Abstract
Objective: To investigate a syntrophic interaction between Geobacter sulfurreducens and hydrogenotrophic methanogens in sludge-inoculated microbial fuel cell (MFC) systems running on glucose with an improved electron recovery at the anode. Results: The presence of archaea in MFC reduces Coulombic efficiency (CE) due to their electron scavenging capability but, here, we demonstrate that a syntrophic interaction can occur between G. sulfurreducens and hydrogenotrophic methanogens via interspecies H2 transfer with improvement in CE and power density. The addition of the methanogenesis inhibitor, 2-bromoethanesulfonate (BES), resulted in the reduction in power density from 5.29 to 2 W/m(3), and then gradually increased to the peak value of 5.5 W/m(3) when BES addition was stopped. Conclusion: Reduction of H2 partial pressure by archaea is an efficient approach in improving power output in a glucose-fed MFC system using Geobacter sp. as an inoculum.