

# MICROALGAE PRODUCTS OFFER ECONOMIC RETURNS

AN INTERVIEW WITH MARY IBARRA VIDAL, MASTER OF SCIENCE CANDIDATE,  
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**Mary Ibarra Vidal, Master of Science candidate at the University of Calgary in Canada, is part of a team of researchers investigating ways to increase the production of high-value lipids and antioxidants through the cultivation of microalgae at biodiesel production plants, maximising the economic value of the whole process. *Australasian BioTechnology* speaks with Vidal about her research and its potential.**

What is the potential for biodiesel producers in Australia to integrate the cultivation of microalgae?

From a practical point of view, microalgae is easy to cultivate; it can grow with little attention, using water unsuitable for human consumption and nutrients that are easy to obtain. The specific strain *A. protothecoides* is a robust cell that grows under heterotrophic (unable to synthesise food and is dependent on complex organic substances for nutrition) and autotrophic (capable of synthesising food from inorganic substances using light or chemical energy) conditions.

Heterotrophic culture enhances the biomass and lipid production, which will be the target product. The use of glycerol as a carbon source provides the opportunity to integrate the biorefinery concept with the use of this waste produced by the biofuels production.

After oil extraction, the resulting algae biomass can be processed into ethanol, methane, livestock feed and organic fertiliser with a high nitrogen-to-phosphate ratio, or simply burned for energy cogeneration (electricity and heat).

The co-production of high-value products will reduce the cost of microalgal biomass production and microalgal oil production, maximising the economic value of the whole process. It is important to consider that we are not evaluating the co-production of

biofuels in our research, we are considering the utilisation of *A. protothecoides* as a source of high-value product only. The focus is health, which will require different processing of the biomass, since the extraction of these high-value products will need to comply with biopharmaceutical industry standards.



Mary Ibarra Vidal

What do you believe are the biggest roadblocks and challenges of microalgae cultivation?

The most common roadblock is the harvesting process, since it requires a lot of energy to dewater the cultures, representing between 20–30 per cent of the total biomass production cost. This is an active area for research in order to find an appropriate and economical harvesting system for any algal species. For high-quality algae, such as high-value products for food or aquaculture applications, it is often recommended to use continuously operating centrifuges that can process large volumes of biomass, since the dewatering cost is intrinsic in the market value of these products.

Has this technology been commercialised before?

The production of biofuels from microalgae is still not commercial. The production of microalgae is more focused on high-value products. In Australia and America, this includes the antioxidant supplement astaxanthin. The production of microalgae for food, nutritional supplements and animal feed is a reality providing this industry with biofuels feedstock, but not as the main product. 🌱

Mary Ibarra Vidal will be speaking at the 17th International Biotechnology Symposium (IBS 2016).

