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Investigation of biogas generation from the wastes of a vegetable market in single and double chamber reactors

This paper presents the results of two sets of laboratory experiments on biogas generation from the wastes of a rural vegetable market of Bangladesh under daily feed condition. The daily average composition of easily biodegradable wastes was used as the substrate for biogas generation. Cow dung, cauliflower stick, papaya and potato were the major biodegradable wastes. The average total solids (TS) and volatile solids (VS) concentrations of the substrate were determined and found to be 18.90% and 15.10% respectively. The experimental setups were placed in a large closed chamber containing a room heater. It was operated at 35°C to maintain a favorable condition for anaerobic digestion. In the first setup, 750 g waste and required amount of inoculum were added initially to a single chamber reactor to make the effective volume of 2

L, and a double chamber reactor (middle interconnection) was initially fed with 750 g wastes (350 g in each chamber) and inoculum was added to make the effective volume of 1 L for each chamber. Both the reactors were operated for 39 days. Considering the HRT as 40 days, from the 2nd day of operation, each reactor was fed daily with a mixture of 18.75 g wastes and required volume of tap water to make the total volume of 50 mL after dispensing equal volume of slurry from the reactor. The results of the experiments revealed that the temperature varied from 30 to 35°C and it did not affect the rate of biogas generation. For the OLR of 1.42 gVS/L/d, the daily stable biogas generation rate was 0.39 and 0.32 m³/kg of VS added for the single chamber reactor and the double chamber reactor respectively.

Biography

Md Abdul Jalil is the Professor at Civil Engineering Department at BUET, Dhaka, Bangladesh. He received his PhD in Civil Engineering in 1993 from Tokyo University, Japan under ADB Scholarship. He conducted post-doctoral research on water management in Loughborough University, UK under Commonwealth Fellowship. He was appointed as a Lecturer in the Department of Civil Engineering of BUET in 1986. He was promoted to the post of Assistant Professor in 1989. He became Associate Professor in 1996 and Professor in 2001. He has published over 40 papers upto now. His research areas are biogas generation from solid wastes, water and wastewater treatment technologies, and rain water harvesting.

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