

Eco Battery

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Abstract—Eco-bat is an Eco-friendly battery that operates on the principal of Renewable technology and Waste management Eco-bat generates electricity as well as produces fuel from any sort of kitchen (wastes such as cooked rice, vegetables peels or any liquid wastes) and other biodegradable and organic waste. Further research over it gives us a compact Eco-bat, which gives electricity up to 18V, it is high voltage, long lasting, good efficiency and very compact (small in size). The concept of generating electricity is actually a hypothesis of electrolytic principle. It contains a system of zinc plate, copper plate and a membrane, system is arranged accordingly research to obtain better efficiency. Eco-bat is a modern, innovative and revolutionary model that it will bring a revolution in batteries. It is easy to use and very portable. There is neither threat nor any side effect in its usage. It is an Eco-friendly Battery concept. Eco-bat reduces the energy costs and greenhouse gas pollution. It is unparalleled and alone one good example in the creation. It is well tested and properly working. The Eco - bat can be needed for several applications like Led, rechargeable battery, travel charger and other electronic device. The monetary value of batteries is very less compared other batteries.

1. INTRODUCTION

This project is about generation of energy from kitchen waste and composting of 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 rice, vegetables, and water too and usually we throw it somewhere but this battery 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 find out some alternate solution which could be renewable energy and waste management. Waste management is quite important and nothing could be better than that if we can generate electricity out of that. This is a unique idea which is capable of generating energy from waste of food products or vegetable waste. This project tells us about the two most important aspects which is required in rural India currently and that is Waste Management and energy. Eco battery is an initiative towards the food waste and looking forward towards the energy boon. Eco-Battery is an Eco-friendly battery that generates electricity using any sort of organic or kitchen waste. This battery best manages waste as well give output as

electricity. The waste can be further used as fuel by making it ethanol.

2. OBJECTIVE OF PROJECT

The objective of project is to fulfill the need of energy. Eco battery is initiative to this. This battery can be useful to glow led light, table lamps, and other basic required things for energy. This battery also provides fuel in the form of ethanol which can be used to cook food. So electricity and fuel both can be obtained with one input which is actually a waste. The main objective of this project is to provide this battery to rural India in as much as less cost possible so that they can at least charge their mobile phone and torch easily. And in the urban areas it will for sure increase the value of waste and it will be managed properly. Also it will save electricity usage in the home.

3. MATERIAL REQUIRED

- Zinc plate
- Copper plate
- Porous membrane
- Connecting wire
- Plastic box
- crusher
- Waste food/fruits /vegetables
- Rechargeable battery.

4. CONSTRUCTION

There are two model of eco battery. In the first model shown in figure 1. It has six chambers. Each chamber has two pair of zinc and copper plate separated by a membrane. Membrane is used to separate the plates and allow the flow of current. Plates are tightly bonded to each other with membrane in between them and to conduct maximum electrolyte and improve efficiency. There are six chamber and six pair of plates placed opposite to each other. The entire chamber is

connected to each other via a small hole in order to maintain the level of input waste equally in each chamber. It has manual crusher placed at the top to receive waste as input. All the plates are connected to each other in series via connecting wire. To take waste of the box an external pipe is fitted which took the waste to another chamber where fermentation process is done to generate ethanol.

In the second model which is modified one. There is only one box and no divider. Copper plate and zinc plate of smaller size along with membrane are arranged. There is five such arrangements done. Each system is connected to other in series via a connecting wire. This is completely open system. The output wire is connected to rechargeable battery.

Photos of Eco-Battery



Fig. 1: Model of Eco-Battery.



Fig. 2: Modified model of Eco-battery.

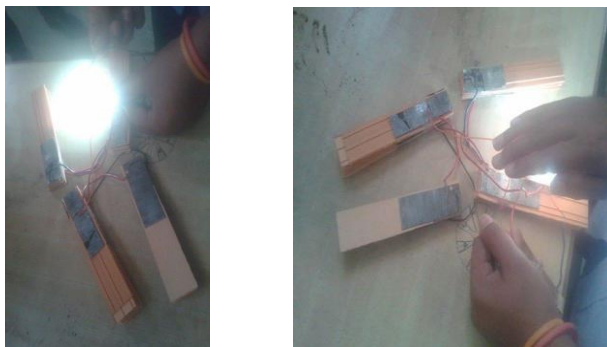


Fig. 3: Connecting plate and circuit.

Working principal

The concept of generating electricity is a hypothesis of electrolytic principal. [1]. The plates of copper and zinc separated by membrane gain ions and give voltage. Every waste has ions into it in the form of citric and other acid. These ions get over the plates from positive to negative and their flow generate electricity. In the first model zinc membrane and copper are tightly bonded. Each chamber has two pair of same arrangement and all the arrangements are connected to each other in series via connecting wire. The working process is easy, any kitchen waste such as rice, tomato, potato, waste water or any other waste, and it is put into the battery from the crusher which is placed at the top. The role of crusher is to crush waste into semi liquid so it gets easily divide into all the chambers. The crusher is manually operated. All the chambers are connected to each other via a small hole so to maintain level equally. The plates collect ions from waste materials and give output which is been stored in rechargeable battery.. In result, after taking hundreds of reading it is been observed that it give average voltage close to 10-15 V. After one or two days the same waste is taken out via an exit pipe and is send to another box where fermentation process is done to convert waste into ethanol. This is under research process but some readings has been taken and we get satisfying result

In the second model there is no crusher used and neither any chamber is made. A system is made with this arrangement. "Copper-zinc-membrane-copper-zinc". This membrane also performs osmosis process in its working and that is why its length is kept longer than zinc and copper. It is found after research that this arrangement give maximum efficiency. Five such arrangements are made in open and connected in series via connecting wire. The waste material is directly put into battery and plates collect the ions from waste material and give output. The output is stored in rechargeable battery which can be further used. It is found after hundreds of observation it give average output close to 20-24 V which is much more than first model. After one or two days waste is taken out to another box where it is fermented to produce ethanol which can be used as fuel.

5. COST ESTIMATION

Model 1

Name	Cost	Quantity	Total
Zinc plate	40 INR	12	480INR
Copper plate	40 INR	12	480 INR
Connecting wire	10 INR	1	10 INR
Membrane	5 INR	10	50 INR
Plastic box	20 INR	1	20 INR
Crusher	50 INR	1	50 INR
Rechargeable Battery	40	1	40
Total			1130 INR

Model 2

Zinc plate	40INR	3	120 INR
Copper plate	40 INR	3	120 INR
Connecting wire	10 INR	1	10 INR
Plastic box	20 INR	1	20 INR
Membrane	5 INR	5	25 INR
Rechargeable battery	40 INR	1	40 INR
Total			335 INR

Advantages

- Eco-battery is portable and easy to use.
- It has zero percent accidental chances.
- One time input give output for a longer time.
- The cost of Eco-bat is also very reasonable that it can be afforded by rural area people.
- It manages waste things and gives output for further use of glowing LED, recharging battery etc.

6. RESULT AND DISCUSSION

This Eco-battery is capable of generating 24 v which is a demo model. If this battery can produce this much by just simple food waste like waste of rice, peels of vegetables and fruits, tap water etc when placed in a chamber of the battery together. When this battery is made in a huge size and consists of large amount of waste then it then it is capable of generating enough energy to light a floor in hostel, mess or building.

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REFERENCES

- [1] Bockris, J. M., and Reddy, A. K. N. (1998). Modern Electrochemistry. New York: Plenum. [1]
- [2] <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>