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Intellectual Property Status:

Patent Pending

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Cylindrical microbial electrochemical cell with a carbon fiber weave electrode

AzTE Case # M11-081

Invention Description

Much of the organic material in the waste stream of food processing plants consists of simple sugars and starches. This represents a waste of a valuable resource. A process that could convert these simple sugars into a valuable feedstock or commodity would have immediate application.

Researchers at the Biodesign Institute of Arizona State University have developed a microbial electrolysis cell that can convert these waste sugars into hydrogen gas. By using a cylindrical, one-chamber cell, high current densities can be achieved while providing a large surface area on which to grow the anode respiring bacteria that break down the sugars. The hydrogen and carbon dioxide which are produced can be collected, separated, and used onsite or sold.

This device can be used to produce hydrogen for use as a carbon-free fuel or chemical feedstock, and carbon dioxide as a chemical feedstock or for use in other processes.

Potential Applications

 Treatment of wastewater from food processing plants, or other industrial processes producing wastewater laden with simple sugars

Benefits and Advantages

- Produces valuable products from simple sugars that would otherwise be discarded
 - o Hydrogen for
 - carbon-free fuel
 - oil refining processes, such as cracking
 - ammonia production (Haber process) for fertilizers and chemical feedstock
 - reduction of oxidized contaminants in water
 - Carbon dioxide for
 - refrigerants
 - food service industry
 - enhanced recovery of oil and gas