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Antidiabetic drug loaded biodegradable nanoparticles for the management of Diabetes mellitus

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In drug delivery system, appliance of nanotechnology has opened up new areas of research in prolonged release of drugs in order to reduce the side effects of administration of conventional dosage form especially for the treatment of diabetes mellitus. With this objective, Rosiglitazone loaded PLGA nanoparticles were prepared by solvent evaporation method. The nanoparticles were characterized for various parameters including dynamic laser spectroscopy, transmission electron microscopy and atomic force microscopy. These studies favorably revealed that the mean particle diameter of nanoparticle was ~301 nm and had spherical morphology. Moreover, fourier transform infrared spectroscopy (FTIR) and differential scanning calorimetry (DSC) analysis results showed that, there were no interaction between drug and polymer. Drug encapsulation efficiency was found to be ~55 %. Nanoparticle formulation released the drug at a sustained rate for prolonged duration (~35 % in two weeks). The developed nanoparticles also revealed an enhanced bioavailability of the drug in *in vivo* system. Blood glucose level of Rosiglitazone loaded nanoparticle treated streptozotocin induced diabetic rats was reduced significantly (upto 7 days) to normal levels compared with native drug treated group (upto 2 hours). The in vivo toxicity study of the nanoparticles showed no significant change in behavioral, biochemical and haematological examinations in albino rats. Thus, the developed system could be beneficial to achieve a sustained release of the drug that could be helpful to achieve reduce dose frequency and improve patient compliance for the management of type-2 diabetes mellitus.

Biography

Sachinkumar Patil Presenting author has submitted his Ph.D. and having 1 year industrial experience and 8 years of academic experience. He has published more than 12 papers in reputed national and international journals.

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