

Production of Biogas from Canteen Food Waste

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Abstract— Biogas production requires anaerobic digestion. Project was to Create an Organic Processing Facility to create biogas which will be more cost effective, eco-friendly, generate a high-quality renewable fuel. Biogas can be used as energy source and also for numerous purposes. But, any possible applications requires knowledge & information about the composition and quantity of constituents in the biogas produced. For this we have prepared our solution of cow dung and kitchen waste to produce biogas. A combination of these mixed solution is used for biogas production at 37°C in laboratory (small scale) reactor (20L capacity) In our study, the production of biogas and methane is done from the starch-rich and sugary material cow dung and is determined at laboratory scale using the simple digesters.

Key words: Canteen Food Waste, DO, BOD, COD, TDS, TS

I. INTRODUCTION

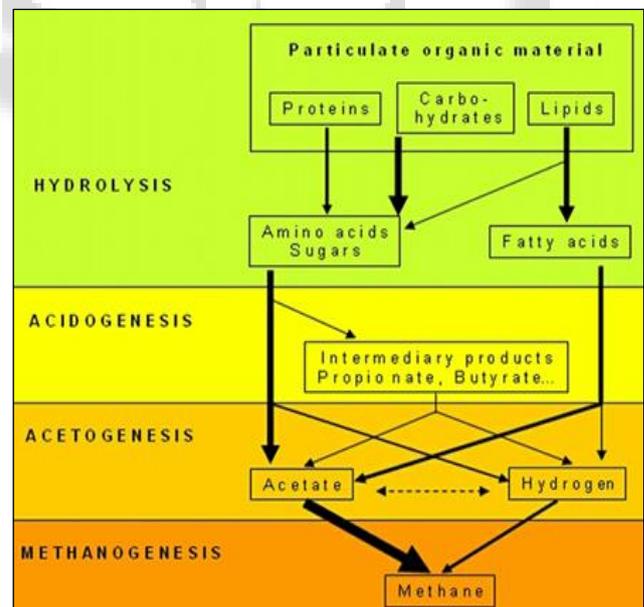
Due to scarcity of petroleum and coal it threatens supply of fuel throughout the world also problem of their combustion leads to research in different corners to get access the , new sources of energy, like renewable energy resources. Solar energy, wind energy, different thermal and hydro sources of energy, biogas are all renewable energy resources. But, biogas is distinct from other renewable energies because of its characteristics of using, controlling and collecting organic wastes and at the same time producing fertilizer and water for use in agricultural irrigation. Biogas does not have any geographical limitations nor does it requires advanced technology for producing energy, also it is very simple to use and apply. Deforestation is a very big problem in developing countries like India, most of the part depends on charcoal and fuel-wood for fuel supply which requires cutting of forest. Also, due to deforestation It leads to decrease the fertility of land by soil erosion. Use of dung , firewood as energy is also harmful for the health of the masses due to the smoke arising from them causing air pollution. We need an eco-friendly substitute for energy. Kitchen waste is organic material having the high calorific value and nutritive value to microbes, that's why efficiency of methane production can be increased by several order of magnitude as said earlier. It means higher efficiency and size of reactor and cost of biogas production is reduced. Also in most of cities and places, kitchen waste is disposed in landfill or discarded which causes the public health hazards and diseases like malaria, cholera, typhoid. Inadequate management of wastes like uncontrolled dumping bears several adverse consequences: It not only leads to polluting surface and groundwater through leachate and further promotes the breeding of flies , mosquitoes, rats and other disease bearing vectors. Also, it emits unpleasant odor & methane which is a major

greenhouse gas contributing to global warming. Mankind can tackle this problem(threat) successfully with the help of methane , however till now we have not been benefited, because of ignorance of basic sciences – like output of work is dependent on energy available for doing that work. This fact can be seen in current practices of using low calorific inputs like cattle dung, distillery effluent, municipal solid waste (MSW) or sewerage, in biogas plants, making methane generation highly inefficient. We can make this system extremely efficient by using kitchen waste/food wastes.

II. OBJECTIVES OF THE STUDY

- 1) Optimization of gas production
- 2) Analyzation of cow dung and kitchen waste
- 3) Effect of different parameters viz.
 - Temperature
 - PH
 - Total solids
 - Dissolved oxygen

III. MANUFACTURING PROCESS



IV. MATERIALS AND METHODS

A. Source of Kitchen Waste

The waste used in this study is collected from our own kitchen waste. Waste Contains cooked rice vegetables, vegetable waste, fruits, fruit peelings and other waste. This waste is crushed by mixer grinder and slurry was prepared by mixing with water

B. Lab Scale

In lab scale this experiment was done in 20 liters bottle with the measurements of 3000grams of cow dung and 1000 grams of waste with the ratio of 3:1 and 14 liters of water (ref IIT ROURKELA)

C. Procedure

A 20 liter water bottle is taken for the experiment. It is painted black colour to prevent it from the action of fungi. An opening is provided at top of the bottle to provide a inlet and another opening is provided at the bottom of the bottle to remove the sludge. One more opening is provided at middle of the bottle to take out the slurry and to conduct the different tests. M seal is used at every openings to make the set up air tight. Now Rubber cork is inserted at the top most opening of the bottle which is in turn using gas pipe it is connected to the air pillow where the gas is stored. The important aspect while preparing set up is it should be air tight.

After Preparing the set up pour the prepared solution of kitchen waste, cow dung and water in to the bottle through inlet. The various tests are conducted at an interval of 5 days to analyze the change in properties of the slurry.



V. EXPECTED OUTCOMES OF THE PROJECT

- Biogas generation is a very clean and sustainable method of fuel generation as it uses disposed waste matter that would have otherwise caused air, land, and water pollution. Biogas production does not add to the greenhouse effect.
- Biogas generation is economically viable. Biogas generation has benefited several rural communities in developing nations such as Nepal and India.
- The villages in these developing countries benefit from biogas as the sources needed to feed are unwanted waste and sewage which actually can help keep the villages clean as they are used to produce biogas so there is less of such waste lying outside that breeds unsanitary conditions and causes infections and sickness.
- Another advantage of biogas is it can help in preventing deforestation. Trees are cut down to get firewood for domestic purposes such as cooking and heating. Using Biogas can help by eliminating cutting down of trees.

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