Synthesis and characterization of Carboxymethyl cellulose-rosin gum hybrid nanoparticles for efficient delivery of 5-ASA

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ABSTRACT

The present study describes the synthesis, characterization and colon-specific oral drug delivery of 5-Aminosalicylic acid through Carboxymethyl cellulose-rosin gum hybrid nanoparticles (CRNP3). The drug easily permeates at the gastrointestinal pH so its adequate release in colon is challenging. Hence, CRNP3 were fabricated by nanoprecipitation method to target the delayed release of 5-ASA at acidic pH. Its physicochemical characterization was done by Scanning Electron Microscopy (SEM), Fourier Transform Spectroscopy (FTIR), X-ray Diffraction (XRD), and particle size analysis based on dynamic light scattering. In vitro release of 5 Aminosalicylic acid from CRNPs was monitored in simulated gastric (SGF) and intestinal (SIF) fluids. The release profile revealed that slow release of drug in first 2 h in SGF, as compared to SIF and 72% drug was released in a controlled manner during 12 h. While native carboxymethyl cellulose or rosin gum showed 100% release within 5 h or 8 h respectively. The delayed release from CRNPs is attractive for enhancing the bioavailability of drug in colon. The drug release followed zero-order kinetics and non-Fickian diffusion mechanism.

Thrust area – Polymer Chemistry, and Category – Research