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## COMPARISON OF PERFORMANCE OF AN EARTHEN PLATE AND NAFION AS MEMBRANE SEPARATORS IN DUAL CHAMBER MICROBIAL FUEL CELLS

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### Abstract

The performance of microbial fuel cells (MFC) employing an earthen plate as a membrane separator is compared to that using Nafion 117 in an identical up-flow dual-chambered cylindrical cell configuration. The MFC configuration is of a cylindrical outer cathode chamber separated by the membrane from a concentric rectangular inner anode chamber. The fuel cells, operated under continuous mode at hydraulic retention time of 12 hr, achieved average chemical oxygen demand removal efficiency of 60% and 48%, for the Nafion and earthen plate separators, respectively. The microbial fuel cells based on the earthen plate separator generated slightly lower average (28%) and maximum (48%) power densities than Nafion separator which is likely due to the higher membrane resistance. The earthen plate separator is 99% cheaper than the Nafion membrane, showing promise as an alternate separator for application to MFC technology.

*Key words:* chemical oxygen demand, earthen plate, microbial fuel cell, power density, proton exchange membrane

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