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Preparation and in vitro characterization of Repaglinide-loaded Solid Lipid Nanoparticles

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Background and Aims: Repaglinide is an orally administred anti-diabetic drug with rapid gastrointestinal absorption and 3-4 times-a-day schedule. These pharmacokinetic parameters in addition to the practical water insolubility property, presented it as a good candidate for prolonged release formulations. With this object, repaglinide-loaded solid lipid nanoparticles (SLN) have been developed and optimised.
Methods: SLNs were prepared using solvent diffusion method, where stearic acid, surfactant and repaglinide were dissolved in Ethyl alcohol and this solution was added in a drop-wise manner and under stirring condition onto aqueous phase. The SLNs were subjected to various tests for characterization including photon correlation spectroscopy (PCS) to determine size and zeta potential, atomic force microscopy (AFM), differential scanning calorimetry (DSC) and fourier transform infrared spectroscopy (FTIR) to study their morphology, chemistry and physicochemical properties. In addition drug release behavior from SLNs was studied.
Results: The results showed that the mean particle size of SLNs was 210±16 nm and the mean zeta potential was -17±3 mv. Nanoparticles had spherical morphology and no chemical interaction was detected between the drug and carrier. In-vitro release data revealed at least 24h release time with mild burst release.
Conclusions: Regarding the findings, this system can be applied efficiently for prolonged release of repaglinide and can improve the patient compliance in this drug consumption.