Electrogenic and Antimethanogenic Properties of *Bacillus cereus* for Enhanced Power Generation in Anaerobic Sludge-Driven Microbial Fuel Cells

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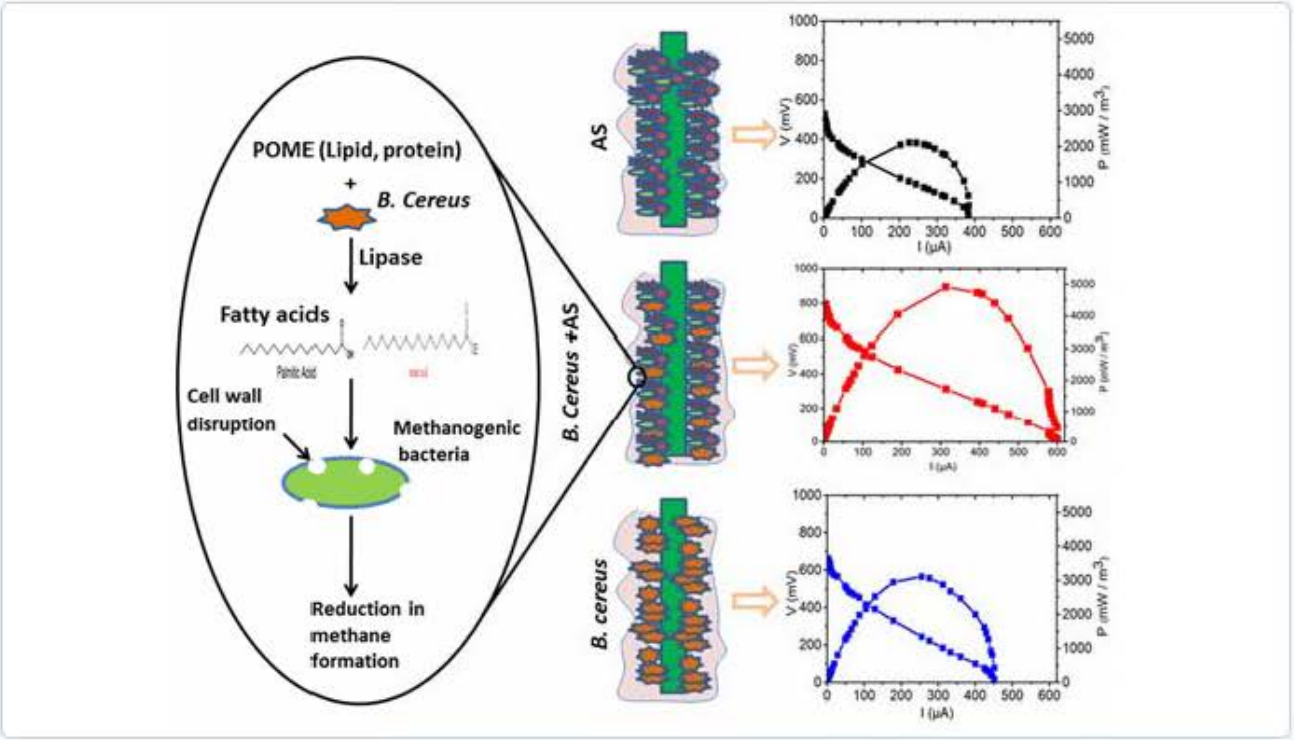
Abstract



Mutual interactions between microorganisms play a vital role in the formation of electroactive biofilms, which is a key element in the longevity and success of bioelectrochemical systems. The present study was intended to examine both the electrogenic properties of *B. cereus* and its ability to inhibit methanogenesis in microbial fuel cells (MFCs). The potential influence of the incorporation of *B. cereus* into anaerobic sludge (AS) on the electrochemical activity was assessed using cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) analyses. The CV of MFCs with *B. cereus* showed a strong redox peak, suggesting that *B. cereus* has electrogenetic properties. Moreover, the incorporation of *B. cereus* into AS provided an enhancement in the power generation (4.83 W/m^3) and the CE (22%) of the MFC compared to the corresponding values for an MFC inoculated solely with AS (1.82 W/m^3, 12%). The increase in power generation could be due to the antimethanogenic property of *B. cereus*, which was evident from the 54% reduction in methane production. The results of this study suggest that the incorporation of microorganisms with electrogenic and antimethanogenic properties into AS promotes the formation of electroactive biofilms and maximizes the power generation of MFCs by suppressing the methanogenesis.