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Effects of temperature on the elemental and biochemical composition of a marine microalga

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A change in environmental conditions often leads to changes in physiology and biochemical composition of microalgae. Temperature is an important environmental factor regulating the growth of microalgae. In this study, the elemental and biochemical composition were measured in the marine haptophyte *Emiliania huxleyi* (clone CCMP 1516) in nutrient replete conditions. Triplicate cultures were incubated from 14°C to 22°C. Culture was illuminated under photon flux densities (PFD) 600 $\mu\text{mol photon m}^{-2} \text{s}^{-1}$ on a 14L:10D cycle. The growth rate (GR) of *E. huxleyi* increased with temperature from 0.41 d⁻¹ at 14°C to 1.12 d⁻¹ at 22°C. Cell volume also varied with temperature. Cellular chlorophyll a, nitrogen, phosphorus, carbon and contents were also lower at 22°C than other temperatures. Protein, total amino acids from free and combined amino acid, and total pigments [mol accessory pigment (mol chl a)⁻¹] were decreased with increasing temperature; however, the opposite response was observed in fatty acids. Myristic (C14:0) and oleic (C18:1) acids were predominant fatty acids approximately 18.1-22.9% total fatty acids. Eicosapentaenoic acid (EPA, C20:5n3) and docosahexaenoic acid (DHA, C22:6n3) as polyunsaturated fatty acids (PUFAs) were found in *E. huxleyi*. The content of the highest DHA was 8.2% total fatty acid at the low temperature while EPA content did not change (3-4% total fatty acid) with temperature. The highest level of n-3 to n-6 ratio of the remaining fatty acids (~2) was achieved at 14°C of *E. huxleyi* which would make *E. huxleyi* suitable as a feed stock for aquaculture.

Biography

Narin Chansawang has completed her PhD in 2015 from University of Essex at England. She is a Researcher of Bioscience Department at Thailand Institute of Scientific and Technological Research. She is doing her research on fresh water and marine algae.

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