

Co-composting landfill leachate with sugarcane bagasse for biofertilizer production

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Abstract:

Landfill leachate is generally characterized by extremely high concentrations of biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammoniacal-nitrogen, and heavy metals. However, it is also a source of nutrients, which consists of high organic matters such as nitrogen (N), phosphorus (P) and potassium (K) that makes it viable as a biofertilizer. The objective of this research was to investigate the effects of co-composting leachate with sugarcane bagasse for the production of biofertilizer. In this research, the sugarcane bagasse was chosen as it was able to maintain the moisture content for proper composting and stabilize the level of nutrients in the soil. Three different ratios of soil to sugarcane bagasse were applied; V1 (1:0.5), V2 (1:1) and V3 (0.5:1) with the addition of standard amount of leachate. Each of the mixture was introduced with 90 earthworms and the moisture content was maintained at 60%-80% throughout the composting period. HACH Spectrophotometer was utilized to measure the NPK content of the vermicompost. The results indicated that the NPK content of all the ratios increased significantly. The highest NPK content was observed in vermicompost V2 compared to V1 and V3 at the end of the vermicomposting process. The potential of this V2 as a biofertilizer was verified by phytotoxicity assay on the growth of onion plant for 31 days. Based on the phytotoxicity test, V2 showed the highest shoot elongation (28.6 cm) and number of leaves (17) compared to its control counterpart.

Keyword: Sugarcane bagasse; Biofertilizer production