

## **Evaluation of the variability of fucoidan extracted from brown seaweed and its anti-inflammatory and antitumor activity**

Ana Rita Inácio<sup>1,2</sup>, Rita O. Sousa<sup>1,2</sup>, Rui L. Reis<sup>1,2</sup>, Tiago H. Silva<sup>1,2</sup>

<sup>1</sup> 3B's Research Group, I3Bs – Research Institute on Biomaterials, Biodegradables and Biomimetics, University of Minho, Headquarters of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine, AvePark, Parque de Ciência e Tecnologia, Zona Industrial da Gandra, 4805-017 Barco, Guimarães, Portugal; <sup>2</sup> ICVS/3B's – PT Government Associate Laboratory, Braga/Guimarães 4805-017, Portugal; <sup>3</sup> The Discoveries Centre for Regenerative and Precision Medicine, Headquarters at University of Minho, Avepark, 4805-017 Barco, Guimarães, Portugal.

Marine origin polysaccharides are among the most abundant compounds in the oceans, playing structural, energetic and other roles in several organisms. Nevertheless, many of those are still poorly explored. In the recent decade, the ocean is receiving significant attention as a source of sulphated polysaccharides with very interesting properties, being particularly extracted from macroalgae. Seaweeds have always been of economic importance for centuries, with certain cultures exploring their use as a treatment for various diseases. The brown alga *Bifurcaria bifurcata* is an edible seaweed currently little studied and will be used as a source for the extraction of a sulfated polysaccharide, fucoidan. Fucoidan corresponds to a family of polysaccharides rich in sulfated fucose found in brown algae, besides other sugars as uronic acids, presenting a variety of bioactive properties of enormous interest, such as: antitumor, antithrombotic, antioxidant, anti-inflammatory, anticoagulant and antiviral, among others. The properties of this polysaccharide are of interest for many industrial applications, being in the development of pharmaceuticals and nutraceuticals compounds or in the design of innovative biomedical applications. It has been reported that the extraction methods and other factors (for example seaweed species, geographic location and harvest season) have been influencing the composition of the produced fucoidan extract, namely the polysaccharide chemical structure, amount of polysaccharides, which consecutively influences its biological activity. The present work is addressing the extraction of fucoidan from selected samples of brown alga *Bifurcaria bifurcata*, based in water extraction methodologies, and further evaluating the variability of the produced extract throughout the year on the yield of extraction and the chemical properties that contemplate the biological activities and its further biomedical application, more concretely as anti-tumor and anti-inflammatory agent.