

Antioxidant Capacity, Proximate Biomass Composition and Fatty Acid Profile of Five Marine Microalgal Species with Potential as Aquaculture Feed

Authors : Vasilis Andriopoulos, Maria D. Gkioni, Elena Koutra, Savvas G. Mastropetros, Fotini N. Lamari, Sofia Hatziantoniou, Michalis Kornaros

Abstract : In the present study, the antioxidant activity of aqueous and methanolic extracts of *Chlorella minutissima*, *Dunaliella salina*, *Isochrysis galbana*, *Nannochloropsis oculata* and *Tisohrysis lutea*, as well as the proximate composition and fatty acid profile were evaluated, with the aim to select species suitable for co-production of antioxidants and aquaculture feed. Batch cultivation was performed at 25°C in a modified f/2 medium under continuous illumination and aeration with ambient air. Biomass was collected via centrifugation and extracted first with H₂O and subsequently with methanol at two growth phases (early and late stationary). Total phenolic content and antioxidant and reducing activity of the extracts were evaluated. The highest phenolic content was found in the methanolic extract of *C. minutissima* at the early stationary phase (9.04±0.68 mg Gallic Acid Equivalent g⁻¹ dry weight), and the aqueous extract of *D. salina* at the late stationary phase (8.78±1.49 mg Gallic Acid Equivalent g⁻¹ Dry weight). Antioxidant activity, measured as 1,1-diphenyl-2-picrylhydrazyl radical scavenging activity, and Ferric reducing antioxidant power assay of methanolic extracts were comparable to the literature and correlated to Total phenolic content and Chlorophyll content of the biomass. No such correlation was found in the aqueous extracts. *N. oculata* and *T. lutea* were high in protein (39.88±1.72% Dry weight and 43.30±1.33% Dry weight, respectively) and carotenoids (0.64±0.13% and 0.92±0.02%, respectively). Additionally, they presented high eicosapentaenoic acid and docosahexaenoic acid levels (33.74±9.98 mg eicosapentaenoic acid g⁻¹ DW and 31.31±2.92 mg docosahexaenoic acid g⁻¹ dry weight, respectively). *N. oculata* and *T. lutea* are promising candidates for the co-production of antioxidants and aquaculture feed, while *C. minutissima* and *D. salina* showed promise due to their higher antioxidant content.

Keywords : aquaculture fee, antioxidant activity, fatty acids, microalgae, total phenolic content

Conference Title : ICMMBGE 2021 : International Conference on Marine Microalgae, Biotechnology and Genetic Engineering

Conference Location : Rome, Italy

Conference Dates : December 13-14, 2021