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CAROTENOID PROFILE OF TETRASELMIS STRIATA GROWN UNDER OPTIMAL CULTIVATION CONDITIONS IN A PILOT SCALE BIOREACTOR

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Microalgae are recognized as a valuable natural source of bioactive compounds, such as proteins, lipids, carotenoids and vitamins, for the aquaculture industry. The carotenoid profile of *Tetraselmis striata*, laboratory cultivated at different pH, temperature and photoperiod, was analyzed using Ultra High-Pressure Liquid Chromatography (UPLC) coupled with a mass spectrometer (Q-TOF). Identification and quantification of the carotenoid profile were performed using standard solutions (astaxanthin, lutein & zeaxanthin, canthaxanthin, echinenone, lycopene, b-cryptoxanthin, b-carotene), and an internal standard (trans- β -apo-carotenal). A carotenoid extraction protocol was developed and chloroform was selected as the extraction solvent. A saponification protocol was applied for the successful removal of chlorophylls, lipids, and esters, assisting in the quantification of b-carotene, canthaxanthin, and b-cryptoxanthin. However, this method had a notable deterioration effect on the remaining carotenoids. Consequently, a simultaneous extraction protocol without saponification was followed to quantify the rest of the carotenoids. A scale-up cultivation of *T. striata* was conducted in a 40 L capacity paddlewheel stainless steel raceway pond (110.5 x 61 x 20 cm, external length, width and height, respectively), by applying the optimal cultivation conditions found in previous laboratory trials (continuous illumination, 25°C and pH8), in terms of its high biomass productivity (92.5 mg L⁻¹ d⁻¹). Carotenoids detected in *T. striata* were b-carotene (7063.4 mg/kg dry biomass), lutein & zeaxanthin (1692.8 mg/kg), echinenone (190.9 mg/kg), b-cryptoxanthin (40.7 mg/kg), astaxanthin (33.5 mg/kg) and canthaxanthin (2.12 mg/kg), while lycopene was not detected in any of the analyzed samples. The results showed that *T. striata* can be considered a potential natural source of carotenoid compounds.