FLUCTUATIONS IN PHYSICO-CHEMICAL PARAMETERS AND DIPTERAN LARVAL DENSITY IN HOUSE-HOLD COMPOSTING UNITS

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Composting is one of the cost- effective methods of household waste or garbage utilization. The composition and the quality of the composting mass and its final conversion into compost can be expressed using several physico-chemical and biological parameters. Therefore the study was carried out to monitor the levels of selected physical, chemical and biological parameters of kitchen waste during composting in a barrel type of composting unit.

A composting unit was run in a household and fed weekly with kitchen waste for a period of 6 months. Thereafter 2 other household composting units were run in order to replicate the study. The measured parameters of the composting mass were amount of compost formed (overall height and height reduction), temperature, bulk density, water content, pH, organic carbon, adult fly density (Drosophilidae flies and Lonchopteridae flies) and larval density of Stratiomyidae flies. The measurements were taken at three levels of the composting mass. The data were analyzed using Two sample t- test and One Way or Two-Way ANOVA or Correlation matrix using MINITAB Version 13.

Unit 1 was added with the total weight of 90.4 kg waste over 25 weeks and the amount of compost formed was 17 L. Units 2 and 3 were fed with 41 kg and 38 kg and the amount of compost formed were 9 L and 10 L respectively. Highest temperatures of the 3 units recorded were 39.5 °C , 43 °C and 36 °C in Units 1, 2 and 3 at 6 weeks respectively. The lowest bulk densities that indicate the availability of more pore spaces were 0.002, 0.009

and 0.007 g/cm3 were reached at week 10 in Units 1, 2 and 3 respectively. The highest water content of compost of three units fluctuated between 72.1 - 91.2%. The lowest pH values recorded fluctuated between 7.3 and 8.7 with a mean of 7.8. The highest carbon content in the three units varied markedly between 1.4% and 23.6% with a mean of 6.9%. Adult Drosophilidae flies were recorded from composting mass mainly from week 2 and then reached a peak (19 flies/ sweep) in week 4 and declined thereafter. A similar pattern was shown by adult Lonchopteridae flies. Stratiomyidae larvae were recorded from composting mass from week 8 and they reached a peak density (93, 84 and 62 larvae/ 10 cm^3 respectively in Units 1, 2 and 3) in week 17 and declined thereafter.

Furthermore, there was no significant interaction between maximum fly larval density and maximum height of compost attained or maximum temperature or maximum carbon content. Although statistical analysis of larval density with amount of compost formation (in terms of overall height) did not show a significant relationship, observations indicate that as larval density increases, the overall reduction in compost height. However larval activity may enhance microbial activity through the break up particles and their loose packing which facilitates aeration.