CHAPTER 6

SUMMARY

AND

CONCLUSION
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The aim of the present study was to enhance the drug dissolution and hence, the bioavailability of some drugs by solid dispersion technique.

On the basis of experimental work done following conclusion can be drawn:

1. Solid dispersions were successfully formulated using various types of carriers. All solid dispersions formulated demonstrated positive results in enhancement of drug solubility and hence, dissolution in in vitro studies, helped in achieving objective of the study.

2. New classes of carriers like Kollidon® CL and Kollicoat® IR were used for preparation of solid dispersions, which showed promising results and helped in increasing the drug solubility. Till now Cremophor® had been in use for improving drug solubility in liquid preparations, but was successfully tried as carrier for preparation of solid dispersions. Also, superdisintegrants were explored as a new class of carriers for solid dispersion and found to be effective in enhancing drug release.

3. Poloxamer 188 was found to be the most acceptable carrier for enhancement of solubility of acyclovir; while, Soldium starch glycolate was found to be best carrier for enhancement of solubility of cefuroxime axetil when formulated as solid dispersions.

4. New surfactants viz. Labrasol®, Labrafil®, Solutol® and Transcutol® were used for solubility enhancement, which were previously not employed conventionally for preparation of solid dispersions.

5. The optimized solid dispersion of both model drugs- acyclovir and cefuroxime axetil resulted in enhancement of drug release that was appreciably more than physical mixture and pure drug per se. In both the cases, there was enhancement in drug release from optimized solid dispersion by three folds, as compared to release profile of pure drug.

6. All methods of preparation were found to be satisfactory for formulating solid dispersions. Though, spray drying method despite exhibiting positive effect on drug dissolution had problem of poor yield, compared to other methods. Solid dispersion formulated with freeze drying method not only demonstrated maximum drug enhancement, in comparison to conventional methods like solvent evaporation and melt fusion method, but also overcame
formulation processing disadvantages of solid dispersions prepared by those conventional method.

7. Both acyclovir and cefuroxime axetil was found to be completely dispersed in their respective optimized solid dispersion, as no peak of drug was observed in differential scanning calorimetric analysis of optimized formulation. Absence of sharp crystalline peaks of both drugs in their respective optimized formulation concluded transformation of crystalline form of drug to amorphous state, which was inferred to be another reason for huge enhancement of drug release during in vitro drug dissolution study.

8. The effect of food on release from optimized solid dispersion of cefuroxime axetil was studied by performing dissolution studies in FeSSIF and FaSSIF media. Pure cefuroxime axetil exhibited greater dissolution in FeSSIF media, as compared to FaSSIF media. But this effect was observed to eliminated, as no effect of fed or fasted state simulated media was observed with optimized formulation of cefuroxime axetil.

9. The newly developed UPLC methods for determination acyclovir and cefuroxime axetil respectively, were found to be simple, sensitive, capable of giving faster retention times and maintaining excellent resolution, thus enabling rapid and economical sample analysis. Both methods were validated showing satisfactory data on all the validation parameters tested as per ICH guidelines.

10. In vivo studies revealed better release of drug from optimized solid dispersions of both acyclovir and cefuroxime axetil, respectively. The in vitro-in vivo correlation results corroborated with the results obtained from in vitro dissolution and in vivo studies.

11. Optimized solid dispersions were found to be stable over shelf life period of two years in both accelerated and long term stability study conditions as per ICH [Q1A (R2)] guidelines. No recrystallization of amorphous drug was observed in DSC analysis of the formulations over period of both the studies.

CONCLUSION:

By formulating solid dispersions of both the drugs viz. acyclovir and cefuroxime axetil in this study, it can be successfully concluded that solid dispersions prepared with new carrier systems like SSG and exploring new surfactants like Labrasol® and Transcutol®, the bioavailability of poorly soluble and hence, poorly bioavailable drugs can be enhanced successfully.