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Brown macroalgae (Phaeophyceae) extracts with antimicrobial activity as a natural strategy to improve food safety

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Growing consumer demands for high-quality products with longer shelf-life, coupled with minimally processed products and a less use of synthetic food additives, promote that the development of alternative solutions for food safety continue playing a key role in food industry. Consequently, efforts are currently under way for the search of new sources of natural antimicrobials. In this sense, brown macroalgae represent an unexploited resource of bioactive compounds since characteristic structures from this macroalgae group like phlorotannins, fucoidans or fucoxanthin have been widely described as potential antimicrobial compounds.

The aim of this study was to assess the antimicrobial potential of extracts obtained from brown macroalgae collected in North coasts of Spain, as well as the evaluation of their potential as food preservatives.

Macroalgae extracts were performed from 20 brown macroalgae species using a mid-polarity extraction medium. Their antimicrobial potential was first tested by disk diffusion assay and Minimum Inhibitory (MIC) and Minimum Bactericidal Concentrations (MBC) were evaluated for the active extracts. Although a high variability was observed due to environmental effects, extracts from *Bifurcaria bifurcata*, *Dictyota dichotoma* and *Ericaria selaginoides* showed activity against six Gram-positive target strains including *Bacillus cereus*, *Bacillus subtilis*, *Geobacillus stearothermophilus*, *Listeria monocytogenes*, *Staphylococcus aureus* and *Staphylococcus haemolyticus*, selected because of their interest as food-borne pathogens and spoilage bacteria. Antimicrobial activity of the purified apolar fraction from *E. selaginoides* extracts was further evaluated as ingredient for extending the safe shelf-life of fresh cheese against *L. monocytogenes*. The results obtained through by a challenge test showed that the effect over this pathogen was dose- dependent and its growth was completely inhibited at the highest concentration tested.

This study proves that brown macroalgae constitute an alternative source of antimicrobial compounds of natural origin with application as effective food preservatives to improve the safety and extent shelf-life of ready-to-eat products.

Keywords: Brown macroalgae, bioactive compounds, antimicrobial activity, food safety.

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