World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Solid Lipid Nanoparticles of Levamisole Hydrochloride

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Abstract : Levamisole hydrochloride is a prominent anticancer drug in the treatment of colon cancer but resulted in toxic effects due poor bioavailability and poor cellular uptake by tumor cells. Levamisole is an unstable drug. Incorporation of this molecule in solid lipids may minimize their exposure to the aqueous environment and partly immobilize the drug molecules within the lipid matrix-both of which may protect the encapsulated drugs against degradation. The objectives of the study were to enhance bioavailability by sustaining drug release and to reduce the toxicities associated with the therapy. Solubility of the drug was determined in different lipids to select the components of Solid Lipid Nanoparticles (SLN). Pseudoternary phase diagrams were created using aqueous titration method. Formulations were subjected to particle size and stability evaluation to select the final test formulations which were characterized for average particle size, zeta potential, and in-vitro drug release and percentage transmittance to optimize the final formulation. SLN of Levamisole hydrochloride was prepared by Nanoprecipitation method. Glyceryl behenate (Compritol 888 ATO) was used as core comprising of Tween 80 as surfactant and Lecithin as co-surfactant in (1:1) ratio. Entrapment efficiency (EE) was found to be 45.89%. Particle size was found in the range of 100-600 nm. Zeta potential of the formulation was -17.0 mV revealing the stability of the product. In-vitro release study showed that 66 % drug released in 24 hours in pH 7.2 which represent that formulation can give controlled action at the intestinal environment. In pH 5.0 it showed 64% release indicating that it can even release drug in acidic environment of tumor cells. In conclusion, results revealed SLN to be a promising approach to sustain the drug release so as to increase bioavailability and cellular uptake of the drug with reduction in toxic effects as dose has been reduced with controlled delivery.

Keywords : SLN, nanoparticulate delivery of levamisole, pharmacy, pharmaceutical sciences
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020