

Solar Times

Microbial Fuel Cells

Posted in [Alternative Energy](#) by admin.

The other end of solar energy?



As the search for fuel cells goes on, many environmentalists give all their attention to solar energy, the possibilities involving photosynthesis and the [microbial](#) world. What about where there is no solar energy directly available, such as below the sea?

For more than 30 years, research has tried to develop a microbial fuel cell that digests wastes, instantly producing electricity. Just take a look at Dr. Emitt Browns Time Machine in Back to the Future with Michael J. Fox; just after he comes back from his trip 30 years into the future; he just drops a banana peel out of the garbage into the Delorians microbial fuel cell chamber, and vroom... into the sky.

That is the kind of energy conversion researchers desire from microbial fuel cells, but it is still far away in the distant (evolutionary and genetic) future. At present this conversion takes about a week at its fastest rate.

The biggest challenge is getting what are being called Geobacters, to be far more aggressive in their microbial digestion in anaerobic environments such as underground and undersea waste products, which means genetic engineering on a nanite-scale of 2 to 3 microns at most.

More than 30 species of these iron breathers used in Microbial Fuel Cells are being tested and developed at the University of Massachusetts in Amherst by Dr. Derek R. Lovley (American) and Dr. Swades Chaudhuri (Indian).

Their Microbial Fuel Cells are so far removed from the direct line of Solar Energy that it actually makes one wonder about the implications on our

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future methods of harnessing energy.

In recent years UMASS Environmental Biotechnology Center has put in a lot of research into the [Geobacter Project](#). The word Geobacter (geological bacteria) refers to anaerobic micro-organisms that in most cases thrive under extremely high temperatures, far above those temperatures commonly inhabited by more complex organisms.

We have found that dissimilatory metal-reducing microorganisms, such as Geobacter and Rhodoferrax species, have the novel ability to directly transfer electrons to the surface of electrodes.

The word Geobacter seems more for quick thirty-second media bites rather than for scientific researchers accustomed to big language, because the concept is so easy to grasp.

When regular folks hear the word Geobacter nowadays, it indicates to their minds eye a battery that generates electricity from deep sea composting micro-organisms that just love to break down sugars, producing needed CO2 for underwater plants. It has this resilient ecological tone while it cleans up oil spills over time and can even reduce radioactivity in uranium-polluted ground water to regulation levels within a week according to Dr. Lovley in a recent [interview](#) done on Massachusetts Commonwealth Journal radio show.

The word Geobacter also gives the futurist gist of being able to deposit a sugar cube into the microbial fuel cell of a [cellular phone](#) and for those who are addicted to old reruns of Star Trek the Next Generation; it conjures up images of Wesley Crusher accidentally letting loose his artificially intelligent nanite medical-robots that end up taking over the Enterprise.

Geobacters guarantee bigger concepts for those delving in renewable energies and solar power is only the tip of the proverbial flame. Heat is energy, and Geobacters give off the kind of energy that we as a civilization need to charge and propel ever-SMALLER batteries.

That word smaller, is the important end of the renewable energy spectrum. When most people think electricity, especially solar electricity, they think outward and upward to larger scales, Geobacters at present however are going smaller and smaller into the future of nanotechnology rather than in the direction of powering the grid.

While some patents do exist on Microbial Fuel Cells for such things as large as electric lawn mowers or even maybe the size of say a Delorian; at present

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The Search

researchers think smaller every day devices like cell phones or even delicate military and medical technologies are going to be far more efficient with the development of Microbial Fuel Cells for the next century of sustainable energies.

Vulgarly speaking, anywhere the sun doesnt reach, Geobacters generally can. Mainly this is simply because they are natures way of breaking down organic material in anaerobic environments, originally produced either by direct solar energy, along that chain indirectly or simply never even exposed to it as in the case of the deep ocean floor where sunlight is totally absent.

Microbial fuel cells are not merely the micro aspect of renewable and solar the macro, they are naturally the [composting](#) and cleaning end of renewable while solar energy is the non-polluting and preventive end.

Hopefully this research will prove worthwhile within the next ten years for consumers. Solar Energy for off the grid living and Microbial Fuel Cells for off the grid comfort and an ever better quality of life. Two sides of one human coin.

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