AN ATTEMPT TO ENHANCE THE PERFORMANCE OF ORGANIC WASTE BASED MICROBIAL FUEL CELL USING GRAPHITE AND STEEL CATHODE

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Microbial electrochemical technology has been evolving as a sustainable biotechnology branch, due to its ability to produce bioenergy and recover value added products. Microbial Electrochemical systems have diverse applications , which include Microbial fuel cells(MFCs) for harnessing bioelectricity. The construction and analysis of MFCs requires the knowledge of different scientific and engineering fields, ranging from microbiology to electrochemistry to materials and environmental engineering. Microbial fuel cells provide inexpensive energy source as they offer the direct generation of electricity from different resources. They function mainly by converting organic matter to electricity energy through a cascade of redox reactions in the presence of biocatalysts. Use of mixed consortia as the biocatalyst and organic solid waste(in liquid form) as the feed stock is an economically viable option to upgrade MFCs, which will have many benefits. The artificial electron acceptor and donor (anode and cathode) induce the development of potential difference , which acts as a net driving force to transfer the electrons. For further development of MFCs a greater focus on the understanding of its components, microbial processes, factors of limitations and design of the construction is mandatory to develop a simplified and large scale system. The objectives of the present study is to enhance the power production efficiency of a single chambered mediator-less microbial fuel cell from organic solid waste using modified electrodes and determining the performance of MFC based on the polarization behavior , potential difference and sustainable resistance.

Keywords : Bioelectricity, microbiology, electrochemistry, redox reactions, biocatalysts, power production, electron acceptors and donors.