Anaerobic digestion of cattle manure: influence of inoculum concentration

ABSTRACT

This study evaluated the performance of anaerobic treatment of cattle manure (CM) with palm oil mill effluent (POME) inoculum in terms of biogas production and volatile solid (VS) reduction. The objective of the study was to determine the effect of substrate to (POME) ratio used as inoculum on digester performance. The study was conducted in a 10-L lab-scale bioreactor operated at thermophilic (53oC) temperature. The result from the study showed that anaerobic digestion of cattle manure with POME inoculum can be done successfully in batch and semi-continuous mode. Biogas production was observed to commence immediately and the POME inoculum shown a strong influence on the initial biogas production rate. Average biogas yield was estimated to be about 0.346 and 0.299 m3 kg-1 VS added for the CM(5) : POME(1.5) and CM(5) : POME(1) respectively. However, nearly similar chemical oxygen demand (COD) removal of 33% and 30% with volatile solids (VS) removal of 58.6% and 52% for the CM(5):P0ME(1.5) and CM(5):POME(1), respectively was achieved. These results are hopeful for the treatment of cattle wastes and POME mass available in Malaysia.

Keyword: Biogas production; Anaerobic digestion; Inoculum; Batch; Semi-continuous