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Microalgae 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 urbanisation and industrialisation 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 saviours of the world's ailmentsdue 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. Amongst the various algal products that can be derived from the biomass, fertiliser 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 generatenew market opportunities for expansion of aquaculture into hitherto non-traditional aquaculture markets.

Biography

K Heimann established and is the director of the North Queensland Algal Identification/Culturing Facility at James Cook University, Townsville, Australia and initiated and built the AMCRC microalgal carbon capture and leads the methane bioremediation project at JCU. The biomass is used for commercial algal co-products. Heimann received competitive research funding of more than $16 million. She has published extensively in high ranking journals including Nature. Her research has won many awards, the NQ Corporate Business Women Award 2011 being the latest.

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