Populärvetenskaplig sammanfattning

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Limited resources of fossil fuels and their negative impact on the Earth has motivated researchers, in both academia and industry, to search for renewable green energies, which contribute less to environmental stresses such as climate change and global warming. Another global problem is the management of municipal- and wastewater and other waste streams. Microbial electrochemical systems are modern sustainable green technologies that have been introduced in the last few decades and could in various forms contribute to energy generation and storage, resource recovery from waste streams, and degradation of pollutants in wastewater and the environment. In microbial electrochemical systems, living microorganisms function as catalysts for reactions on the anode and/or the cathode. There is a variety of potential applications ranging from wastewater treatment and biogas generation to production of chemicals. Systems with bioanodes could be used to convert organic compounds to electrical current and systems with biocathodes could be used to reduce CO_2 to methane, acetate, or other high-value chemicals. During the operation of such systems, biological electrodes may encounter disturbances that can affect their performance and microbial community composition. The work in this thesis assesses the effects of three disturbances, namely storage, starvation and potential changes on the biological electrodes enriched in microbial fuel cells and microbial electrolysis cells.