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Conference Proceedings Abstract

FUEL POTENTIAL OF FAECAL SLUDGE - CALORIFIC VALUE RESULTS FROM UGANDA, GHANA AND SENEGAL

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Abstract

Using faecal sludge (FS) as a fuel to provide energy for industry could help to solve both the sanitation challenge and reliance on dirty or expensive fuels. This research aimed to test the viability of using FS as solid fuel – an end use that could unlock an environmentally and financially beneficial replacement for costly, disposal-oriented FS management solutions. FS is defined as sludge collected from onsite sanitation systems, and has highly variable characteristics, including the solid concentration. To determine the average calorific value of FS, and how it varies with source and age, samples were collected in three cities: Dakar, Senegal; Kampala, Uganda; and Kumasi, Ghana. Samples were tested for calorific value, total solids and water content. In Kampala, samples were collected from unlined, fully lined and partially lined pit latrines, septic tanks, and drying beds fed with FS from these systems. In Dakar, samples were collected from septic tanks and drying beds fed with raw FS. In Kumasi, samples were collected from public and private lined pit latrines, septic tanks, and anaerobic ponds to mainly assess the effect of biological treatment on the calorific value.

On average, calorific value of FS was 17.2 MJ/kg dry solids (DS), which compares well with other commonly used fuels such as rice husks at 15.6 MJ/kg DS, forest residues at 19.5 MJ/kg DS, coffee husks at 19.8 MJ/kg DS, and sawdust at 20.9 MJ/kg DS. FS age did not affect its calorific value. The total solids content of FS depended on its source. The TS of FS from unlined pit latrines was 6% of wet weight, which is higher than that in lined pit latrines at 2.7% of wet weight and septic tanks at 1% of wet weight. This is attributed to the water in the unlined pit latrine sludge draining into the soil. . For industries to derive net energy from FS at 17.2 MJ/kg DS, the sludge must be dried to ≥ 27 % dry solids. Any increase in dry solids above 27% increases the energy requirement to dry the FS, but also increases the benefit to the end user. The TS of FS from drying beds in Kampala was above 30% of wet weight after two weeks, indicating that additional energy for drying the FS can be harnessed with minimal recurring costs assuming land is available.