Modelling of the electricity generation from living plants

Abstract

Electricity can be harvested from living plants by generating reaction between the plant and a pair of different metals. It has great potential in sustainable energy production because it offers a green approach to harvest energy from sources that are abundantly available. Previous investigation has shown that electrochemistry process is accountable for its mechanism of energy production. In this paper, the behavior of the ions flow in the electrodes-plant system is modelled and illustrated. For this purpose, energy harvesting system consists of Zn-Cu electrodes and aloe Vera was used where the electrodes were immersed in the aloe Vera leaf. It was hypothesized that during the energy harvesting process, oxidations of zinc atoms occur when an external load is connected between the two electrodes. For 72 hours of harvesting process, the zinc electrode experienced a mass loss of 3.2mg compared to electrochemistry prediction which is 0.0853mg when 1M? load was used. However, using a lower load resistor (1k?), the measured mass loss of the zinc increased to 6.7mg compared to the prediction which is 4.0452mg. This means that there is an increase of efficiency when a lower load resistance is used, which is 60.4% for 1k?, compared to 2.67% when using 1M?. This shows that the electrochemistry process is influenced by the load connected to the system. This finding improvises a better understanding on the energy production mechanism of the system.