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ANAEROBIC CO-FERMENTATION PROCESS USING THE SWINE MANURE WITH ORGANIC BYPRODUCT

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ABSTRACT The present study aims to develop a co-fermentation process using animal manure and organic by-products. The fermentation materials used were: swine manure only as a control, swine manure mixed with corn silage, and swine manure mixed with kitchen wastes. Two concentrations of total solid materials of 5 and 10% were used. The digested materials were analyzed before and after the experiments and the biogas generation was evaluated in terms of CH_4. The system is evaluated under continuous feeding with mesophilic temperature. Results indicated that increasing the total solid matter from 5% to 10% leads to increase the biogas generation from 0.389 to 0.556 L/L-d for swine manure only. Using the higher TS of 10% produced biogas of about 1.43 times more than that of low TS (5%). Mixing with the corn silage, the test has shown a gas production of 1.11 L/L-d for the level of TS 10%. It was two times more than that of the control. The test with kitchen waste has a biogas production of 1.01 L/L-d, which is close to the result of corn silage. Based on the organic dry matter (odm), a biogas production was 203, 362 and 216 L/kg odm-d for control, manure mixed with corn silage, and manure mixed with kitchen waste, respectively. Because the kitchen waste has shown relatively high odm contents, the gas production based on the odm was low compared to manure mixed with corn silage. The experimental results indicated that, utilization of organic by-products have enhanced the biogas production from anaerobic fermentation of animal manure up to 2 times.

Keywords: Anaerobic co-fermentation, swine manure, biogas, corn silage, kitchen waste