Microbial fuel cell technology recharges smartphones with urine

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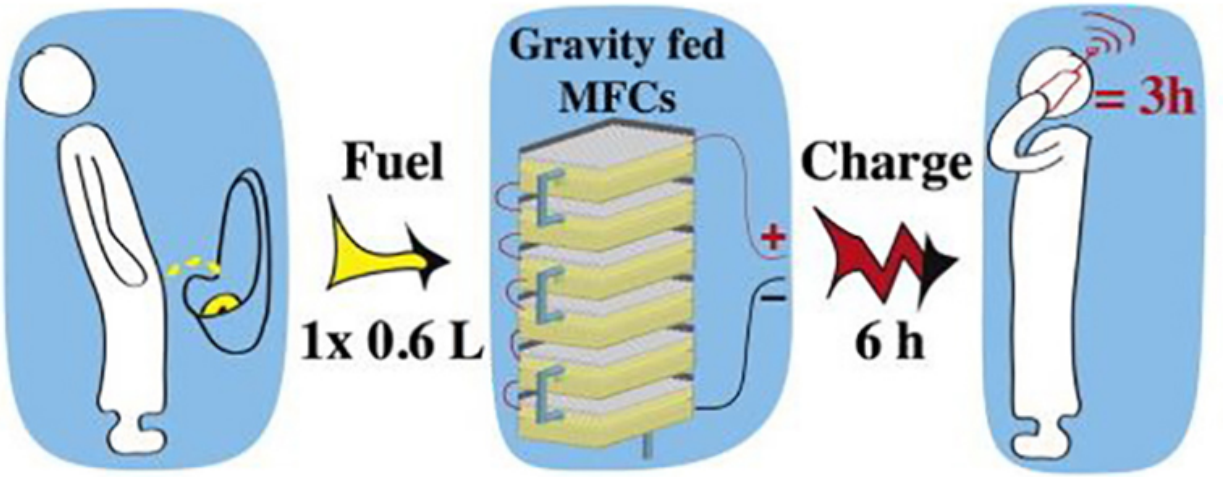

Credit: University of the West of England

The microbial fuel cell technology, which is also inside the 'Pee Power' urinals developed at the University of the West of England (UWE Bristol), now has the capacity to power up and recharge a smartphone.

A world first, the new improved system enables three hours of phone operation (outgoing call) for every six hours of charge time, with as little as 600ml (per charge) of urine.

The sustainable charging system provides enormous potential to enable people to stay connected in areas that are off grid using urine, a freely

available fuel.

Three years ago Professor Ioannis Ieropoulos, Director of the Bristol Bioenergy Centre (BBiC), at the Bristol Robotics Laboratory at UWE Bristol, announced that it was possible to power up an ordinary mobile phone using urine fed microbial fuel cell stacks (MFCs).

Since making the initial discovery that urine could be used as an electricity generator by acting as the fuel for MFCs the team has been investigating finding ways of increasing the power generating capabilities as well as reducing the size of the MFC stack.

The new study 'Urine transduction to usable energy: A modular MFC approach for smartphone and remote system charging' reports for the first time the full charging of a state-of-the-art mobile smartphone, using microbial fuel cells fed with urine.

Professor Ieropoulos explains, "We are excited to announce several global firsts - this development was possible by employing a new design of MFCs that allowed scaling-up without power density losses.

"Although it was demonstrated in the past that a basic mobile phone could be charged by MFCs, the present study goes beyond this to show how, simply using urine, an MFC system successfully charges a modern-day smartphone."

Several energy-harvesting systems have been tested and results have demonstrated that the charging circuitry of commercially available phones may consume up to 38% of energy on top of the battery capacity. The study concludes by developing a mobile phone charger capable of three hours of phone operation (outgoing call) for every six hours of charge time, with as little as 600ml (per charge) of neat urine – equivalent to a single visit to the toilet.

More information: Xavier Alexis Walter et al. Urine transduction to usable energy: A modular MFC approach for smartphone and remote system charging, *Applied Energy* (2016). DOI: 10.1016/j.apenergy.2016.06.006