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Dissolution rate enhancement of irbesartan using solid dispersion with PEGs

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Background and Aims: Irbesartan, an antihypertensive agent, is a poorly soluble drug with lower dissolution rate which resulted in poor bioavailability after oral administration. The aim of the present study was to enhance the dissolution rate of irbesartan by solid dispersion technique using different molecular weights of polyethylene glycol (PEG).
Methods: Solid dispersions (SDs) of irbesartan were prepared with various concentrations of PEG 4000, PEG 6000, PEG 10000 and PEG 20000 using solvent method. The dissolution rate of SDs as well as related physical mixtures (PMs) and the intact drug was determined in pH 1.2. Dissolution efficiency (DE%) was calculated to compare the dissolution data. Formulations were characterized by Infrared spectrophotometry (IR), scanning electron microscopy (SEM), differential scanning calorimetry (DCS) and X-ray diffraction (XRD). All samples were also studied for the drug solubility.
Results: The dissolution rate was remarkably improved in case of most solid dispersions prepared with different molecular weights of PEG compared to the related PMs and pure irbesartan (P value <0.05). A formulation containing PEG 6000 dissolved completely after 20 minmin and showed higher dissolution efficiency in comparison to the intact drug (DE10= 62 and 19.85 , respectively). Irbesartan solubility was slightly increased in SD samples due to wetting property of PEGs. The results obtained from DSC and XRD studies confirmed that no polymorphic change was occurred during sample preparation.
Conclusions: Irbesartan dissolution rate was improved significantly using various PEGs as a hydrophilic solid dispersion carrier.

Keywords: Irbesartan; Solid dispersion; Polyethylene glycol