



Hydrocaffeic Acid-Chitosan Nanoparticles with Enhanced Stability, Mucoadhesion and Permeation Properties

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Abstract:

Catechol-containing molecules, such as hydrocaffeic acid (HCA) have been shown to increase the mucoadhesion of several polymers. We report here a simple and bioinspired approach to enhance chitosan (CS) mucoadhesion and stabilize it in nanoparticulate form by preparing HCA-CS conjugates. HCA-CS conjugates containing 6 and 15 mol% HCA were synthesized and characterized by FT-IR, ¹H NMR and UV-vis spectrophotometry. HCA-CS nanoparticles prepared by ionic gelation with sodium tripolyphosphate (TPP) ranged in size between 100 and 250 nm depending on the polymer and TPP/CS weight ratio. In contrast to CS nanoparticles, which aggregate at pH > 6.5, HCA-CS nanoparticles did not show any sign of aggregation or precipitation over the 4-10 pH range and maintain their size. Unexpectedly, HCA-CS nanoparticles also maintained their size and polydispersity index at pH 7.4 and NaCl concentrations of up to 500 mM. Partial oxidation of HCA resulted in nanoparticle cross-linking and improved stability at pH

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