Evaluating the Effectiveness of Plant-Microbial Fuel Cell Energy Derived From Traditional House Plants

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Electricity access in homes is crucial to a modern-day standard of living, but harnessing energy efficiently from sustainable sources remains challenging. Due to the complexity and price of implementing current options, scientists continue investigating renewable and clean energy sources, such as plant microbial fuel cell technology, where electrons released by microbes surrounding plant roots can be harnessed as electricity. Energy derived from plants not only provides a sustainable energy source but also incentivizes wildlife conservation, as forests could be power plants. Effectiveness of the four common household plants, Jessenia Pathos (Epipremnum aureum), Cypress Tree (Taxodium distichum), Spider Plant (Chlorophytum comosum), and Giant Hair Grass (Eleocharis montevidensis) in a P-MFC system was evaluated through a five-digit handheld multimeter. A proton exchange membrane, wired to a graphite anode and cathode was submerged in water acting as an electrical conductor. 10 voltage readings were taken for each of 3 subjects per species. The values were then averaged to find the mean voltage output. The Spider Plant subjects yielded the greatest mean voltage of 0.0902. The Jessenia Pothos' closely followed at 0.0762, then the Bald Cypress' at 0.0438, and lastly Giant Hairgrass' at 0.0251 mean volts. A small LED can operate on 1.2 volts, indicating a maximized system, possibly with multiple plants, could power home lighting. All plant subjects were in early stages of growth and the maturity of root systems directly correlated with voltage output, implying more developed plants, such as mature trees, could produce greater voltage readings.