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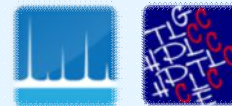
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BUILDING BRIDGES OF COOPERATION IN SEPARATION SCIENCE

**ABSTRACT BOOK**





## **P-023 CYSTOSEIRA ABIES-MARINA LIFE CYCLE: COMPARATIVE STUDY OF ITS POLAR PROFILE BY RP-HPLC-DAD-MS**

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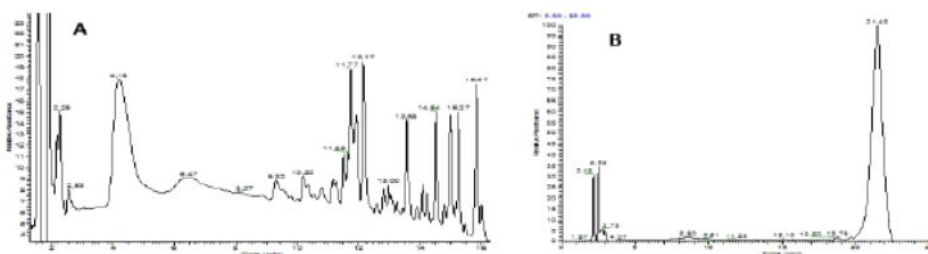
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Macroalgae, are largely used in food, pharmaceutical and cosmetics industries [1]. *Cystoseira abies-marina* (S.G. Gmelin) C. Agardh is a brown macroalgae (Phaeophyta) which belongs to *Cystoseira* genus and is distributed in the Mediterranean, Macaronesian Region and the coast of Africa [2]. In the Azores Islands, it grows abundantly in the intertidal zone where it is pioneer and attains large size [3]. Since intertidal seaweeds are exposed to extreme stress conditions (temperature, UV, water level) in addition to herbivory and fouling, they develop protective mechanisms, some of which involve the biosynthesis of metabolites with properties that may be useful to man (e.g. natural antioxidants, antifouling agents, novel UV sunscreens) [4]. The dichlormethane extract of *C. abies-marina* from Azores was studied revealing the presence of meronorditerpenoids with cytotoxic and antioxidant activities [5].

In this research the antioxidant activity and chemical composition of the ethyl acetate fraction of *C. abies-marina* methanolic extract was studied. *C. abies-marina* was collected in two phases of its life cycle (juvenile phase and mature phase). The antioxidant activity (DPPH assay, reducing power assay and chelating power assay) and the phenolic profile (by RP-HPLC-DAD-MS) of both fractions were evaluated. The obtained results show that the algae in the mature phase possess more antioxidant activity than in the juvenile one. Moreover, the main antioxidant mechanism is through scavenging activity and no metal chelation was detected. From the chromatograms (figure 1) it is clearly that the polar profile in the two phases is very different and indicates that the antioxidant activity is gained by different metabolite production and

not from accumulation of the same metabolites. Through analysis of ESI-MS spectra, in negative and positive mode, and MS/MS data of each peak, we were able to identify interesting compounds, such as quercetin, cinnamic acid and kaempferol derivatives in juvenile phase. While a kaempferol-O-rutinoside derivative is the most abundant compound in the mature phase and can be responsible for its antioxidant activity. In conclusion, the results showed that *C. abies-marina* extracts could be a source of antioxidant compounds although their composition varies with the life cycle phase. To the best of our knowledge, this is the first work that compares the chemical composition and antioxidant properties of *C. abies-marina* polar extracts obtained in two growth stages.



**Figure 1.** HPLC-DAD chromatogram obtained for ethyl acetate fraction of methanol extracts from juvenile (A) and mature (B) *Cystoseira abies-marina*

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#### References:

- [1] P. Kiuru, M. V. D'Auria, C. D. Muller, P. Tammela, H. Vuorela, J. Yli-Kauhaluoma, *Planta Med.* 2014, 80, 1234-1246.
- [2] M. D. Guiry in Guiry, M. D. & Guiry, G. M.; *AlgaeBase*; World-wide electronic publication, National University of Ireland; Galway; 2015 <http://www.algaebase.org>; searched on 03 October 2015.
- [3] A. I. Neto, I. Tittley, P. Raposeiro, *Flora Marinha do Litoral dos Açores*. Secretaria Regional do Ambiente e do Mar, Horta, Açores, 2005.
- [4] Gouveia, V.; Seca, A. M. L.; Barreto, M. C.; Pinto, D. C. G. A. *Mini-Rev. Med. Chem.* 2013, 13, 1150 - 1159.
- [5] Gouveia, V. L.; Seca, A. M. L.; Barreto, M. C.; Neto, A. I.; Kijjoa, A.; Silva, A. M. S. *Phytochem. Letters* 2013, 6, 593 - 597