Production of Liquid Manures Through an Aerobic Biodigester for Leafy Vegetable Growing Hydroponic System Using Bio-Wastes

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Millions of people worldwide experience food insecurity and various types of malnutrition because the price of healthy diets is out of their reach. To prevent this from happening, alternative farming methods must be used. The purpose of this study was to evaluate organic liquid manure made from vermiwash (VW), black soldier fly feces mixed with undigested materials (BSF-FUM) and distillery spent wash (DSW) with the use of an aerobic bio digester (ABD) on the growth of *Amaranthus* in a simple hydroponic system. Six liquid organic manure formulae were tested on the growth of a leafy vegetable, *Amaranthus* over a period of 30 days. The germination index, chemical properties of liquid manure combinations, mycelial growth of *Trichoderma viride* were evaluated against chemical liquid fertilizer, being the control on the vegetative growth of *Amaranthus* and data were analyzed using SAS version 6.0. The results revealed that the combination of VW+BSF-FUM wash+ DSW had a significant impact on plant height (38.63cm), root length (18cm), number of leaves (8/plant), leaf length (5cm), leaf width (4.5cm) and biomass. All combinations showed a germination index equal or greater than 80%. The mycelial growth of *T.viride* was high in DSW+BSF-FUM (>8cm) and the ranges of chemical parameters of liquid manure combinations were 6.5-7.5 pH, 26-29dS/m EC, 1.0-2.51% total N, 0.50-0.79% total P, 0.50-0.67% total K and 12.05-44.14% OC at 30 days of aerobic digestion. The combination of wastes passing through an ABD, gave significant results according to specification for liquid organic fertilizers (SLS 1702:2021) and this response encourages studying further on the efficient use of these wastes. Further a need arises to investigate the complete profile of macro and micro elements and the use of underutilized plant extracts to increase the efficiency of these organic wastes for recommending the liquid organic fertilizer in hydroponic culture.

Keywords: Aerobic Digester, Organic, Liquid Manure, Hydroponic, Leafy Vegetable