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Experimental Study And Application Of household bioreactor for generation of Biogas from Kitchen Waste.

Gholap P. D.[1], Dr. Gawande S.M. [2], Dr. Thakare S. B.[3],

(Civil Engineering Department, APCOER/ Savitribai Phule Pune University, India)

ABSTRACT: *Generation of Solid wastes in general and biodegradable waste in particular is increasing at house hold level from the last two decades.Biogas production requires anaerobic digestion. We should go for creating 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. The anaerobic digestion of kitchen waste produces biogas, a valuable energy resource. Anaerobic digestion is a microbial process EM technology for production of biogas, which consists of primarily. A combination of this will use for biogas production at 37°C in laboratory (small scale) reactor (20L capacity). Mixture of vegetable wastes will be an-aerobically digest in a lab scale batch reactors. Biogas can be use as energy source and also for numerous purposes. But, any possible application requires knowledge & information about the composition and quantity of constituents in the biogas produce. The continuously-fed digester requires addition of sodium hydroxide (NaOH) to maintain the alkalinity and pH to 7. For this reactor we can prepare Inoculum than we will install batch reactors, to which inoculum of previous cow dung slurry along with the kitchen waste will add to develop our own Inoculum. This project is 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 and methane emissions.*

KEYWORDS: *Biogas, Waste,EM technology, digester,composition, methane, alkalinity, energy, digestion, alkalinity, anaerobic.*

I. INTRODUCTION

Now a days one of the burning problems faced by the world is management of all types of wastes and energy crisis. Rapid growth of population and uncontrolled urbanization has created serious problems of energy requirement and solid waste disposal. Vegetable market wastes contribute to a great amount of pollution; hence, there has been a strong need for appropriate vegetable waste management systems. [1] Vegetable wastes that comprise of high fraction of putrecible organic matter cause serious environmental and health risks. [2] Per Annum India produces 150 million tones of fruits and vegetables and generates 50 million tones of wastes, Therefore it become necessary to develop appropriate waste treatment technology for vegetable wastes to minimize green house gas emission. Therefore , it is very essential to use such techniques which will convert the waste into a useful by product. The reduction and recycling of domestic solid and waste water has become a main problem in the present day life of each and every one. One of them is Effective microorganism technology which was utilized for treatment of different type of waste to convert them into useful byproduct.

Biogas production through anaerobic digestion (AD) is an environmental friendly process utilizing the increasing amounts of organic waste produced worldwide.

II. LITERATURE REVIEW

Sr. No.	RESEARCH PAPER	AUTHOR/S	CONCLUSION/OUTCOME
1.	An insight into research and studies on biogas generation from waste (2016) Vol. 3 issue 5,2454-2237	Sunil J. Kulkarni	Biogas production from waste can reduce energy requirment. The waste after biogas production can be used as fertilizer as a rich in organic matter content.
2.	Effect of inoculum to substrate ratio on methane potential of micro-crystaline cellulose production waste water (2015) Bio-resources 10(1),898-911	M. Rodriguez, Chiang, Olli P.Dahl	ISR plays critical element in BMP test , and working with high ISR is the way to obtain a reproducible kinetic constant.
3.	Production Of Bio Gas By Using Food Waste.Vol.3,issue 4,jul-aug 2013,pp.390-394.	S.Mohan, K.Jagadeesan	Bio Gas Has Been Best Produced With A Considerable Rate Of Decrease Of BOD, COD, pH, acidity And Alkalinity.Upflow Anaerobic Sludge Blanket (UASB) Can Treat Food Waste With High Contaminated Load.
4.	Municipal solid waste management manual	CPHEEO, Ministry of Urban Development, Govt. of India	Municipal solid waste management measures, its impact and standard parameter values.
5.	Analysis And Processing Of Kitchen Waste Using Portable Biomethanation Digestor,vol.4,issue10, Oct 2015.	Pavan Bharadwaj Pisipati	The Parameter Conducive For The Best Production Of Bio Gas In An Anaerobic Bio Reactor.
6.	Anaerobic Digestion and Biogas Potential: Simulation of Lab and Industrial-Scale Processes	Ihsan Hamawand * and Craig Baillie	simulation can be carried out to predict the process efficiency and subsequent potential biogas, regardless of the size and/or the operation mode (batch or continuous). The simulation showed the ability to overcome the uncertainty and discrepancy of measured biogasfrom an industrial digester.

III. Methodology

This is designed in such a way that it will i) produce a renewable bio energy from kitchen waste. ii) It will reduce air pollution. iii) To find ecofriendly disposal methods. iv) To generate revenue from the waste that is generation of wealth from the waste. v) To reduce global warming.

A flowchart showing the methodology for Treatment of waste water by using EM Technology

- **Process for generation of biogas-**

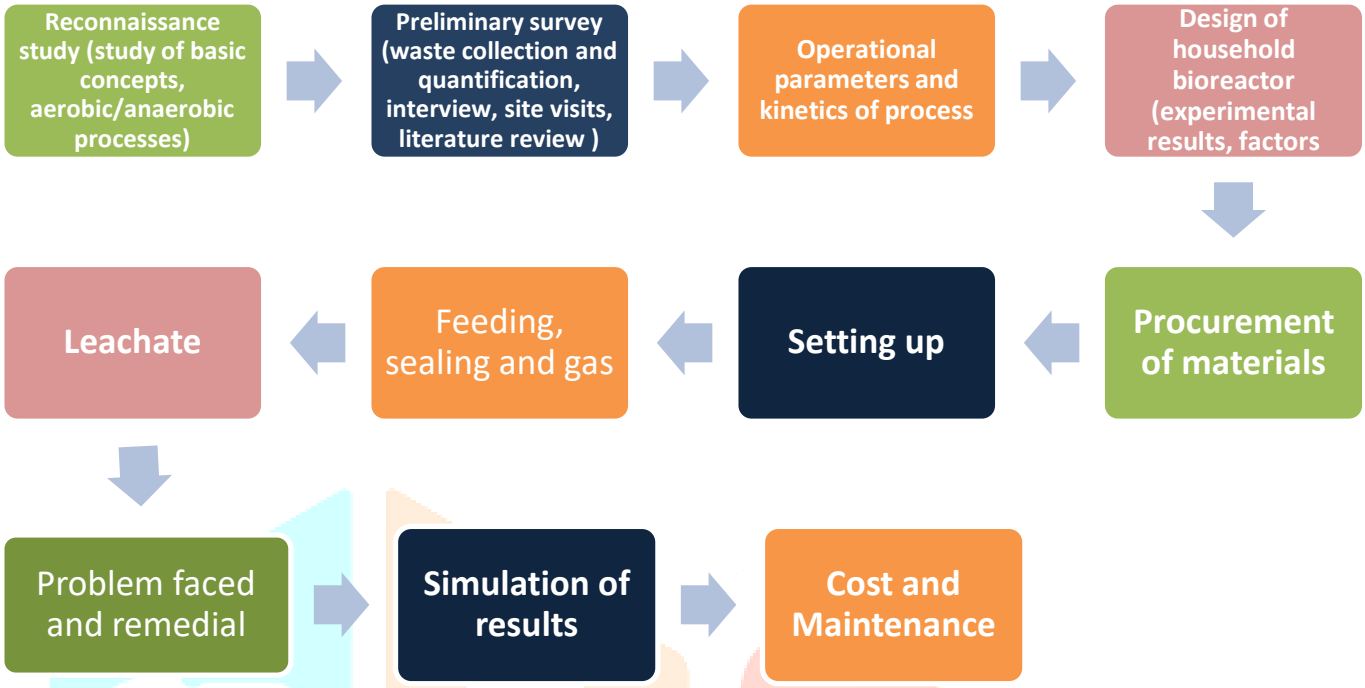

Figure1. Flow Chart Of Methodology

2.1 Sample Collection:

All Samples for treatment of food waste has collect from different families near to manchar. About 20 kg of waste items will be required to collect are categorized as vegetables, fruits, rice, other food items and waste water which mixing together, forms semi solid state.

The waste water also can collect in a sterilized plastic container from further hotels, canteen mess. Immediately after collection, the waste water will brought to the laboratory for further analysis. The collected waste water sample will be subjected to physicochemical and microbiological analysis.

- **Problem Statement:**

We have lot of kitchen waste being generated in our homes. However, we don't make any fruitful use of this waste. So we have come up with an innovative suggestion to make use of new alternative energy source device (Bio-reactor) that will be easy to use and is not harmful to the environment. The gap between demand and supply for energy sources can be reduced by converting Bio degradable kitchen waste into a biogas. It is a source of renewable green energy. The biogas can be used as a cooking gas and also can be used in turbine to generate electricity. The left over sludge can be packed and used as a manure and compost for agriculture forming.

- **Importance of the project**

1) Landfills have limited use; they are bad for the environment. We need to reduce their number.

2) Eco-friendly use of waste.
3) Renewable energy source (biogas)
4) Economical for household use
5) Reduce green-house effect (CFCs)

IV. CONCLUSION

From the survey of various literature research findings of this study, the following conclusion can be drawn:

1. The biogas digester is simple but effective option to save cost on power.
2. It was established that there was enough waste (100 kg per day) for production of sufficient biogas of about 24 m^3 per day to substitute the use of wood fuel and liquid petroleum gas.
3. Organic fertilizers can be made from the slurry generated after the biogas production process. This can also be sold to generate income.
4. Temperature played an important role in anaerobic system. It should be between 30-40°C for a good yield of biogas.
5. The reactor inner components play important role in enhancing the treatment efficiency and the most significant functions of inner component is effective to improve the retention sludge reactor capacity.
6. There was an attempt to capture biogas into a plastic bag with a patent, but it was not successful due to the cessation of biogas production.
7. It is observed from reduction of TV/VS production of biogas from leftover food waste of students cafeteria mixed with cow manure will give more biogas than fruit and vegetable wastes mixed with cow manure.
8. The waste after biogas production can be used as fertilizer as it is rich in organic matter content.
9. The least production was from fish waste as compared to other wastes with mean volume of 1090ml/day.

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