4.

SUMMARY AND CONCLUSION

In preformulation study, from the results of characterization of TEL and VPH it was found that results complied with the specifications given in the pharmacopoeia and certificate of analysis provided by sample provider of TEL and VPH. In calibration curves of TEL and VPH both drugs obeys Beer-Lambert’s law in the range 2-18 µg/mL. FTIR spectra of both the drugs showed characteristic peaks, hence procured drug samples were found to be pure.

After selection of oil, surfactant and co-surfactant pseudo ternary phase diagram was constructed at different Km value 1:1, 2:1, 3:1, 1:2 and 1:3. From ternary phase diagram 3:1 surfactant to co-surfactant ratio was selected for preparation of liquid SMEDDS of both the drugs. The three formulations were selected from phase diagram at Km value 3, named as TLM1, TLM2, and TLM3 for TEL and VLM1, VLM2 and VLM3 for VPH.

From results of preliminary thermodynamic stability studies, robustness to dilution test and assessment of efficiency of self-emulsification test it was found that all formulations of liquid SMEDDS of TEL and VPH rapidly formed micro emulsion which was clear and slightly bluish in appearance.

% Transmittance of all formulations of liquid SMEDDS of TEL and VPH was found in between 90.7 ±0.67 to 97.36±0.28. This indicates that prepared liquid SMEDDS are clear and no turbid. Globule size and zeta potential of all formulations were found to be in between 30.2 nm to 42.4 nm and -5.80 mV to -9.35 mV respectively Polydispersity index of all formulations was found to be less than 1 which indicates that uniform distribution of globules throughout formulation. Viscosity of all formulations was found to be in the range of 15.28±0.12 cP to 21.36±0.16 cP.

Cloud point of all liquid SMEDDS was found to be higher than 85°C, which indicate that micro emulsion will be stable at physiological temperature without risk of phase separation.
Different batches of S-SMEDDS of TEL and VPH by spray drying technique and adsorption technique was successfully prepared. Results of characterization of S-SMEDDS indicate that, all formulations of S-SMEDDS have good flow properties (except S-SMEDDS prepared by adsorption technique using Aerosil 200) with excellent drug content and spray drying process yield.

Globule size and zeta potential of all formulations were found to be in between 34.5 nm to 50.4 nm and -1.59 mV to -17.7 mV respectively. Polydispersity index of all formulations was found to be less than 1 which indicates that uniform distribution of globules throughout formulation. There was only slight increase in globule size of reconstituted S-SMEDDS as compared to liquid SMEDDS hence it was concluded that, encapsulation of liquid SMEDDS of TEL in Maltodextrin and VPH in HPMC K15 M did not affect self emulsification performance of liquid SMEDDS.

The dissolution rate of S-SMEDDS formulations of VPH was found to be enhanced as compared to that of non-self-micro emulsifying HPMC K15M particle formulations (PM).

The S-SMEDDS formulations of TEL and VPH were optimized on the basis of drug content spray dried process yield, % transmittance, globule size of reconstituted S-SMEDDS and in-vitro drug release, etc and formulations TSM1, TSM4 and VSM1 were found to be optimized formulations and hence used for further study.

In solid state characterization of S- SMEDDS i.e. FTIR, DSC, PXRD and SEM it was found that both drugs retained their functional group, drugs get dissolved in the matrix system.

In-vivo absorption study of S-SMEDDS revealed the higher $C_{max}$ and $AUC_{0-t}$ as compared with the plain drug in case of TEL and as compared to marketed formulation in case of VPH. Relative bioavailability of both drugs also found to be more. It concludes that, S-SMEDDS formulations may enhance bioavailability of poorly soluble drugs like TEL and can be formulated in the form of sustained release dosage form for drugs like VPH.

After accelerated stability study, all these formulations were found to be stable. It concludes that, stable SMEDDS formulations can be prepared by converting it into solid form.
The present investigation has shown that it is possible to enhance dissolution rate and absorption and concomitantly bioavailability of TEL and VPH by S-SMEDDS with maltodextrin and HPMC K15M as solid carrier.