Electroactive microorganisms in bulk solution contribute significantly to methane production in bioelectrochemical anaerobic reactor

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Electroactive microorganisms in bulk solution contribute significantly to methane production in bioelectrochemical anaerobic reactor

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Abstract

The role of anaerobic microorganisms suspended in the bulk solution on methane production was investigated in a bioelectrochemical anaerobic reactor with the electrode polarized at 0.5V. The electron transfer from substrate to methane and hydrogen were 25% and 7.5%, respectively, in the absence of the anaerobic microorganisms in the bulk solution. As the anaerobic microorganisms increased to 4,400 mg/L, the electrons transferred to methane increased to 83.3% but decreased to 0.3% in hydrogen. The electroactive anaerobic microorganisms (EAM), including exoelectrogens and electrotrophs, enriched in the bulk solution that confirmed by the redox peaks in the cyclic voltammogram was proportional to