Abstract:

Aim of present investigation was to develop Solid self micro emulsifying drug delivery system (S-SMEDDS) of cardiovascular drugs such as Telmisartan (TEL) and Verapamil Hydrochloride (VPH) to enhance solubility, dissolution rate which may improve therapeutic performance and drug loading capacity so as to develop alternative to traditional oral formulations to improve bioavailability. In this study Oleic acid, Tween 80 and PEG 400 were selected as oil, surfactant and co-surfactant respectively for TEL and Castor oil, Labrasol, Transcutol P were selected as oil, surfactant and co-surfactant respectively for VPH. The three formulations were selected from ternary phase diagram at Km value 3, named as TLM1, TLM2, and TLM3 for TEL and VLM1, VLM2 and VLM3 for VPH and prepared successfully. Prepared liquid SMEDDS were evaluated for different parameters. From this study it was found that all formulations of liquid SMEDDS showed globule size in nanometric range, good stability with no phase separation, creaming or cracking and rapidly formed micro emulsion which was clear and slightly bluish in appearance. All these formulations were converted into S-SMEDDS by spray drying and adsorption technique. For spray drying maltodextrin and HPMC K15M were used as solid carrier for TEL and VPH respectively and for adsorption technique Neusilin US2 and Aerosil 200 were used as solid carrier for TEL. Prepared S-SMEDDS were evaluated for micromeritic properties, various reconstitution properties and for in-vitro dissolution study. Formulations were optimized on the basis of drug content, in-vitro drug release, globule size, PDI, zeta potential of reconstituted S-SMEDDS, spray dried process yield, etc and selected formulations were further studied for solid state characterization, morphological analysis, ex-vivo intestinal permeability studies, bioavailability and stability study. Ex-vivo intestinal permeability study of TEL S-SMEDDS formulations concluded that, drug diffused through the biological membrane has more when it is given in the form of S-SMEDDS. Relative bioavailability of both drugs also found to be more. 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. Study also concluded that, S-SMEDDS can also be efficiently formulated by adsorption technique using Neusilin US2 as solid carrier to enhance dissolution rate and concomitantly bioavailability of poorly soluble drug.