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Bioelectrochemical systems for treatment of liquid effluents

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Microbial Fuel Cells (MFC) and Microbial Electrolysis Cells (MEC) have emerged during the last years as an alternative to conventional wastewater treatments. These treatments commonly called Bioelectrochemical Systems (BES) can offer substantial advantages from the economic and environmental perspective since they allow the recovery of a fraction of the energy initially present in the organic matter contained in wastewaters. Moreover, it has been demonstrated that BES can also perform combined carbon and nitrogen removal with the simultaneous production of electricity and fuels, thus creating new opportunities for BES to be considered as an integral wastewater treatment. In this paper, we present a general point of view of the different applications of this technology with the focus on new developments for the production of chemicals production. Particular examples are also presented, which were obtained in our laboratories with the use of pilot plants at different scales: Results of organic matter removal of various liquid effluents and preliminary data of the simultaneous removal of carbon and nitrogen in a pilot microbial electrolysis cell of more than 100 L along with a 60 L aerobic reactor for ammonium oxidation. The treatment of wastewater with a low organic matter load in a MEC system resulted in a reduction near 80% or total organic carbon (TOC). For the highest load tested the TOC reduction reached a value near 90%.

Biography

Antonio Moran has been involved in several nationals and internationals projects. He is working in the optimization of biogas and bio-hydrogen production from biowastes, and in some cooperative projects related to wastewater treatment by Microbial Electrolysis Cells (MEC). He is the Co-coordinator of the Engineering PhD I program in Leon University. He has published more than 80 papers in reputed journals. He has actuated as referee of some scientific journals and evaluator of national and international projects (different countries and European Commission).

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