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GREEN POWER

Algae production plant pilots commercial application

A major innovation in algae production is being exploited by OriginOil, in collaboration with the Idaho National Laboratory (INL), USA.

At the heart of the new system is a series of 200 gal (760 l) tanks which can be individually configured and managed for various strains, growth strategies, and lighting geometries. The tanks are illuminated with LED light sticks (see picture) submerged in icicle-like arrays. A stirrer circulates the algae slowly around the lights.

Once the algae reach harvest concentration they are sent to the integrated extraction system, a combination of ultrasound generation and

low-power electromagnetic pulsing. This new system has a throughput of 5 gal/min (191 l/min), which more than matches the daily output of the pilot system. After extraction, a series of settling tanks separates the oils and biomass for eventual use as fuel and by-products. A water recycling system completes the loop, so the process can start again (see Figure).

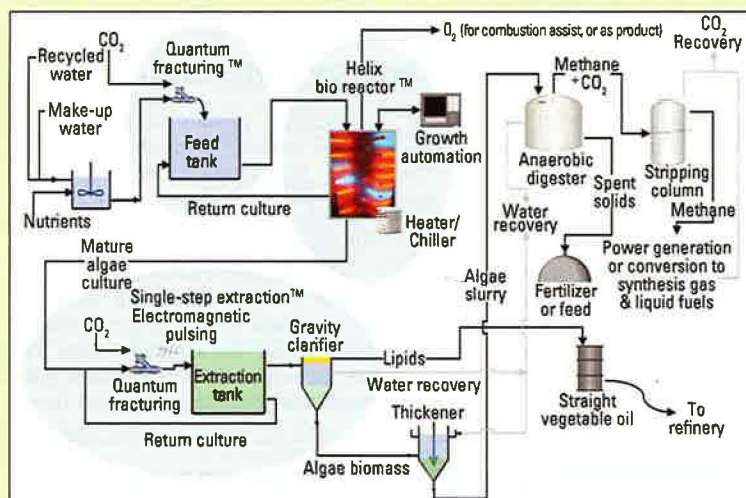
The company's Dynamic Control System manages the operation of the growth phase, releasing CO₂ and other nutrients as the algae need it. While bottled CO₂ is currently used for the supply, an in-house generator is planned in which exhaust gas is

processed for its CO₂.

Algae can be harvested on a daily basis, making industrial levels of production possible. In a series of experiments in 2009, OriginOil researchers have learned that the amount that can be harvested in the organism's steady state appears to stabilize at a specific amount of algae biomass per day, regardless of the concentration of algae.

Algae systems will be attached to wastewater plants, factories, breweries, and any other location that generates CO₂. This will lead to a highly distributed energy production model with associated job creation.

Helix array of LED rods for the 800 l medium-sized prototype. The type of algae processed best to specific red and blue wavelengths (which is true of all green algae). Both blue and red singly combined are equally successful. The latest process uses red, as it takes less energy to generate than blue, being lower on the spectrum.



Representation of the algae production and harvesting.