

Accepted Manuscript

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PII: S0960-8524(17)30687-9

DOI: <http://dx.doi.org/10.1016/j.biortech.2017.05.048>

Reference: BITE 18074

To appear in: *Bioresource Technology*

Received Date: 31 January 2017

Revised Date: 6 May 2017

Accepted Date: 8 May 2017

Please cite this article as: Velvizhi, G., Venkata Mohan, S., Multi-Electrode bioelectrochemical system for the treatment of high dissolved solids bearing chemical based wastewater, *Bioresource Technology* (2017), doi: <http://dx.doi.org/10.1016/j.biortech.2017.05.048>

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ICETB 2016 Abstract No: BR-032

Multi-Electrode bioelectrochemical system for the treatment of high dissolved solids bearing chemical based wastewater

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Abstract

Multi-electrode bioelectrochemical treatment system (ME-BET; membrane less) consisting of six electrode assemblies (E1 to E6) was developed for the treatment of complex chemical based wastewater with high salt concentrations. The study was also compared with single electrode assembly BET reactor (SE-BET). Enhanced salts and COD removal was observed in ME-BET (32%; 56%) compared to SE-BET (11%; 23%) as a result of *in situ* bio-potentials generated from multiple electrodes through the oxidation of organic substrate in the wastewater. Inorganic pollutants viz., nitrates (28%; 8%), sulphates (25%; 9%) and phosphates (20%; 7%) removal was higher in ME-BET in comparison with SE-BET and this was also supported with bioelectrogenic activity (584; 160 mW/m³). The study infers that the development of compact reactors with multiple electrodes in a single system enhances the anodic reactions for effective treatment of complex wastewater and simultaneous power production.

Key words: Total Dissolved Solids (TDS); Electron losses; Desalination; Microbial fuel cell; Voltage reversal.

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