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Solid lipid nanoparticulate system for improved entrapment efficiency of hydrophilic drugs

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Introduction: Premise of the present study is, that, by suitably selecting or modifying the constitution of the lipid matrix, entrapment efficiency (EE) of hydrophilic drugs into solid lipid nanoparticles (SLNs) can be improved.

Methods and Materials: Isoniazid was selected as a representative hydrophilic drug with a high solubility of 230 mg/ml and a log P of -0.402 at 25°C (determined as per OECD 105 and 107 guideline respectively). Three lipids/fatty acids (GMS, Compritol 888 ATO® and stearic acid) were evaluated out of which Compritol 888 ATO® and stearic acid showed favourable interactions (FTIR and DSC studies) and were used alone or in combination for preparing SLNs. Formulation by microemulsification method, employed presently, can result in expulsion of the hydrophilic drug from the lipid matrix; hence, partitioning of Isoniazid from the hot lipid melts into cold water was also determined.

Results and Discussion: Results indicate that combining stearic acid with Compritol 888 ATO® in certain ratio (1:4) resulted in significant EE (84±1.1). The formulations were subjected to morphological, physiochemical and *in vitro* drug release studies. Developed SLNs were found to be stable for 1 year at 4 °C.

Conclusion: Study demonstrates the benefit of excipients screening techniques in improving entrapment efficiency of a hydrophilic drug.

Biography

Indu Pal Kaur working as a Professor in the Department of pharmaceutics of U.I.P.S, Panjab University, Chandigarh and have a teaching and research experience of almost two decades. Her research focus lies in:

- *Bioavailability enhancement using nanoparticle technology* for tuberculosis & neurodegenerative disorders especially Alzheimer's and Depression.
- Exploration and evaluation of naturally occurring phytochemicals as therapeutics, against pathological conditions like neurodegeneration, cancer, ulcer, inflammation & ageing.
- Strategies convalescing ocular bioavailability of drugs.
- *Probiotics* and their Formulation development.

International/national papers: 85, (H-index of 18 on scopus).

Indu Pal Kaur guided 5 Ph D and 27 M. Pharm students and am presently supervising: 2 M. Pharm. + 7 Ph. D.

Indu Pal Kaur completed 2 major research Projects and have two ongoing major research projects (worth Rs 1.04 crores) from DBT, New Delhi.

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