عنوان مقاله:

Synthesis and characterization of N- α-tocopherol -O-sulfate chitosan nanomicelles as a delivery vehicle

محل انتشار:

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خلاصه مقاله:

Background and objective: Delivery of poorly water soluble active compounds such as anticancer drugs to the specific site of action, is challenging. Nowadays, use of polymeric nanparticles for delivery of various active compounds is a good strategy. Polymeric nanomicelles are a class of stable nanoparticles that can be used for delivery of water-insoluble drugs. Chitosan is a natural, biocompatible and biodegradable polymer that has been widely used for preparation of nanomicelles. The aim of the current project is preparation of N- α-tocopherol -O-sulfate chitosan nanomicelles as a delivery vehicle for water-insoluble active compounds. Materials and Methods: In order to prepare α-tocopherol modified chitosan, sodium nitrite depolymerized chitosan was reacted with synthesized α-tocopherol-succinate in the presence of NHS and EDC. In the next step, some of the hydroxyl groups of chitosan were converted to sulfate using chlorsulfonic acid. The chemical structure of each compound was analyzed using FT-IR spectroscopy. The substitution degree of α- tocopherol and degree of conversion for hydroxyl to sulafe group was determined using TNBS and FTIR assay, respectively. Particle size and zeta potential of nanomicelles were determined using dynamic light scattering; the pyrene assay was performed to determine critical micelle concentration.Findings: FT-IR spectroscopy showed that each synthesis step was performed successfully. TNBS assay indicated that amine groups were modified with α- tocopherol- succinate. Modified chitosan self-assembled into nanomicelles with CMC value below 25 µg/mL. Conclusion: N- α-tocopherol -O-sulfate chitosan can be a good candidate for delivery of various water-insoluble materials like antioxidants and anticancer drugs.

کلمات کلیدی:

chitosan; α-tocopherol-succinate; sulfate; nanomicelle