

Increasing biogas production of rumen fluid using cattle manure collected at different time as a substrate

ABSTRACT

The effect of cattle manure collected at different time inoculated with rumen fluid of cattle on biogas production at mesophilic condition was evaluated. A laboratory experiment was carried out using 1000 ml biodigester and performed in batch operation mode. Approximately 100 grams of fresh cattle manure (M) was assigned to each biodigester and mixed with rumen fluid (R) and distilled water (W) into three different M:W:R ratio; 1:1:0; 1:0.5:0.5; and 1:0:1 respectively. All the treatments were prepared in triplicates. The pH of the slurry was recorded before and after the biogas production was determined. The biogas production was recorded at every three days interval for 24 days. The results obtained shows that the pH of the mixture before and after the biogas production provided a reading of 7.34 and 7.15. Significant different ($P < 0.05$) was observed in the cattle manure collected at 0 h and 24 h between the treatment group and control. The best performance biogas production was observed if the rumen fluid used between the ranges of 25-50% of rumen fluid. Cattle manure collected after 12 h of defecation recorded with the highest biogas production compared to 0 h and 24 h of cattle post-defecation. The highest biogas produced was recorded in T3 throughout the experimental periods.

Keyword: Rumen fluid; Inoculums; Biogas; Mesophilic condition