Microalgae Extracts Enriched in Polar Lipids and Carotenoids: Bioactivity Assays for Nutraceutical Applications

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Microalgae are photosynthetic organisms that produce valuable compounds with application in food, pharmaceutical and cosmetic industry. Besides the bioactives produced in microalgae, polar lipids enriched in omega-3 fatty acids are emerging as novel value-added compounds with health beneficial effects. Moreover, carotenoids also stand out due the antioxidant and anti-inflammatory potential. Both of them are of high interest for its possible use in food formulations. In this work, *Odontella aurita* was selected due to its content in eicosapentaenoic acid (EPA) and fucoxanthin. In order to maintain their bioactivity and preserve their structure for nutraceutical applications, scale-up of advanced extraction methods such as pressurized liquid extraction (PLE) at 120ºC using ethanol as green solvent was applied. Microalgae extracts enriched in polar lipids (glycolipids and free fatty acids) and carotenoids (fucoxanthin) were characterized by HPLC-ELSD/DAD, LC-MS and GC-MS and compared to microalgae extracts obtained by traditional extraction techniques that uses hazardous organic solvents. To further analyze the potential bioactivity of the enriched microalgal oils, *in vitro* assays for anti-inflammatory and antioxidant activities were studied in different cell lines, and the antimicrobial activity against *Helicobacter pylori* was examined *in vitro* by minimal inhibitory concentration. Therefore, microalgae extract enriched in omega-3 glycolipids as well as fucoxanthin expressed good bioactivity results highly linked to health benefits demonstrating its potential application as functional food.