Non-thermal production of pure hydrogen from biomass

Results in Brief

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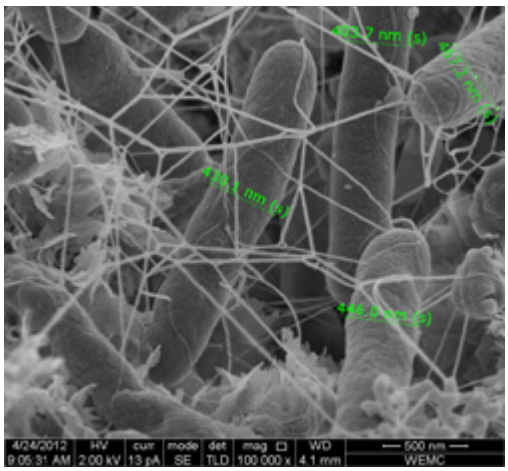
Bacteria process vegetables for hydrogen production

EU-funded scientists fed bacteria with plant remains, harvesting the hydrogen gas (H2) produced as a result of digestion. Utilising this natural source of hydrogen gas may have important impact on a future hydrogen fuel economy.

ENERGY



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The term ‘hydrogen economy’ has been around for over 40 years since the concept of an energy economy based on hydrogen was first officially proposed. Until now, although receiving much acclaim and being the subject of extensive research, hydrogen has not lived up to its potential to replace fossil fuels as a source of electricity.

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One of the main obstacles has been development of efficient and cost-effective ways to produce the H2 required for fuel applications. Hydrogen in its natural form exists as a part of other molecules, such as water and hydrocarbons (as in fossil fuels). In order to develop a hydrogen economy from which to produce electricity, the world must first find better ways to obtain hydrogen.

European scientists used the natural capability of bacteria to produce hydrogen as a result of metabolic processes. With EU funding of the ‘Non-thermal production of pure hydrogen from biomass’ (Hyvolution) project, they developed a two-stage fermentation reactor in which bacteria ‘fed’ with biomass produced important quantities of hydrogen.

Although the Hyvolution process produced carbon dioxide (CO2) as a by-product, it was considered carbon neutral. Trees and plants take up CO2 from the atmosphere and then release it when digested, making a CO2 cycle that does not change CO2 levels in the atmosphere. In contrast, burning fossil fuels releases CO2 into the atmosphere that has been sequestered for millions of years, imposing a heavy burden on the planet.

Hyvolution’s technology may just provide a solution to another problem associated with a hydrogen economy, that of storage and transport. Scientists designed the prototype plant with high-efficiency, small-scale production units in mind that might even make backyard reactors possible in the future.

Project Information

HYVOLUTION

Grant agreement ID: 19825

Project website

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End date
31 December 2010

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FP6-SUSTDEV

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EU contribution
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