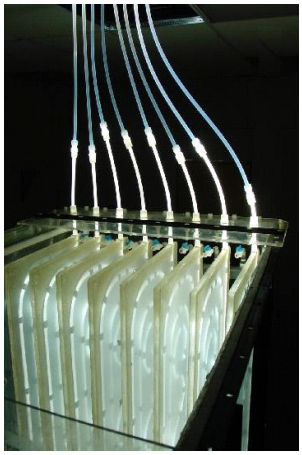
Hybrid Bioreactor for Reduction of Capital Costs

TECHNOLOGY OVERVIEW



The technology is a hybrid bioreactor that utilizes both incident light directly from the sun, as well as collected and distributed light for the growth of algal. The collected or stored light make up deficiencies in using only sunlight for the growth of algal in systems such as greenhouse reactors, raceway cultivators and ponds. The described technology provides a high degree of algal (microalgae and cyanobacteria) productivity and environmentally controls, while minimizing the capital costs for the overall system. Important elements to this hybrid design are a transparent photobioreactor and collectively utilizing collected and distributed light. By themselves, the elements are not novel. But using them in combination, the result is unique. By placing fiber optic photon units strategically within the algal growth membranes within the bioreactor, algal growth can be increased and at a much lower cost than conventional photosynthetic active radiation. The growth of algal is possible throughout the entire daylight time period, and not just at mid-afternoon or when the sun is directly overhead. This design also minimizes the interference with sunlight incident with high solar angles.

POTENTIAL FIELDS OF USE

The most direct application of the technology is in the production of microalgae as a feedstock for the mitigation of carbon dioxide and biofuels that require environmentally controlled bioreactors, capable of maximum productivity at the lowest possible cost. The growth of the algal industry for the production of biofuels alone has significantly increased over the past three years, and have their eyes in influencing the alternative fuel market, which was estimated at $600 billion in 2007. This market is expected its growth at a rate of 12% for each of the next three years. The bio-fuel sector of the global clean-energy market is projected to increase as well, from $26 billion in 2006 to over $80 billion by 2016, which demonstrates a large available market for the technology.

BENEFIT ANALYSIS

The process has a number of benefits over existing bioreactors:

- Cost-effective in terms of both capital and operating costs when compared to other reactors of similar size and capacity.
- Increased growing potential and at a faster rate than current systems on the market.
- Flexible and adaptable to other growing systems such as vertical substrate membrane photobioreactors and plastic bag/tube bioreactors.
- Eliminates the use of tracking and mirrors systems to gather and distribute sunlight as in other systems.
- Simple design allows for easy maintenance and support.

STAGE OF DEVELOPMENT

The technology is in an early stage of development, but has had successful bench and pilot scale prototypes trials with very favorable results. Further developments are necessary before commercialization.

FUTURE DEVELOPMENT

The bioreactor is scalable and flexible allowing for various design configurations with a number of operation parameters.

LICENSING OPPORTUNITIES

The patent application for this technology has been filed. Licensing opportunities are available.

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