2013-14

Rajnibhai V. Patel
PharmInnova Award
Best M. Pharm Thesis

WINNER

Runner-Up

Mr. Tejas Mistry

Research Guide

Dr. Sanjeev Acharya

Subject:
Pharmacognosy

Thesis Title :
Development and Evaluation of Asiatic Acid Nanoparticles: for Brain specific Drug Delivery

College:
Institute of Pharmacy, Nirma University, Ahmedabad

Novel formulation enabling drug delivery into the brain

Outcome of Research:

For drugs to be effective in the treatment of central nervous system (CNS) diseases, they have to cross a barrier called blood brain barrier (BBB) to enter into the brain. Many drugs cannot cross BBB due to poor lipid soluble properties. Due to this reason, delivery of drugs into the brain remains a challenge. This study isolated an active constituent called Asiatic Acid from the resins of the plant S.robusta (Sal tree/Shakhua) and formulated this into a new unique carrier system [Nanoparticle with surface modification using glutathione (brain specific ligand)], which will be able to deliver the drug into the brain. This investigation helped to develop formulations of drugs for the effective treatment of CNS diseases.

Thesis Title: Development and Evaluation of Asiatic Acid Nanoparticles: for Brain specific Drug Delivery

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ABSTRACT

The present project was planned with the objective to develop novel polymeric bovine serum albumin nanoparticles of asiatic acid coupled with natural tripeptide i.e. glutathione to enhance drug delivery to brain. To evaluate the brain targeting efficiency we have used asiatic acid, which was isolated from resins of Shroea robusta. Different extractions techniques like soxhlet extraction, ultrasonication and microwave assisted extraction were developed and optimization was done. Ultrasonication method was found as the best method based on % yield(w/w), time for extraction and content of asiatic acid. The Bovine Serum Albumin (BSA) nanoparticles of asiatic acid were developed using modified desolvation method. Glutathione was coupled to the surface of asiatic acid loaded BSA nanoparticles using two step carbodiimides chemistry using EDAC as coupling agent. Asiatic acid was estimated in biological system by novel pre-derivatization HPLC method using EDAC as coupling agent and p-toludine as derivatization agent. Bio-distribution pattern and brain targeting potential of optimized glutathione conjugated BSA nano-carriers was determined using Wistar rat and compared with non-conjugated BSA nano-carriers and asiatic acid. The results showed significant increase in asiatic acid uptake in brain with glutathione conjugated BSA nanoparticles as compared to asiatic acid solution. The present investigations demonstrated that glutathione can serve as a potential vector for drug delivery of asiatic acid.