Methods to Dose and Coat Inhalation Powders Onto Surfaces

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Technology description

An effective technique for coating powdered medical agents onto carrier particles for use in dry powder inhalers.
Various types of energy are used to deaggregate the drug powder to particles having a primary particle size. The energy may be derived from ultrasonic energy, sonic energy, or piezoelectric energy. The use of ultrasonics to load the drug onto the carrier materials may compensate for vastly reduced surface area of large carrier particles compared to lactose carrier particles.

Background

Drug delivery to the lungs for the treatment of pulmonary disorders such as asthma, chronic obstructive pulmonary disease (COPD), cystic fibrosis and many others has long been utilized. Given the lung’ s extremely large surface area, mild environment, and ease of administration, in contrast to oral and intravenous routes of drug delivery, it presents an especially attractive avenue for therapeutic delivery. However, treatment via the pulmonary route is not without obstacles. For drug particles to deposit in deep within lung, where they exert their therapeutic action, they must possess certain physical properties in size and density. Furthermore, while dry powder formulations offer many advantages over liquid formulations, their performance is plagued by low drug delivery (generally below 30% of the total dose is delivered to the deep lung) and high throat and upper airway deposition. There exists a present market need for new technologies for dosing and coating inhalation powders onto carrier particles that deaggregates drug powder into particles of primary size and reduces the presence and subsequent dispersion of drug agglomerates that could undesirably deposit in the mouth and upper airways.

Technology Description

Researchers from the University of New Mexico have developed an effective technique for coating powdered medical agents onto carrier particles for use in dry powder inhalers. More specifically, various types of energy are used to deaggregate the drug powder to particles having a primary particle size. The energy may be derived from ultrasonic energy, sonic energy, or piezoelectric energy. The use

of ultrasonics to load the drug onto the carrier materials may compensate for vastly reduced surface area of large carrier particles compared to lactose carrier particles.

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Application area

Effective techniques to dose and coat inhalation powders onto surfaces for use in dry powder inhalers
Use of ultrasonic energy to deaggregate drug powders may also reduce the instances of tightly bound drug-carrier interactions by eliminating, for example, the press-on forces that occur when powder is tumbled in an orbital mixer
Strength of the interactions between drug and carrier is increased and the amount of drug delivered to the deep lung is reduced

Institution

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