

Novel IPN Hydrogel Beads as pH Sensitive Drug Delivery System for an Anti-Ulcer Drug

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Abstract : Purpose: This study has been undertaken to develop novel pH sensitive interpenetrating network hydrogel beads. Methods: The pH sensitive PAAM-g-Guar gum copolymer was synthesized by free radical polymerization followed by alkaline hydrolysis. Beads of guar gum-grafted-polyacrylamide and sodium Carboxy methyl cellulose (Na CMC) loaded with Pantoprazole sodium were prepared and evaluated for pH sensitivity, swelling properties, drug entrapment efficiency and in vitro drug release characteristics. Seven formulations were prepared for the drug with varying polymer and cross linker concentrations. Results: The grafting and alkaline hydrolysis reactions were confirmed by FT-IR spectroscopy. Differential scanning calorimetry was carried out to know the compatibility of encapsulated drug with the polymers. Scanning electron microscopic study revealed that the IPN beads were spherical. The entrapment efficiency was found to be in the range of 85-92%. Particle size analysis was carried out by optical microscopy. As the pH of the medium was changed from 1.2 to 7.4, a considerable increase in swelling was observed for all beads. Increase in the copolymer concentration showed sustained the drug release up to 12 hrs. Drug release from the beads followed super case II transport mechanism. Conclusion: It was concluded that guar gum-acrylamide beads, cross-linked with aluminum chloride offer an opportunity for controlled drug release of pantoprazole sodium.

Keywords : IPN, hydrogels, DSC, SEM

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