The Effect of Mixed Culture on MFC

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Since the US spends over $500 billion on energy annually, scientists try to find a cheaper, cleaner, and renewable source of energy. A great solution can be a microbial fuel cell (MFC), which uses bacteria to generate electricity. The purpose of this project (which is a continuation of previous studies) was to determine if pure (E. coli only) or mixed (E. coli and E. aerogenes) cultures of bacteria are able to generate a higher voltage. The hypothesis formulated based off of research stated that if the electricity in an MFC was generated by the mixed cultures of E. coli and E. aerogenes, then this MFC would have a higher voltage than the MFC where the electricity was produced only by E. coli because the growth rate of the mixed cultures was higher. Two trials of the experiment were performed. In each trial, one MFC was a control group with 1 mL of E. coli fed with 60 grams of glucose. The other MFC was an experimental group with 0.5 mL of E. coli and 0.5 mL of E. aerogenes, also with 60 grams of glucose as substrate. The total amount of bacteria in the experimental group was 1 mL, just like in the control group. The results were checked daily for 14 days. The results of both trials showed that the mixed cultures of bacteria are able to generate a higher amount of electricity than the pure cultures. The average output of the experimental groups in both trials was almost twice as high as the average output of both control groups. This proves the hypothesis correct.

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