

Development of small scale ceramic Microbial Fuel Cells for clean energy extraction from urine

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During the last 20 years great interest in Microbial Fuel Cells (MFCs) has intensified due to the extraction of clean electricity from waste streams such as urine. The technology is based on ceramic built MFCs in which the terracotta chassis is also the membrane between the anode and the cathode half-cells. The microbial engine (anode) bio-transforms the organic matter in urine to generate direct electric current, whilst the cathode reduces oxygen allowing the extraction of water and nutrients from the waste stream. By improving the reactor configuration, size, electrode/volume ratio and further multiplication of units into stacks, the technology is able to produce usable power levels to operate indoor lighting, robots or charge devices such as mobile phones. Physical and chemical stability of ceramic based MFCs is allowing to also extract valuable compounds from urine in the cathode chamber in the form of catholyte adding value to the sustainable treatment of waste. This work is aiming to look into the improved levels of electric current with the use of non-platinum cathode catalyst as well as the physicochemical nature of the extracted catholyte as a metric of current induced treatment.