DESIGN AND CHARACTERIZATION OF ACRYLATED POLYETHYLENE GLYCOL GEL CONTAINING ACARBOSE

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ABSTRACT

Diabetes mellitus is a metabolic syndrome and affects about 415 million people worldwide. Type II diabetes mellitus (T2DM) is a chronic condition that is progressive with no effective cure till date. Contemporary pharmacological agents such as metformin, acarbose and other drugs are employed as front line pharmaceutics to treat T2DM. However, they are associated with detrimental side effects, also the issue of patients' non-compliance due to inconvenient drug taking has added to the advancement of this disease condition. Acarbose has low rates of absorption and only about 2 % of the drug is absorbed in its original form. Acarbose is potentially affected by some metabolic enzymes which are undesirable hence the improvement to bioavailability of acarbose is targeted. Polymer hydrogels have been successfully employed as drug delivery systems. Hence, a unique acrylation design of an effective polyethylene glycol polymer-drug delivery mechanism for the successful delivery of acarbose is achieved to improve its delivery and effectiveness. pH swelling analysis was performed on the plain polymer gel. Toxicological studies were performed using c2c12 mouse myoblast cells. Successful drug encapsulation was accomplished and confirmed further characterization was performed viz; Fourier Transform Infrared Spectroscopy (FTIR), Thermal Analysis, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and X-Ray Diffraction (XRD) performed. Results from the toxicological studies confirmed the non-toxic nature of the polymer to the c2c12 cell lines and swelling behavior revealed the capacity for controlled drug release.

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