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P04 Encapsulation of rosmarinic acid into chitosan nanoparticles

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Introduction: The use of nanotechnology in medical sciences is a innovation that promises a new age of health. Among the different approaches explored so far, chitosan exhibits favourable and unique biological properties, such as biocompatibility, biodegradability, non-antigenic, non-toxicity and mucoadhesiveness . On the other hand, natural extracts have been incorporated in chitosan films, or macro/microparticles, becoming more effective as antimicrobial or improving the antioxidant protection. The combination of antioxidants and nanoparticles is seen as the key to success in the topical administration of therapeutic antioxidants . Phenolic compound like rosmarinic acid are potent natural antioxidant with a multitude of biological activities like anti-inflammatory, antimutagen, antibacterial and antiviral as well as high potential radical scavenging activity .

Objectives: In this study, chitosan nanoparticles with rosmarinic acid were prepared and characterized in order to ensure their best size, efficient encapsulation and to test the antioxidant activity performance.

Methods: Chitosan nanoparticles were prepared by ionic gelation and the encapsulation of rosmarinic acid was tested in different theoretical loadings (5%, 10%, 15%, 20%, 30%, 40% and 50%) fairly to the initial concentration of chitosan, to guarantee the best ratio between chitosan and the acid. Spectrophotometric measurements as well as flurometric techniques were carried out to determine the antioxidant capacity of the nanoparticles with rosmarinic acid such as ABTS and ORAC method and the encapsulation efficiency was measured by a validated HPLC method. Size and zeta potential of the nanoparticles were measured using zeta potential analyzer utilizing phase analysis light scattering - Zeta Pals.

Discussion and conclusions: The data showed that the best results considering the evaluation of nanoparticles size, zeta potential, encapsulation efficiency and antioxidant activity were the 40% of rosmarinic acid loading. Pharmaceutically, the systems are expected to increase the capacity of maintaining the antioxidant activity during the preparation process, to optimize the release of the compound from the nanoparticles. A good control of the physicochemical properties and stability of the nanoparticles to improve the bioavailability and therapeutic efficacy is expected, without compromising the safety performance of the drug.

Bibliography
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