عنوان مقاله:

Preparation and characterization of celecoxib solid dispersions; comparison of poloxamer-۱۸۸ and PVP-K۳۰ as carriers

محل انتشار:

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خلاصه مقاله:

Objective(s):Solid dispersion formulation is the most promising strategy to improve oral bioavailability of poorly water soluble drugs. The aim of this study was to compare the effect of polyvinylpyrrolidone K۳۰ (PVP) and poloxamer-۱۸۸ (PLX) as carrier in solid dispersion formulations of celecoxib (CLX). Materials and Methods: Solid dispersions of CLX:PVP or CLX:PLX were prepared at different ratios (۲:۱, ۱:۱, ۱:۲, ۱:۴, ۱:۶) by solvent evaporation and melting methods, respectively. The characterization of samples was performed using differential scanning calorimetery (DSC), X-Ray powder diffraction (XRPD) and Fourier transform infrared spectroscopy (FT-IR). The Gordon-Taylor equation was used to estimate the Tg of solid dispersion systems and the possibility of the interaction between CLX and PVP. Also, the dissolution rate of all samples was determined. Results: DSC and XRPD analyses confirmed the presence of amorphous state of drug in solid dispersion systems. FT-IR studies showed CLX could participate in hydrogen bonding with PVP whilst no specific interaction between CLX and PLX was observed. Both PVP and PLX enhanced the dissolution rate of drug in solid dispersion samples. The dissolution rate was dependent on the ratio of drug: carrier. Interestingly, the solid dispersion samples of PLX at ۲:۱ and ۱:۱ drug: carrier showed slower dissolution rate than pure CLX, whilst these results were not observed for PVP. Conclusion: The effect of PVP on dissolution rate enhancement was more pronounced compared to the other carrier. Having a higher Tg and more effect on dissolution rate, PVP could be considered as a more suitable carrier compared to PLX in solid dispersion formulation of CLX.

کلمات کلیدی:
Celecoxib, Dissolution rate, Poloxamer-۱۸۸, PVP-K۳۰, Solid dispersion