



Efficient cultivation and harvesting of microalgae



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R+D result

Patent

Knowledge Area

- Chemical Engineering
- Biochemical Engineering
- Environment

Collaboration

- Technology available for licensing
- Other collaborations

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Method for cultivation and pre-harvesting algal biomass with high productivity

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Background: Currently, the cultivation and harvesting of microalgae is a method of obtaining biofuels that is attracting attention. Once microalgae are grown and harvested, the biomass can be converted into different value-added products such as biofuels in a clean, reproducible and sustainable manner by a sequence of chemical processes. In systems known to date, the cultivation of microalgae takes place generally in open ponds or in closed photobioreactors. The main advantages of open ponds are easy operation and low cost of investment and operation, but they are very sensitive to contamination and have low capacity to automate. On the other hand, photobioreactors have high investment costs but they solve the problems associated with contamination and automation. However, despite the great interest and the advance in the cultivation of microalgae, there are still many challenges to be overcome before the cultivation of microalgae can become a viable technology for energy production and large-scale product manufacture. These challenges include, among others, improving the efficiency of algal biomass production and harvesting, the application of an integrated technology, detailed operation (equipment, guideline values for operation) and tested process to enable its implementation on an industrial scale.

The invention: Researchers from the Universitat de València and Universitat Politècnica de Valencia have developed a **new method for cultivation and harvesting of algae** that significantly increases the efficacy compared to current methods. The developed method is an integrated system that allows a continuous and uninterrupted operation of the entire process (cultivation and harvesting), decreasing installation and operating costs. Moreover, since the method has two filtration units (one for pre-harvesting and one for the harvesting), it is possible to separate the concentration of the solids that is maintained in the photobioreactor from the concentration purged from the system. It permits to optimize the concentration in each unit to achieve higher biomass productivity and facilitate the harvesting process. Thus, the developed system overcomes the disadvantages of the up-to-date described procedures.

Applications: The invention is applicable in the industrial scale production of algae biomass. This biomass could be used for one or more of the following applications:

- as a CO₂ sink;
- as a raw material for industrial production of lipids, proteins and other value-added products associated with the food industry;
- as raw material to produce biodiesel and bio-fertilizers;
- as a carbon source in biogas production plants and
- as sustainable treatment system for the recovery of the nutrients in the wastewater.

Advantages: The method of the invention has the following advantages:

- It allows the production of algal biomass in an efficient way, decreasing the associated production costs, reducing the energy consumption and thus, minimizing the environmental impact associated with such processes.
- It is possible to maximize the recovery of nutrients if it is working with wastewater and to obtain a liquid stream with characteristics that enable its reuse.
- The production of concentrated algal biomass that enables its further use as commercial products.



Image of the pilot plant for the cultivation and harvesting of microalgae

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de resultats d'investigació

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