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Delivery of ginseng extract containing Phytosome loaded microsphere system: A preclinical approach for treatment of neuropathic pain in animal model

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Purpose: The current research work focuses mainly on evolving a delivery system for Ginseng Extract (GE), which in-turn will ameliorate the neuroprotective potential by means of enhancing the ginsenoside (Rb1) Bio-Availability (BA). For more noteworthy enhancement in Oral BioAvailability (OBA) along with pharmacological properties, the drug carriers' performance can be strengthened by utilizing Phytosomes-loaded microspheres (PM) delivery system.

Methods: For preparing the disparate phytosome complexes (F1, F2, and F3), an aqueous extract of Ginseng Roots (GR) along with phospholipids were reacted in disparate ratio. Considering the outcomes, F3 formulation (spray-dried) was chosen for preparing the phytosomes powder (PP), PM, and Extract Microspheres (EM). PM was made by means of loading of F3 into Gum Arabic (GA) in addition to maltodextrin polymer mixture, whereas EM was prepared by means of the addition of extract directly into the same polymer mixture. For investigating the NeuroProtective Effect (NPE) in addition to their PharmacoKinetic (PK) properties, PP, PM, and EM formulations were assessed.

Results: A significantly ($p<0.05$) greater Anti-Oxidant (AO) potential of PM can well be perceived as of the diminution in the lipid peroxidase level. It also showed a greater neuroprotective potential exhibiting significant ($p<0.05$) augmentation in the nociceptive threshold together with the diminution in damage to nerves. A noteworthy enhancement in the relative BA (157.94%) of GRb1 through the PM formulation can well be seen in the PK studies.

Conclusion: PM system is an optimistic and feasible strategy to enhance the delivery of GE for the effectual treatment of neuropathic pain.

Key words: *Panax ginseng*, Ginsenoside, Phytosomes, Neuroprotective, Saponins, Pain