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DESIGN OF BIOGAS

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➢ **Abstracts:**

This report contains this detailed information about each and every single process, equipment. A biogas plant is an anaerobic digester that produces biogas from animal wastes or energy crops. Energy crops are cheap crops grown for the purpose of biofuels, rather than food. Biofuels are liquid, gaseous, or solid fuel made from live or recently dead organic material known as biomass, as opposed to fossil fuels, which are composed of ancient biological materials. Biogas is a type of biofuel created via anaerobic, or oxygen-free, digestion of organic matter by bacteria. A biogas plant is composed of a digester and a gas holder. The digester is an airtight container that harnesses the gases emitted by the slurry. Bacteria within the digester tank breaks down the waste and, as it decomposes, gases such as carbon monoxide, methane, hydrogen, and nitrogen, are released. Through a pressurized system, the gas holder conducts the flow of these gases upward into a hole in its drum. The hole is specially designed to allow gases to pass freely into the holder while prohibiting any gases from escaping back into the digester. In a controlled environment, the gases are later combusted, or reacted, with oxygen to create an energy source for such processes as heating and vehicle propulsion.

INTRODUCTION

BIO GAS:

A biogas plant is an anaerobic digester that produces biogas from animal wastes or energy crops. Energy crops are cheap crops grown for the purpose of biofuels, rather than food. Biofuels are liquid, gaseous, or solid fuel made from live or recently dead organic material known as biomass, as opposed to fossil fuels, which are composed of ancient biological materials. Biogas is a type of biofuel created via anaerobic, or oxygen-free, digestion of organic matter by bacteria.

A biogas plant is composed of a digester and a gas holder.

The digester is an airtight container in which the waste is dumped and decomposed, and the gas holder is a tank that harnesses the gases emitted by the slurry. Bacteria within the digester tank breaks down the waste and, as it decomposes, gases such as carbon monoxide, methane, hydrogen, and nitrogen, are released. Through a pressurized system, the gas holder conducts the flow of these gases

upward into a hole in its drum. In a controlled environment, the gases are later combusted, or reacted, with oxygen to create an energy source for such processes as heating and vehicle propulsion.as shown in figure 1.1

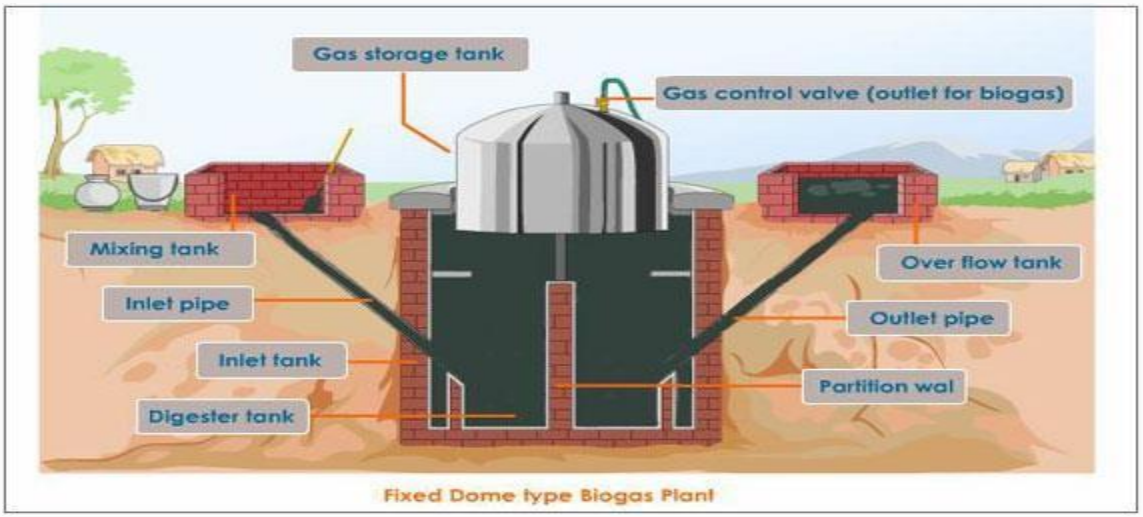
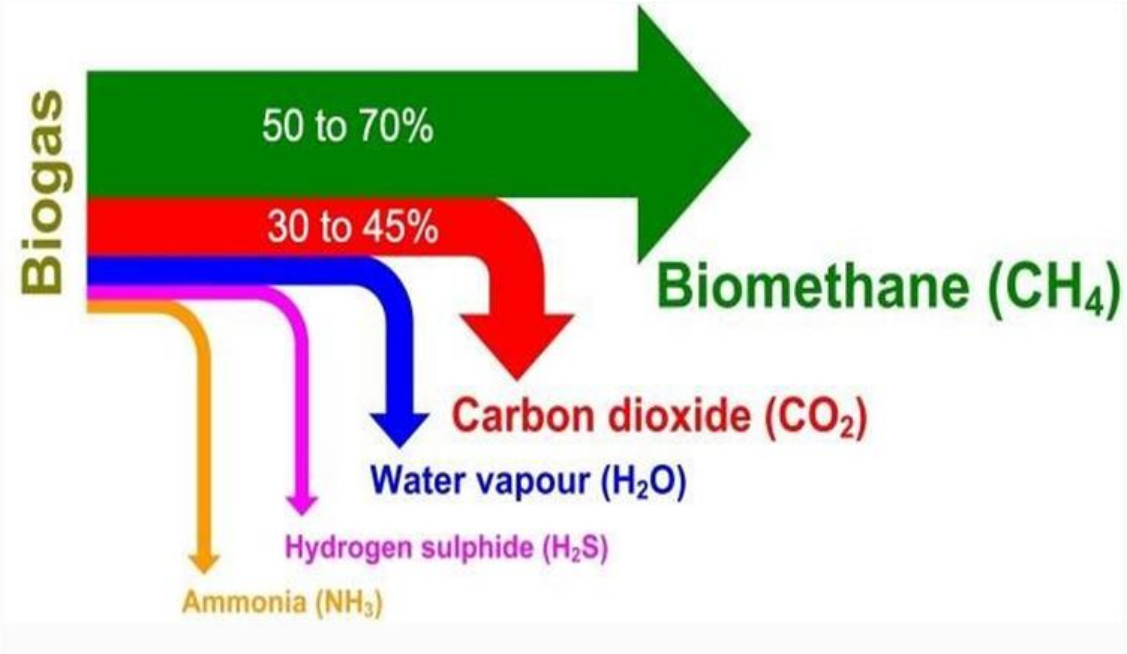


Figure 1.1

- **Composition of biogas:**

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen, usually consisting of certain quantities of methane and other constituents. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste as shown in figure 1.1



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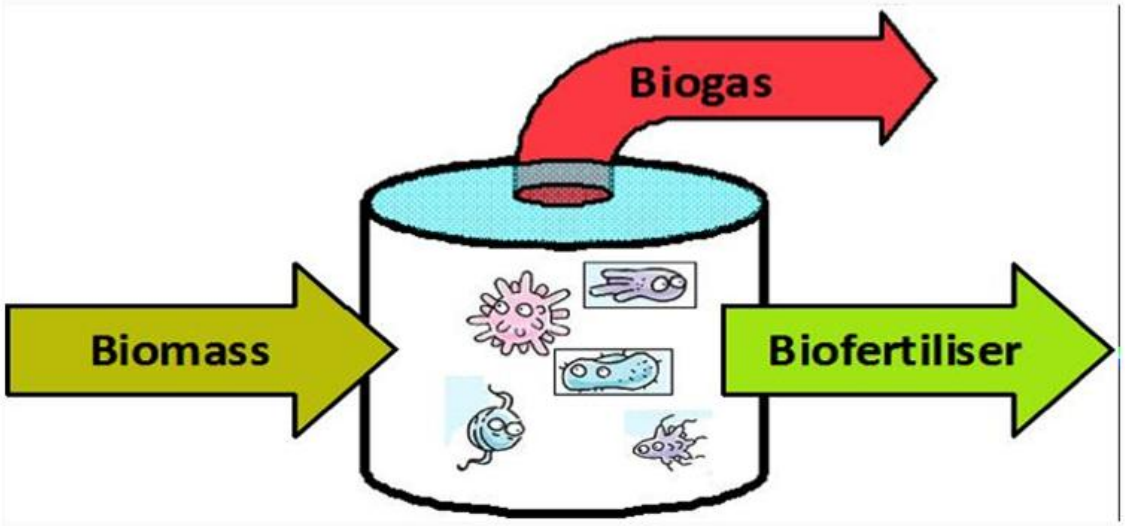
BASIC METHOD OF BIO GAS:



Basic method of bio gas as shown in figure 2.1 Mini Bio-gas Plant Using Food Waste, Decomposable Organic Material and Kitchen Waste: I have been searching for some method of using the food waste, decomposable organic material and kitchen waste efficiently, and came across information on producing bio-gas from organic waste.

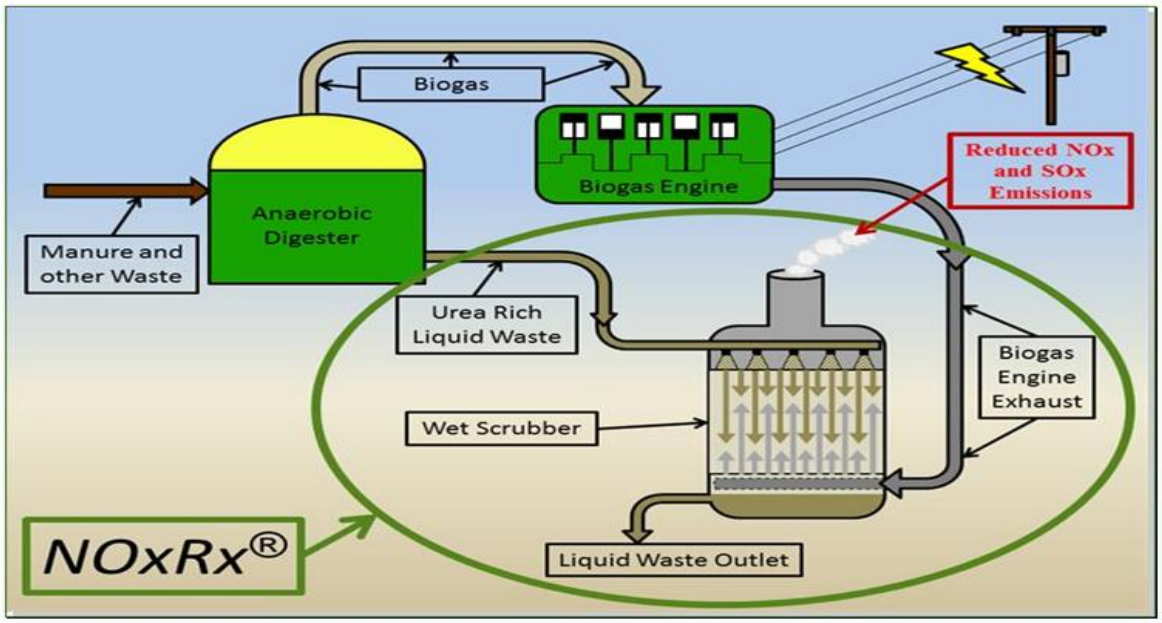


Figure 2.2

Other example of Bio gas. we can say digital methods for biogas

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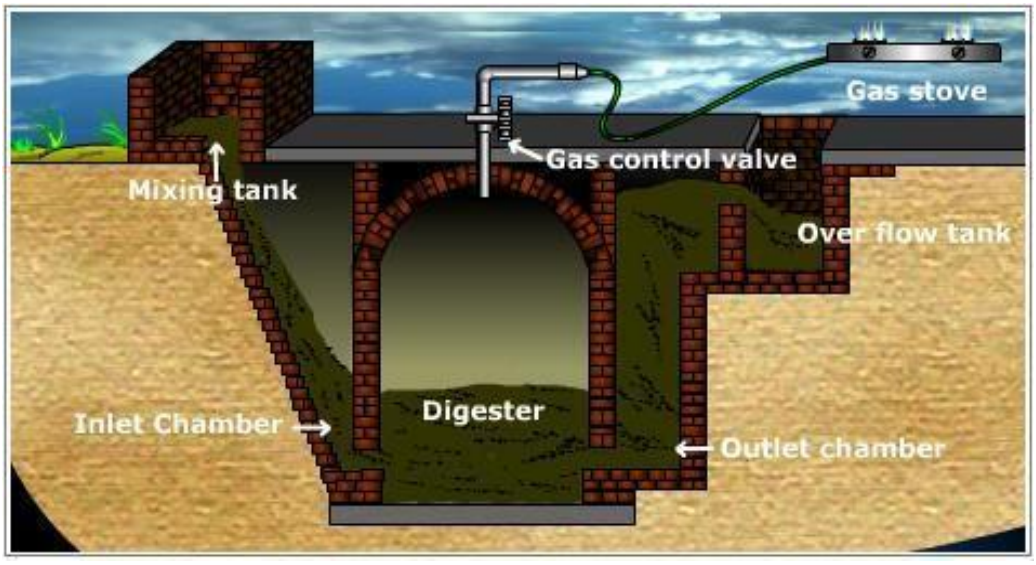
WORKING OF BIOGAS

- **Working :**

Organic input materials such as foodstuff remnants, fats or sludge can be fed into the biogas plant as substrate. Renewable resources such as corn, beets or grass serve as feed both for animals such as cows and pigs as well as for the micro - organisms in the biogas plant. Manure and dung are also fed into the biogas plant. In the fermenter, heated to approx. 38-40 °C, the substrate is decomposed by the micro- organisms under exclusion of light and oxygen. The final product of this fermentation process is biogas with methane as the main ingredient. But aggressive hydrogen sulphide is also contained in the biogas. A fermenter made of stainless steel has the clear advantage that it withstands the attacks of the hydrogen sulphide and is usable for decades. Furthermore, a stainless steel fermenter provides the opportunity to operation the biogas plant also in the thermophile temperature range (up to 56 °C).Once the substrate has been fermented. it is transported to the fermentation residues end storage tank and can be retrieved from there for further utilization The residues can be utilised as high quality fertilizer. The advantage: Biogas manure has a lower viscosity and therefore penetrates into the ground more quickly. Furthermore, the fermentation residue quite often has a higher fertiliser value and is less intense to the olfactory senses. But drying it and subsequently using it as dry fertilizer is also an option .The biogas generated is stored in the roof of the tank and from there it is burned in the combined heat and power plant (CHP) to generate electricity and heat .The electric power is fed directly into the power grid. The heat generated can be utilised to heat building or to dry wood or harvest products. Processing of biogas Gas supply to the national grid or gas filling stations



WORKING SHOW THIS FIGURE 3.1

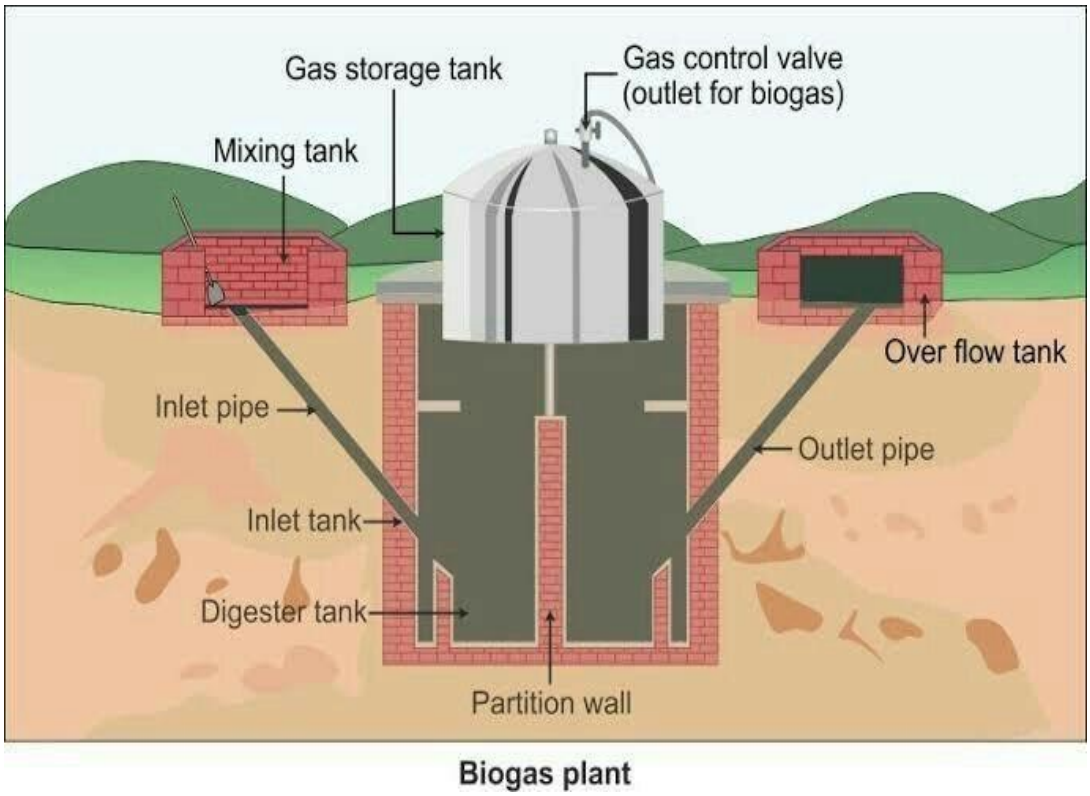


Figure 3.2 this is also working of bio gas plant

- **Advantage:**

- Production of large amount of methane gas (ambient temperatures storage)
- Production of freeflowing thick sludge
- Odourless sludge
- Sludge can be use for the fertilizer and soil conditioner
- Sanitry way for human and animal waste disposal
- Conservation of scarce resources like wood

- **Disadvantage:**

- Explosion chances
- High capital lost
- Incorrect handling of liquid sludge causes pollution
- Require control and maintenance
- Need proper condition
- Use as a fuel require
- Removal of CO2 and H2S

Conclusion:

A biogas tank has a movable cover that adjusts to the amount of gas produced. Different design exist and this design with the above gorund feeder pipe was maybe not the most easy, Alternatives are buried gas tank with a cover level to the surface and a feeder canal where water and dung are mixed are also at surface level. In any case biogas is relatively new in Botswana with only a few examples existing in the country. Biogas potential in kolar district is good (>60%). Analyses reveals

that the domestic energy requirement can be met by biogas option in 301 villages in kolar district for more than 60% population, 363 villages for 40-60% population, 1025 villages for 20-40% population and 1656 villages for less than 20% of the population. However to support the
The production and use of biogas for domestic purposes can drastically reduce the depletion of natural resources like forests, which are otherwise the prominent Conclusion. The process design, plant erection and some operational experiences of an innovative biogas upgrading plant have been presented .

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