



Development and characterization of pH-Sensitive Pectin/Acrylic Acid Hydrogels for Colon Specific Drug Delivery

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SUMMARY. The present work was aimed to rationally design and synthesize pH-sensitive crosslinked pectin/acrylic acid hydrogels for studying release pattern of alfuzosin HCl. Such hydrogels were prepared through free radical polymerizations. Then these materials were used as model systems to envisage various important characterizations like Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM) and thermal analysis. *In vitro* release pattern of alfuzosin HCl was investigated in buffer solutions of pH 1.2, 5.5 and 7.5. The release kinetics was evaluated by applying zero order, first order, Higuchi and Peppas kinetic models. Dynamic and equilibrium swelling analysis was performed to predict release behavior and releasing site. Remarkable swelling was observed at higher pH values. FTIR spectra showed intensity of esterified carboxyl group at 1755.92 cm⁻¹, which is of pure pectin, shifted to lower frequency indicating interaction between pectin and acrylic acid. Thermo gravimetric analysis indicated increase in thermal stability while Differential Scanning Calorimetry (DSC) results showed increase in enthalpy after copolymerization. The release of drug followed zero order and exhibited non-fickian diffusion mechanism. As maximum of the drug released at pH 7.5, it depicts the character of this developed polymer as a suitable candidate for colon specific drug delivery.

KEY WORDS: Acrylic acid, Degree of crosslinking, Pectin, pH-sensitive, Swelling ratio.

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