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Design, development and optimization of lipid based nanoformulation of silymarin using response surface methodology

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The objective of the present work was to formulate a poorly water soluble drug into a lipid nanocarrier by homogenization technique, in order to enhance its solubility and stability by combining the advantage of lipid formulations and nano size range. A full factorial design for two factors at three levels, was selected to optimize the formulation. Three optimum combinations were selected after considering all the six dependent variables. An FTIR spectrophotometer was used to obtain the infra red spectra of drug in the isotropic mixtures of excipients. Thermal analysis of the pure drug, individual excipients, physical mixture (1:2) and co-melt (1:2) of the drug with individual excipients were carried out using a differential scanning calorimeter. To study all the possible combinations, 2-factor, 3-level full factorial design (32) was constructed and conducted in a fully randomized order at all 9 possible combinations. The independent variables were the amount of Compritol 888 ATO (Glyceryldibehenate) and Miglyol 812 and amount of surfactant. Developed formulations were evaluated on the basis of particle size, in-vitro drug release, and activity was measured by cell line studies. Average particle size was found to be in range from 119.42 - 164.83 nm indicating that all the particles were in the nanometer range. Drug content of formulation was found in the range of 97.39-100%. Optimized silymarin-NLC was incorporated into gel and further assessed for rheological parameters. The NLC based gel described in this study showed faster onset, and prolonged activity up to 24 h and better anti oxidant action. In case of anti-cancer activity of silymarin-NLC against G-361 cell lines, silymarin-NLC proved to possess anticancer activity in a dose-dependent manner (10–100 μ M) and induced apoptosis at 60 μ M in g-361 cancer cells.

Biography

Pooja Singh is pursuing her PhD from Babasaheb Bhimrao Ambedkar University (BBAU), Lucknow, India. She is Research Scholar at BBAU (a Central University), and has 2 years of industrial research experience in Dr. Reddy's Lab (Hyderabad) and Himalaya Drug Ltd. (Bangalore). She has published 4 papers in reputed journals.

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