6.0. SUMMARY AND CONCLUSION

The applicability of the solid dispersion technique as a method for enhancing the GI absorption of a drug has been explored in order to achieve better dissolution characteristics and better bioavailability for poorly soluble drugs.

Solubility studies on Efavirenz was performed with PVP, HPC and HPMC and found to be more soluble in polyvinyl pyrrolidone and hydroxy propyl cellulose in comparison with hydroxy propyl methyl cellulose.

Effect of with and without antisticking agent on % practical yield was performed by using antisticking agent as Neusilin. Practical yield of solid dispersion using anti sticking agent (Neusilin) was more in comparison with solid dispersion without antisticking agent.

The formulations were evaluated for their flow properties with anti sticking agent like Angle of repose, Carr index and Hausner ratio. These values indicate that the solid dispersions prepared by using Neusilin having the good flow properties, which suggest neusilin increases the flow properties of solid dispersion by reducing the stickiness of mixture.

The release rate of Efavirenz from the resulting complexes was determined from dissolution studies and dissolution characteristics were carried out for solid dispersion formulations, pure drug and physical mixtures. The results indicated that dissolution of optimized formulation (FSD2) showed significantly higher than pure drug and physical mixtures.

In order to get evidence on the possible interactions of drug with the carrier, FTIR analysis was used. The optimized formulation (FSD2) displayed the characteristic peaks at wave numbers nearer to that of pure Efavirenz, there was no alteration in the characteristic peaks of Efavirenz suggesting that there was no interaction between the drug and polymers.

X-ray diffraction studies of optimized formulation showed no physicochemical interaction.

DSC studies revealed that absence of drug peak in the free flowing solid dispersion formulation indicating the drug was in amorphous form.

The rate of dissolution of Efavirenz from free flowing solid dispersion optimized formulation (FSD2) was found to be significantly higher than drug alone. Thus, a free flowing solid dispersion formulation of Efavirenz with increased dissolution efficiency was successfully developed using kollidon30 and Neusilin as anti sticking agent.

After oral administration of Efavirenz (50 mg kg^{-1}) to either sex Wistar rats, these formulations (free flowing solid dispersion) showed superior absorption profile than the suspension of pure drug. The relative bioavailability of free flowing solid dispersion formulations were enhanced in comparison with pure drug suspension. Calculated concentration was found to be more for solid dispersion formulations compared with pure drug of Efavirenz at maximum concentrations by LC-MS study.

It can be concluded that the present study successfully illustrates the potential utility of free flowing solid dispersion formulation for the delivery of poor water-soluble compounds such as Efavirenz. The comparison of *in vivo* bioavailability studies of optimized formulation(FSD2) and that of a pure drug as reference standard in Wistar rats confirmed that the higher amount of drug concentration in blood indicated better systemic absorption and bioavailability also found to be increased with optimized formulation.