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Selective extraction of diterpenes from the macroalga Bifurcaria bifurcata using high-pressure assisted extraction

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PURPOSE OF THE ABSTRACT

In the last years marine species have been seen as promising sources of value-added compounds. Macroalgae, in particular, have become the most explored marine resources, due to their high biological and chemical diversity and fast-growing properties. Among the vast realm of macroalgae (about 10000 species) the brown macroalgae Bifurcaria bifurcata has shown particular interest, due to its high content on diterpenes, to which different biological properties have already been assigned, namely anti-inflammatory and antibacterial activities. A relevant synergetic effect with antibiotics of a B. bifurcata dichloromethane extract was also verified.1 However, the use of such fraction and its application in biomedical or pharmaceutical fields requires the development of green and sustainable extraction methodologies. High-pressure assisted extraction (HPE) has been considered a promising approach, due to lower solvents consumption and the use of moderate temperatures, avoiding the degradation of thermo-sensible components.2 In this vein, HPE of diterpenes from B. bifurcata was studied and optimized. This methodology was compared to conventional dichloromethane extraction. The composition of the extracts was analyzed by GC-MS. Optimization of the extraction conditions was done by Response Surface Methodology (RSM) in order to maximize the diterpenes content. B. bifurcata HPE extracts obtained at optimal conditions showed a diterpenes content one order of magnitude higher than extracts obtained without HPE. The antioxidant activity, expressed as IC50 values, of the HPE extract obtained under optimal conditions showed to be considerably higher than that obtained without HPE.
In conclusion, these results pointed out HPE as a promising methodology, comparatively to conventional methodologies, to obtain bioactive diterpenes richer extracts from the macroalga B. bifurcata.

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FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Bifurcaria bifurcata | diterpenes | high-pressure assisted extraction | bioactive compounds

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