Environmental Remediation and Energy Generation by Bioelectrochemical Systems

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Abstract

The waterbody across the world is confronting serious dilemma as a result of widespread chemical contamination which largely threatens human health and endangers the ecosystems. However, the developed countries are contributing intensively for the ecological remediation comprising of both surface water and groundwater, soil as well as the atmosphere. In addition, the utilization of water by the chemical industries has been consistently expanding. The demand of water is predicted to approach 55% by 2050 whereas the water requirement in the industrial fields are forecasted to be 400% higher for the upcoming 50 years. Nevertheless, the treatment of industrial wastewater by traditional methods is energy intensive. The bioelectrochemical system (BES) also known as microbial electrochemical system is an advanced stage of technology which is useful for wastewater treatment and concurrently generates clean energy. In accordance with that, this innovative technology creates latest interdisciplinary field with regards to research and development by incorporation of microbiology, electrochemistry, materials science and engineering. BESs possess few scope of potential configurations and applications and these includes wastewater treatment, biofuels production, water desalination, biosensors and as a source of energy for control areas. Hence, the presentation will concentrate more on the current status of research on particular BES which is the microbial fuel cell (MFC). The factors influencing performance of MFC will be discussed in detail. Besides, specific attention will be paid on the mechanism of electron transfer in the anode. The issues and challenges identified with the scale up of MFC technology will also be thoroughly discussed.