

Novel hydrogels based on new dendritic polymers as antimicrobial carrier systems

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Abstract

Hydrogels are usually defined as a crosslinked polymeric network having the capacity of holding large amount of water within its porous structure. Those comprise an important class of biomaterials specially used for drug delivery applications, due to their biocompatibility, good rheological and bioadhesive properties, high capacity of loaded drug and modified-release behaviors. This work reports the development of an antibacterial delivery system, under hydrogel form, based on a novel biocompatible dendronized polyelectrolyte (DP) as a carrier of ciprofloxacin (CIP). The ionic complexes of DP-CIP were formed by acid-base reaction using the high density of acid groups of the dendronized polymer and the amine groups of the ciprofloxacin drug. Hydrogels based on DP-CIP were easily prepared and showed excellent mechanical properties without dermal irritation for topical administration. A slow and diffusion-controlled *in vitro* release of CIP towards simulated physiological fluids was observed. The release performance could be attributed to the ion exchange phenomenon, revealing that the release of CIP from these hydrogels was appropriate, in terms of both magnitude and velocity. *In vitro* bacterial growth inhibition assay showed a significant CIP activity, corresponding to 38 and 58 % compared to that exhibited by CIP hydrochloride solution at similar CIP concentrations, against *S. aureus* and *P. aeruginosa*, respectively. In addition, the high biocompatibility of hydrogel was demonstrated by *in vivo* skin irritancy test. The hydrogel based on DP-CIP showed particularly promising properties that could be exploited for the treatment of topical and mucosal opportunistic infections in human or veterinary applications.

Biography

García Mónica C has completed 5 years degree at Universidad Nacional de Córdoba, Argentina. She is a pharmacist and she is working on her PhD thesis at the Unidad de Investigación y Desarrollo en Tecnología Farmacéutica (UNITEFA), CONICET and Departamento de Farmacia, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Particularly, she works in the Group of Pharmaceutical Technology led by Rubén H. Manzo, PhD. The goal of her work is to develop and study new pharmacotherapeutic systems, including novel drug delivery systems, in order to improve the efficacy and safety of Chagas disease treatment.

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