

Enzymatic Biofuel Cells for Energy Harvesting

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As we start to consider energy sustainability as a component of combatting global climate change, we need to consider energy harvesting and energy conversion from waste streams as possible components of the solution to energy sustainability. Enzymatic biofuel cells are one technology that can be useful for energy harvesting and energy conversion from waste streams. Enzymatic biofuel cells can harvest energy from living organisms (i.e. implanting biofuel cells in plants, trees, cacti, etc.) or from waste streams (i.e. utilizing biofuel cells to do energy conversion of food and beverage waste streams). This paper will detail the development of enzymatic biofuel cells utilizing both direct electron transfer and mediated electron transfer systems. Fuel systems such as alcohols, acids, and carbohydrates will be discussed as well as some of the technological issues with utilizing biofuel cells for energy harvesting (i.e. toxins present in tree sap, variability of fuel source and content from waste streams, etc.).