Utilizing Eukaryotic Saccharomyces cerevisiae as an Electricigen in Both Pure & Co-Culture in the Anode of a Microbial Fuel Cell

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With America's newfound commitment to reducing fossil fuel usage, more renewable energy sources need to be researched. To address this need, microbial fuel cells (MFCs) have been receiving renewed attention. Much research is still needed to determine the ideal electricigen or combination of electricigens, for ideal voltage production. The yeast, Saccharomyces cerevisiae, shows great potential for use in MFCs as it is nonpathogenic and easier to handle then most electricigens, but has yet produced a viable voltage amount in pure culture MFC experiments. This study looked at utilizing S. cerevisiae, in co-culture with the more common prokaryotic Escherichia coli, as a viable candidate for voltage production in MFC. 3 experimental groups of MFC's were established as follows: control of pure culture E. coil, control of pure cultured yeast, and a co-culture of yeast and E. coli. Voltage readings were taken every second for a minimum of 24 hours. A two sample t-test comparing the mean voltage produced in pure culture yeast, and also pure culture E. coli, to co-culture yeast & E.coli trials during peak production. A second t-test on maximum voltage for pure cultures yeast and E. coli were compared to the maximum voltage of the co-culture yeast & E.coli. The largest average maximum voltage produced across all trials for each group was found in co-culture at 0.31V. The only test that did not fail to reject the null hypothesis is when comparing the mean voltage of pure culture yeast to co-cultured yeast & E.coli group during peak production. This provides statistical merit to the alternative hypothesis but more testing is necessary. In the future, a full scale attempt at producing voltage in a microbial fuel cell using yeast, shows more promise in co-culture than in pure.

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