Microalgae could be a profitable source of biodiesel

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Researchers at the UAB's Institute of Environmental Science and Technology (ICTA-UAB) and the Institute of Marine Sciences (ICM-CSIC), have analysed the potential of different species of microalgae for producing biodiesel, comparing their growth, production of biomass and the quantity of lipids per cell (essential for obtaining fuel).

Their study shows that one type of marine algae that has received little attention till now - dinoflagellate microalgae - is highly suitable for cultivation with the aim of producing biodiesel.

The scientists carried out the whole production process in exterior cultures, in natural conditions, without artificial light or temperature control, in cultivation conditions with low energy costs and subject to seasonal fluctuations. Detailed analysis of all costs over 4 years gives promising results: microalgae cultures are close to producing biodiesel profitably even in uncontrolled environmental conditions.

"If we make simple adjustments to completely optimise the process, biodiesel obtained by cultivating these marine microalgae could be an option for energy supplies to towns near the sea", points out Sergio Rossi, an ICTA researcher at the UAB.

Among these adjustments, scientists highlight the possibility of reusing leftover organic pulp (the glycerol and protein pulp that is not converted into biodiesel) and using air pumps and more efficient cultivation materials.

Though similar studies have been done on other alga species, dinoflagellate microalgae have shown themselves to be a very promising group that stands out from the rest. Moreover, these microalgae are autochthonous to the Mediterranean, so they would present no environmental threat in the event of leakage.

Third-generation biodiesel

First-generation biodiesel and bioethanol (obtained from monoculture of palm oil, sugar cane, maize, etc.) have presented problems that make them less attractive. The crops cover large areas of land and need huge amounts of fresh water, and their use implies diverting food products to the energy market.

The possibility of creating energy from hydrocarbons extracted from organisms like marine phytoplankton, the so-called third-generation biodiesel, has several advantages. Firstly, algae offer the same production levels while taking up only between 4 and 7 per cent of the area occupied by crops on land, thanks to their high concentration of energy per cell. Secondly, they do not need fresh water, as sea water is sufficient, which makes them viable even in deserts or arid areas near the coast. Finally, marine algae are not, a priori, sources of food for human consumption, which avoids the ethical problem of monoculture to provide fuel rather than food.

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