

ASSESSMENT OF THE COMPOSITION AND THE VOLUME OF BIOGAS LIBERATION FROM AGRICULTURAL WASTES

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Study was conducted in the Faculty of Agriculture, University of Ruhuna, Mapalana to assess the composition and the volume of biogas liberation pattern from different agricultural raw materials.

In the Sri Lankan batch type biogas generator (volume 6m^3), first batch of straw (1000kg) was filled in September 1999 and second and third batch in October 2000, April 2001 respectively. It was revealed that average gas production from the digester was $1.0\text{ m}^3/\text{day}$ with a peak value of $1.8\text{m}^3/\text{day}$. Total gas production during four and half month period of digestion was 166.85 m^3 . The maximum average methane percentage and the average lag phase during the digestion were 50% and 20 days respectively.

In order to assess the biogas liberation pattern and composition of each material, a laboratory test unit was designed using a 20 L plastic gallon as the digester and experiment was conducted using straw, cow dung and market garbage (vegetable) as raw materials. Gas volumes, pH value of slurry and methane percentage were measured while maintaining the temperature between 35°C - 37°C using electric bulbs.

N,P,K compositions, C/N ratio and dry matter percentages of different raw materials were analyzed. Total biogas liberated per unit weight of dry matter was 8.15 L, 58.7 L and 15.797L for dung, vegetable and straw respectively. The duration of digestion period was 55-60 days. Average methane percentages of the liberated gases were 53%, 54% and 50% for dung, vegetable and straw respectively. It was revealed that market garbage had the highest digestibility value, which had the highest gas production with high methane percentage.