Docket #: S14-200

Method for sustained microbial electrosynthesis

Researchers in Dr. Alfred Spormann's lab have developed methods for sustained microbial electrosynthesis that may improve the production of biofuels. Microbial electrosynthesis is a process where electric current at a cathode supplies electrons to microorganisms which then use them to convert carbon dioxide into organic products such as biofuel. This process has promising potential for the industrial conversion of carbon dioxide into useful products; however the process first needs to be optimized for large scale use. To help meet this need, the inventors have developed methods of coating a cathode with cell-derived enzymes to promote sustained production of small compounds that can be used by the cells during microbial electrosynthesis. These methods will be useful for building sustainably operating commercial scale bio-electrochemical reactors.

Stage of research
Preliminary studies performed by the inventors have shown promising results.

Applications

- Biofuel production
- Carbon dioxide fixation

Advantages

- By-passes need for direct electron uptake
- Advances ability to build commercial scale bio-electrochemical reactors
- Microbial electrosynthesis does not require:
    - Biomass
    - Photosynthetic microorganisms

Publications

- Lohner ST, Deutzmann JS, Logan BE, Leigh J, Spormann AM. Hydrogenase-independent uptake and metabolism of electrons by the archaeon Methanococcus maripaludis. ISME J. 2014 Aug;8(8):1673-81. doi: 10.1038/ismej.2014.82. Epub 2014 May 20.

Innovators

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