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Assessing potential cathodes for resource recovery through wastewater treatment and salinity removal using non-buffered microbial electrochemical systems

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Abstract

The present study evaluates relative functioning of Microbial Electrochemical Systems (MES) for simultaneous wastewater treatment, desalination and resource recovery. Two MES were designed having abiotic cathode (MES-A) and biocathode (MES-B) which were investigated with synthetic feed and saline water as proxy of typical real-field wastewater. Comparative anodic and cathodic efficiencies revealed a distinct disparity in both the MES when operated in open circuit (OC) and closed circuit (CC). The maximum open circuit voltage (OCV) read in MES-A and MES-B was about 700 mV and 600 mV, respectively. Salinity and organic carbon removal efficiencies were noticed high during CC operation as 72% and 55% in MES-A and 60% and 63% in MES-B. These discrete observations evidenced ascribe to the influence of microbial electrochemical induced ion-migration over cathodic reduction reactions (CRR).

Keywords: bioelectrofermentation; biofilms; biocathode; external circuitry; waste