

Innovative Acceleration of Composting using Mixed Municipal Solid Waste Materials via Enzymatic Process

Amando Perfecto dlC. Molin

Abstract

This study tested the viability of using enzymatic technology to accelerate the composting process, increase the total percent compost yield, improve compost quality, and improve the growth of plants. Two compost piles were assembled, a control setup and another setup with additional industrial enzymes added. After harvesting and sample analysis, the compost from both piles was used to cultivate *Raphanus sativus*, *Zea mays*, and *Brassica rapa* plants over the course of one month, before the measurements were taken of the mean leaf quantity, leaf length and leaf width of the *Raphanus sativus* plants, as well as the mean plant height of the *Zea mays* plants and the mean leaf length and width of the *Brassica rapa* plants. The mean leaf quantity of the *Raphanus sativus* plants underwent statistical Analysis of Variance (ANOVA), and the leaf length and leaf width of the *Raphanus sativus* plants also underwent statistical analysis via T-test. The results showed that, from the enzymatic compost pile, the amount of enzymatic compost produced with desirable aesthetic quality had a total mass of 188.5 kg, which contained a total NPK content of 5.29%, moisture content of 14%, and organic matter content of 24.89%, compared to the 101 kg of non-enzymatic compost produced, which contained a total NPK content of 4.35%, moisture content of 27%, and organic matter content of 11.42%. In addition, all analyzed parameters of the produced enzymatic compost met the standard requirements for plain organic fertilizer, set by the Philippine Food and Pesticide Authority. Furthermore, the *Raphanus sativus*, *Zea mays* and *Brassica rapa* plants cultivated using enzymatic compost showed a greater amount of plant growth compared to similar plants cultivated using non-enzymatic compost. Also, statistical analyses showed that, using a maximum benchmark P-value of 0.050 (a minimum level of confidence of 95%), the *Raphanus sativus* plants grown using the produced enzymatic compost showed significantly greater plant growth in terms of mean leaf quantity, length and width, compared to the *Raphanus sativus* plants grown using non-enzymatic compost.