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GREEN ELECTRICITY – ALOEVERA PLANT – A REVIEW

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Abstract:

An Electrical power is places major role in our daily life. It places a major role in our life and its consumption also increased in every day. Almost all methods we used straight energy sources and also some of them are non-conformist type. Due to these ways there are many environmental problems are solved. So, in order to defeat all these environmental troubles many different non-conventional energy sources are developed. On this project we are introducing new type of non- conventional type energy source. It generates electricity from Aloe Vera plant. This is eco-friendly electrical technology. To create new type of electrical batteries by using aloe Vera gel. It is very useful technologies in electrical field. It also comes from new revelation in electronic field, now we create battery with eco-friendly products, safe and secure product which brings new exposure in electrical and electronic fields.

Key Words: ***Plant Electrical Generation, Aloe Vera gel, Green Electricity, Aloe Vera battery***

INTRODUCTION:

In the 21st century has fashioned a series of low power consumption Systems for everyone. This event had an opportunity for the development of energy harvesting technique from low power energy sources such as bio-energy from organic compounds via microbial fuel cell, piezoelectric materials, thermal energy via thermo-electric generator (TEG) and light energy via solar photovoltaic cell, radio frequency (RF) signal via RF power harvester. Hence, apart technologies, this investigate would like to introduce the usage of living plants as another new renewable energy source to harvest micro-energy in nature. Certain plants can produce a uninterrupted small amount of electrical power at both day and night, nothing like solar power. This new nature source of energy from plants is renewable, non- pollution and sustainable. Plants are

much more sensitive to light due to its photoreceptors, which can be categorized as phytochromes, blue/UV-A and UV-B photoreceptors [1].

The Respiration in plants, on the other hand, is a reversed process of photosynthesis. It is a process of transforming one form of carbohydrate from photosynthesis into energy for the plants. Both the chemical processes that induce the stream of electrons. However, the rate of photosynthesis and respiration are influenced by other factors such as water, the concentration of oxygen and carbon dioxide in the air and nutrient supply available in the soil [2].

Photosynthesis is a process used by plants to synthesize carbohydrate molecules from carbon dioxide and water via the usage of light energy that observed, normally from the sun. This process will cause the transport of electrons inside the plants from one form to another form, which creates a potential difference between the leaves and roots under exposure of light. This phenomenon is triggered on the plant by the interrupted changes of light and darkness from the light source. With such circumstance, a plant can generate a potential difference as much as 50mV [3–4].

The inter-cellular process within the plant will produce an electric potential signal in response to this peripheral stimulus. These responses are due to the physiological tricks of plants [5–6] in the cellular cell at the microscopic level. The electric potential variation generated in the response of the physiological activities to the external stimuli is measured at most at tens of millivolts [7]. However, the electrical conduction will differ from one plants to another plants [8–9]. As plants constitute of complex conductive and insulated essentials, these will affect the electron flow facility among different group of plants. The most promising type of plants, which can generate a high amount of electron, is the tender family of plants [10]. moist plants are water-retain plants, which can store water in their roots leaves, and stems in order to survive in a dehydrated environment. Hence, the conductivity of the plants is better with its relatively profuse of water in its bodies. Earlier research had been conducted on several special types of trees covering the non-succulent trees and succulent trees. More over species of the plants covered are Alstonia scholaris (Pulai tree) and Musa acuminata (Banana tree) for non-succulent plants as well as Aloe barbadensis Miller (Aloe Vera) for succulent plant [11]. It is established that the succulent plant produces much upper voltage compare to non-succulent plant.

The oxidization development, which happens at the anode electrode and reduction process, which happens at the cathode electrode, causes the electron to stream from anode to cathode to generate electricity. With this method, the plant's organic matter is operation as an electrolyte between the two electrodes. This system is termed as Plant Based Cell (PBC) in this presented article. It provides a direct method to yield DC current and voltage from the plants, which can be potentially, used to power up to very-low power devices. However, there are several aspects to be considered in the setup of the electro-chemistry process that will

influence the magnitude of energy generated. At first, the different types of materials are used as the electrode pairs. And then, the number of electrode pairs after that thirdly, the connection method between the electrodes.

Setup to Investigate The Effect of Distance Between Electrodes

The experiment aims to identify the best distance between cathode and anode electrodes to produce maximum voltage and current from the plant. The electrode couple is chosen to be in two materials they are copper as the cathode and zinc as the anode. The copper electrode is absorbed in a fixed position at the Aloe Vera leaf located near the stem whereas the zinc electrode varies its distance from the copper electrode throughout the leaf until its tip edge. The reserve varies in an increment of 1 cm along the leaf it will covering from 1–12 cm gap between the length. The size and depth of electrode diffusion remain constant. The high precision multi-meter is used to measure the voltage and current.

Conclusion

It is concluded that the Aloe Vera plant can generate electrical energy with easy methods, which can also be potentially useful to low power consumption devices. As compared to other living plants used in other researches to harvest energy, Aloe Vera has been generate the highest magnitude of voltage and current. This energy can be stored in a capacitor. From the results of the experiments, it is observed that copper as the cathode electrode and zinc as the anode electrode is the best combination to generate maximum voltage and current.

. We have also seen that the harvested voltage or current can be increased by connecting a higher number of electrode pairs in series or in parallel. A series connection of the Aloe Vera leaves, which are inserted with copper-zinc electrodes, can generate a higher voltage. On the other hand, a parallel connection of the Aloe Vera leaves, which are inserted with copper-zinc electrodes, can generate higher current. Hence, a combination of series and parallel connection between the Aloe Vera leaves can be used to generate the optimum amount of voltage and current to power a desired low power consumption device.

Reference

1. Uchida A, Yamamoto KT. Effects of mechanical vibration on seed germination of Arabidopsis thaliana(L.) Heynh. Plant cell physiol. 2002; 43: 647–651. pmid:12091718

2. Lautner S, Grams TEE, Matyssek R, Fromm J. Characteristics of electrical signals in poplar and responses in photosynthesis. Plant Physiology. 2005; 138: 2200–2209. pmid:16040648

3. Clark WG. Note on Effect of Light on the Bioelectric Potentials in the Avena Coleoptile. PNAS. 1935; 21: 681–684. pmid:16588033

4. Schrank AR. The Effect of Light on the Electrical Polarity and the Rate of Elongation of the Avena Coleoptile. Plant Physiology. 1946; 21: 467–475. pmid:16654062

5.Labady A, Thomas D, Shvetsova T, Volkov AG. Plant Bioelectrochemistry: Effects of CCCP on Electrical Signaling in Soybean. Elsevier Bioelectrochemistry. 2002; 57: 47–53.

6.Gurovich LA, Hermosilla P. Electric Signalling in Fruit Trees in Response to Water Applications and Light-darkness Conditions. Elsevier Journal of Plant Physiology. 2009; 166: 290–300.

7.Volkov AG, Vilfranc CL, Murphy VA, Mitchell CM, Volkova MI, O'Neal L. Electrotonic and Action Potentials in the Venus Flytrap. Elsevier Journal of Plant Physiology. 2013; 170: 838–846.

8.Lautner S, Matyssek R, Fromm J. Distinct Roles of Electric and Hydraulic Signals on the Reaction of Leaf Gas Exchange Upon Re-irrigation in Zea Mays. Plant Cell and Environment. 2006; 30: 79–84.

9.Taiz Zeiger. Plant Physiology. (3rd ed). 2002; Chapter 10: 33–46.

10. Krinker M, Goykadosh A. Renewable and sustainable energy replacement sources. Presented in 2010 IEEE Long Island Systems, Applications and Technology Conference. 2010.

11. Choo YY, Dayou J. A Method to Harvest Electrical Energy from Living Plants. Journal of Science and Technology. 2013; 5: 79–90.