Urea Concentration on Microbial Fuel Cell Power Output for Applications in Waste Management

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The project studied the effect of urea on Microbial Fuel Cells (MFCs). Researchers have found MFCs to show the greatest potential for upscaling in the field of waste management. The cells could treat waste while simultaneously producing energy, thereby limiting the energy usage of traditional treatment plants. Increasing concentrations of specific compounds, selected so as to remain treatable by systems, may increase energy production. The study looked at the effect of urea concentration on the cells' energy output, recorded in microwatts. The data showed a positive relationship between urea concentration and maximum cell power output. Irregularities in the experiment included unequal water levels, as a constant overall substrate mass (compost + water + urea) was prioritized over a constant mass of water. Also, data consistently showed an uptick in the power output of cells with a 0% urea concentration when graphed against higher resistance levels of 2200+ ohms; however, this pattern isn’t drastic enough to change the overarching conclusion. This study could be improved by testing a greater spread of resistors to further study this possible pattern. Furthermore, higher urea concentrations could be tested to see when urea begins to negatively impact power output, with additional trials to confirm the results. Future studies should explore the effect of other compounds commonly found in waste on MFC power output.

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