

## Study On Press Mud

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### Abstract:

Nowadays, we use fossil fuels for electricity, heat for our homes and fuel for vehicles. We are using them faster than they are created. Finally, they are going to end. Today, there is an urgent need to find another source to fossil fuels since fossil fuels are vanishing. Therefore, we need to discover another source of energy. This article leads us to notice that Press Mud, a waste from sugar cane, can be utilized for the production of bio-gas. The sugar industry produces a huge amount of waste that is organic and nutrients rich in nature. Sugar cane Press Mud, have a high potential for the production of renewable energy through the anaerobic digestion process. In order to obtain bio-gas from the mud, press mud is anaerobically fermented in an anaerobic digester for 3 to 4 hours at 35 to 40°C. As India stands second largest producer of sugarcane, this can play important role in India

**Keywords** — Press Mud, BioCNG, Biogas, Anaerobic digestion

### I. INTRODUCTION

Energy, plays an important role in ensuring the security of the country, which is the fuel that drives the economy. Energy remains practical, in order to make use of oil, coal, and natural gas, but they are limited, and once they are used all the time, and quickly, they take a long time. India is highly dependent on agriculture for their main sector of the economy, generating income and jobs. The most important crops are able to produce sugar for industrial quantities, is the sugar-cane. The sugar cane is grown mainly for the production of sugar. India is the second largest producer of sugar. currently, sugarcane grown in more than 110 countries. Sugarcane is grown mainly for sugar production. India is the largest producer of sugar. Press Mud also known as a filter cake is a solid waste that is produced when the sugar cane juice is made clear before, it is a highly concentrated and the sugar crystallizes. It is a soft, spongy, light, and the amorphous material is of a dark brown or black in color. Because of the sugars and other organic components it makes unpleasant smell, which causes the degradation of the environment. The Press Mud to be used as a fuel in many places. The press mud is high in methane, which is the main

root of the bio-gas and to be thrown out like the trash. A little bit of the sugar factories of the use of it in order to make it to the compost. However, compost along with all its benefits, there are also some disadvantages associated with it. It increases the oxygen content of the soil. The resulting biogas can be recycled for many purposes, such as fuel, for the kitchen, replaced the liquid, gas, fuel, food, vehicles, etc, waste that remains after the extraction of the bio-gas from the press mud can also be manage as a fertilizer.. Press Mud consists of hydrocarbons, sugar, and other components and the relationship between carbon and nitrogen (C/N) is about 10:20; these characteristics are considered significantly more attractive for, to get the bio-energy by the anaerobic fermentation process.

### II. PRESS MUD

The Press Mud, the sugar-cane residue in the purification of the juice of the sugar cane. The precision of this process, to divide the juice and clear juice, as it rises to the surface, and is made out of mud builds up on the bottom. It is then to be filtered in order to separate the suspended substance that is not soluble salts, and the fine bagasse. For every 100 tons of crushed sugarcane,

we get about 3 tons of press mud. It is estimated that 2.7 million tons of mud is produced in our country every year and it is that economic soil most reclaims the red loamy soil. India annually produces about 10-12 million tons of press mud. Press mud traditionally is used as manure through bio-compost process by spraying spent wash on press mud. Existing ways to dispose of mud are unsuitable for the economy and pollute the environment. As it carry a reasonable amount of easily digestible organisms has excellent potential for biogas production. In excess, the crushed slurry can be utilized as superior quality Fertilizer. Eventhough there are some biogas plants, which are active but their effectiveness is unsatisfactory due to the exist of wax and the issue of brisk acidification.

Typical composition and characteristics of press-mud

Table 1. Press-mud Composition

| COMPOUND       | PERCENTAGE(%) |
|----------------|---------------|
| Cellulose      | 11.4          |
| Hemi cellulose | 10.0          |
| Lignin         | 9.3           |
| Protein        | 15.5          |
| Wax            | 8.4           |
| Sugar          | 5.7           |
| Sodium         | 0.22          |

Table 2. Press-mud Characteristics

| PARAMETER       | AVERAGE VALUE (%) |
|-----------------|-------------------|
| Moisture        | 76.3              |
| Volatile Matter | 76.6              |
| Sugars          | 6.4               |
| Wax             | 7.2               |
| C/N ratio       | 14                |

The press mud itself from the factory, carries 71% moisture, 9% ash, 20% - solids, which contain 74 - 75% manure. There is a lot of methane in the sugar syrup.

Its usefulness as fertilizer is assumed on the nutrient content of the mud as shown below

Table 3: Nutrient content of press mud

| COMPOSITION | PRESS MUD% |
|-------------|------------|
| Nitrogen    | 1.15-3.0   |
| Phosphorus  | 0.60-3.50  |
| Potassium   | 0.30-1.80  |

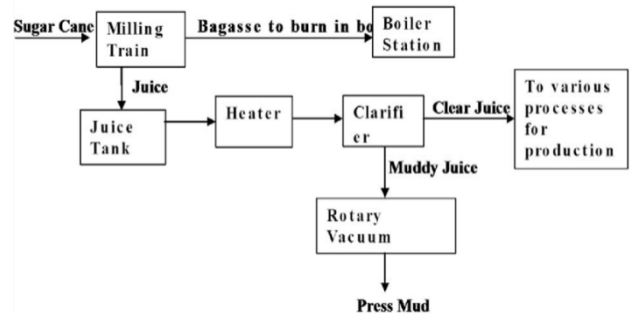


Fig. 1. Formation of press mud in sugar mill

### III. PRESS MUD DIGESTER: CSTR REACTOR

The Press Mud digester works on a collection-flow-process. It is directed to the digester with presence of a pump, many times a day. In addition, reused and treated water from the plant is added to those compounds. The existing sludge is drawn in the two digesters, which are defined at a given level, which is controlled by the control culture, and are, in general, are managed by a PLC. The boiler is fully mixed, high, quality of the water, a stirrer, and it is going to be used in the mesophilic temperature range (-40 ° C). This combination results in a stable process with a good homogenization effect, and the less effort required, depending on the local needs of the digester volume. The biogas plant must be designed for at least manual operations. Because daily quantity of waste to be disposed of, it is a well-known fact, that the plant is designed to operate automatically. The day to day operations in response to the locks and the adjustment for changes in conditions of the work is to be done manually with the help of a special power, control, and representation of the cars. The design is dynamic,

and there are a lot of efficient control is required. This is a green plant that can be used by less-skilled workers, with a simple and intuitive test of the technology.

The system consists of a series of inter-connected components consisting of four elements: digesters, a gas management system, a port for waste, or slurry, and a biogas purification and compression unit for converting biogas into bio CNG or electricity, and small components such as connectors, pumps, solid feeder, and valve. biogas plant is to be controlled by a central computer, a PLC and a SCADA system in order to maintain safety and to ensure the ongoing performance, in order to achieve a high biogas yield. Each day, a portion of the treated feedstock becomes slurry and shall be pumped into a nearby storage lagoon. This slurry shall be separated into solid and liquid manure.

Solid manure will be dried on land and excess liquid component shall be sprayed on the rows of solid component before further drying and bagging. Solids and water are stored inside Bio Digesters to decompose in Volatile Solids. The digester will release impurities after the digestion of the required HRT. Out of some effluent will be recirculated with the next day's feed material whereas some part can easily sold as the liquid fertilizer after evaporation as well as transit losses.

Each and every day fills up about 4% to 5% of the solids in the liquid. The dried solids from slurry eliminated with a solid liquid separator. which uses simple-to-screw-in-process for the production of high-pressure and provides a high level of separation of the solids. Liquid in liquid separator will contain approximately 1.5% TS. The separated liquid can be used to control the day to day water content of the anaerobic digestion.

Press Mud continuous stirred-tank reactor (CSTR) is the economical low solids biogas technology option that provides efficient biogas production on a reduced footprint. The CSTR is most suitable for agricultural or industrial applications with high flow rates for waste.

### **Waste Conditioning and High Loading**

The complete design for agricultural plants includes a feedstock conditioning phase in order to maximize the efficiency of the biogas plant. During this conditioning phase, the substrate will be hydrolyzed

and have sand removed as needed. The raw feedstock will be heated and homogenized for digester injection. This allows the CSTR to process feedstocks with high ammonia content.

### **Maximized Biogas Production**

Each digester vessel is equipped with one two-layer propeller to ensure complete mixing and sufficient heat & mass transfer to avoid fermentation dead-zone and local acidification. The digesters are designed to work in series (two-stage) with one another to prevent short-circuit flow of feedstock.

### **Operational Efficiency**

With a life cycle of 30 years, the vessels are designed to reduce solid settling, minimize operation & maintenance costs, and maximize uptime while expecting 5 years between digester internal cleaning and inspections under typical operation.

## **IV. PRESS MUD TO BIO CNG**

Step 1: Converting Natural Waste to Biogas Waste, waste decomposition, or feedstock (pressmud), enters the system during the anaerobic process bacteria are used to boil waste and produce biogas a natural gas . Sometimes a day, trash, clean water and reused water (more than 30% recycled water during plant operations) is digested, which is used for the analysis of raw materials, and, in the end, the conversion of biogas rich in methane, along with carbon dioxide, and hydrogen sulfide.



Fig. 2. Biogas / Bio Cng plant

### Step 2: Biogas Conversion to Bio-CNG

The biogas generates approximately 60% to 70% methane and 30% to 40% reduction in carbon dioxide emissions, and that a certain amount of hydrogen sulfide. The biogas produced will be enhanced by the release of carbon dioxide, and hydrogen sulfide gas in the air. The result of this is a gas rich in methane. On the basis of the application of functions, in bottles with plants, methane, and carbon dioxide in the atmosphere, it will be under enormous pressure in the cylinder. These can then be used in an industrial processes, such as that of gasoline engines, generators, and other heating purposes. With a combination of a unit of heat-and-power on to the stage, the power generation has also been active. Some of the temperatures of the CHP unit is used for the operation of the geothermal heat.



Fig. 3. Inside Bio Cng Plant



Fig. 4. Inside Bio gas Plant

### Step 3: Use and Storage of Organic Manure / Soil Conditioner

The solid non-digestible residue comes out of the mill of the liquid-type mud. The liquid slurry is processed through a separator where the solid (dry) is separated and sold as a soil spray. Drinks from the separation process are sold to local farmers and some are stored in a nearby storage pool and eventually returned to digesters via feedstock at the starting of the anaerobic digestion process. suspension containing active microorganisms, which fix

nitrogen in the air and eliminate soluble phosphates and potash chemicals and make them available to LBFs on healthy shelves for at least one year, has no health risks for productive workers and is easy to transport. In addition, LBF can be used for irrigation and as part of organic farming. Bio Fertilizer is broadly divided into three categories such as Nitrogen Fixing, Phosphate Propagation, and Organic Matter Decomposers and are therefore more friendly than chemical fertilizers.

### V. BENEFITS OF BIOGAS PRODUCTION FROM PRESS MUD

Biogas is an attractive renewable energy which has become a critical part of alternative energy plans for both industry leaders and legislative bodies. It directly replaces fossil fuels and can do so as a baseload energy source, unlike solar or wind which is intermittent, and with distributed generation, which lowers the overall cost of energy and raises reliability. Recycling organic wastes such as manure, food waste, and green waste by sending it to an anaerobic digester generates environmental, economic, and agronomic benefits.

#### Environmental Benefits

Anaerobic digestion and subsequent waste treatment reduce the impact on air pollution by capturing greenhouse gases like methane and dramatically reducing odor, and water pollution by stabilizing nutrients while reducing the volume of land-applied material by concentrating nutrients.

#### Economic Benefits

Energy offtake opportunities such as power purchase agreements or carbon credits programs create revenue streams where previously there were costs to treat waste. These projects can also create jobs and improve infrastructure in rural areas.

#### Agronomic Benefits

Anaerobic digestion can provide reductions in pathogen level in land-applied waste. Digestion is an efficient process allowing for faster recovery

and recycling of NPK, which can increase crop yield.

## VI. CONCLUSION

Press mud hold ~ 77% Volatile solids, which is naturally perishable, and a adequate amount of nitrogen This creates it an excellent bioenergy (methane) for anaerobic biomethanation. One of the most important environmental problems the world faces is waste management. The current emphasis is on reducing waste and revenue from product acquisition. It is a challenge to create a national market for Bio CNG made in our country, with a limited national grid gas grid and demonstrate the power of pyrolysis; bio-char production (Press Mud); with essential chemicals such as toluene, carboxylic acid, alkanes, and alkenes (press mud and extract sludge); and aliphatic, fragrant phenols, and ketone (powder vinasse). The mud comes out from digester is best fertilizer compression mud utilized with further substances to increase performance. Further uses are that which has no air contamination, reduced trash, variable control of biogas etc Apart from benefits, there are some obstructions as it craves that the temperature be uphold at 40°C and the same mobilization effort is mandatory.

Applications of this Article are as follows

- 1) It can implement on LPG-owned company which is a burning need now-days.
- 2) It can be apt to generate electricity.
- 3) Other fuel in IC engines etc

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