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Electric Plan

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ABSTRACTS

Energy consumption that still use fossil energy or non-renewable energy has a negative impact on the environment. Alternative energy innovations or renewable energy have also begun to be developed to replace fossil energy or non-renewable energy. This study aims to determine whether other types of plants that wasn't used by Helder could also generate electricity and reduce the impact of non-renewable energy. This research was conducted by placing electrodes on the soil close to the roots of the plants. In this experiment, we used 3 types of plants that are common at home, namely Chrysanthemum, Orchid, and Red Begonia. The results show that there is indeed a very small flow of electricity, this could possibly due to various factors. If this experiment continues to develop, the possibility of green-electrical energy could be more than just a dream. Based on experiments using a prototype that we have done, the three plants have the potential to produce electric currents in the range of 0.02mA-0.65mA.

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1. INTRODUCTION

The problem of the energy crisis has become a concern for the world community. Even in Indonesia, energy consumption is quite high. Energy consumption that still uses fossil energy or non-renewable energy has a negative impact on the environment, such as forest destruction and global warming (Minister of Energy and Mineral Resources, 2016). Not a few parties are aware of this. Alternative energy innovations or renewable energy have also begun to be developed to replace fossil energy or non-renewable energy.

To answer the energy crisis problem and fulfill AMSTR course, we created a solution, namely, Electric Plant. Marjolein Helder (in Zein Sakti, 2020) has conducted research on this source, the results of this study show that there is an interaction in plant roots with soil bacteria that generate electrical energy (Sakti and Zein, 2020). The plants that are strongest in symbiosis with bacteria on the roots are the plants of the Fabaceae or Leguminosae family.

This study aims to determine whether other types of plants other than those used by Marjolin Helder can also generate electricity and to reduce the impact resulting from the use of non-renewable energy. We do this research method by making a prototype using plants in the surrounding environment.

2. METHODS

The prototyping we do uses several tools and materials, namely electrodes, mole fertilizer, plants, indicator lamp, cable, manual and digital multimeters.

Figure 1 show the step of this research. The step are:

1. Prepare plants with a good root system and have become mature plants.
2. The plants are quarantined for two days with mole fertilizer before applying the electrodes.
3. After two days, another pot is filled with half of the soil that is ready to attach the electrodes.
4. The electrodes are stored in the pot in the anode position that has been connected with the cable first, given a little soil then stored the cathode that has been connected with the cable.
5. Plants that have been quarantined are transferred to a pot that has been fitted with electrodes and a little soil is added to complete the pot.
6. After that, the electrode is connected to the multimeter to see the electric current generated.
7. Checks are carried out periodically to see the changes that occur in the electric current generated.
8. Plants are still watered regularly to support the interaction between electrons and bacteria in the roots.

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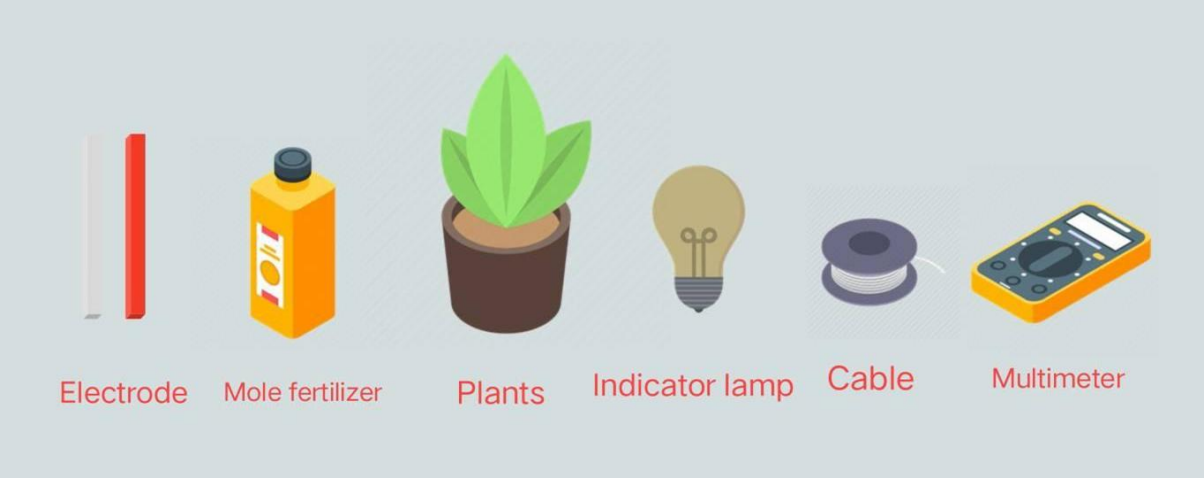

Figure 1. Tools and Materials

3. RESULTS AND DISCUSSION

3.1. Overview

This research was conducted by placing electrodes on the soil close to the roots of the plants. In this experiment, we used 3 types of plants that are common at home, namely Chrysanthemum, Orchid, and Red Begonia. **Figure 2** shows the depiction of our idea when implemented in real life scenario. The cathode is installed above the anode, here we use copper as cathode and zinc as anode.

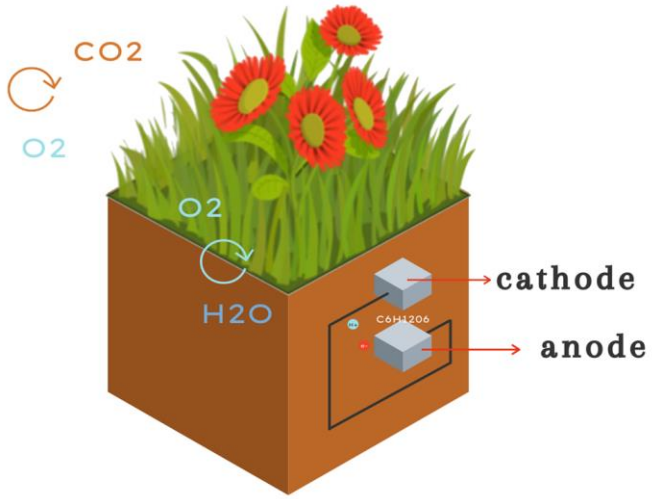

Figure 2. Component installation's layout

3.2. Results

The results show that there is indeed a very small flow of electricity, this may be due to various factors. If this experiment continues to be developed the possibility of electrical energy can be greater and this is a great solution because this energy is environmentally friendly and renewable. **Table 1** shows the magnitudes of current produced by *Chrysanthemum* each day from March 19—21 2021. The results give us constant magnitudes within the three days period. *Begoniaceae* (**Table 3**) provides the same constant condition but with different magnitude, that is 0,02 mA. Unlike the other two, *Orchindaceae* (**Table 2**) presents a different magnitude and condition throughout, with an indication of increasing current's magnitude.

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Table 1. Results shown in *Chrysanthemum.*

Date	Current
19^{th} March 2021	0,65 mA
20^{th} March 2021	0,65 mA
21^{st} March 2021	0,65 mA
*Chrysantemum was planted in March 3 when the electrodes were installed in March 12	

Table 2. Results shown in *Orchindaceae*

Date	Current
19^{th} March 2021	0,15 mA
20^{th} March 2021	0,20 mA
21^{st} March 2021	0,30 mA
**Orchindaceae* was planted in March 11 when the electrodes were installed in March 13	

Table 3. Results shown in *Begoniaceae*

Date	Current
13^{rd} March 2021	0,15 mA
17^{th} March 2021	0,20 mA
21^{st} March 2021	0,30 mA
**Begoniceae was planted in March 10*	

4. CONCLUSION

Based on experiments using a prototype that we have done, the three plants have the potential to produce electric currents in the range 0.02mA-0.65mA.

5. ACKNOWLEDGEMENTS

We would like to express our gratitude to the lecturers, team, and all of our friends who have contributed to our project so that it can be put in writing and informed to the public.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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