

ASSESSING DECOMPOSITION RATES AND NUTRIENT RELEASE FROM VARIOUS ORGANIC MATERIALS IN PINEAPPLE CULTIVATION

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Deteriorating soil fertility remains a persistent issue affecting agricultural production in *Kalutara*, a wet zone in Sri Lanka. Using heavy amounts of synthetic fertilizer to enrich soil fertility is harmful to the environment. Therefore, finding alternative, more sustainable, and cost-effective organic nutrient management systems is vital. This study was designed to assess the decomposition dynamics and nutrient release patterns of various organic matters (OMs) through a litter bag experiment conducted in pineapple cultivation. The four different organic matters; Gliricidia (G), Compost (C), Cattle manure (CM), and Poultry manure (PM) were used as treatments. The experiment was arranged in a Randomized Complete Block Design (RCBD) with 3 replicates. Decomposition rate (remaining dry mass after 16 weeks of decay) and the release of certain macronutrients [nitrogen (N), phosphorous (P), potassium (K)] and micronutrients [zinc (Zn) and manganese (Mn)] were analysed. After 16 weeks of the study, the results revealed the significantly highest decomposition rate ($0.12 \pm 0.007 \text{ g week}^{-1}$) with Gliricidia compared to other OMs ($p < 0.05$). The order of decomposition for OM were shown as $G > PM = CM = C$. From the nutrient analysis, the significantly ($p < 0.05$) highest release of P ($5.76 \pm 0.4\%$), and K ($0.10 \pm 0.01\%$) were recorded with PM showed simultaneously the highest ($p < 0.05$) release in Zn ($0.09 \pm 0.001\%$) and Mn ($0.08 \pm 0.002\%$). However, the significantly highest N ($13.57 \pm 0.6\%$) was released with Gliricidia compared with other OMs ($p < 0.05$). Overall, it can be concluded that PM is highly effective as OM for nutrient release for many tested nutrients, however, it exhibits limitations in releasing N with lower decomposition. Hence, future studies will be essential to enhance the decomposition rate of PM, making it a viable alternative source for cultivating pineapples.

Keywords: Decomposition rate, Litter bag study, Organic matter, Poultry manure