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Electroporation for More Efficient Biofuel Extraction and Dewatering of Algae

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Intellectual Property Status:

Patent Pending

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Invention Description

Biofuel precursors are typically extracted from algae via mechanical pressing and/or solvent extraction. Some problems associated with these methods include capture of only a small fraction of the biofuel, slow processing time, and handling of hazardous and often flammable solvents.

Other industrial processes involve dewatering algae, using such methods as membrane filtration, flocculation, and centrifugation. However, the remaining water content can still be quite high, often near 85%, requiring more involved methods such as homogenization. Clearly a need exists for improved methods of extracting biofuel and water from algae.

Researchers at Arizona State University and OptiSwitch Technology Corporation have developed an alternative approach that uses a system of electrodes to deliver a high intensity pulsed electric field which electroporates algal cell membranes, leading to more ready release of their interior biofuel and water.

This system permeabilizes the algae cell membranes, leading to a more efficacious release of the biofuel and/or water from within the cells.

Potential Applications

- Algae-based biofuel production systems for
  - Biofuel extraction
  - Algae dewatering

Benefits and Advantages

- Works equally well with batch and continuous flow mode
- Compatible with existing technologies (mechanical pressing, centrifugation, distillation, solvent extraction, etc.) positioned downstream
- Real-time feedback control for optimum processing