Scientists convert cellulose into hydrogen

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U.S. researchers have developed a method of converting cellulose and other biodegradable organic materials into hydrogen.

Penn State University Professor Bruce Logan and research associate Shaoan Cheng said today's energy focus is on ethanol as a fuel, but economical ethanol from cellulose is at least 10 years away.

Logan and Cheng used naturally occurring bacteria in a microbial electrolysis cell with acetic acid -- the predominant acid produced by fermentation of glucose or cellulose.

The cell's anode was granulated graphite, the cathode was carbon with a platinum catalyst, and they used an off-the-shelf anion exchange membrane. The bacteria consume the acetic acid and release electrons and protons creating up to 0.3 volts. When more than 0.2 volts are added from an outside source, the liquid emits hydrogen gas.

"This process produces 288 percent more energy in hydrogen than the electrical energy that is added to the process," said Logan, who suggests hydrogen produced from cellulose and other renewable organic materials could be blended with natural gas for use in natural gas vehicles.

The research appeared in the Nov. 20 issue of the Proceedings of the National Academy of Sciences online.