



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 4, Issue 2)

Available online at: www.ijariit.com

Biogas fuel station for Dilkap College

Mukri Farhan Rizwan

mukrifarhan61121@gmail.com

Dilkap Research Institute Engineering and Management
Studies, Mumbai, Maharashtra

Shaikh Abrar Sattar

abrars186@gmail.com

Dilkap Research Institute Engineering and Management
Studies, Mumbai, Maharashtra

Yadav Sunil Fathebahadur

sunil108.ys@gmail.com

Dilkap Research Institute Engineering and Management
Studies, Mumbai, Maharashtra

Sharan Reetika

reetika.sharan@gmail.com

Dilkap Research Institute Engineering and Management
Studies, Mumbai, Maharashtra

ABSTRACT

Biogas is one of the most useful gas which is widely used for various purpose. Biogas is used as a heat energy, electricity generation and if the gas is treated further can be into Compressed Natural Gas (CNG). The production of biogas is under the anaerobic condition where oxygen is absent and anaerobic bacteria are present. The temperature plays an important role in the whole process. In this project waste of food produced from the kitchen is the important source of an ingredient which is useful for the production of bio gas. The kitchen food waste can be easily decomposable and produce gases which contain methane, carbon dioxide, moisture, etc. The biogas produce can be used as a supplement fuel for kitchen and also used to generate electricity. The main unit of the process is digester in which the biomass waste in feeded after some interval of days the degradation takes place, during process oxygen is used completely and carbon dioxide is produced, know these carbon dioxide is used for the production of methane in presence of methanogen bacteria. The scrubber is installed to remove the useless gases rather than methane. The first scrubber is soda lime which is used to remove carbon dioxide. Second scrubber in which there is silica gel which is useful for the removal of hydrogen sulphate. Third scrubber in which there is ethylene glycol which is useful for removal of moisture present in the gas. After removal of all such gases only methane is left which is combustible and that is also known as natural gas which is used to generate electricity, heat, etc. Final product which is left in digester can also be used as fertilizer.

Keywords: *Biogas, Compressed Natural Gas, anaerobic condition, kitchen waste, scrubbers, soda lime, silica gel, ethylene glycol, combustible, methanogen organisms.*

1. INTRODUCTION

1.1 General

Bio gas is having various gases like methane (CH₄) 50-60%, Carbon dioxide (CO₂) 34-38%, Nitrogen (N₂) 0-5%, Water vapour 6%, Hydrogen Sulphate (H₂S) traces. The process is carried out under anaerobic digestion in the absence of oxygen. The temperature plays an important role. Around 30-65 degree needed in the process but the temperature should not fall below 20 degrees. At starting stage carbon dioxide is produced due to decomposition of organic matter until an anaerobic atmosphere is created. After initial stage the bacteria which are known as methanogen which converts feed stock into methane, carbon dioxide, and other gases. The kitchen waste is a serious environment pollution but digestion process of this biomass is an ideal way to generate energy. The biomass has different material waste which has different methane production value. The experiment is very useful for the populated country like India, China, Bangladesh, etc. In India, nearly 30-50% municipal solid waste comes from kitchen waste. In this experiment, food waste is incubated with some amount of water in an air tight container. At initial stage due to some amount of oxygen (O₂) present in container aerobic decomposition takes place and carbon dioxide (CO₂) is produced due to which oxygen (O₂) is consumed. Once the oxygen (O₂) is depleted the methanogenic bacteria is activated and consume carbon dioxide (CO₂) to produce methane The bio gas obtained at the end of reaction or process is the mixture of carbon dioxide (CO₂) and methane (CH₄).

1.2 NECESSITY

The waste which is generated from the canteen can be utilized. The electricity which is consumed by the college can be produced in the college itself. There will be no load shedding problem. For canteen use, the cooking gas can be generated

1.3 OBJECTIVES

- To generate the cooking gas
- To supply of organic fertilizer.
- To control leachate production.
- To minimize bio degradable waste.

2. LITERATURE REVIEW

A.APTE, Potential of Using Kitchen Waste in Bio Gas Plant, Volume 4, AUGUST 2013, et all he has suggested that potential of using kitchen waste in a biogas plan under anaerobic condition. He converted feed stock into biogas, fertilizer and reduce greenhouse gases

ANNA FERNANDEZ, Anaerobic Co-digestion Of A Stimulated Organic Fraction The Municipal Waste And Fats Of Animal And Vegetable Origin, 18 February 2005, et all he has suggested that anaerobic digestion of organic waste like municipal solid waste and vegetable origin is helpful to produce energy for combustion of gas.

ANURADHA TOMAR, Electricity From Waste-Bibliographic Survey, 20 May 2014, et all sated that the municipal solid waste or kitchen vegetable waste is helpful for production of electricity under an aerobic condition.

AWASIF JAMIL MASKHOOT AL SAADI, Design and Production of Methane Gas from Food Waste Using Anaerobic Digestion, Volume 1, July 2016, et all has suggested that the methane gas produced from the food waste in digester under anaerobic condition.

3. METHODOLOGY

3.1. ORGANIC WASTE

- Organic waste is a material that is bio degradable and comes from either plant or animal.
- It is usually broken down by another organism over time.
- Most of the time, it is made up of vegetable and fruit debris.



Fig no 3.1 (Organic waste)

3.2. DIGESTER

The main part of a biogas system is a large tank or digester. Inside this tank, bacteria convert organic waste into methane gas through the process of anaerobic digestion.



Fig no 3.2 (Digester)

3.3. SCRUBBER

The water absorption method of scrubbing is used to remove carbon dioxide, hydrogen sulphide, and moisture from biogas. The process works because these gases are more soluble in water than methane. This is an entirely physical process.



Fig no 3.3 (Scrubber)



Fig no 3. 4(Bio CNG unit)

4. REFERENCES

- [1] A. Apte, V. Cheernam, M. Kamat, S. Kamat, P. Kashikar, and H. Jeswani, “Potential of Using Kitchen Waste in a Biogas Plant”, *International Journal of Environmental Science and Development*, Vol. 4, No. 4, August 2013.
- [2] Ms Awasif Jamil Maskhoot Al Saadi Dr. Lakkimsetty Nageswara Rao, “Design and Production of Methane Gas from Food Waste using Anaerobic Digestion”, *Global Research and Development Journal for Engineering | Volume 1 | Issue 8 | July 2016* ISSN: 2455-5703.
- [3] Anna Fernandez, Antoni Sanchez, Xavier Font, “Anaerobic co-digestion of a simulated organic fraction of municipal solid wastes and fats of animal and vegetable origin”, *Biochemical Engineering Journal* 26 (2005) 22–28 Received 10 February 2005; accepted 18 February 2005.
- [4] Anuradha Tomar , Anushree Shrivastav, Saurav Vats, Manuja, Shrey Vishnoi, “Electricity from Waste –Bibliographic Survey”, *Science and Education Publishing* Vol. 2, No. 3, 108-115 Received January 21, 2014; Revised May 20, 2014; Accepted May 20, 2014.