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Nano-suspension of ursolic acid for improving oral bioavailability and attenuation of type II diabetes: A histopathological investigation

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Abstract

Ursolic acid is a pentacyclic carboxylic acid present in medicinal herbs abundantly. There is scientific evidence of important benefits of ursolic acid in metabolism of lipids and glucose, as well as on the body weight and metabolic parameters. However, the hydrophobicity of ursolic acid increases the difficulty in its potential clinical application. The aim of the present study is to develop ursolic acid nanoparticles to enhance its bioavailability and further subjected for evaluating the antidiabetic activity. Ursolic acid nanoparticles were prepared by nanoprecipitation method and optimized by varying formulation variables including PVA concentration and processing variables including stirring speed. Mean Particle Size, Polydispersity index and zeta potential were measured for the optimized nanoparticles. Non-insulin dependent diabetes mellitus was induced intra-peritonially in wistar albino rats at 60mg/kg streptozotocin. Ursolic acid (100mg/kg) and nanoparticle (UNP 25mg/kg and 50mg/kg) were given orally for 4 weeks. *In vivo* antidiabetic effect was estimated by measuring blood glucose level. The Serum cholesterol, triglycerides, SGOT, SGPT, albumin, total protein and *in-vivo* antioxidant parameters were determined by using diagnostic kits. Optimized Ursolic acid nanosuspension showed particle size and polydispersity index to be 246.4nm and 0.206 respectively. Zeta potential of the prepared nanoparticle was −31.2±5.17mV. Ursolic acid nanoparticle showed significant reduction ($p<0.001$) in elevated blood glucose level in dose dependent manner with prominent lipid lowering and antioxidant effect. The promising results from the