

Preparation and Characterization of Rhoifolin-Loaded Polymeric Nanoparticles as a Potential Natural Nanomedicine for inflammation

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Abstract

Rhoifolin (ROF) is a bioactive plant flavonoid with known antioxidant and anti-inflammatory activity. However, no delivery system has yet been developed for ROF. Therefore, the aim of the current study was to design a polymeric nanocarrier to improve the biopharmaceutical properties of ROF. ROF was isolated from Jordanian *Teucrium polium* L. and encapsulated into poly(ethylene glycol)-modified poly(lactide-co-glycolide) nanoparticles (NPs). Characterization of the optimal NPs showed an average size of 204nm with high monodispersity, negative surface charge, and encapsulation efficiency of 45%. The NPs exhibited long term stability, excellent colloidal stability, and sustained release. *In vitro* antioxidant and *in vivo* anti-inflammatory assays in a formalin-induced rat paw edema model confirmed the excellent antioxidant and anti-inflammatory activity of ROF NPs which was comparable to free ROF and diclofenac. Our findings could provide a promising nanocarrier platform for the delivery of ROF and similar natural products in the treatment of inflammatory diseases.

Keywords: Rhoifolin, *Teucrium polium*, polymeric nanoparticles, anti-inflammatory, nanomedicine.