Sneak peek at electrofuels: Geobacter team aims for bio-based solution to solar energy storage : Biofuels Digest - biofuels, biodiesel, ethanol, algae, jatropha, green gasoline, green diesel, and biocrude daily news

In Massachusetts, more information about the new category of electrofuels has become available from a research team at University of Massachusetts Amherst.

The "Geobacter" team led by microbiologist Derek Lovley said that a combination of solar power, bacteria and carbon dioxide could provide a hybrid of solar and bio-power and also solve the most perplexing problem facing solar energy: energy storage.

Lovley's microbial electrosynthesis converts solar power directly into chemicals, which are then readily stored with existing infrastructure and distributed on demand, and are 90 percent efficient at turning electrons into fuel without further processing.

Lovley and colleagues published their experimental results and discuss implications in the current, May issue of mBIO, an online journal of the American Society of Microbiology, and are presenting this week at the American Society for Microbiology's annual meeting in San Diego, which runs from May 23–27.

The bench-scale technology, funded by a $1 million DOE grant, is based on the discovery that some bacteria can feed on electrons delivered by electrodes. These microbes live on the electrodes and use electrons released from them as their food source. "This is basically a new form of photosynthesis, in which carbon dioxide and water are combined to produce organic compounds, and oxygen is released as a byproduct," Lovley explains. Solar energy powers the microbes to "breathe in" carbon dioxide and "exhale" fuels and chemicals. The main product is acetate or acetyl-Co A, from which many fuels and other chemicals can be easily produced, notably butanol,

About the system, Lovley explains, "It's a two-electrode system. One electrode extracts electrons from water and produces oxygen as a byproduct. The electrons travel to the second electrode where the bacteria are, and they take in carbon dioxide and spit out acetate.

Additional UMass Amherst principal investigators working on bio-electrosynthesis include Kelly Nevin and Thomas Russell, and are collaborating with the University of California-San Diego and Genomatica on the project.

More on the story.

Entry Information