KSN 2020
FULLY VIRTUAL MEETING

Abstract Type : Poster
Abstract Submission No. : PO-1531

Development and Evaluation of Novel Nano Formulation for Improved Bioavailability of Furosemide

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Objectives: Bioavailability of furosemide (FRS), a loop diuretic, from GIT is highly variable as its absorption is solubility as well as permeability rate limited. Therefore, the study was designed to enhance the bioavailability of FRS by using a novel self-emulsifying formulation.

Methods: Pseudoternary phase diagram was constructed based on solubility studies of FRS in various vehicles. Self-emulsifying area was identified and based on this, various formulations prepared. Self emulsification time, dilution studies, viscosity determination, globule size and zeta potential analysis, in vitro release studies and in vivo pharmacodynamic evaluation of prepared formulations was performed.

Results: Self emulsification time analysis showed a fast rate of emulsification of prepared formulations. Globule size analysis showed very fine droplets in nano-size range. A significant increase in the extent of dissolution was observed for prepared formulations as compared to plain FRS and marketed table formulation. Significant increase in diuresis and natriuresis was shown by optimized formulation in rats as compared to plain FRS.

Conclusions: Optimized formulation, having self-emulsifying capability, improved pharmacodynamic efficacy of FRS and it may be used as an alternative of traditional oral formulations.