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Resveratrol nanoparticles improve oral delivery and arrests the progression of Paracetamol-induced liver cirrhosis: Stability assessment, *In-vitro* and *In-vivo* studies

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This research aims to formulate and characterize solid lipid nanoparticles (SLNs) of Resveratrol (RV-SLNs) for the effective treatment of liver cirrhosis. Formulations were prepared using the solvent injection method and Box-Behnken experimental design was applied for optimization to get a desired particle size having maximum entrapment efficiency as well as % release. Optimized RV-SLNs (SR-1) of appropriate characteristics (particle size= 191.1±10.44nm; zeta potential = -13.56±4.14 mV; entrapment efficiency = 75.23 ± 3.85%; maximum % release =80.53±3.99%) were produced. DSC and XRD studies were carried out which collectively proved the reduced crystallinity and stability enhancing effect of the SLNs. Improved drug stability was further established by the subjection of the RV-SLNs to accelerated stability studies (as per ICH guidelines) in contrast to the RV-suspension. *In-vivo* studies revealed nearly 5 fold increase in the bioavailability of SR-1 (AUC0→∞ = 3411±170.341µg/mL/h) as compared to RV suspension (AUC0→∞ = 653.5±30.098µg/mL/h). Pharmacodynamic data exhibited a significant decrease in the serum biomarker enzymes (SGOT, SGPT and ALP) after oral administration of RV-SLNs as compared to control and marketed (SILYBON®) formulations against paracetamol (PCM)-induced liver cirrhosis. The effect of the treatment was confirmed by the histopathology of the liver microtome sections. Last but not the least, RT-PCR (Reverse Transcriptase- Polymerase chain Reaction) studies were conducted on isolated liver mRNA and the levels were assessed for critically important genes contributing to the development and progression of liver fibrosis.

Biography

Anjali Singh had completed her M.Pharm (Pharmaceutics) at the age of 24 years from Hamdard University and won a Gold medal. Currently she is pursuing Ph.D. in Pharmaceutical Medicine. She has published 5 papers in reputed journals.

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