

FEEDING THE WORLD

ALGACULTURE

Cross-pollination of valuable knowledge

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The potential of algae is often discussed and the benefits of algae production are clear: Co-production of food and fuel at a high productivity per unit of land area, with the possibility of using residual streams as a source of nitrogen, phosphorus and CO₂. There are a number of similarities between algaeculture and horticulture, with both disciplines able to learn from each other.

The market volume for algae is estimated at about € 1 billion. Researchers in Wageningen UR's Algae PARC (Algae Production And Research Centre) are developing knowledge, technologies and process strategies for a sustainable production of microalgae as feedstock for fuel, chemicals, food and feed on an industrial scale. They are working on photobioreactors, screen species, production strategies, long-term tests and dynamic process control. The main focus is on identifying bottlenecks such as the accumulation of oxygen.



Bioreactors

Dutch company LGem is among those working on the frontline of this exciting new development. LGem is focusing on the problems that occur when using conventional tubular photobioreactors, including the accumulation of dissolved oxygen and fouling. It has developed a new system which is ten times cheaper than traditional tubular systems.

Another interesting technique that is an offshoot from algaeculture is the Algae Wheel, developed in the US and introduced and explained by Grow Technology. Functionally, the wheel offers an environment where bacteria and algae work in a symbiotic way to synthesise living organic mass from nutrients.

Keeping an eye on the end product

According to Fytagoras, the creation of high-grade compounds makes it necessary to understand the metabolism of algae. There is a difference between the primary metabolism, which is responsible for growth, and the secondary metabolism, which is activated as a result of stress. Fytagoras is working on disposable bioreactors in which 10-15% of the costs are represented by the bag and 85-90% by the sensors. For high-grade algae, optical sensor technology seems to offer an affordable way to monitor important processes.

It is imperative to keep the end products in mind when cultivating algae. Production and refinery should go hand in hand, according to Algae Biotech. Refining can take place using several methods, such as spray-drying, extraction, supercritical CO₂-drying and freeze-drying.

Still in its infancy

In making the algae business profitable, one must focus on true figures. Compared to horticulture, algaeculture is still in its infancy. However, algaeculture shares similar interests and motivations with horticulture, allowing both disciplines to potentially help each other in their future development.

Partners in this seminar: Algae Biotech, Fytagoras, Grow Technology, LGem, Wageningen University