# Superbugs make green energy from black waste

September 18 2013

A costly health problem facing countries all over the world – petroleum contamination of groundwater – could soon be tackled by armies of the world's tiniest inhabitants turning toxic waste into green electricity.

Australia alone has some 120,000 contaminated groundwater sites of the world's estimated 5 million sites. These are a legacy of petrol, diesel and other hydrocarbons that have leached into the ground from old service stations, fuel dumps and factories, and often remain polluted long after the redevelopment of the land, posing a health risk to current and future residents.

Krishna Venkidusamy, a PhD student with the CRC for Contamination Assessment and Remediation of the Environment (CRC CARE) and University of South Australia (UniSA), is part of a team developing technology to take on the massive task of cleaning up this 'black waste' using an army of bacteria to digest the contaminants and clean the water.

But that is not all – during the cleaning process these bacteria produce electrons, which Ms Venkidusamy and the team at UniSA are harnessing with a special reactor that produces electricity, or 'green watts'.

Miss Venkidusamy's work towards this Australian-first advance will be presented at the Crown Conference Centre for CleanUp 2013, the 5th International Contaminated Site Remediation Conference, being held in Melbourne.

"During my research I've managed to isolate peculiar bacteria that are efficient gobblers of black waste, and on top of that, also convert this waste into green watts," says Ms Venkidusamy.

"The idea of using bacteria to clean up polluted sites has been known for decades, but recent technological advances have made it possible to harness the electricity generated during the clean up process.

"To charge these 'bacterial batteries' we pass contaminated groundwater through a reactor, which contains a series of electrodes and billions of bacteria. As the bacteria eat the waste material and produce electrons, this charge is conducted through the reactor to generate power."

The approach may prove especially useful in areas with limited access to electricity as, once up and running, the reactor can potentially power itself.

"Our laboratory trials of this new method have been really promising. Not only does the bacteria-and-electrode combination avoid the production of harmful by-products that some other clean-up processes generate, but it is also faster," says Ms Venkidusamy.

"Soon we will start with field experiments to scale up the technology so that it can be operated at a commercial level.

"Although we are currently working on petroleum-polluted groundwater, the process is suitable for almost any type of organic waste material, from contaminated soil to the by-products of many industries," she adds.

The technology is expected to be of value to land developers and heavy industry wishing to rid valuable urban land of its legacy of petroleum contamination from years gone by – and to help reduce the cost of clean-up by generating 'free' electrical power.

**More information:** www.cleanupconference.com/

Provided by CRC for Contamination Assessment and Remediation of the Environment