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Design and Fabrication of a Plastic Biogas Digester for the Production of Biogas from Cow Dung

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Biogas digester dimensions and materials of construction are important factors of consideration during the design and fabrication phase. The aim of this study is to provide a detailed analysis of the design and fabrication of a 2.15 m³ pilot plastic biogas digester for biogas generation. To establish this, a design equation covering the volume of the digester, inlet and outlet chambers, and digester cover plate was developed considering the shape of the digester. The digestion chamber of the biogas digester under study was fabricated using high-density polyethylene (HDPE) plastic, while the inlet and outlet chambers were constructed with bricks/cement. The study was motivated due to some limitations such as leakage associated with previous designs. In the present study, a ventilation test was conducted after the fabrication to ensure the digester is leak free. Results obtained showed a total volumetric methane gas yield of 2.18 m³ (54.50%) and carbon dioxide yield of 1.77 m³ (44.25%) making up a total biogas yield of 4.00 m³. In addition, the percentage concentration of methane and carbon dioxide were found to be 60% and 30%, respectively. The developed plastic biogas digester has been found to be appropriate for biogas production using cow dung as substrate.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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