

GENERATION OF BIOGAS USING FOOD WASTE

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ABSTRACT

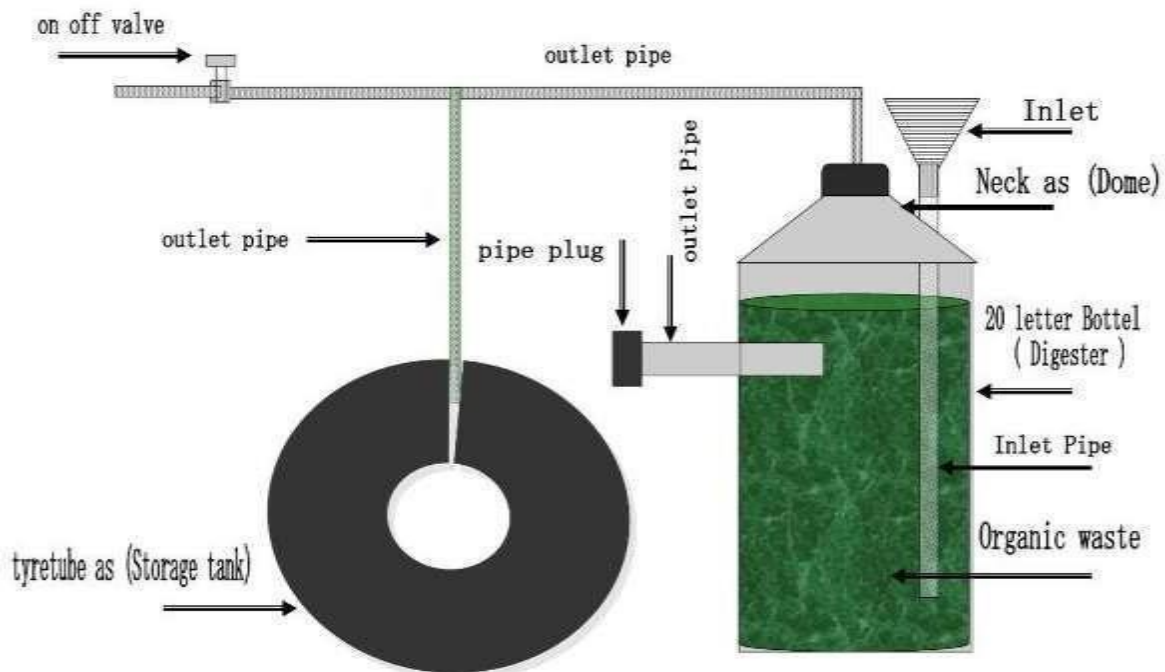
In our college there is 2 hostels with their own individual mess, daily a lot of kitchen waste is obtained which can be utilized for better purposes. Biogas production requires anaerobic digestion .Extend was to make an natural processing facility to make biogas which is able be more taken a toll successful , Eco-friendly , cut down on landfill squander, era a high-quality renewable fuel, and decrease carbon dioxide and methane outflows. The bio gas yields have been decided utilizing bunch anaerobic assimilation tests for a period of 42 days. Characteristic wavering was watched within the rate of methane generation, which. The full bio gas created within the framework over the test period was the entirety of methane and carbon dioxide. Bio gas delivered from the deterioration of nourishment squander was a blend of 76% methane and 24% carbon dioxide.

I. INTRODUCTION

Due to shortage of petroleum and coal, it undermines supply of fuel all through the world too issue of their combustion leads to investigate in numerous corners to urge get to the unused sources of vitality, like renewable vitality assets. Sun oriented vitality, Wind vitality, distinctive warm and hydro sources of vitality, biogas are all renewable vitality assets. In any case, biogas is particular from other renewable energies since of its characteristics of utilizing, controlling and collecting natural squanders and at the same time creating fertilizer and water for utilize in agrarian water system. Biogas does not have any geological confinements nor does it require progressed innovation for creating vitality, too it is exceptionally straightforward to utilize and apply.

II. METHODOLOGY

In this chapter, testing facilities, experimental procedures and experimental programs are included .Design of experimental set up is done based on the basic design of anaerobic digester .As per the literature review the design for set-up is done.



2.1 The fabrication of the biogas plant model was done in environmental engineering laboratory. The following materials were used for the fabrication of the biogas plant model which are listed in the table

Table 2.1: List of materials used for fabrication of biogas plant model.

SL.NO	MATERIAL USED
1	Water can of 20 litre capacity
2	PVC pipes of 3/4 inch
3	Gas pipes
4	PVC caps (to seal container)
5	Three pin valve
6	Gas collecting tube
7	Gas regulator ,black paint
8	Bucket (15-20 litre)

2.2 PRECAUTIONS DURING INSTALLATION

During the construction of the plant all the connections of PVC pipes with the can was sealed air tight with the help of a mixture of sand and super glue (adhesive) to avoid leakages and to prevent the entry of air inside. The entire plant was painted black in order to exclude the entry of sunlight inside. The set up was kept in a place free from moisture and water.

2.3 COLLECTION OF SAMPLE

As canteens are the major source of food waste generation, our study mainly focuses on it. Dayananda Sagar College of engineering situated in Kumaraswamy layout is the study area of our project. The college has 2 canteens of which we have collected waste from the Indian canteen.

2.4 PRECAUTIONS WHILE COLLECTING CANTEEN WASTE SAMPLE:

- A separate container for coconut shells, egg shells, peels and chicken mutton bones. These will be crushed separately by mixer grinders.
- Different holders of volumes 5litre to gather the damp squander, stale cooked nourishment, squander drain items. The vegetables deny like peels, spoiled potatoes coriander takes off collected in bags.

III. MODELING AND ANALYSIS



IV. RESULTS AND DISCUSSION

The main objective of the project is to promote the sustainable production of renewable energy from the biogas obtained from biodegradation of canteen waste .To provide fuel for cooking purposes and residue as organic manure to agricultural purposes. To improve sanitization on cities by collecting the food waste generated, which is used as organic matter for biogas production.

4.1 COMPOSITION OF BIOGAS

The biogas mainly comprises of gases like methane, carbon dioxide, hydrogen sulphide and other gases. The below pie chart fig 4.1(a) represents the composition of biogas generated during the process.

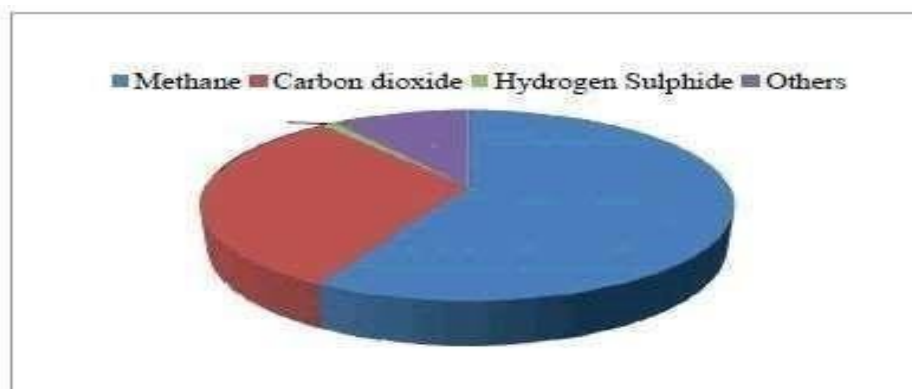


Fig 4.1(a) Pie chart of biogas composition

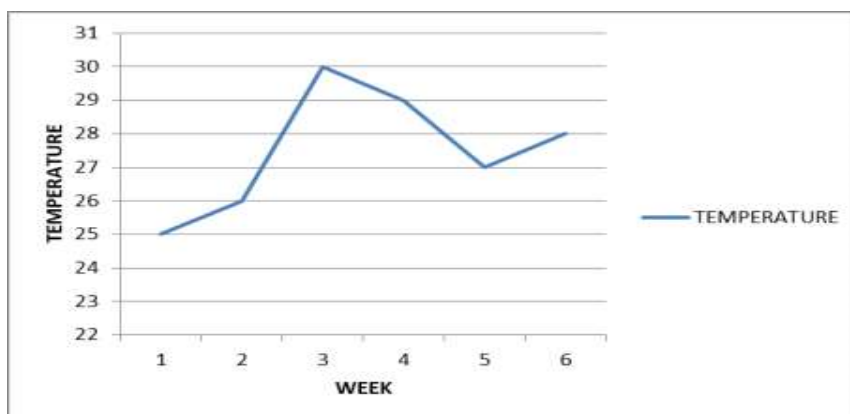
Table 4.1(b) Composition of biogas

COSTITUENT	COMPOSITION
Methane (CH ₄)	55-65%
Carbon dioxide(CO ₂)	30-40%
Nitrogen (N)	2-3%
Water vapour	0.5%

The table 4.1(b) represents the percentage of various fractions of gases present in produced biogas. Biogas gas produced mainly comprises of methane ranging 50-60%, carbon dioxide ranging 30-40%, nitrogen 2-3% and water vapour 0.5%.

4.2 pH and Temperature measurement

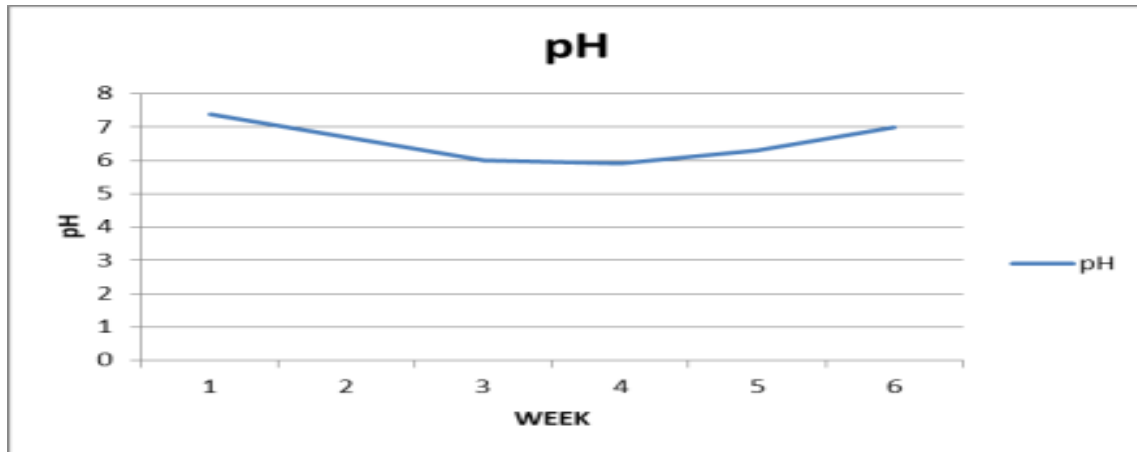
The physical and chemical compositions were tested during the process of biogas generation like temperature and pH. The graph 4.2(a) represents the variation of temperature with the duration during the process.



Graph 4.2(a) Variation of temperature with duration during biogas generation process

It was observed that the maximum and minimum temperature were 300C and 250C respectively during 3rd and 1st week. The most methane forming bacteria are active in temperature ranges, the mesophilic and thermophilic range.

The graph 4.2(b) represents the variation of temperature with the duration during the process.



Graph 4.2(b) Variation of pH with duration during biogas generation process

It was observed that the maximum and minimum pH were 7.4 and 5.9 respectively during 1st and 4th week. It was found that the pH was favourable for bacterial growth during the process.

V. CONCLUSION

- Biogas gas produced mainly comprises of methane ranging 50-60%, carbon dioxide ranging 30-40%, nitrogen 2-3% and water vapour 0.5%.
- Generation of biogas using kitchen waste is slower when compared to other types of waste.
- Accelerators can be used for improved results.
- From the results we suggest that in every home household waste mainly consist kitchen waste, which can used to produce biogas, which can replace our natural gas.
- Instead of throwing the garbage, every home can collect them, produce their very own biogas and used it for their cooking and heating purposes.
- This may reduce the transportation and other costs associated with the garbage collection and removal.
- Saving this money can be used for the future development of implementing biogas plant in every city of India. In addition landfills can be used for other good purposes like developing research center for biogas production, building biogas plant.
- Even after the biogas production is completed, the slurry, which cannot produce more biogas, can be converted to natural fertilizers.
- Since we are leaving the garbage on landfills, produce biogas which mainly consist methane and carbon dioxide which are the major greenhouse gases, can increase the environmental temperature leading to global warming.

VI. REFERENCES

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