An Investigation on the Use of "Tradescantia pallida" as a Sensitizer for the Dye-Sensitized Solar Cell

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This project investigated the use of the plant "Tradescantia Pallida," also called Purple Heart, as a sensitizer for the Gratzel cell. Never before has Purple Heart been researched for such a purpose. First, the effect of soaking time and solvent on the efficacy of the dye was tested. Purple heart leaves were chopped into strips, then soaked for 1 day or 3 weeks in either water or ethanol. The extracted dyes were used to sensitize solar cells. After fabrication, the cells' voltage output was measured using a multimeter under a 250W incandescent tungsten lamp. Results showed that aqueous dyes produced cells with higher average cell potentials than ethanol dyes. In addition, soaking time for longer than a day did not boost the solar cell's potential. Further testing proved that lowering the pH of the aqueous purple heart dye increased the solar cell's current significantly. Additionally, acetone was used to extract chlorophyll from the purple heart plant. The solar cell sensitized with this dye produced similar results to the aqueous purple heart dye. However, a spectrophotometric analysis done on the chlorophyll and aqueous purple heart dyes revealed that they absorbed light from different parts of the visible light spectrum. Further research will be done to find a way to co-sensitize a solar cell with the chlorophyll and acidic aqueous purple heart dyes in order to maximize the absorption spectrum. Overall, Purple Heart has proved to be an effective source of dye to be used as a sensitizer for the Gratzel cell.

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