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Application of Microbial Fuel Cell as a Combine Strategy for Treatment of Landfill Leachate and Power Generation: Review

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ABSTRACT

Microbial fuel cells (MFC) have emerged as a promising energy-harvesting technology in recent years which offer important economic benefits. This method employed environmental contaminants as a substrate, such as effluent from landfill leachate to recover energy and improve treatment efficiency. These contaminants pollute water bodies, harming aquatic life, raising costs of water treatment plant, and emit harmful gases to deplete the ozone layer. Among several substrates, landfill leachate effluent is mostly employed to investigate the potentials of this technique. This paper presents a state-of-the-art review of the current application of the MFC as a combined strategy for the treatment of landfill leachate as well as the generation of electricity. The review article highlighted the prior findings of the influence of operational factors, operating mode, substrate composition and impact of contaminants on MFC power potential and treatment efficiency. The review presents prior findings from various implementations of the technology across the globe, the operational parameters in the respective case studies, the results obtained as well as the challenges encountered with the view to recommending possible solutions. While there is a consensus of opinions that the MFC is an efficient technology both in the treatment of landfill leachate and the generation of electric power, a significant number of the findings identified the inhibiting influence of Ammonia Nitrogen as a hurdle that must be crossed if the gains of the technology will fully be harnessed and retained.

Keywords: *Microbial Fuel Cell; Landfill Leachate Effluent; Waste Treatment; Energy Generation*