

"Insights on the hydrogel-forming ability of Exopolysaccharide (EPS) from *Porphyridium cruentum* for skin wound healing applications"

Marta M. Duarte (1), Artem Suprinovych (1), Anabela Veiga (1,2), Inês V. Silva (1), Ana L. Oliveira (1)

1 Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Portugal

2 LEPABE – Laboratory for Process Engineering, Environment, Biotechnology & Energy, Department of Chemical Engineering, Faculty of Engineering of the University of Porto, R. Dr. Roberto Frias, 4200-465 Porto, Portugal

Marine algae and their metabolites have been widely recognized for their bioactive properties with applications in various industries, such as nutraceutical, cosmetical, and pharmaceutical. In this work the extracted sulfated exopolysaccharides (EPS) from *Porphyridium cruentum* were analyzed for their hydrogel-forming ability and potential to be used as a new platform for healing and regeneration of chronic wounds, due to their bioactive potential.

The rheological behavior of aqueous solutions of EPS formulations (0.5, 1.5, 2.5%) in 0.1 M NaOH in the presence of divalent and trivalent metal ions (M^{2+} and M^{3+}) was measured and compared to a more well-characterized polymer, alginate. Ionic cross-linked nature and polymer concentration was significant for the formation of gels, with higher concentrations (1.5 and 2.5%) having a broader range of success. After hydrogel formation, the overall rheological response remained similar with varying ionic cross-linker concentration. However, overall EPS formulations led to less stiff and stable hydrogels than alginate formulations, revealing that there are further optimizations needed for gelling conditions and formulations.