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Rapid population growth in developing countries including Cameroon has resulted to a lot of problems with regards to livestock and other agricultural wastes management

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Rapid population growth in developing countries including Cameroon has resulted to a lot of problems with regards to livestock and other agricultural wastes management. Waste-toenergy/resource remains the best technology in eradicating the waste generated. This study, carried out in Fako-Division, South West Region of Cameroon was aimed at; (i) characterising the existing livestock manure management practices, (ii) quantifying methane (CH4) produced from the digestion of different livestock manure and their co-digestion with palm oil mill effluence (POME), (iii) increasing the quality of CH4 produced in biogas by using purifying chambers, (iv) assessing the physiochemical properties of livestock manure with added woo shavings during windrow composting and (v) assessing greenhouse gas (GHG) reduction potential from composting livestock manure with wood shavings.

Different proportions of cow manure (CM), pig manure (PM), fowl manure (FM), POME and wood shavings (WS) were used. Physiochemical parameters, volume of biogas produced, efficiency of the purifiers and the concentration of GHG's were recorded. Data generated from this research was analysed using MINITAB 17, SPSS 21 and R 4.1.1Results revealed that, (i) of the different livestock manure management practices observed, open air dumping and stream deposition were the most common while biogas production and composting were the least. (ii) With regards to biogas production, CM produced the highest volume of CH4 (0.024 m3 CH4/kg VS), followed by FM CH4 (0.024 M3 CH4/kg VS). CM and PM when mixed separately with POME showed no significant difference in CH4 production, as was with PM. The least CH4 production was observed from the mixture of FM and POME (0.024 x 10-2m 3 CH4/kg VS). (iii) Furthermore, results from biogas purification showed that, the highest efficiency of CO2 absorption was recorded with activated carbon (86.41%) and the least being 4M Ca(OH)2 (85.32%). H2S efficiency was 98.93%. The entire purification process increased CH4 concentration in the biogas from 0% to 80.8%. (iv) Comparing different livestock manure amended with wood shavings to the corresponding raw manure during windrow composting showed that, there was an insignificant decrease of volatile (VS) and total organic carbon (TOC) and a significant mass reduction. Comparing the different amended livestock manures with wood shavings during windrow composting shows that, only temperature and pH had a significant change while mass and VS had an insignificant change. (v) Again, monitoring GHG concentration during the composting period showed that; of the different combinations of livestock manure and its corresponding amended variant had a significant change for CO2 and ResN, H2S had a significant change for PM, FM and CM+WS while CH4 had an insignificant change in the entire livestock manure combination before and after turning. Turning had a significant change on the GHG concentrations reduction over the different livestock manure combinations. Wood shavings addition had significant reduction in GHG concentration (especially in CO2, H2H and ResN) over the entire composting period. It can be recommended from this study that; (i) the co-digestion of oil mill waste water with livestock manure at different proportions should be further investigated. (ii) desulphurisation and decarboxylation technology should be improved on to increase CH4

yield. (iii) different proportion of livestock manure with woods shavings should be further investigated to see its effect on physiochemical properties. (iv) different proportion of wood shaving and mixing rateshould be further investigated to see its effect on GHG concentration reduction.

Biography

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