

Abstract

The demand for truly green energy solutions is increasing both as a necessity worldwide and as a requirement in more energy progressive jurisdictions. Melanin, a non-toxic and widely available biopolymer, has shown some promise in past research as a candidate for truly clean energy storage and production. With potential applications in the biotechnology field, where non-toxicity is imperative, this body of work sets out to engineer a proof of concept melanin-aqueous electrochemical cell, which converts incident electromagnetic radiation into useful electrical energy. Fungal and bacterial melanin were utilized in different concentrations in melanin aqueous cells. After comparing the multiple cells constructed, the results revealed the bacterial melanin electrochemical cell with a 1% concentration of melanin by weight to have the best performance. Analysis of the voltage output demonstrates reactivity to incident artificial solar radiation and a recorded power density of 268 $\mu\text{W/L}$.