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# Anaerobic Digestion of Banana Waste, a Potential Source of Energy in Uganda

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**Abstract**

Bananas and plantains are the world's fourth most produced food commodity, after rice, wheat and apple. Bananas are grown in more than hundred countries, mostly in the developing world where they represent an important staple food. Uganda currently produces more than 4.5 million metric tons of bananas every year, accounting for about 10 % of the total world production. However, a considerable part of the harvest is lost. It is estimated that 40 % of the bananas produced in Uganda perish. An effective way to enhance storability and distribution of bananas are drying and processing. Processing of banana results in a huge amount of waste generation, leaves, stems and peels and to some extent the degraded bananas itself. Indiscriminate disposal of these wastes when decomposed produces noxious gases such as hydrogen sulphide and ammonia, which pose serious environmental hazards. The banana waste is a concentrated source of putrid organic waste, ideal for anaerobic digestion to produce energy while fermentation products can serve as fertiliser with high nutritional value, as well as a valuable energy source in form of biogas. Channeling these peels into the production of biogas is an efficient way of waste management. The aim of this study was to compare the amount of methane produced from different fractions of banana (stem, peel, and fruit) through anaerobic batch digestion assays at 37 °C for a period of 35 days, using pre-digested manure as inoculums source. For this purpose, the biogas production as well as the methane content in the biogas produced was analyzed. The methane yields of the different fractions were compared to the methane potential of the whole banana. The stem, peel and fruit fractions represented 0.84 %, 17.71 % and 81.46 % of the total methane production potential of the whole banana with specific methane yield of 0.256, 0.322, and 0.367 $m^3$ $kg_{-1}$ volatile solids respectively. Hence, anaerobic digestion of banana waste could generate important amounts of energy, which could be used to cover essential needs of either households or to meet the requirements of the processing industry in developing countries such as Uganda.

**Keywords:** Anaerobic digestion, banana, biogas

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