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Soluplus®; a novel excipient to improve dissolution rate of poorly water soluble drug, celecoxib

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Background and Aims: Solid dispersion is one of the effective methods that is used to improve dissolution rate and bioavailability of drugs. The aim of the present study was to improve the dissolution rate of a poorly water-soluble drug, Celecoxib (CLX), by solid dispersion technique. In the present work a novel solubility enhancing excipient (Soluplus®) (SOL) was tested as a carrier.
Methods: Solid dispersion of CLX and SOL in 2:1, 1:1, 1:2, 1:4, 1:6, ratio of drug and carrier were prepared by solvent evaporation and fusion method. Physical mixtures of drug and carrier were also prepared at the same ratios. The properties of all solid dispersions and physical mixtures were studied using dissolution test, X-ray powder diffraction (XRPD), differential scanning calorimetry (DSC), and scanning electron microscopy (SEM).
Results: Solid dispersions of CLX-SOL with the ratio of 1:4 prepared by both methods showed significantly higher dissolution rate than the corresponding physical mixtures and pure CLX. DSC and XRPD analysis confirmed the presence of amorphous state of drug in solid dispersion systems obtained by both methods. The improvement in dissolution rate could be attributed to improved wettability and dispersibility, as well as decrease in the crystalline state and increase of the amorphous fraction of the drug in presence of SOL.
Conclusions: Soluplus could be regarded as a potential carrier in solid dispersion systems in order to improve the dissolution rate of poorly water soluble drugs.

Keywords: Celecoxib; Dissolution rate; Soluplus