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Preparation and characterization of antidiabetic sulfonylureas plus metformin loaded polymeric nanoparticles

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Objectives: Nanoparticles has been used as suitable carriers for delivery of drug with poor solubility. The aim of present work was preparation and characterization of sulfonylureas and metformin loaded polymeric nanoparticles.

Methods: Sulfonylureas and metformin was taken as model antidiabetic drug was incorporated in Nanoparticles loaded with were prepared by a hot homogenization method using cephalin and lecithin as lipids and Tween 80 as stabilizer. Characterization and evaluation studies such as particle size measurement, poly dispersity index, Zeta potential, entrapment and loading capacity, Stability studies, in vitro release studies were done to ensure the quality Nanoparticles.

Results: Scanning Electron Microscopy showed the SLN particles were spherical shape in the size between 95 – 100 nm and the poly dispersity indexes were 0.117 to 0.219. The zeta potential was -18.1 ± 1.5 to −23.1 ± 4.8 mV. The entrapment efficiency (EE %) and drug loading capacity (DL %) determined were 91.4 ± 2.5 % to 97.1 ± 2.8 %. Differential scanning calorimetry (DSC) thermo grams revealed the stability of nanoparticles with no tendency of recrystallisation. In situ and externally sink method revealed the release pattern of drug was found to follow fick's and Higuchi equations. Results of stability evaluation showed a relatively long-term stability after storage at 5°C and 30°C for 10 weeks. In this formulation increase in concentration of lipid content has increased the entrapment efficiency of nanoparticles.

Conclusions: Nanoparticles with small particle size, excellent physical stability, high entrapment efficiency, good loading capacity for diabetic drug can be maintaining blood glucose level normally for long time.