

Indole oxidation enhances electricity production in an E. coli-catalyzed microbial fuel cell

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Microbial fuel cells (MFCs) generate electricity from the oxidation of dissolved organic matter. A variety of Gram-positive and Gram-negative bacteria, including Escherichia coli, produce a large quantity of indole, which functions as an extracellular signal molecule. This work explored the role of indole in a mediatorless E. coli catalyzed MFC. Although the presence of indole alone did not affect power generation, indole oxidation by the indole-oxidizing enzyme toluene-o-monooxygenase (TOM) enhanced power density by 9-fold. Open circuit voltage and polarization curve showed that indole oxidation by TOM produced a maximum power density of 5.4 mW/m² at 1,000 ohm. Cyclic voltammetric results suggested that indole oxidation resulted in the production of redox compounds.