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Abstract

Large porous particles are becoming increasingly popular as carriers for pulmonary drug delivery with both local and systemic applications. These particles have high geometric diameters (5-30 μm) but low bulk density (~0.1 g/cm^3 or less) such that the aerodynamic diameter remains low (1-5 μm). In this study salbutamol and budesonide serve as model inhalable drugs with poor water solubility. A novel method is proposed for the production of dry powder inhaler formulations with enhanced aerosol performance (e.g. for salbutamol-glycine formulation the fine particle fraction (FPF≤4.7μm) value is 67.0±1.3%) from substances that are poorly soluble in water. To overcome the problems related to extremely poor aqueous solubility of the APIs, not individual solvents are used for spray freeze-drying of API solutions, but organic-water mixtures, which can form clathrate hydrates at low temperatures and release APIs or their complexes as fine powders,