ABSTRACT

The increasing global electricity consumption driven by population growth and industrial development necessitates the exploration of environmentally friendly renewable energy sources. Microbial fuel cells (MFCs), more specifically deep-sea sediment microbial fuel cells, have gained significant attention in the bioenergy industry as they can harness bacteria capability to generate electricity from the abundant organic matter in sediment. Temperature is a crucial factor influencing MFC performance, affecting microbial activity, mass transfer efficiency, and thermodynamic properties. In this study, deep-sea SMFCs were evaluated for their electricity generation and bacterial viability at three different temperatures: 4°C, 25°C, and 37°C. Results demonstrated that the higher temperature (37°C) yielded the highest current density (172.4966 mA/m^2) and power density (20.0967 mW/m^2), accompanied by increased viable cell enumeration and mixed colony growth.

Keywords: microbial fuel cells (MFC), sediment microbial fuel cells (SMFC), deep-sea sediment, temperature effect, electricity generation, bacterial viability