

## A Cradle System : Ultralow Energy Closed Bioreactor for Production of Algae

### TECHNOLOGY DESCRIPTION

This technology is a Cradle System for production of algae for sustainable aquaculture industries.

### TECHNOLOGY FEATURES

The recycling process used in this technology produces fertilizer and biofuel. This technology also recycles nutrient from biological decomposition process to produce algae biomass that contains various bio-compounds that can be used for pharmaceutical and nutraceutical products. It applies energy saving technique and 20 times higher efficiency compared to current conventional photo-bioreactor. This technology is also cheaper and can be produced by reasonable materials such as plastic bag.

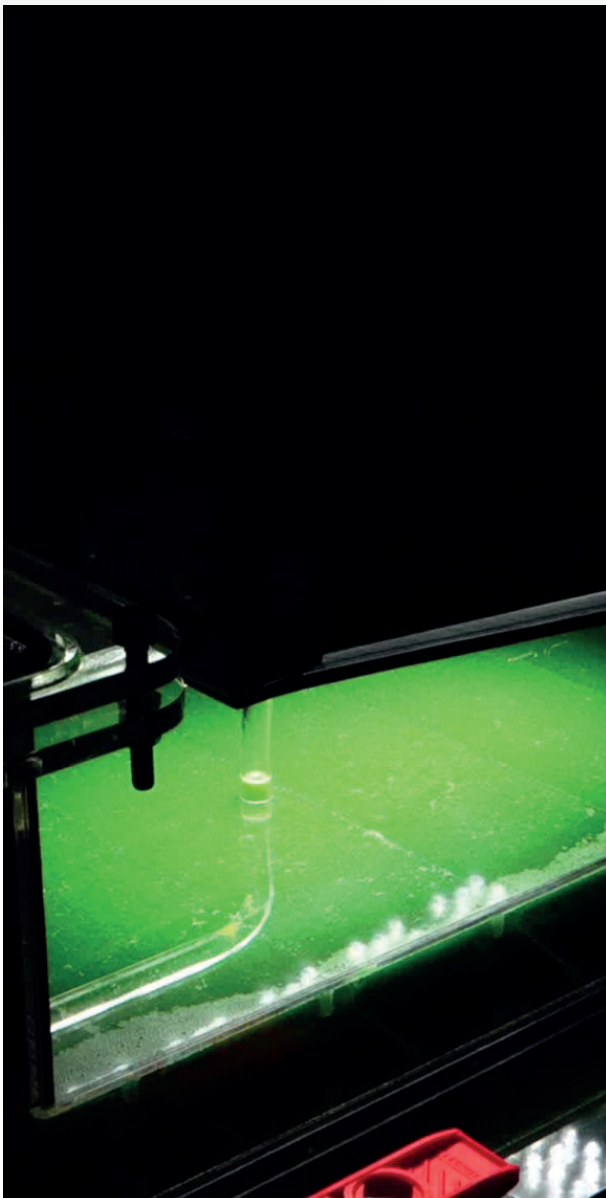
### ADVANTAGES

- 20 times more efficient
- New mixing technology which saves energy
- High biomass yields: 2000kg/GJ
- Cheaper
- Can produce pure (high value) biomass

### INDUSTRY OVERVIEW

#### Prospect Industry: Microalgae production, Global Carotenoids Market

This innovation will provide a more cost effective alternative to production of algae biomass which is part of carotenoids market. This industry has high growth potential, both in the domestic and export markets. Algae biomass is used as the ingredient for functional feed, nutraceuticals, pharmaceuticals and cosmeceuticals. Large number of end-use applications, usage in preventive healthcare and nutraceuticals, and the growing importance of food quality and appearance have been of importance to the growth of the global carotenoids market. Carotenoids find a wide range of end use applications. It can be used in feed, food, supplements, cosmetics, and pharmaceuticals. According to BCC research, the carotenoids market is huge and expanding. The total market will be 1.4 billion US\$/year in 2018. The global carotenoids market is estimated to be valued at USD 1.24 billion in 2016 and projected to reach USD 1.53 billion by 2021, at a CAGR of 3.78% from 2016 to 2021. In terms of pharmaceutical industry, this product may also be used by pharmaceuticals who exports globally. According to Malaysia External Trade Development Corporation (MATRADE), carotenoids market was valued at 1.31 billion ringgit (\$317 million) in 2015, an increase of 15.8 percent on 2014.



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