

BOOK OF ABSTRACTS



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Climate change impact on algae

(23113) - TEMPORAL AND SPATIAL VARIATIONS IN BROWN ALGAE CELL WALL COMPOSITION: INSIGHTS FROM FTIR-ATR ANALYSIS

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Abstract

Brown algae cells are surrounded by a polysaccharide-rich cell wall primarily composed of fucose-containing sulfated polysaccharides and alginates, crucial for desiccation resistance, structural support, and bioactive functions. Moreover, they mediate the uptake of various pollutants, which can impact algae integrity. Despite this important biological role and potential economic value, we still know little about how much the composition of this extracellular matrix varies both across space and time and which are the main factors driving this variation. In this study, we used Mid-infrared Fourier Transform Infrared Spectroscopy (FTIR-ATR) to detect spatiotemporal patterns of variation in the cell wall composition of brown macroalgae. We analyzed over 850 samples of *Fucus vesiculosus*, *Fucus ceranoides*, and *Fucus spiralis*, gathered along the North Atlantic coast (Galicia, NW Spain), by combining three experimental designs: transplant experiments conducted across 15 sampling stations, monthly sampling from 2015 to 2019 at 3 sampling stations, and consistent sampling in 1989, 1990, 2001, 2003, 2005, 2007, 2017 and 2021 across nearly 200 sampling stations. We also determined the concentrations of Cd, Hg, Pb and $\delta^{15}\text{N}$ in the algae tissues. The preliminary results indicate differences in cell wall composition among populations of algae exposed to varying pollution levels, suggesting acclimation responses to pollution. Moreover, we identified seasonal differences in the FTIR-ATR profiles, which may help explain the seasonal changes detected in elemental concentrations. Given the critical role of brown algae as largest primary biomass producers in coastal environments, understanding their adaptations and mechanisms that affect their physiology holds immense importance.

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Keywords: Polysaccharides, FTIR-ATR, Pollution, Seaweed, Brown algae, Acclimatation



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CERTIFICATE

We hereby certificate that the work

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Wall Composition: Insights from FTIR-ATR Analysis***

was presented as ***Oral Presentation***, at the **8th Congress of the International Society for Applied Phycology**, which was held in Alfândega do Porto, Portugal, from the **16th to the 21st of June, 2024**.

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A handwritten signature in brown ink, appearing to read 'Vitor Vasconcelos'.

Prof. Dr. Vítor Vasconcelos
Congress Chairman

