
Extraction, structural characterization, and in vitro antioxidant and anti-inflammatory effects of alginate from the seaweed *Ericaria amentacea*

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Résumé

Sodium alginates (SA) were extracted and purified from apices resulting as waste of the *ex-situ* cultivation step for restoration of the brown seaweed *Ericaria amentacea* in the Ligurian Sea, employing hydrothermal-alkaline extraction. The structural characterization of SA was obtained by FTIR and ¹H-NMR. The bioactive properties of this polysaccharide were also investigated, in terms of in vitro antioxidant activities and of anti-inflammatory properties in LPS-stimulated macrophages by assessment of inhibition of inflammatory cytokines and mediators. The FTIR analysis of SA exhibited O-H, C-H, and COO- stretching which are represented by bands at 3301 cm⁻¹, 2926 cm⁻¹, and 1597–1408 cm⁻¹, respectively, compared to commercial alginate. The ¹H NMR spectroscopy indicated that the extracted sodium alginates have a high content of β -D-mannuronic (M) than α -L-guluronic acid (G) with M/G ratio 2.33. SA exerted significant antioxidant activities with high DPPH and nitric oxide radical-scavenging potential, together with a moderate ferric reducing potential. Moreover, the data obtained in this study demonstrate a strong anti-inflammatory effect of sodium alginate polysaccharide. Indeed, SA were able to strongly inhibit LPS-induced inflammatory mediators, such as IL-1 β , IL-6, IL-8, MCP-1, iNOS and TNF- α gene expression in human THP1-M0 macrophages as well as in Raw 264.7 murine macrophages. These results pave the way for the future use of *E. amentacea* metabolites, particularly if sustainably obtained from waste of restoration activities, in industrial and biomedical applications.

Mots-Clés: Brown algae, *E. amentacea*, sodium alginate, biological effects, gene expression

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