BIOREACTOR FOR BIOREFINING FEEDSTOCK PRODUCTION

OU ID: #06009

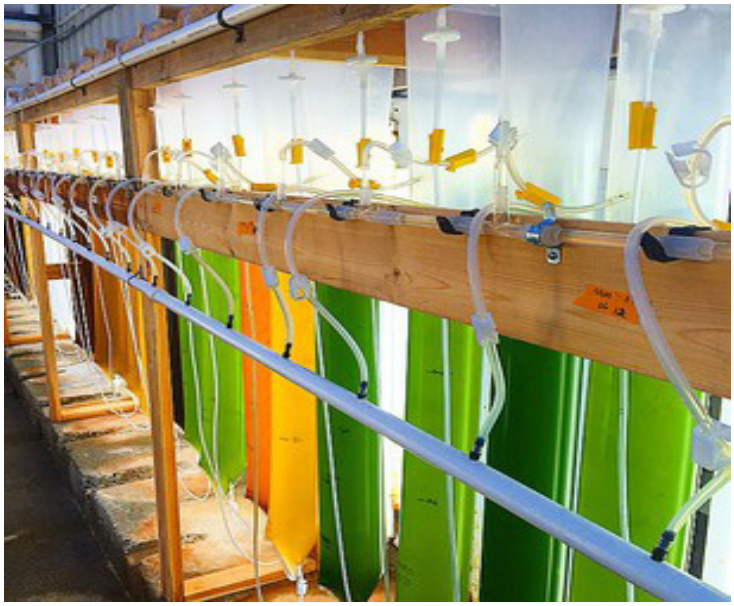
Overview

This bioreactor technology provides the optimization required for production of microalgae as a feedstock for refining into biodiesel by increasing algea production by maximizing the presence of the distributed solar energy. It also facilitates the use of artificial lighting during the nonavailability periods of solar energy. Gas is injected in the algal slurry at the bottom of the bioreactor and travels to the top, where it is separated from the liquid. The advanced design facilitates the transmission of photosynthetically active radiation to the microalgae at the optimal level. Continuous motion of the algal slurry over as well as away from the light sources, ensures the stimulation of photosynthesis, as well as prevents the build-up of the slurry inside the bioreactor. The transmission fibers are terminated inside the bioreactor, eliminating any requirement for the use of a separate light distribution system. This helps in saving both design and construction costs. The technology also incorporates a mechanism to minimize the effect of heat dissipation in the optical fibers.

The technology has applications in the areas of biofuel production and protein/feed and nutraceuticals (health enhancing foods). It can also be utilized in processes that remediate CO_2 emissions and perform carbon recycling. Biofuels are emerging as the most innovative and promising alternative to meet the global energy crisis, with US as the biggest global producer. The world-wide requirement for biofuels is expected to grow at an aggressive rate from a $82.7 billion market to $185.3 billion market in 2021.

Commercial Applications

- Energy production
- Livestock feed



OHIO UNIVERSITY

BIOREACTOR FOR BIOREFINING FEEDSTOCK PRODUCTION

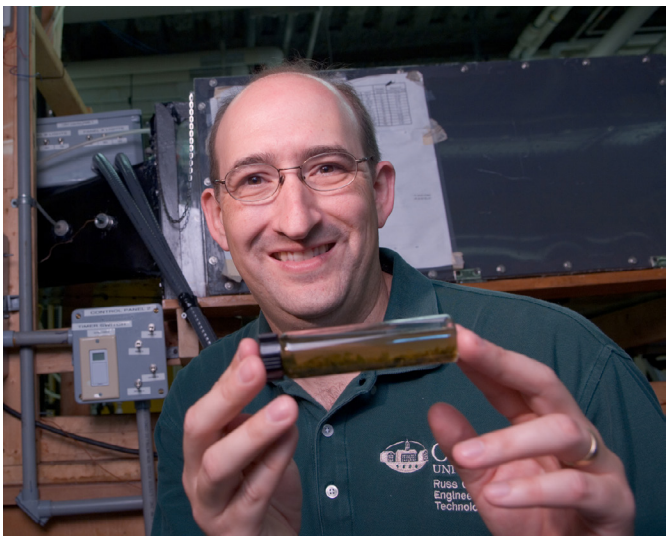
OU ID: #06009

Benefits

- Improves on current bioreactor designs that can only function in the presence of solar energy.
- Increased productivity and cost-effectiveness by enabling plant operation through the use of artificial lighting.
- Increased productivity of the biofilm system due to the usage of algae in the slurry state.
- Improved design of the slurry circulation system which provides areas to facilitate dark reactions in the system.
- Optimal utilization of the area of the fabric plates to maximize the amount of algae that can be grown.
- Decreased footprint over the water reservoirs due to the vertical design of the bioreactor.

Inventors

Dr. David Bayless is the Loehr Professor of Mechanical Engineering at Ohio University, Director of the Ohio Coal Research Center, Director of the Robe Leadership Institute, and Fellow of the American Society of Mechanical Engineering. He is also the Voinovich School for Leadership and Public Affairs Faculty Fellow, as well as the Graduate Faculty in Chemical Engineering. His research interests include development of photobioreactors for remediation of CO_2 emissions, coal and biomass gasification via ultra-high temperature steam reforming, Fischer-Tropsch reforming of coal syngas, adapting planar solid oxide fuel cells to use coal-derived syngas, hot gas particulate clean-up, membrane-based wet electrostatic precipitation for particulate and mercury control, and membrane-based wet electrostatic precipitation.



Contact Us

Mark Foley
Technology Commercialization Manager
P: 740.593.0813
E: foleym@ohio.edu

OHIO UNIVERSITY
1804