PREPARATION AND CHARACTERISATION OF GLIMEPIRIDE SOLID DISPERSIONS BY POWDER X-RAY DIFFRACTION AND DIFFERENTIAL SCANNING CALOROMETRY

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The aim of the present investigation was to improve the dissolution properties of glimepiride. The oral antidiabetic drug, glimepiride, was chosen as a model drug because of its low dose and poor solubility. One possible way to overcome this problem is to prepare solid dispersions of the drug with inert carriers in an attempt to improve the dissolution of poorly soluble glimepiride. The solid dispersions were prepared by the solvent evaporation method using different proportions of water soluble inert carriers such as PEG4000, HPC or lactose in the ratio of 1:9. Physical mixtures of glimepiride and PEG4000, HPC or lactose were also prepared in the same ratio of 1:9. Both the prepared solid dispersion systems and physical mixtures were evaluated for solubility and dissolution studies. *In vitro* drug release of the solid dispersions was studied in USP XXIII dissolution apparatus (apparatus 2, 50 rpm) using 900 ml of phosphate buffer pH 7.4 at 37± 0.5°C. The dissolution rate of glimepiride was increased by 3 to 4-fold with PEG4000 or lactose as carrier when compared to drug alone. Both the physical mixture and solid dispersions of glimepiride, with PEG4000 as carrier, were characterized by Differential Scanning Calorimetry and X-ray powder diffraction. The diffraction spectrum of pure glimepiride showed that drug was crystalline in nature as demonstrated by numerous distinct peaks whereas PEG4000 was amorphous. The X-ray diffraction pattern of the physical mixture (1:9 of drug and PEG4000) presented slightly crystalline form whereas the solid dispersion (1:9 drug and PEG4000) was absolutely amorphous. The DSC studies showed no possibility of glimepiride interaction with the carriers used in the study.