GENERATION OF ELECTRICAL ENERGY USING BIOGAS PLANT FROM BIO 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, cut down on landfill waste, generate a high-quality renewable fuel, and reduce carbon dioxide& methane emissions. . But, any possible applications require knowledge & information about the composition and quantity of constituents in the biogas produced. The biogas is used to generate the electrical power by means of the gas generator.

KEYWORDS :- *Bio waste, Bio gas, Electrical Energy.*

1. 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 source of energy, like renewable energy resource solar energy, wind energy, different thermal and hydro source of energy, biogas are also 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 used for 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.

Fig-1: Bio waste

2. HYDROLYSIS

In the first step the organic matter is enzymolysed externally by extra cellularenzymes, cellulose, amylase, protease & lipase, of micro organisms. Bacteria decompose long chains of complex carbohydrates, proteins, & lipids into small chains. For example, polysaccharides are converted into monosaccharide. Proteins are split into peptides and amino acids.

AMINO ACIDS ⇒ *PROTEINS*

CARBOHYDRATES ⇒ *STARCH & CELLULOSE*

LIPIDS ⇒ *GLYCEROL & FATTY ACIDS*

3. ACIDFICATION

Acid-producing bacteria, involved this step, convert the intermediates offermenting bacteria into acetic acid, hydrogen and carbon dioxide. These bacteria are anaerobic and can grow under acidic 2use dissolved O2 or bounded-oxygen. Hereby, the acid-producing bacteria creates anaerobic condition which is essential for the methane producing microorganisms

Glucose + water → Acetic + hydrogen + carbon-di-oxide

4. CPU FAN (GAS TURBINE)

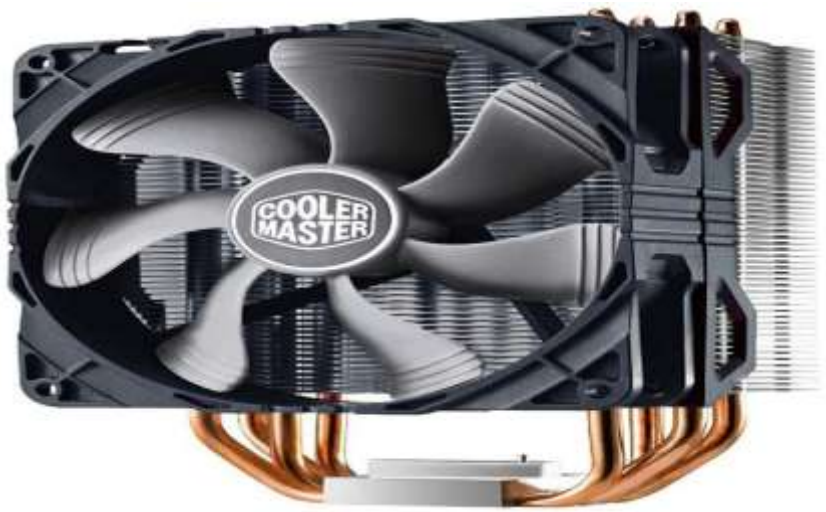

Fig-2: PC Fan

The PC fan is brush less DC (BLDC) Motor. It can be converted to a generator in 5 Minutes. The concept is simple. You can skip this part and start directly with the conversion. The BLDC motor used here has a stator winding and a Permanent Magnet Rotor. The motor is supplied by 12V DC. But the magnetic field rotation is generated by electronics (Electronic Commutator). As the name implies, the electronics components component convert DC into AC which makes the magnetic filed in the stator rotate.

5. ENERGY CONVERTION PROCESS

The following energy conversion table -3 shows the bio waste product to the biogas energy. The conversion can have the main aspect to attain the clearance in the waste product to face the energy demand and to clean the environment from the waste.

6. APPLICATION OF BIOGAS

1. Biogas replacing LPG, coal etc

This is a cheapest and simplest proposition.

2. Biogas enriched to CNG quality

This requires purification and bottling plant. Sweden is having 60% of bio-methane in their CNG national grid.

3. Biogas to produce electricity through Engine generator set. Every 1.0 M3 of biogas gives 105 to 2.4 KWH depending on size and technology of engine generator set.

4. Biogas replacing from fuel. Used as a fuels in the thermal heating process.

7. CONCLUSION

More than 80% of the population lives in the rural areas where more than 90% of the energy being consumed comes from non-commercial source, the major one being fuel wood. Biogas can be produced from food waste/refuse and peelings as a substitute for fossil fuels. The generation of biogas from food waste/refuse or peelings produces an energy resource. The process also creates an excellent residue that retains the fertilizer value of the original waste products.

8. REFERENCES

1. Ajay Kumar Jha, Jianzheng, LoringNies And LiguoZhang(2011),
2. Karve .A.D.(2007), 'Compact biogas plant, a low cost digester for biogas from waste starch'. http://www.arti-india.org.
3. Karve of Pune A.D(2006). 'Compact biogas plant compact low-cost digester from waste starch'. www.bioenergylists.org.
4. Jantsch and Mattiasson (2004), Discuss how anaerobic digestion is a suitable method for the treatment of waste water and organic wastes, yielding biogas as a useful by-product.