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Evaluation of Small Scale Biogas Systems in the Mekong-delta

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Abstract

Small Scale Biogas Systems are used to produce biogas in the south of Vietnam. The biogas is used as renewable energy for cooking. In this study nineteen biogas systems (9 fix dome systems and 10 plastic tube systems) were surveyed to investigate their operation and to deduce optimisation measures. The biogas amount and quality and the substrate input were analysed. Data on size of the animal house, number of animals and the farmer's experiences concerning maintenance and operation of the systems were collected. All systems were operated by pig excrements. The size of the systems varied between 5,7 and 8 m^3. The size was not adapted to the amount of excrements that was treated in the fermenter: the organic load was in a range of 2,33 and 23,06 kg oDM/d with hydraulic residence times (HRT) between 1,19 and 20,4 days. Biogas was produced between 0,12 and 7,14 CH_4 m^3/d or 26,8 and 882 CH_4 m^3/oDM. We did not find a significant correlation between HRT, organic load and biogas yield. One reason could be the lack of substrate agitation. Substrate may sediment in the fermenter and contribute for a longer time to the CH_4 production.

Most of the farmers are able to control and maintain the systems. The most frequent problem is that during the cleaning procedure of the animal houses the excrements sometimes stuck in the inflow pipe of the biogas plant. From time to time rodents cause problems at the plastic tube system, due to erode the plastic tubes. All farmers are interested to produce electricity with biogas.

The systems may be optimised by decreasing the water amount, which the farmers use for cleaning. With this measure the hydraulic residence time will get increased and the biogas yield may be higher. Although, the effect of this measure needs further investigations in the future.

Keywords: Biogas, concrete, methane production, organic dry matter, plastic

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