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Marine Biotechnology – drivers for the aquaculture industry

The world population is predicted to expand from 7 to ~9 billion people by 2050 which is likely to result in significant increased demands for food (70%), fuel (50%) and fresh water (30%). Feeding the growing world population will require increases in agricultural crop productivities as arable land resources are limited and continued urbanization and industrialization has led to declines in Australia's farmland over the last four decades, following world trends. Increasing crop productivities is further challenged by predicted freshwater resource scarcity and greenhouse gas (GHG)-induced climate instability, i.e. the increase and/or severity of 'freak' weather events, such as storms, prolonged droughts etc.. Maintaining and increasing Australian crop productivities will inevitably require, fertilisation, the production of which was estimated to contribute 1.2% of the total GHG emissions due to energy requirements. Algae are heralded as the potential saviors of the world's ailments due to photosynthetic cultivation on non-arable land using non-potable water (saline, brackish, industrial waste waters). Algal cultivation remediates CO_2 GHG pollution (1.83 t CO_2 per t biomass dry weight) and nutrient- or metal-rich waste waters. Among the various algal products that can be derived from the biomass, fertilizer production is an immediate and readily implementable product pathway offering potential for regional agricultural communities to become self-sufficient and independent of costly imports. This key-note will compare productivities of traditional and novel cultivation and processing pathways highlighting where biotechnological production processes can improve traditional aquaculture and generate new market opportunities for expansion of aquaculture into hitherto non-traditional aquaculture markets.

Speaker Biography

Heimann K is a recognized leader in designing, enabling, implementing and advancing industry-driven research on closed system approaches using high-yield microbes in environmental, aqua and agricultural and commercial applications for developing renewable products and sustainable industries. She has extensively in peer-reviewed scientific journals, including Nature, 91 journal articles (citations >2,500), 5 books and 11 book chapters, leading to a H-index of 27. Her research has won many awards, the NQ Corporate Business Women Award 2011 and the JCU Advisor of the Year Award 2016, being the latest. She is the president of ASPAB, associate editor of Botanica Marina, and has served on the science and education committee of the Advanced Manufacturing Cooperative Research Centre (AMCRC) and the tarong science steering committee for microalgae GHG emission abatement at coal-fired power stations.

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