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Evaluating the Process of Biofuel Generation from Grass

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Abstract : Almost quarter region of Indian terrain is covered by grasslands. Grass being a low maintenance perennial crop is in abundance. Farmers are well acquainted with its nature, yield and storage. The aim of this paper is to study and identify the applicability of grass as a source of bio fuel. Anaerobic break down is a well-recognized technology. This process is vital for harnessing bio fuel from grass. Grass is a lignocellulosic material which is fibrous and can readily cause problems with parts in motion. Further, it also has a tendency to float. This paper also deals with the ideal digester configuration for biogas generation from grass. Intensive analysis of the literature is studied on the optimum production of grass storage in accordance with bio digester specifications. Subsequent to this two different digester systems were designed, fabricated, analyzed. The first setup was a double stage wet continuous arrangement usually known as a Continuously Stirred Tank Reactor (CSTR). The next was a double stage, double phase system implementing Sequentially Fed Leach Beds using an Upflow Anaerobic Sludge Blanket (SLBR-UASB). The above methodologies were carried for the same feedstock acquired from the same field. Examination of grass silage was undertaken using Biomethane Potential values. The outcomes portrayed that the Continuously Stirred Tank Reactor system produced about 450 liters of methane per Kg of volatile solids, at a detention period of 48 days. The second method involving Leach Beds produced about 340 liters of methane per Kg of volatile solids with a detention period of 28 days. The results showcased that CSTR when designed exclusively for grass proved to be extremely efficient in methane production. The SLBR-UASB has significant potential to allow for lower detention times with significant levels of methane production. This technology has immense future for research and development in India in terms utilizing of grass crop as a non-conventional source of fuel.

Keywords : biomethane potential values, bio digester specifications, continuously stirred tank reactor, upflow anaerobic sludge blanket
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