

BIOGAS POTENTIAL FROM SLAUGHTERHOUSE WASTES AT AMBIENT TEMPERATURES IN LIRA MUNICIPALITY OF NORTHERN UGANDA

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Abstract

The generation of biodegradable solid waste and wastewaters is characteristic of all slaughterhouses including the Lira Municipality slaughterhouse (LMS) in northern Uganda. However, the LMS is not properly designed to handle and manage the ever-increasing biodegradable solid waste and wastewater. The wastes discharged from LMS, contain reasonable amounts of paunch, fat, grease, undigested food, diluted blood, suspended material, urine, loose meat and soluble protein. The lack of a properly designed slaughterhouse in Lira Municipality, needed to manage and handle the waste has resulted in the discharge of the waste into the environment, leading to pollution of water sources, outbreaks of diseases, and production of unfavorable odors. The objective of this study was to investigate the biogas potential of the LMS biodegradable solid waste and wastewaters at ambient temperatures. The waste was quantified based on Measurement at the point of generation method. Representative samples were characterized for biogas potential. Five treatments of the waste replicated three times were anaerobically digested in 1500mL batch digesters with a working volume of 750mL. Treatment A contained only the inoculum and inoculum in the other treatments B, C, D, and E was approximately 20% of the volume of the substrate. Substrate: water ratio of 1:1, maintained pH of 6.0- 7.0 and retention time of 30 days were used for the study under ambient conditions. On average, 2,597 L, 40 kg and 502 kg of wastewater, cow dung and punch manure respectively were produced from LMS. The quantity and methane content of the biogas ranged from 1029.6 to 3512.7 ml/gVS and 40.6 to 50.4% respectively. Therefore, slaughterhouse wastes are potential sources of biogas production at ambient temperatures.

Keywords: slaughterhouses, punch, cow dung, wastewater, inoculum, biogas