

Study of Electrical Properties of *Eucalyptus* Sp. Plant Leaves

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Abstract

Bioelectricity relates to the study of biological electrical currents. Bioelectric potentials are brought forth by a mixture of biological procedures and generally range in intensity from one to a few hundred millivolts. In this paper, we study bioelectricity property of Eucalyptus Sp. plant leaves. In this study, we prepared leaves extract of Eucalyptus Sp. Plant in distilled water. Electrical properties of this plant, EMF obtained is 1.86V and Current is 3.5 mA. In this study we also glows LED bulb.

Keywords: Bio-emf; Bioelectricity; Eucalyptus Sp. Plant; Current; EMF

Introduction

Energy is the important aspect for economic development as well as to increase standards of living in the country. Renewables emerged as a majority energy source for the global community, besides contributing to climate mitigation efforts. According to the 'Renewables 2014 - Global Status Report' published by REN 21, the estimated global RE power capacity added in 2013 is over 1560 GW, up more than 8 % over 2012; and renewables, other than hydropower (> 50 MW), collectively grew nearly 17 %. In 2013, a new investment in renewable power and fuels globally, excluding hydropower was to the tune of USD 214.4 billion. Further, by the end of 2013, India emerged as one of the top 6 countries in terms of total installed non-hydro renewable power in the world. The other countries are China, the United States, Germany, Spain, and Italy. Today, over 14 % of the total installed power generation capacity of the country comes from renewable resources, which is around 32.50 GW of which, over 22 GW comes from wind, taking India to the 5th position in the world [1].

There are various types of bio-fuel cells, which are classified according to the nature of the electrode reaction and the nature of the biochemical reactions. The study of such bio fuel cell was studied in this paper [2]. Microbial fuel cells (MFCs) represent a completely new long term, affordable, accessible and ecofriendly approach to waste water treatment with production of sustainable energy. Using the wastewater treatment, microbial fuel cells (MFCs) are made, which generates the power. In this paper, the author studied to generate electricity using bacteria while accomplishing waste water treatment in process based on microbial fuel cell technologies [3]. In order to combat warming, depleting natural sources and actualizing the energy demands, there is a need to find alternative source of energy. Bio energy is renewable energy made available from materials derived from biological sources. Due to

shortages, increasing prices and environmental problems, therefore, their scopes to generate bioelectricity energy like renewable sources. [4]

The different plant parts like leaves are natural bio system, which contain different organic and inorganic ions. The controlled and regulated ionic movement in plants makes the bio-system unusual from a usual physical and electrolytic system. Hence, the plants parts may be called as “bio-electrolytic systems” or “bioenergy conducting systems”. Ionic conductor is a basic provision for an electric material. Ionic condition found within the living systems has great importance in low power energy source. Here we found that using the plant leaves as a new non-conventional matter for developing power sources [5]. The generation of electricity using plant leaf aqueous extract is very rarely studied by researchers. Here, we present results on the development of Bioelectricity using leaves of Eucalyptus sp. (which belongs to Myrtaceae family) and cell. In this paper, we study the variation of emf with time maximum current.

Experimental Work

The Eucalyptus sp. leaf extract is prepared in distilled water. Eucalyptus sp. Leaves are collected from Rajgurunagar village, Pune (India). Eucalyptus sp. leaf extract is used as electrolyte in Daniel cell. We also used LED bulb. The pH of Eucalyptus sp. leaf is 7.08 as shown in figure 1, and pH of this solution indicates it is neutral solution have no any toxic effects for handling purposes.

Results and Discussions

The crushed leaf of Eucalyptus sp. leaf acted as a good electrolyte and copper and zinc metals acted as positive and negative electrodes respectively. We studied the experiments with variations of potentials using Eucalyptus sp. leaf with respect to time in a single and series connection under open circuit condition.

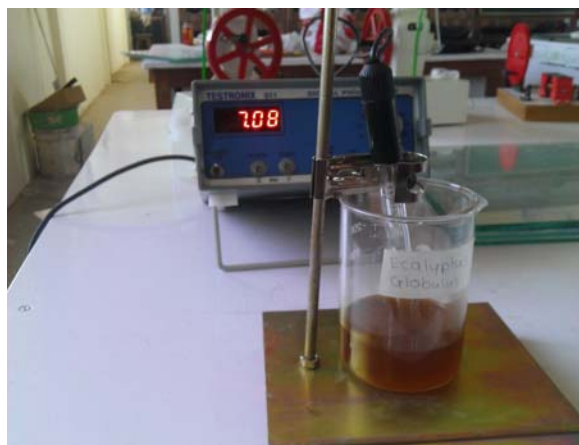


Figure 1. pH of Eucalyptus sp. leaf extract

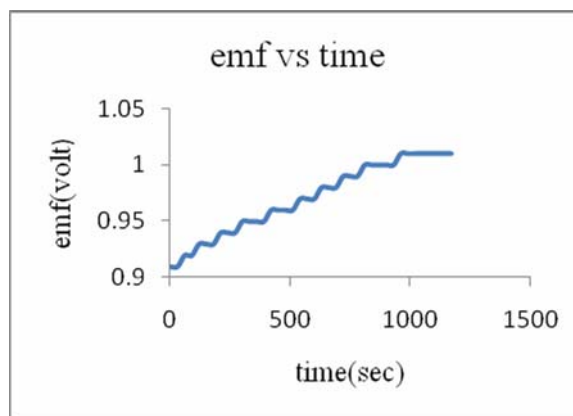


Figure 2. Variation of emf with time for a single cell

The results of bio-electrolyte under open circuit condition for potential variations with time are shown in figures 2 and 3. Figure 2 indicates that emf variable increases with time for single cell. After sixteen minutes, the emf remains constant. Figure 3 shows the variation of emf with time when connected in a series. From figure 3, we observed that when two cell connected in series, emf is continuously increases and after six minutes it remains constant.

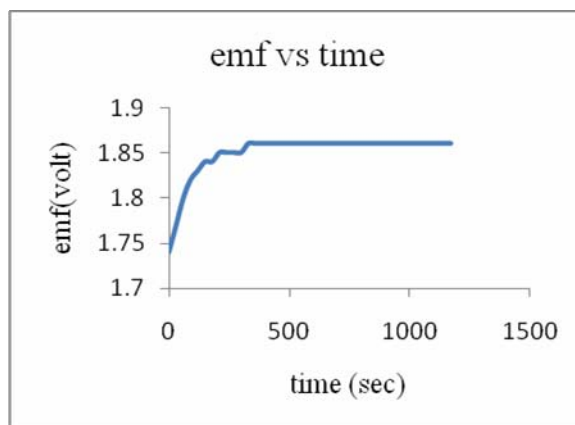


Figure 3. Variation of emf with time for a series of two cells

Conclusions

In this study we found *Eucalyptus* sp. leaf extract is good bioelectrolyte when they are connected in series as compared to single cell. The merits of this cell are easily available electrodes, inexpensive, pollution free and save electricity.

Acknowledgement

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