

## BIOGAS PRODUCTION THROUGH ANAEROBIC DIGESTION OF PRESSMUD AND COWDUNG

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**Abstract:** Biogas is a readily available energy resource that significantly reduces greenhouse-gas emission compared to the emission of landfill gas to the atmosphere (Nabuuna and Okure, 2005). Being a source of renewable natural gas, it has been adopted as one of the best alternatives for fossil fuels after 1970's world energy crisis (Imam *et al.* 2013).

**Keywords:** Biogas, Production, Atmosphere, Energy

### INTRODUCTION

Biogas is smokeless domestic fuel which reduces the incidence of eye and lung diseases among the users while reducing the burden on forest, reduction in drudgery of women and children. It is a better and cheaper fuel for cooking, lighting and power generation. The use of agricultural wastes for biogas generation offers several benefits such as the production of safe, clean energy resource that can be stored and used more efficiently. The production of stabilized residue that retains the fertilizer value of original material which has superior nutrient qualities over the usual organic fertilizer. Indirect benefits of biogas generation include the potential for partial sterilization of wastes with consequent reduction of the public health hazard of faecal pathogens and reduction of fungal and other plant pathogens from crop residue (Sagagi *et al.* 2009).

Press mud is a solid residue, obtained from sugarcane juice before crystallization of sugar. Generally press mud is used as manure in India. It is a soft, spongy, light weight, amorphous, dark brown to black coloured material. It generally contains 60-85 per cent moisture (w/w); the chemical composition depends on cane variety, soil condition, nutrients applied in the field, process of clarification adopted and other environmental factors (Agrawal *et al.* 2011). Press mud from sugar factory typically contains 71 per cent moisture, 9 per cent ash and 20 per cent volatile solids, with 74-75 per cent organic matter on solids. Sugar molasses has methane potential (*i.e.* CH<sub>4</sub> per ton of raw material) of 230 m<sup>3</sup>.

The present methods for disposal of press mud are not economically suitable and pollute the environment. As it contains appreciable proportion of biodegradable organic matter, it has very good potential for the production of biogas. The press mud contains volatile solids, lignin, lipids, cellulose, hemicelluloses etc which favours biogas production. It also has good proportion of nitrogen. This makes it a very good material for generation of bioenergy (methane) by anaerobic biomethanation. The advantage of using press mud is that the sludge coming out from the digester is a good fertilizer and press mud can be used in combination with other raw materials to increase the efficiency (Agrawal *et al.* 2011).

Recently, large volume of cow dung generated from feedlot farming increased annually, most of which are disposed into landfills are applied to the land without treatment. Anaerobic digestion provides an alternative option for energy recovery and waste treatment. Handling of wastes and their management is a problem now, so one approach to utilize the waste is to use it as energy resource. Moreover, (Pound *et al.* 1981) it is observed that biogas production units provide a decentralized fuel supply and waste management system both of which are very attractive particularly in rural areas of developing countries.

Chemical composition of the substrate (Cow dung: 250 grams + Press mud: 500 grams) was estimated before it is used for the production of biogas through anaerobic digestion.

CHEMICAL COMPOSITION OF SUBSTRATE (Cow dung + Press mud)	
Total solids %(TS)	18.76
Total Volatile solids %(TVS)	72.40
Volatile fatty acids g l <sup>-1</sup> (VFA)	0.96
pH	7.66
N%	1.75
P%	1.87
K%	0.78

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<b>Organic Carbon%</b>	46.97
<b>BOD mg l<sup>-1</sup></b>	123.70
<b>COD g l<sup>-1</sup></b>	123.02
<b>EC</b>	5.42

Biogas production unit was established in the lab scale with 750 g substrate (Cow dung + Press mud) and 1500 ml water in three litres glass bottles. For 10 weeks duration gas production was observed. (Cow dung + Press mud) - **9903.31 ml** gas production was recorded and **52.08** per cent **methane** and **42.02** per cent **carbon dioxide** was also observed during the period of gas production.

Substrate (Cow dung + Press mud) gave good amount of biogas and also the methane content was good and hence can be used for lightening and cooking purpose.

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