



Production and bioaccessibility of *Emiliania huxleyi* biomass and bioactivity of its aqueous and ethanolic extracts

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Abstract

The coccolithophore *Emiliania huxleyi* (Lohmann) W.W. Hay & H.P. Mohler has been receiving ever increasing attention as a result of its bioactivity potential. A strain of *E. huxleyi* recently isolated from Portuguese coastal waters (NE Atlantic) was cultivated under controlled laboratory conditions and the attained biomass was biochemically characterized (fatty acid (FA) profile, total phenolic and alkenone contents) and its bioactivity measured (antioxidant and anti-inflammatory properties). Moreover, bioaccessibility of selected constituents and bioactivities was assessed. A total dry weight of 556 mg L⁻¹ was attained. The biomass was characterized by a large polyunsaturated fatty acids (PUFA) share of the total FA, 60.8 ± 1.8%, followed by saturated fatty acids (SFA), 22.8 ± 1.0%, and monounsaturated fatty acids (MUFA), 15.9 ± 0.7%. Furthermore, an ω3/ω6 ratio of 37 was calculated. The daily amount of freeze-dried *E. huxleyi* required to meet the EPA + DHA recommended daily intake (RDI) was 19.9 g. As to the phenolic content, both extracts had similar values, reaching 435.5–465.4 mg GAE (100 g dw)⁻¹. Substantial antioxidant activity as measured by DPPH (2,2-diphenyl-1-picrylhydrazyl), FRAP (ferric reducing antioxidant power), and ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) was observed. The levels of anti-inflammatory activity were also substantial, 38 ± 4% and 85 ± 11% of COX-2 inhibition in the aqueous and ethanolic extracts, respectively. Moreover, it was observed that the C37:3, C37:2, and C38:2 alkenones were the most abundant, with values exceeding 500 mg (100 g dw)⁻¹ and total alkenone content was approximately 2,500 mg (100 g dw)⁻¹. The bioaccessibility of studied compounds and bioactivities was always low or even nonexistent/undetected. Therefore, future work should aim at microalgal extraction and processing for achieving higher bioaccessibility levels.

Keywords *Emiliania huxleyi* · Haptophyta · FA composition · Alkenones · Antioxidant activity · Anti-inflammatory activity · Bioaccessibility

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