عنوان مقاله:

Silica-Coated Magnetic Tragacanth Gum Nanoparticles Crosslinked with Citric Acid for the Loading and Delivery of Ranitidine

محل انتشار:

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خلاصه مقاله:

A new magnetic nanocomposite was prepared by synthesizing Fe۳O۴@SiO۲ nanoparticles and then coating them with a shell of tragacanth gum (TG) as a natural product modified by citric acid (CA). The obtained Fe۳O۴@SiO۲@TG@CA nanoparticles were identified by scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX) and Fourier transform infrared spectroscopy (FT-IR). The prepared magnetic nanoparticles were used for loading and delivery of ranitidine, an oral drug. Conditions for drug loading were optimized by a central composite design optimization method. The maximum loading efficiency for ranitidine was ۷۹.۳% that was obtained at pH ۱۱ and its in vitro release was gained within ۵۵ min at pH ۱.۶ in a phosphate buffer medium. The loading capacity of the nanocarrier was dependent on the initial concentration of ranitidine and exceeded ۱۱.۴ mg g-۱ in a solution of ۲۰۰ mg L-۱. The study of adsorption isotherms to describe the interaction of ranitidine with the carrier showed the best fit with Freundlich isotherm. The results showed that the prepared Fe۳O۴@SiO۲@TG@CA adsorbent, as a non-toxic and low-cost nanocarrier, is quite suitable for drug delivery applications.

کلمات کلیدی:

Magnetic nanoparticles, Tragacanth Gum, Citric acid, Drug Delivery, Hydrogel