

Investigation of the Effects of Different Operational Parameters on Vermicomposting

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Keywords: *E.foetida*, vermicomposting, additives, ventilation.

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Vegetable-market solid waste from urban areas and municipal wastewater treatment plant (MWTP) sludge are produced in millions tons of waste each year. These types of wastes cause a lot of disadvantages in landfill area. Since storage volume acquisition from landfill, composting is a good practice of solid waste removal system. Vermicomposting is a composting process realized with organic fraction of MWTP sludge, garden waste and worms. Vermicomposting is a biochemical degradation process of organic materials, which implicates the complex relationships between earthworms and microorganisms.

Fruit and vegetable wastes and sludge using vermicomposting process were taken from market areas and MWTP, respectively. Two different combination of fruit and vegetable wastes and sludge have been prepared with green yard waste. Fruit and vegetable wastes: green yard waste in 50:50 ratio (FVG), sludge: green yard waste in 50:50 ratio (SG) were used for vermicomposting experiments. The effects of additives (vermicompost) and ventilation on decomposition rate of composting were investigated of composting mixtures. Composting process was carried out in the aerobic reactors made of plastic pots which were monitored for 60 days. Each pots includes 50 adult earthworms, *Eisenia Foetida*. Temperature, moisture, organic matter, pH, electrical conductivity, total carbon and total nitrogen were monitored during the composting process. In addition, worm number changes of the mixtures were determined.

At the end of the study, maximum survival rate (for earthworms) and bigger size of worm were recorded in vermicomposting process using MWTP sludge. On the other hand, less worm and cocoon count and slim worms were observed in pots including market waste. Maximum decomposition degree was determined for the mixture based on the dry matter loss where sludge cake pots. The vermicomposting caused a decrease in organic C and C:N ratio while increase in total N contents.