NASA Develops Algae Bioreactor as a Sustainable Energy Source

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(PhysOrg.com) -- As a clean energy alternative, NASA invented an algae photo-bioreactor that grows algae in municipal wastewater to produce biofuel and a variety of other products.

The NASA bioreactor is an Offshore Membrane Enclosure for Growing Algae (OMEGA), which won't compete with agriculture for land, fertilizer, or freshwater.

NASA's Ames Research Center, Moffett Field, Calif., licensed the patent pending algae photo-bioreactor to Algae Systems, LLC, Carson City, Nev., which plans to develop and pilot the technology in Tampa Bay, Florida. The company plans to refine and integrate the NASA technology into biorefineries to produce renewable energy products, including diesel and jet fuel.

"NASA has a long history of developing very successful energy conversion devices and novel life support systems," said Lisa Lockyer, deputy director of the New Ventures and Communication Directorate at NASA Ames. "NASA is excited to support the commercialization of an algae bioreactor with potential for providing renewable energy here on Earth."

The OMEGA system consists of large plastic bags with inserts of forward-osmosis membranes that grow freshwater algae in processed wastewater by photosynthesis. Using energy from the sun, the algae absorb carbon dioxide from the atmosphere and nutrients from the

wastewater to produce biomass and oxygen. As the algae grow, the nutrients are contained in the enclosures, while the cleansed freshwater is released into the surrounding ocean through the forward-osmosis membranes.

“The OMEGA technology has transformational powers. It can convert sewage and carbon dioxide into abundant and inexpensive fuels,” said Matthew Atwood, president and founder of Algae Systems. “The technology is simple and scalable enough to create an inexpensive, local energy supply that also creates jobs to sustain it.”

When deployed in contaminated and “dead zone” coastal areas, this system may help remediate these zones by removing and utilizing the nutrients that cause them. The forward-osmosis membranes use relatively small amounts of external energy compared to the conventional methods of harvesting algae, which have an energy intensive de-watering process.

Potential benefits include oil production from the harvested algae, and conversion of municipal wastewater into clean water before it is released into the ocean. After the oil is extracted from the algae, the algal remains can be used to make fertilizer, animal feed, cosmetics, or other valuable products.

This successful spinoff of NASA-derived technology will help support the commercial development of a new algae-based biofuels industry and wastewater treatment.

Provided by JPL/NASA (news : web)