International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.10 No.9, pp 1018-1025, 2017

In Vitro Evaluation of PLGA-PEG-PLGA Microspheres for Sustained Release of Insulin

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Abstract : Formulating a polypeptide gastrointestinal drug delivery system have been persistent challenges. To overcome thesechallenges, microsphere are more attractive because of their biodegradability and easy preparation and administration. In this study, biodegradable triblockcopolymerpolylactide-co-glycolide- polyethylene glycol-poly lactide-co-glycolide (PLGA-PEG-PLGA) was synthesized under microwave for insulin encapsulation and release. PLGA-PEG-PLGA was characterized by ^{1}HNMR and gel permeation chromatography. The sol–gel transition temperature of PLGA-PEG-PLGA was also evaluated using refrigerated bath circulator instrument. The solution of PLGA-PEG-PLGA and insulin was injected in distilled water (45 ^{o}C) in probe sonication system during 1 min for achieving the microsphere without using any organic solvent. The amount of insulin encapsulated in the PLGA-PEG-PLGA microspheres were determined by the Bradford method. Microspheres of an average particle size of 34±8.3 µm that were observed using optical microscope were used for an in vitro release study. Finally, CD spectrum tests were performed to approve the stability of released insulin. It was demonstrated that the synthesis of PLGA-PEG-PLGA via microwave irradiation was fast and efficient. In vitro release studies affirmed the sustained release profile of insulin. Results of stability tests confirmed the stability of insulin following release.
Key Words : PLGA-PEG-PLGA, Insulin, Microsphere, Sustained release.

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