

Harnessing of Electricity from Distillery Effluent and Simultaneous Effluent Treatment by Microbial Fuel Cell

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Abstract : The advancement in the science and technology has made it possible to convert electrical energy into any desired form. It has given electrical energy a place of pride in the modern world. The survival of industrial undertakings and our social structure depends primarily upon low cost and uninterrupted supply of electrical energy. Microbial fuel cell (MFC) is a promising and emerging technique for sustainable bioelectricity generation and wastewater treatment. MFCs are devices which are capable of converting organic matter to electricity/hydrogen with help of microorganisms. Different kinds of wastewater could be used in this technique, distillery effluent is one of the most troublesome and complex and strong organic effluent with high chemical oxygen demand of 1,53,846 mg/L. A single cell MFC unit was designed and fabricated for the distillery effluent treatment and to generate electricity. Due to the high COD value of the distillery effluent helped in the production of energy for 74 days. The highest voltage got from the fuel cell is 206 mV on the 30th day. A maximum power density obtained from the MFC was 9.8 mW, treatment efficiency was evaluated in terms of COD removal and other parameters. COD removal efficiencies were around 68.5 % and other parameters such as Total Hardness (81.5%), turbidity (70 %), chloride (66%), phosphate (79.5%), Nitrate (77%) and sulphate (71%). MFC using distillery effluent is a promising new unexplored substrate for the power generation and sustainable treatment technique through harnessing of bioelectricity.

Keywords : microbial fuel cell (MFC), bioelectricity, distillery effluent, wastewater treatment

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020