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TITLE

A Novel Approach to Prepare Gliclazide-Poly (ε-caprolactone) Microparticles for Controlled Release Drug Delivery

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The objective of this study was to establish a new preparation method for poly (ε-caprolactone) microparticles-containing gliclazide by modifying the spontaneous emulsification solvent diffusion method. The influence of various formulation factors (stirring speed, drug:polymer ratio, homogenization, addition of surfactants, addition of release retarding agents) on particle size, drug loading, and encapsulation efficiency were investigated. The effect of formulation factors and processing conditions were studied by scanning electron microscopy, FTIR spectroscopic studies, and differential thermal analysis. Mean particle size altered by changing the drug: polymer ratio and stirring speed. Addition of surfactants, and release retarding agent, like ethyl cellulose and Eudragit L100 showed a promise of decrease particle size of the prepared microparticles. Dissolution study revealed sustained release of gliclazide from poly(ε-caprolactone)-Eudragit L100 matrix microparticles. In vivo evaluation studies were conducted on gliclazide microparticles in normal ten white albino rabbits by measuring serum gliclazide levels following oral administration of an immediate-release 80 mg gliclazide tablet and extended release gliclazide microparticles at a dose equivalent 80 mg. Blood samples were obtained at zero time until 48 h post-dose. The formulations were compared using area under the plasma concentration-time curve, AUC_{0-a}, time to reach peak plasma concentration, T_{max}, and peak plasma concentration C_{max}, The data generated in the bioavailability study were used to develop the IVIVC, Linear regression analysis was applied to the IVIVC plots and coefficient of determination (R2) was calculated. The hypoglycemic effect of gliclazide microparticles was also examined in diabetic rats. The microparticles were discrete, spherical and free flowing. The microencapsulation efficiency was in the range 89-96% . The drug release was found to be slow and extended for more than 16 hours. The hypoglycemic effect obtained by promising microparticles formulation was lasting for more than 16 hours in diabetic rats.

Biography

Nahla has graduated from School of Pharmacy, Alexandria University and got a master and PhD degree from Alexandria University. Now Nahla is working in King saud University, College of Pharmacy.