



Solid Dispersion as an Approach for Dissolution Enhancement of Poorly Water Soluble Drug Ritonavir

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Abstract : Ritonavir is an antiretroviral drug from the protease inhibitor class used to treat Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome. It is characterized by low solubility and high permeability which corresponds it to BCS class II drug. It exhibits low and variable oral bioavailability due to its poor aqueous solubility and its absorption is dissolution rate limited which makes it a suitable candidate for solid dispersion system. In the current investigation, Ritonavir is selected to improve the solubility and dissolution rate by solid dispersion method. Solid dispersions of Ritonavir were prepared by kneading method by incorporating Arginine and Proline as carriers in molar ratios of 1:0.5, 1:1 and evaluated for solubility studies, drug-carrier compatibility studies and *in vitro* dissolution studies. Based on the results of solubility and dissolution profiles of solid dispersions, Arginine as a carrier was selected to prepare tablets by direct compression method and compared with conventional marketed tablets. Tablets were evaluated for pre compression and post compression parameters and *in vitro* dissolution studies. From the Fourier Transform Infrared Spectroscopy and Differential Scanning Calorimetry studies, it was confirmed that there was no significant drug and polymer interactions. From the *in vitro* dissolution study, Ritonavir and Arginine 1% tablets shows 76.65 ± 2.5 % drug release within 10 min. The results were much higher compared to conventional marketed tablets containing pure drug ($59.19 \pm 2.3\%$ in 10 min). The drug release from the formulations is as follows: Arginine 1% tablet > Arginine 0.5% tablet > Marketed tablets. Thus, it is concluded that the formulation of solid dispersions with Arginine as carrier is a suitable approach to improve the solubility and dissolution rate of Ritonavir than pure form of drug.

Keywords: Ritonavir, Arginine, Proline, Solid dispersion.