
## PO96 - 24926 - FORMATION AND EVALUATION OF CHITOSAN NANOPARTICLES WITH ANTIBACTERIAL AND EMULSIFYING PROPERTIES FOR FOOD APPLICATION

***Ana Carolina Racioni Gonçalves[1]; Raiza Iacuzio[1]; William Alencar[1]; Nathália Silva[1]; Carolina Picone[1]; Luiz Henrique Fasolin[2]***

1 – University of Campinas - UNICAMP, 13083-862, Campinas, SP, Brazil; 2 - Centre of Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

E-mail: carolina.racioni@gmail.com

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**Abstract**

Chitosan (CS) is a natural polysaccharide with several functional properties, including antimicrobial and emulsifying activities. However, these properties are not intense enough to enable its use as food preservative or emulsifier. Through nanoscale aggregation, the functional properties of polymers can be enhanced, due to the huge increase of surface area. The present work studied the formation of chitosan nanoparticles with sodium tripolyphosphate (TPP) or genipin (GN), in order to enhance chitosan antimicrobial and emulsifying properties. The particles were synthesized via ionic and covalent crosslinking of chitosan (2 mg/mL, Sigma-Aldrich) with 1 mg/mL TPP or GN, respectively, under magnetic stirring at pH 3.5 for 1 h at 25 °C. The complexes were characterized by Dynamic Light Scattering (DLS), Fourier Transform Infrared Spectroscopy (FTIR) and Atomic Force Microscopy. Minimum Inhibitory Concentration (MIC) against *Staphylococcus aureus* was evaluated and the emulsifying property was studied by emulsification index in a model emulsion (10O:90W), prepared with the particles in suspension, soybean oil and 5% lecithin. The size and zeta potential stability over time of the complexes stored under refrigeration was also studied. The FTIR spectra confirmed the chemical interactions between the chitosan and TPP/genipin groups. The complexes showed hydrodynamic diameter of 87.8 and 953.7 nm to CS-TPP and CS-GN particles, respectively. The MIC results showed that the antimicrobial property was intensified for the smaller size particle (0.007 mg/mL, CS-TPP NPs), confirming the hypothesis that nanotechnology can improve polymer functional properties. Regarding the emulsifying property, the particles were also able to extend the stability of the emulsions, since the phases separation occurred slowly, especially for CS-TPP nanoparticles. The particles remained stable for 56 days. In this scenario, chitosan nanoscale structuration is a viable alternative to food application, once both functional properties were improved through nanotechnology.


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