

# Generating Electricity and Production of Ethanol using Kitchen Waste

Divyanshu Sharma<sup>1</sup>, Prakhar Srivastav<sup>2, 3</sup>, Vedangi Dhyani<sup>3</sup>,  
Preeti Chauhan<sup>4</sup>, Rima Mukherjee<sup>5</sup> and Nishikant<sup>6</sup>

<sup>1</sup>B.Tech ECE. Graphic Era University, Dehradun

<sup>2</sup>B.Tech ME. Graphic Era University, Dehradun

<sup>3</sup>B.Tech BioTech. Graphic Era University, Dehradun

<sup>4</sup>M.SC Chemistry, SGRR PG College, Dehradun

<sup>5</sup>B.Tech BioTech. Graphic Era University, Dehradun

<sup>6</sup>BTECH CSE. Graphic Era University Dehradun

E-mail: <sup>1</sup>divyanshu3948@gmail.com, <sup>2</sup>prakharsrivastav25@gmail.com, <sup>3</sup>dhyanivedangi@gmail.com,  
<sup>4</sup>preetichauhan569@gmail.com, <sup>5</sup>rimamukherjee96@gmail.com, <sup>6</sup>nish22aries@gmail.com

---

**Abstract**—*The methodology of generating electricity and producing ethanol using any sort of kitchen waste (organic) such as cooked rice, vegetables peels, banana peels or any other liquid waste will be the next big step towards creating the green technology. We all are having a lot of kitchen waste in various forms, which ultimately remains unused. In today's world where the importance of energy and waste management is required the most, this will be one of the most significant things, and is simply generating electricity and producing ethanol using organic waste.*

*India is amongst the largest organic waste producing countries and thus it provides commonly available input in various conformations to be used as lignocelluloses substrate. When it comes to our homes itself, we create almost 45% of organic waste that act as the source for bio ethanol production from the sugars created due to different chemical and biological treatments.*

*While we have already developed a portion for electricity generation and further we are introducing a new concept of making waste a fuel in the form of ethanol. The combined technology is structured into a single product. Initially waste is inserted through the inlet which performs electrolysis process using a arranged structure of zinc copper and a membrane. The output gives electricity. And then waste is send to other chamber using a manual operating system. Waste is then passed through a process to convert into ethanol. The concept of manipulation of biodegradable kitchen waste such as vegetables and fruits peels is an eco-friendly way for the production of an alternative source of energy. Ethanol can be regarded as the most specific energy form which is also termed as one of the most important bio-fuel.*

## 1. INTRODUCTION

Sustainable technology is now creating a great impulsive impact all over the world because of the declining supply of conventional energy sources and ever increasing population rates simultaneously. The exploitation of oil wells and price hike in fossil fuels has attracted the government to frame policies for the development of bio fuels.

This project is about generation of ethanol from kitchen waste and harnessing of energy from waste food. The idea is to manage those organic wastes and take some energy out of it. We have a lot of kitchen waste such as rotten fruits, vegetables, and water too and usually we throw it somewhere, now this concept can reduce such waste and give us back some profitable energy too. In today's world we are lacking fuel and energy slightly and so we have to move to some alternate solution which could be renewable as well as sustainable. Waste management is quite important and nothing could match up with its proper use if we can generate some remarkable amount of energy out of that. This project tells us about the two most important aspects which is required in rural India currently and that is Waste Management and energy. Our primary goal is to obtain an eco-battery that is an Eco-friendly battery which generates electricity using any sort of organic or kitchen waste. This battery best manages waste as well give output as electricity. The solution then formed can be further used as fuel by making it ethanol.

## Objective

The objective of project is to fulfil the need of alternative energy sources. Apart from this, our project aims at raising recycling rates, increasing diversion rates and using a cost effective option. It also aims at generating cheap electricity in rural areas, increasing the useage of biodegradable waste in urban areas, to reduce the inadequacy of electrical energy and to provide fuel in form of ethanol. The fuel in the form of ethanol can be used as a fuel as a replacement of Gasoline. So electricity and fuel both can be obtained with one input which is usually considered as waste. And in the urban areas it will for sure increase the value of waste and it will be managed properly. Also it helps getting rid of energy scarcity.

**Material Required:**

## 1. Substrate

- pH : 4.5 – 4.8
- Salinity (%) : 1.5 -1.8
- Alkalinity (mg/L) : 0.1 – 0.3
- Volatile solid (g/L) : 130-138
- Total solid (g/L) : 163 – 190
- SCOD (g/L) : 62-98
- TCOD (g/L) : 150-180

## 2. Enzyme

- Carbohydrase
- Glucoamylase

## 3. Micro-organism

- Saccharomyces

**Research Background:**

## Composition of kitchen Refuse

Carbon	46-48%
Hydrogen	6-8%
Oxygen	32-36%
Nitrogen	3-4%
Chlorine	1-2%
Moisture content	72-85%

Food waste is alternative substrate for ethanol production

- Because of its abundant supply
- Because it is potentially promising substrate
- Because of its high sugar content
- Because of its high concentration of salt
- Cause it does not lead to resource conflict

**Construction & Method of Production:****Food waste Pre-treatment-saccharification-hexose**

Initially waste is inserted through the inlet which performs electrolysis process using an arranged structure of zinc copper and a membrane. The output gives electricity. And then waste is send to other chamber using a manual operating system. Waste is then passed through a process to convert into ethanol. The concept of manipulation of biodegradable kitchen waste such as vegetables and fruits peels is an eco-friendly way for the production of an alternative source of energy. Ethanol can be regarded as the most specific energy form, which is also termed as one of the most important bio-fuel.

**Conclusion**

In country like India where population has already reached billion, checking and managing usage of crude oil based fuels or funding the bio fuel technology and the alternatives is the urgent need. Such kind of technique can solve the energy crisis and acts as a good Ethanol generation method. Moreover, it uses the same apparatus to generate electricity and Ethanol. In the end, it is the economical way of Ethanol generation.

**Acknowledgement**

We sincerely thank Graphic Era University for providing us the facilities and all the required experiments equipment's. We are very thankful to everyone who guide us and support us in any possible way. Thank you to our faculty member.

**References**

- [1] Bockris, J. M., and Reddy, A. K. N. (1998). Modern Electrochemistry. New York: Plenum.
- [2] [www.smithsonianmag.com/innovation/a-potato-battery-can-light-up-a-room-for-over-a-month-180948260/#AzhqLf2BgopA7whu.99](http://www.smithsonianmag.com/innovation/a-potato-battery-can-light-up-a-room-for-over-a-month-180948260/#AzhqLf2BgopA7whu.99)
- [3] <https://en.wikipedia.org/wiki/Electrolysis>