P-031 - STRUCTURAL AND CYTOTOXIC CHARACTERIZATION OF SARGASSUM MUTICUM AND OSMUNDEA PINNATIFIDA ENZYMATIC EXTRACTS WITH BIOLOGICAL PROPERTIES

Dina Rodrigues[1]; Ana Rita Pinto[1]; Maria Amorim[1]; Teresa Rocha-Santos[1,2]; João Costa[2]; Artur Silva[2]; Armando Duarte[2]; Ana Maria Gomes[1]; Ana Cristina Freitas[1]

1 - CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa/Porto, Rua Arquitecto Lobão Vital, 172, 4200-374 Porto, Portugal; 2 - CESAM - Centre for Environmental and Marine Studies & Department of Chemistry, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

Background

Seaweeds are an important source of healthy ingredients, including new biologically active molecules that may be exploited for food or nutraceutical applications. *Osmundea pinnatifida* and *Sargassum muticum* extracts have demonstrated important antioxidant, antidiabetic and prebiotic biological properties (1), yet their structural and cytotoxic characterization is still lacking.

Method

Enzymatic extracts of *O. pinnatifida* and *S. muticum* obtained with Viscozyme and Alcalase, respectively, were performed according to Rodrigues et al. (1). Structural characterization was based on FTIR-ATR and ^{1}H NMR analyses. The identification of functional groups in the NMR spectra was based on their chemical shift (δ_H) relative to the water 4.7 ppm).

Enzymatic extracts were evaluated for anti-hypertensive activity by the angiotensin-I converting enzyme (ACE) assay according to Tavares et al. (2). To determine the eventual cytotoxicity of the extracts, a mammalian cell line (L929) was used to assess effects on cellular metabolic activity.

Results & Conclusions

FTIR-ATR spectra of *S. muticum* and corresponding enzymatic extract obtained with Alcalase showed high similarity and practically only differences in absorption intensity were observable. In terms of *O. pinnatifida* seaweed and its Viscozyme enzymatic extract, the two spectra presented some qualitative differences in the region 1100 to 1600 cm^{-1}. The increment in the 1150 cm^{-1} band can be related with a possible role of the multi-enzyme carbohydrases complex on polysaccharides (agar) matrix and on cellulose, xylan and manan fibrils of the complex composite cell walls of red seaweeds. In what concerns the ^{1}H NMR spectra, the relative abundance of each type of protons is, in general, relatively similar for the two extracts except the percentages of protons belonging to the aliphatic H-C group directly bound to an oxygen atom (H-C-O) probably due to the presence of nonaromatic ring structures such as sugars; higher values (67%) were observed for the enzymatic extract of *O. pinnatifida* than for the *S. muticum* (43%) counterpart. The *O. pinnatifida* extract exhibited the strongest ACE inhibitory with an IC_{50} value of 111.2 ug/mL whereas for *S. muticum* activity was of little significance (444.4 mg/mL). No cytotoxic effects were observed on mammalian cells, which suggests that both enzymatic extracts can be considered non-toxic in the range of concentrations tested and be further tested for novel nutraceutical and functional food applications.

References & Acknowledgments

(1)Rodrigues et al. 2015. J. Agric. Food Chem. *63*:3177–3188.
(2)Tavares et al. 2011. Peptides 32:1013-1019.
Work supported by national funds through FCT/MEC (PIDDAC) reference project IF/00588/2015 and by FCT project UID/Multi/50016/2013.

Keywords: Seaweeds, Enzymatic Extracts, Biological properties, Structural characterization, Cytotoxicity