Evaluation of Cardiovascular activity of Nanoparticles Loaded with Cardiospermum Halicacabum L. Leaf Extract in Wistar Rat Model

Abstract:

The heart is a vital organ, which pumps blood through the blood vessels of the circulatory system. This work reports a novel biopolymer based nanoparticles formulation loaded with Cardiospermum halicacabum leaf extract prepared by simple, less complicated lab scale techniques for cardio protective activity. Cardiospermum halicacabum (Welpenlain Sinhala; balloon vine in English) is an annual or sometimes perennial herb. The developed nanoformulation was characterized by different parameters, the FTIR and XRD analysis showed that the synthesized formulation remained intact in nanodispersion form and there were no physico-chemical incompatibilities between the active constituents and the biocomposite materials. The SEM and AFM characterization exhibited particle size range as low as 100nm; The DLS studies results revealed that the particle size range was within 200-500nm and the PDI was within the range of 0.3.

The pharmacological evaluation mainly focused on atherogenic diet induced Hyperlipidemia, carotid artery occlusion induced Hypertension, cardio-protection in Doxorubicin induced cardio-toxicity and Cardiotoxic activity using Lagendorff’s in-vitro model. Various parameters measured for anti-hyperlipidemic activity were Serum Total cholesterol, triglycerides, HDL, LDL and VLDL and the developed nanoformulation showed a significant protection against the induced Hyperlipidemia. The anti-hypertension study revealed that nanoformulation treated groups showed a significant decrease in the induced blood pressure. The in-vivo study revealed that nanoformulation treated groups showed a significant decrease in QT and RR interval prolongation and decrease in the serum SGOT, SGPT, LDH and CPK levels when compared with the disease control.

Keywords: Nanoformulation, Cardiospermum Halicacabum, Hyperlipidemia, Hypertension, Cardiotoxic activity

Conclusion: The developed nanoformulation showed a significant anti-Hyperlipidemic, anti-Hypertension, cardioprotection and cardiotonic activity.