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Effect of Molecular Weight on the Dissolution Profiles of PEG Solid Dispersions Containing Ketoprofen

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The aim of this work is to investigate the relationship between low molecular weight polyethylene glycol (PEG) derivates PEG 1000, PEG 1500, and PEG 2000 and ketoprofen regarding the effect of molecular weight.

Solid dispersions are typically binary systems composed of a hydrophilic matrix polymer and a lipophilic active substance. During formulation, the drug undergoes a crystalline to amorphous phase transition, resulting in a supersaturated solution providing enhanced bioavailability. The interaction between the active substance and the polymer is unique and influences the level of supersaturation.

The Fourier transform infrared spectroscopy, powder X-ray diffraction and scanning electron microscopy techniques were used to investigate the the physicochemical properties of solid dispersions prepared with hot melt homogenization and their respective physical mixtures.

A phase solubility study was carried out in hydrochloric acid media which showed no difference between the three polymers, however the dissolution curves differed significantly. PEG 1000 had a higher percentage of released drug than PEG 1500 and 2000, which had similar results. The results indicate that when multiple low molecular weight PEGs are suitable as matrix polymers of solid dispersions, the molecular weight has only limited impact on physicochemical characteristics and interactions and further investigation is needed to select the most applicable candidate.

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