



# Bioelectricity As A Green Technology: Study Of Bioelectricity Generation Potential Of A Domestic Waste Water Based Microbial Fuel Cell

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## Abstract:

Microbial fuel cells (MFCs) utilizes active microorganisms as biocatalysts in an anaerobic anode compartment to produce bioelectricity. The present study records the bioelectricity generation potential of domestic waste water, basically rice washed water as the anolyte and a pure culture of cyanobacteria as the catholyte. Graphite electrodes (4 cm<sup>2</sup>) were inserted into both compartments. Anode compartment was filled with 1 liter of rice washed water from household and sealed. The cathode compartment was filled with pure culture of *Microcystis* sp. cultured under laboratory conditions. Both electrodes were connected to a 0.33Ω external resistor. The control setup of the MFC was maintained using distilled water as the catholyte. Physico-chemical parameters such as Nitrate, Nitrite and Chemical Oxygen Demand (COD) and Orthophosphate concentrations of the rice water sample was measured in both experimental and control setups. In addition the voltage generated at each sampling time was recorded in both setups and subsequently current, power density, current density were calculated. Water treatment efficiencies were recorded as Reduction of COD by 23.37%, N-Nitrate by 61.02%, N-Nitrite by 55.14% and Orthophosphate by 20.06%. The optical density of cathode increased by 11.4%. While control setup did not show a significant reduction. The maximum voltage generated by the MFC was 730± 0.85mV with a current of 2181.82 mA. Maximum current densities and power densities were 1472.21 mAcm<sup>-2</sup> and 1059.99 mW m<sup>-2</sup> respectively. Therefore, the laboratory scale MFC employed in this study could be effective used in treating domestic waste water while using as a source of bioelectricity.

## Biography:

Dr.F.Sumaiya Idroos has completed her PhD at the age of 30 years from University of Sri Jayewardenepura, Sri Lanka. She is a senior lecturer working at the department



of Zoology of University of Sri Jayewardenepura. She has published more than 10 papers in reputed journals and have won 6 awards for research publications in international conferences.

## Recent Publications:

- 1- Biodegradation of microcystin analogues by *Stenotrophomonas maltophilia* isolated from Beira Lake Sri Lanka
- 2- Seasonal occurrence of Microcystin-LR with respect to physico-chemical aspects of Beira lake water
- 3- Toxin Producing Cyanobacteria in Labugama, Kalatuwawa Drinking Water Reservoirs
- 4- Seasonal variation of Microcystin -LR with respect to some physico-chemical parameters in the Beira lake waters
- 5- Aquatic life health quality assessment of the Bolgoda Canal and Waga Stream with respect to selected physicochemical parameters and bioindicators
- 6- Heavy metal contamination status in seven fish species from reservoirs of Polonnaruwa district, Sri Lanka
- 7- Development of an Efficient Extraction Method to Quantify Microcystin-LR from Natural Microcystis Bloom Samples from the Colombo Lake, Sri Lanka

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