

SELF-SUSTAINING KITCHEN (GENERATING BIOGAS FROM HOUSEHOLD WASTE)

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ABSTRACT

Waste management are all the activities and actions required to manage waste from its inception to its final disposal. The general view is that domestic waste is useless and therefore discarded by throwing it away along with garbage.

Generally, organic waste is either rendered useless and mixed with garbage or used as compost material. However, on drawing parallels between domestic organic waste and cow dung which is used as fuel in bio-gas plants in rural areas, we can extend the same idea to make similar bio-gas plants in urban areas.

This report introduces a scientific and economical way to generate biogas from household organic waste thereby tackling the twin issues of generating clean energy and non-hazardous waste disposal.

Keywords- waste management, clean energy, organic waste, bio-gas plant, future scope.

I.INTRODUCTION

For simplicity, household waste can be divided into five types-liquid(sewage),solid(non-biodegradable or garbage),hazardous(volatile, toxic or corrosive),organic(biodegradable) and recyclable.

The idea is to use this domestic waste to produce biogas, similar to how biogas is produced using cow dung as the primary fuel in rural areas. We intend to design a cheap working model of a biogas plant in the backyard of the house which produces sufficient amount of biogas to entirely avoid the use of LPG cylinders and therefore, produce clean, green and cheap cooking gas(fuel).

II.BIOGAS

Biogas typically refers to a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen and can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas can be produced by anaerobic digestion with anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials.

Biogas is primarily methane (CH₄) and carbon dioxide (CO₂) and may have small amounts of hydrogen sulphide, moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking.

III.MATERIALS REQUIRED

In order to make a cheap and working backyard biogas plant we require-

Two containers of different sizes, a bucket, a hose, a tap and silicone.

IV.CONSTRUCTION AND WORKING

The smaller container is used as digester in which the domestic organic waste is put and consumed by bacteria to produce biogas which is carried through a hose into the reservoir. The digester is placed at some height from the second container to allow easy passage of the biogas and silicone is used to seal the hole to prevent leakage.

The bigger container is filled with water and the bucket is placed inverted into this container. Care must be taken that the bucket touches the surface of the container to avoid air bubbles. Holes are made in the bucket and a hose is used to carry the biogas to the reservoir setup. Finally, a tap may be attached to control the amount of biogas supplied to the kitchen.

Step Wise Pictorial Representation of construction of Bio-Gas plant:



Step 1: Collection of Materials



Step 2: Preparing the Digester



Step 3: Preparing the Reservoir



Step 4: Connect Everything

V.ADVANTAGES AND CHALLENGES

The biogas produced is cheap and is a clean source of energy. This biogas contains 50% more carbon dioxide as compared to petrol but is much cleaner due to more efficiency. However, it must be stored safely as it contains methane which is volatile. Also, the gas produced is not of considerable quantity to entirely replace the consumption of LPG cylinders by households.

VI.FUTURE SCOPE

We intend to overcome the primary hurdle of amount of gas produced and increase it up to a level such that it is entirely feasible to replace LPG cylinders.

Also, to take one level higher we can generate electricity by constructing a mini-boiler and mini-generator as an alternate source of electricity.

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REFERENCE

- [1.] www.wikipedia.org
- [2.] www.ecopedia.org
- [3.] www.greenoptimist.com
- [4.] Other related books and journals