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Development of gastro-retentive drug delivery systems based on N-isopropyl acrylamide hydrogels

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It was planned to synthesize dual-responsive hydrogels from N-isopropyl acrylamide (NiPAAm), acrylic acid (AA) and methacrylate (MA). Hydrogels were prepared by free radical copolymerization using ethyl alcohol as a solvent, a redox initiator, benzoyl peroxide (BPO) and ethylene glycol dimethacrylate (EGDMA) and diethylene glycol dimethacrylate (DEGDMA) as cross-linkers. The network parameters like polymer mesh size (ξ) (23.78 to 820 Å), molecular weight between the cross-links (M_c) (970-356096 gmol-1) and crosslink density (q), (0.0928 to 0.00025) were calculated at various pH using the Flory-Rehner theory. Hydrogels exhibited the non-Fickian diffusion mechanism. FTIR spectral analysis and (TGA/DSC) were carried out to characterize the systems and new LCST was found to be increased. Tramadol HCl was used as the model drug to investigate the drug loading and unloading behavior of these gels. It was concluded that these systems exhibited a sharp change in their media sorption capacity and mesh size of the networks with the change in the pH and temperature of the swelling media, proposing their strong candidature for being used as oral drug delivery systems. The results favored the idea to apply these hydrogels to use as targeted drug delivery systems for the proximal part of the gastro-intestinal tract.

Biography

Rubab Zohra is working as an Associate Professor at Department of Chemistry in Forman Christian College (A Chartered University), Lahore, Pakistan.

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