Development and Characterization of Liquisolid Tablet for Poorly Water Soluble Drug

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Abstract

The aim of present investigation was to improve the dissolution rate of the poorly water soluble drug, nicardipine HCl by incorporating the drug in a liquisolid tablet. Liquisolid tablets were prepared using propylene glycol as non-volatile solvent to solubilze the drug. Avicel pH 102 and Aerosil 200 were selected as the carrier and coating material respectively. Fourier transform infrared spectroscopy was performed to study for drug-excipients incompatibility. Liquisolid tablet of nicardipine HCl was prepared using directly compressible method. Optimization of formulation variables was done using 3^2 factorial design using Design Expert software. Optimized batch containing drug(Nicardipine HCl) concentration (30%w/w) and powder excipients(Avicel pH 102 and Aerosil) ratio (30) was evaluated for pre-compression parameters such as angle of repose, carr's index, hausner's ratio and post compression parameters such as hardness, friability, weight variation, disintegration time, and drug content. *In-vitro* drug dissolution was performed on dissolution apparatus (USP paddle type-II) using 0.033 M citric acid buffer, pH 4.5 as a dissolution medium. Stability study was performed at room temperature and accelerated condition. The FTIR study confirmed absence of interaction between drug and excipients. The results of pre-compression parameters such as angle of repose, carr's index, and hausner's ratio were found to be 36.76º±0.35º, 20.62%±0.33%, and 1.25±0.020 which indicates good flow property. Post compression parameters such as hardness, friability, weight variation, disintegration time, drug content were found to be 4.0Kg/cm^2±0.66Kg/cm^2, 0.186%±0.02%, 393.8mg±0.63mg, 1.38min±0.010min, and 100.60%±0.66% respectively for optimized batch. Higher percentage of drug dissolution for nicardipine HCl was found up to 20 min from liquisolid tablet (92.10±0.57%) than the

conventional directly compressible tablet (26.74%±0.246%). The result of stability study showed that there is no major change in drug content and *in vitro* drug dissolution. The present study demonstrated that, increase in the dissolution rate was found to be significant compared to direct compressible tablet of nicardipine HCl. The liquisolid technique appears to be a promising approach for improving the dissolution of poorly soluble drugs like nicardipine HCl.

Keywords: Liquisolid tablet; Nicardipine HCl; Dissolution; Avicel pH 102; Aerosil 200