Abstract

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Combating atherosclerosis with targeted Diosmin nanoparticles-treated experimental diabetes

Diabetes with poor glycemic control is accompanying with an increased risk of disease namely atherosclerotic cardiovascular. Diosmin (DSN), which is obtained from citrus fruit used to assist the treatment of hemorrhoids chronic venous atherosclerosis diseases, has an antioxidant, anti-hyperglycemic and anti-inflammatory effect. DSN is characterized by poor water solubility which limits its absorption by the gastrointestinal tract. To overcome this limitation, this study was designed to increase DSN bioavailability and solubility, through its loading on polymeric matrix hydroxypropyl starch (HPS) and Poly lactide–glycolidechitin (PLGA/chitin) to prepare Diosmin nanoparticles (DSN-NPs). Two methods were used to prepare DSN- NPs Emulsion– solvent evaporation and Acid–base neutralization followed by further assessment on diabetes induced atherosclerosis. The study was conducted on 50 animals assigned into 5 groups with 10 animals in each group: Group I: Normal rats received only normal saline, Group II: Diabetic rats, Group III: diabetic rats received oral DSN, Group IV: diabetic rats received DSN loaded HPS, Group V: diabetic rats received DSN loaded PLGA/chitin. Levels of total cholesterol, triglycerides, HDL-cholesterol, insulin, MDA and NO, plasminogen activator inhibitor-1 (PAI-1), Paraoxonase-1 (PON1), transforming growth factor-β1 (TGF-β1), NFB and Ang II were estimated. Our study revealed that, there was statistically significant difference between DSN treated group compared with DSN loaded HPS treated group and DSN loaded PLGA/chitin. Furthermore, the results obtained clearly disclosed no statistically significant difference between DSN loaded PLGA/chitin and control group exhibited DSN loaded PLGA/chitin has the higher ability to counteract the atherosclerosis factors induced by diabetes in all rats.