

Data acquisition system for in situ monitoring of chemoelectrical potential in living plant fuel cells

Abstract

Photosynthesis process in plants generates numerous sources of bioenergy. However, only a small fraction is readily exploited for electrical energy. The impact of environmental factors is one of the significant physiological influences on the electrical potential of the plants. Hence, we developed a data acquisition (DAQ) system for instantaneous monitoring of electrical potential in plants and Aloe vera was used as a plant sample. The static response characterization, capability index (P/T), and Pearson's coefficient of correlation procedures were applied to assess the reliability of the obtained data. This developed system offers the capability of in situ monitoring and detecting gradual changes in the electrical potential of plants up to a correlational strength of greater than 0.7. Interpretation of the electrical signal mechanisms in the Aloe vera plant and the optimization of the electricity can be achieved through the application of this monitoring system. This system, therefore, can serve as a tool to measure and analyze the electrical signals in plants at different conditions.