

## Magnet-Facilitated Selection of Electrogenic Bacteria from Marine Sediment

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### Abstract

© 2015 Larisa Kiseleva et al. Some bacteria can carry out anaerobic respiration by depositing electrons on external materials, such as electrodes, thereby creating an electrical current. Into the anode chamber of microbial fuel cells (MFCs) having abiotic air-cathodes we inoculated microorganisms cultured from a magnetic particle-enriched portion of a marine tidal sediment, reasoning that since some external electron acceptors are ferromagnetic, electrogenic bacteria should be found in their vicinity. Two MFCs, one inoculated with a mixed bacterial culture and the other with an axenic culture of a helical bacterium isolated from the magnetic particle enrichment, termed strain HJ, were operated for 65 d. Both MFCs produced power, with production from the mixed culture MFC exceeding that of strain HJ. Strain HJ was identified as a *Thalassospira* sp. by transmission electron microscopic analysis and 16S rRNA gene comparisons. An MFC inoculated with strain HJ and operated in open circuit produced 47% and 57% of the maximal power produced from MFCs inoculated with the known electrogen *Geobacter daltonii* and the magnetotactic bacterium *Desulfamplus magnetomortis*, respectively. Further investigation will be needed to determine whether bacterial populations associated with magnetic particles within marine sediments are enriched for electrogens.

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