Biovalorization of Banana Waste:Auditing and Improvement of Bio-Methane Production by Fungal Pre-Treatment

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Abstract
Bananas is an important staple food and cash crop in Tanzania, which generates huge waste quantities, currently underutilized and discarded causing detrimental impact to the environment. However, representsun-tapped bio-resource for bio-valorization into valuable bio-products. A waste audit case study was conducted for four common cultivars, Mshare-Kahuti, Mbwailuma (Matoke), Kisukari-Mshare and Kimalindiat Horticulture Research and Training Institute, Tengeru, Arusha, Tanzania. Wastes quantities generated annually from one hectare were estimated at 57, 99, 64 and 125 tons/year for Mshare-Kahuti, Mbwailuma (Matoke), Kisukari-Mshare and Kimalindi, respectively. Methane yield of various wastes fresh fractions of Mshare-Kahuti (for cooking) and Kisukari-Mshare (for desserts) were investigated in batch anaerobic bioreactors (BAB). The highest methane yields for Mshare-Kahutiof 0.273 and KisukariMshare of 0.255m3 CH4/kg of volatile solids (VS) added were recorded from corm and peels banana waste fractions, respectively. The effect of solid state-fermentation pretreatment of banana wastes with Pleurotus sapidus (P 969) at 10% (wet wt bases) for 7, 14 and 21 incubation days on the extent of methane yield was also investigated in BAB. Maximum methane yields for Mshare-Kahuti and Kisukari-Mshare were 0.96and