



## **Synergic interaction between chitosan and peptides from shrimp side-streams (*Pandalus borealis*) before and after pulsed electric field treatment, a study focused on emulsifying property**

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Even though shrimp byproducts have shown interesting bioactive components, such as chitin, proteins/enzymes, pigments, and lipids, most of these byproducts are discarded. Herein we aimed to evaluate the interaction between chitosan and peptides from shrimp, before and after pulsed electric field treatment to further explore the emulsifying property. Material & Methods Protein hydrolysis was applied using Trypsin 0.5% (E/S). Chitosan was obtained with a 80% (FTIR method) degree of deacetylation using ultrasound during the synthesis; Supramolecular chitosan/peptides complexes were formed at two different pHs 6.2 and 4.2, and their emulsifying properties were evaluated. Samples were characterized by Differential Scanning calorimetry (DSC), Fast Protein Liquid Chromatography (FPLC) and Size Exclusion Chromatography Coupled to Multi-Angle light Scattering (SEC-MALS). The emulsion stability was verified by Turbiscan method (TSI value), and the interfacial properties and viscosity were studied by double wall ring rheology and bulk rheology, respectively. Confocal Laser Scanning microscope (CLSM) and cryo-TEM microscopy techniques were applied. Results & Discussion Emulsion stability was significantly improved in the presence of chitosan/peptides, and even higher when PEF was applied. Microscopy techniques revealed a cluster formation when proteins and chitosan were used as emulsifier whereas in presence of chitosan no aggregates or clusters were evident. The formation of cluster entrapped the oil droplets and increased the viscosity. Interfacial rheology also revealed a faster solid/film formation on the oil/water interface and a higher value of storage modules when Chitosan/protein and PEF was used. Conclusion The study highlighted the potential functionalities of shrimp side-stream and the positive impact of pulsed electric field in the valorization of these components when aimed to be applied as alternative emulsifiers.