

Construction of Biogas Digester and Produce Biogas from Cow Dung and Chicken Droppings as an Alternative Source of Heat to the Existing LPG Gas

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Abstract: The study analyzed the compositions of cow dung and chicken droppings, revealing that cow dung has a higher proximate composition, containing more organic waste, leading to increased biogas output. Anaerobes break down raw materials through hydrolysis, acidification, and methanization processes. The densities of both materials were found to be different, with cow dung having a larger density than chicken droppings. This results in varying chances of becoming soluble in the digester's contents during fermentation periods. The calorific values of the two raw materials were 7.8 mj/kg for cow dung and 7.9 mj/kg for goat dung. Both materials have a high rate of biogas production and a decent calorific value. The pH values of the slurry for cow dung and chicken droppings were 7.8 and 7.9, respectively. For fermentation and regular gas generation, a pH of 7 to 8.5 is ideal. The modest pH variations between the two substrates might be explained by the type of organic feeds given to animals as ruminants. Gas production was usually started from the 5th day. The pH of the slurry was adjusted to the required value (5-8) by adding 1 N sodium bicarbonate solution. The daily production over 30 days' retention period for the slurry with different pH levels showed that biogas gas production was higher during initial days and decreasing gradually as the day passed. The maximum gas yield was obtained for pH 7 on the 16th day and 8th and 19th in 10 and 20% of cow dung and chicken droppings, followed by 33, 22, and 33, 38 ml for pH 5 on the 25th, 23rd, and 16th, 13th days in 10 and 20% of cow dung and chicken droppings, and 14, 22, and 15, 26.1 cm³ for pH 8 on the 20th, 23rd, and 11th, 18th days in 10 and 20% of cow dung and chicken droppings, respectively

Keywords: Biogas, Cow dung, Chicken Droppings, Anaerobes Digester, Retention Time and Proximate composition