganda in 216 L reactors insulated with 75 mm styrofoam or not insulated. The faeces/ash mixture alone exceeded 50° C for ≤ 12 days in insulated reactors, but did not reach or maintain 50° C in non-insulated reactors. Inclusion of food waste kept temperatures above 50° C for over two weeks in insulated reactors except when the substrate was too wet. *Escherichia coli* and total coliform concentrations decreased below detection in material that exceeded 50 ° C for at least six days. *Enterococcus* spp. decreased below detection in material that exceeded 50° C for at least two weeks, but remained detectable after 1.5 months in material that exceeded 50 ° C for less than two weeks, suggesting that a period of at least two weeks above 50° C, combined with mixing, is needed to achieve sanitation. Initially substrates that were too wet proved a challenge to composting and ways of decreasing substrate moisture should be investigated. The results obtained are applicable to the management of small- to medium-scale composting of faeces/ash and food waste at household and institution levels, e.g. schools and restaurants.

Keywords:
composting; faeces; food waste; insulation; temperature