Researchers at the University of South Florida have invented a system with which algae can be cultivated and harvested from wastewater through a passive membrane photobioreactor.

Microalgae is increasingly recognized as a renewable source of biofuel amongst other commercially valuable applications. Algae growth media are synthetically manipulated with the right balance of fresh water, nutrients and carbon dioxide which make the process not only expensive but also face harvesting challenges. On the other hand, wastewater can prospectively be utilized in large scale algae cultivation since it offers a free source of nutrients, and carbon dioxide thereby improving the economics and environmental footprint of algae production. The challenge in using wastewater is that it increases the chances of introducing invasive species to the microalgal culture, which can lead to its collapse.

USF inventors have developed a novel method for growing algae in wastewater or any other synthetic growth medium by using one or more passive membranes to take advantage of concentration gradients across the membranes. Each membrane separates the algae culture from the growth media thereby enabling the passive transportation of nutrients and gases. This eliminates the need to sterilize the media potentially saving energy and cost. The membrane also maintains a physical barrier from potential contaminants, such as endemic wastewater species and airborne pathogens in the growth media.

This method can be used by municipal wastewater treatment plants, industrial wastewater treatment facilities as well as biomass producers.

ADVANTAGES:

- Increase treatment capacity without increasing plant footprint
- Reduce operational costs by decreasing required energy
- Increase treatment capacity with low capital investment
- Provide consistent quality of biomass
- Protect algae crop from contaminants

Mass Production of Algae
Using Wastewater

Conceptual figure of the passive photobioreactor

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