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ABSTRACT BOOK

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Development and Characterization of Self Emulsifying Drug Delivery System of Tenofovir

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Keywords: Tenofovir, Oral bioavailability, Self emulsifying drug delivery system, Ex-vivo permeability.

Aim and Objectives: Aim of this study was to develop and characterize self emulsifying drug delivery system (SEDDS) of Tenofovir to improve its oral bioavailability, which was reported to be low.

Methodology: The solubility of Tenofovir in different vehicles (Eucalyptus oil, Glycerol, Kolliphor EL and Kollisolv MCT 70) was determined by a pseudo-ternary phase diagram (Fig No. 1). The SEDDS were then prepared, optimized, and characterized. The developed formulations were subjected to various physical stability studies and self- emulsification assessment test. HPLC analysis was used to determine the drug content. Tenofovir SEDDS and marketed dosage form were compared for the *ex vivo* permeability study

Results and Discussion: Tenofovir solubility was found to be maximum in Eucalyptus oil, Kolliphor EL and Kollisolv MCT 70 and hence these are selected as a oil, surfactant and co-surfactant for the development of SEDDS. The formulation pass the test by rapidly forming (within 1 minute) micro emulsion having a bluish appearance, hence graded as A (self- emulsification assessment test). The optimized batch of SEDDS was subjected to zeta potential measurement and observed zeta potential was -13.03mV (Fig. 2) and has highest percentage transmittance above 90% with a globule size of 250 nm. (Fig. 3). Chromatogram of standard Tenofovir and optimized formulation of SEDDS shows similar RT and area indicating the stability of drug (Fig 4). *Ex vivo* stomach and intestinal permeability shows the higher permeation of Tenofovir SEDDS as compare to marketed Tenofovir product.

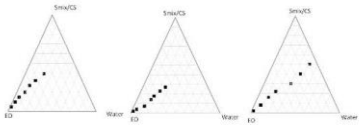

Fig.1: Pseudo-ternary phase diagram of eucalyptus oil, Smix/CS and water of (a) 4:6 ratio; (b) 5:5 ratio; (c) 9:1 ratio

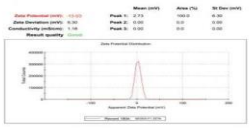

Fig.2: Zeta potential measurement of SEDDS formulation

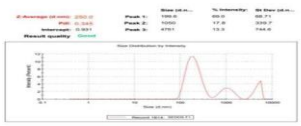

Fig.3: Globule size analysis of SEDDS F1 formulation

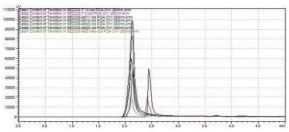

Fig.4: Overlay chromatogram of standard Tenofovir and SEDDS F1 formulation

Conclusion: Based on the findings, it can be concluded that the SEDDS could be the successful alternative for the improvement of oral bioavailability of Tenofovir.

References:

1.Echeverry SM, Rey D, Valderrama IH, de Araujo BV, Aragón DM, Development of a self-emulsifying drug delivery system (SEDDS) to improve the hypoglycemic activity of Passiflora ligularis leaves extract. *J Drug Deliv Sci Technol.* 2021; 1-11.
2. Kamal MM, Salawi A, Lam M, Nokhodchi A, Abu-Fayyad A, El Sayed KA, Nazzal S, Development and characterization of curcumin-loaded solid self-emulsifying drug delivery system (SEDDS) by spray drying using Soluplus® as solid carrier.*Powder Technol,* 2020; 137-145.

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