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Preparation of carvedilol spherical crystals having solid dispersion structure by the emulsion solvent diffusion method and evaluation of its *in vitro* characteristics

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Spherical crystallization (SC) is a promising alternative for improiving micromeritic properties and dissolution rate of active pharmaceutical ingredients. In the present work spherical agglomerates of carvedilol (CAR) were prepared by emulsion solvent diffusion (ESD) method using methanol, water and dichloromethane as good solvent, poor solvent and bridging liquid respectively. Agglomerates were prepared by using Poloxamer F68 and Poloxamer F127 as a hydrophilic polymers. The agglomerates were characterized by fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), powder x-ray diffraction (PXRD) and scanning electron microscopy (SEM) and were evaluated for flowability, solubility and drug release. CAR agglomerates exhibited significantly improved micromeritic properties, solubility as well as dissolution behaviors in comparison with pure CAR crystals. Differential scanning calorimetric and powder X-ray diffraction studies confirm that formulation process altered the crystalline nature of carvedilol.

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