

### **Biogas Production**

Aquatic plants, organic wastes from domestic, agricultural and industrial sectors with high B.O.D. value (Feed stock) are digested anaerobically to produce *biogas*. The biogas is totally used as fuel. The chief constituent of biogas is methane, so the process is also called *biomethanation*. Composition of biogas is given below:

<i>Component</i>	<i>Volume%</i>
CH <sub>4</sub>	52-95
CO <sub>2</sub>	9-45
H <sub>2</sub> S	0.001-2
H <sub>2</sub>	0.01-2
N <sub>2</sub>	0.1-4
O <sub>2</sub>	0.02-6.5
CO	0.001
NH <sub>3</sub>	Small

### Conditions for Biomethanation

- Temperature = 35°
- pH = 6.8-8.2
- Anaerobic condition.
- Trace elements = Na<sup>+</sup>, Co<sup>+3</sup>, Ni<sup>+2</sup> etc.

### Arrangements for Biomethanation

Feed stock is mainly cowdung.

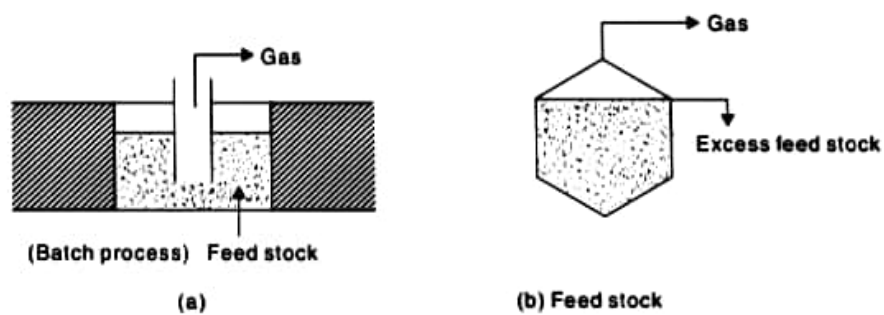
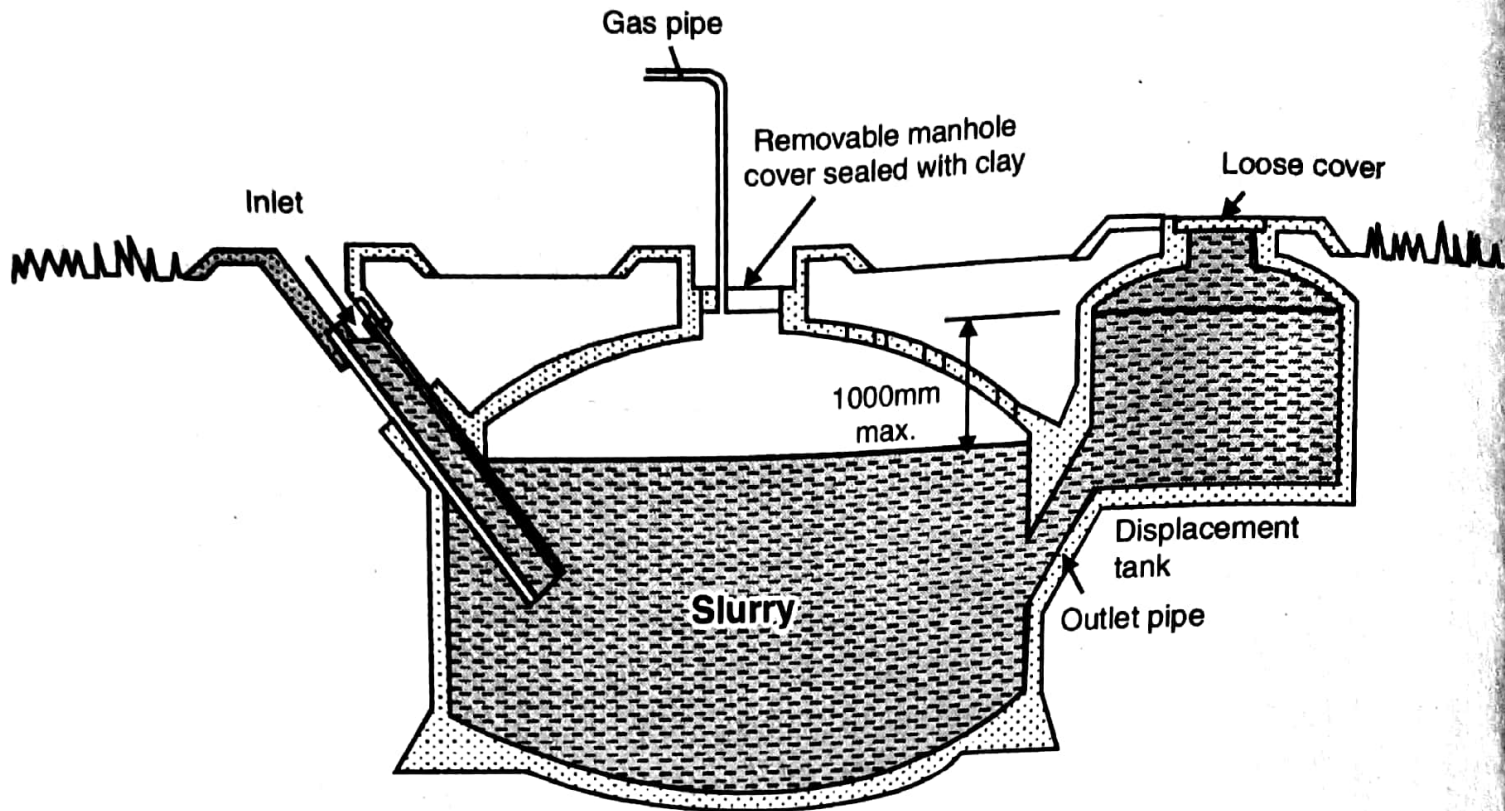


Fig. 18.15

Better quality of coal should have low nitrogen and sulphur content. Higher percentage of oxygen is also undesirable as an increase in 1% oxygen content decreases the calorific value by about 1.7%.

At present, biogas technology provides an alternative source of energy in rural India for cooking. It is particularly useful for village households that have their own cattle. Through a simple process, cattle dung is used to produce a gas, which serves as fuel for cooking. The residual dung is used as manure.



**Fig. 1.15. Biogas Digester**

Biogas plants have been set up in many areas and are becoming very popular. Using local resources, namely cattle waste and other organic wastes, energy and manure are derived. A mini biogas digester has recently been designed and developed, and is being in-field tested for domestic lighting.

Indian sugar mills are rapidly turning to bagasse, the leftover of cane after it is crushed and its juice extracted, to generate electricity. This is mainly being done to clean up the environment, cut down power costs and earn additional revenue. According to current estimates, about 3500 MW of power can be generated from bagasse in the existing 430 sugar mills in the country. Around 270 MW of power has already been commissioned and more is under construction.

#### **4.10.1 Advantages of Biomass Energy**

1. It's a renewable source of energy.
2. It's a comparatively lesser pollution generating energy.
3. Biomass energy helps in cleanliness in villages and cities.
4. It provides manure for the agriculture and gardens.
5. There is tremendous potential to generate biogas energy.
6. Biomass energy is relatively cheaper and reliable.
7. It can be generated from everyday human and animal wastes, vegetable and agriculture left-over etc.
8. Recycling of waste reduces pollution and spread of diseases.
9. Heat energy that one gets from biogas is 3.5 times the heat from burning wood.
10. Because of more heat produced the time required for cooking is lesser.

11. Pressure on the surrounding forest and scrubs can be reduced when biogas is used as cooking fuel.
12. It is a more cost effective means of acquiring energy as compared to oil supplies. As oil supplies are getting depleted day by day, it is becoming a costly commodity.
13. Growing biomass crops use up carbon dioxide and produces oxygen.

#### 4.10.2 Disadvantages of Biomass Energy

1. Cost of construction of biogas plant is high, so only rich people can use it.
2. Continuous supply of biomass is required to generate biomass energy.
3. Some people don't like to cook food on biogas produced from sewage waste.
4. Biogas plant requires space and produces dirty smell.
5. Due to improper construction many biogas plants are working inefficiently.
6. It is difficult to store biogas in cylinders.
7. Transportation of biogas through pipe over long distances is difficult.
8. Many easily grown grains like corn, wheat are being used to make ethanol. This can have bad consequences if too much of food crop is diverted for use as fuel.
9. Crops which are used to produce biomass energy are seasonal and are not available over whole year.