World Academy of Science, Engineering and Technology
International Journal of Pharmacological and Pharmaceutical Sciences
Vol:10, No:12, 2016

Development and Characterization Self-Nanoemulsifying Drug Delivery Systems of Poorly Soluble Drug Dutasteride

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Abstract : The present study aims to prepare and evaluate the self-nano emulsifying drug delivery (SNEDDS) system to enhance the dissolution rate of a poorly soluble drug dutasteride. The formulation was prepared using capryol PGMC, Cremophor EL, and polyethylene glycol (PEG) 400 as oil, surfactant and co-surfactant, respectively. The pseudo-ternary phase diagrams with presence and absence of drug were plotted to find out the nano emulsification range and also to evaluate the effect of dutasteride on the emulsification behavior of the phases. Prepared SNEDDS formulations were evaluated for its particle size distribution, nano emulsifying properties, robustness to dilution, self-emulsification time, turbidity measurement, drug content and in-vitro dissolution. The optimized formulations are further evaluated for heating cooling cycle, centrifugation studies, freeze-thaw cycling, particle size distribution and zeta potential were carried out to confirm the stability of the formed SNEDDS formulations. The particle size, zeta potential and polydispersity index of the optimized formulation found to be 35.45 nm, -15.45 and 0.19, respectively. The in vitro results are revealed that the prepared formulation enhanced the dissolution rate of dutasteride significantly as compared with pure drug. The in vivo studies in was conducted using rats and the results are revealed that SNEDDS formulation has enhanced the bioavailability of dutasteride drug significantly as compared with raw drug. Based the results, it was concluded that the dutasteride-loaded SNEDDS shows potential to enhance the dissolution of dutasteride, thus improving the bioavailability and therapeutic effects.

Keywords : self-emulsifying drug delivery system, dutasteride, enhancement of bioavailability, dissolution enhancement
Conference Title : ICPP 2016 : International Conference on Pharmacy and Pharmacology
Conference Location : Bangkok, Thailand
Conference Dates : December 12-13, 2016