ALOE-VERA based Electrolytic Solution for environment friendly batteries

Swamini Chopra¹*, Kavita Pande², Abhay Deshmukh³

¹Center of Excellence in Materials and Metallurgy, Maharashtra Institute of Technology, Aurangabad, India  
²Matverse Vision Pvt. Ltd., Nagpur, India  
³Energy Devices Lab, Dept. of Physics, R.T.M. Nagpur University, Nagpur, India

ABSTRACT

Electrical energy plays a major role in our daily life and its consumption is also unlimited. There are various ways to store the electricity generated, most common of which is the use of acid batteries and portable dry batteries. The disposal of these batteries creates environmental hazard and are toxic to humans handling them as well. The aim of this project is to develop a non-toxic, environment friendly battery using non-conventional source, i.e. the Aloe-vera plant. The work was done to develop an Aloe-vera gel based electrolyte to generate electricity through metal electrodes like a conventional acid battery. The voltage generated by our set-up was 1.27V after 30 minutes of charging through a 5V charger. The electricity generated was enough for lighting a 1V LED bulb. The future of the project is to develop a higher capacity battery and to scale down the present set-up.

INTRODUCTION

Conventionally used chemicals are widely used as an energy source. However, their chemical and material composition and the unsustainable way in which they are disposed can be hazardous!

OBJECTIVE

To develop a non-hazardous electrolyte solution from Aloe-vera plant

To check voltage generation capacity of electrolyte solution with different concentrations

To check performance of developed electrolyte with combination of sulfuric acid and distilled water

To create new avenues for Aloe-vera farming

RESULT & DISCUSSION

Methods and materials used:

1. Aloe-Vera gel
2. Copper (Cu) plate
3. Zinc (Zn) plate
4. Knife, Scissor or Cutter
5. LED Light
6. Multi-meter
7. 7.5V DC charger
8. Grate or Blender
9. Box with separate sections

The voltage output obtained from the device tested on multi-meter

Zinc (Zn) as anode (negative) and Copper (Cu) as cathode (positive) used for electrolysis process

Aloe-vera pulp is extracted manually in two forms: only pulp and pulp along with cover

<table>
<thead>
<tr>
<th>Base</th>
<th>Addition</th>
<th>Concentration</th>
<th>Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloe-Vera</td>
<td>-</td>
<td>100</td>
<td>1.27</td>
</tr>
<tr>
<td>Aloe-Vera</td>
<td>H₂SO₄</td>
<td>80/20</td>
<td>1.7</td>
</tr>
<tr>
<td>Aloe-Vera</td>
<td>Distilled water</td>
<td>80/20</td>
<td>1.3</td>
</tr>
</tbody>
</table>

The Aloe-Vera plant extract has electrical properties and can generate electricity as illustrated. Pure pulp proves to be more efficient than solution made with pulp and cover.

The handling of Aloe-vera gel is safe, non-toxic and disposal is also non-hazardous.

This product can bring a new revolution in the field of eco-friendly electricity generation.

References: