



ABSTRACT

"The Blue Revolution? Opportunities and challenges in microalgae biotechnology"

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Microalgae account for half of the global primary production and drive the biological pump in the oceans, sequestering significant amounts of the anthropogenic emissions of CO₂. With biomass production rates 10-30 times higher than agricultural crops, microalgae have an enormous biotechnological potential in a number of areas including nutrition, aquaculture, pharmaceuticals, and biofuels. Algae have been commercially cultivated for over 50 years, but investments in technology development and production plants have grown tremendously over the past few years. At the same time a broader use of microalgae biodiversity, breeding and metabolic engineering are seen as being necessary in order to realise their full biotechnological potential. In collaboration with researchers at VIB-PSB we study the biology of diatoms. Diatoms are a species-rich group of microalgae, with enormous ecological significance and great potential for biotechnology. During the last decade, diatoms have begun to be studied intensively using modern molecular techniques and the genomes of four diatoms have been wholly or partially sequenced. Although new insights into the biology and evolution of diatoms are rapidly accumulating due to the availability of reverse genetic tools, experimental control of sexual crosses is required to realize the full potential of molecular biological approaches. I will provide an overview of our current research on diatom life cycle regulation and discuss how this may contribute to the use of diatoms as cell factories.