The Effectiveness of Local Photosynthetic Aquatic Microorganisms in Biophotovoltaic Solar Cells

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This experiment focuses on the isolation and testing of local, photosynthetic, and aquatic microorganisms for use in biophotovoltaic cells (BPV cells). The inspiration for this project stemmed from concern about the world's increasing energy demand. Our limited energy resources require new methods of energy production to be explored. BPV cells are a potential method of energy production; however, they are inefficient compared to commercial energy sources. One of the contributing factors to the improvement of BPV efficiencies is the species of microorganism that is used. To capitalize on this factor, this experiment gathered new microorganisms from their natural habitats. These microorganisms have the potential to produce more energy than those that have been grown in a lab for generations because they may have more efficient photosynthetic processes. The specimens were collected from streams and rivers in Transylvania County, North Carolina. Organisms were inoculated onto plates containing a growth medium and replated every week, then selected for preliminary testing based on purity and a lack of fungal growth. They were tested in BPV cells under uniform, controlled, and measured artificial light. Several BPV cells were found to produce more energy over time, although many produced insufficient voltages. It was determined that local, photosynthetic, and aquatic microorganisms can produce substantive voltages in BPV cells.

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