Design for Bioelectric System

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ABSTRACT

Plant microbial fuel cell is processed by microbial at plants' root. In other research Moss and algae was applied on soil and water. Electricity was produced at low level just to supply small FM radio and small LED light.

This research aimed to developed more efficient plant microbial fuel cell by choosing more appropriate aquatic plants, size of cells and size of electrodes. Provide circuit system that will enhanced efficiency of electric produced. Design of containers to provide PMFC cell that produce up to 5 volt. Three aquatic plants were applied: Water lettuce, Devil's Ivy and Lucky Bamboo. Comparison were made between 3 sizes of containers: small 200, medium 400 and large, 600 milliliter and three size of electrodes, small1 x 2.5, medium 2.5 x5 and large 2.5 x7.5 cm . Electricity was observed for 100 days. Result founds that Water lettuce produced maximum electricity at 1039 millivolt per 1 cell but plants last only 15-30 days while Lucky bamboo produce maximum 0.978 millivolt with longest life of 90 days. Devil's Ivy produce maximum at 0.963 millivolt per 1 cell while plants last 70 days. Size of cell and electrodes found to be most efficient are medium size of 400 milliliter cell and 2.5 X 5 electrodes. The circuit was designed using parallel and series to provide electricity appropriate to low voltage appliances. In order to design the containers, Fusion software was used to minimize materials and the system used vertical arrangement with purpose of filling water from top containers down to lower ones, so it is more practical than horizontal cell where water needs to fill each cell separately from previous research. Six PMFC cells can charge Nickel Metal Hydride battery (NiMH) of 1.2 volt ,950 mAh within 36.18 hours, while 18 PMFC cells can charge 5 volt battery , 11000 mAh within 27 days with energy harvesting circuit.

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