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Solid lipid microparticles of salbutamol sulfate for dry powder inhalation

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Background and Aims: The aim of this study was to design a novel dry powder inhalation (DPI) formulation of Salbutamol sulfate, a short acting beta2-adrenoceptor stimulant, using Solid Lipid Microparticles (SLmPs) composed of cholesterol and dipalmitoylphosphatidylcholine (DPPC).
Methods: Two different types of formulations were spray dried for the preparation of SLmPs. The first kind was prepared by dispersing Salbutamol sulfate microparticles in an ethanolic solution of hydrophobic excipient, prior to spray drying and the second type formulations were consisted of water-ethanol (30:70) solution of the drug and the lipidic material. Finally, all the obtained formulations were physically blended with inhalation grade lactose monohydrate. The obtained SLmPs were characterized for their physical properties, aerolization bahavior and especially their in vitro efficiency of being a sustained release delivery system.
Results: It was shown that the solvent type i.e. ethanol or water-ethanol, the kind of lipid excipient, and inlet temperature of spray drying had a significant effect on the size, shape and fine particle dose (FPD) of the spray dried formulations. Finally, generating microspheres from lipids and Salbutamol sulfate provided a sustained release profile of the drug.
Conclusions: This study was demonstrated the use of SLmPs containing cholesterol or DPPC to improve the delivery of Salbutamol Sulfate, a high water soluble drug, to the pulmonary tract and also to retard the release of this drug.

Keywords: Solid lipid microparticles; Spray drying; Dry powder inhalation