

Maximizing Organic Waste Management through Vermicomposting: A Comparative Study of Red Wigglers and Black Soldier Fly Larvae

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Vermicomposting, a process of composting done by using Red Wigglers and black soldier fly larvae (BSFL) offers a sustainable solution for organic waste management. This study aimed to compare the performance of Red Wigglers and BSFL in vermicomposting and evaluate their suitability for different waste types which were yard, kitchen, and food waste. Each waste type was mixed with the compost filling (cow dung, hay, sand, banana cuttings) in separate 9 pots (3 pots per each waste type). Red wigglers and BSFL were added to each waste type, separately and the remaining 3 setups were maintained as controls. pH and temperature measurements were monitored throughout the vermicomposting process, revealing optimal conditions for both organisms, and counting the Red Wigglers and BSFL every week. Results indicate that BSFL exhibits higher efficiency in breaking down organic matter under specific temperature conditions, at a range of 27-30 °C and pH conditions at a range of 6-7. The mean rate of growth/decline per week in food, kitchen and yard waste respected to Red Wigglers were 1.00, 0.72 and -1.00 and respected to BSFL 1.86, 11.86 and 18.00. A significant difference between the rate of growth/decline of Red Wigglers and BSFL was proved statistically (ANOVA test). The compost piles which contribute to an increase in the population of decomposers lead to an increase in the efficiency of composting. Food waste undergoes the highest rate of fermentation, increasing acidity which promotes rapid growth of BSFL that thrive in acidic conditions. Also, BSFL can stabilize in the acidic pH than Red Wigglers. It can be concluded that food waste is preferred to BSFL than yard waste and kitchen waste and yard waste is preferred to Red Wigglers.

Keywords: *red wigglers, black soldier fly larvae, BSFL, vermicomposting, waste management, organic*