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Spray Drying as a Novel Method for Producing Nanoparticles Intended for the Application in DPI's

S. SCHNEPFLEITNER, N. A. URBANETZ

Institute for Process and Particle Engineering, University of Technology, Graz, Austria

E-mail: sabrina.schnepfleitner@tugraz.at (S. Schnepfleitner), nora.urbanetz@tugraz.at (N. A. Urbanetz)

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In order to use API (active pharmaceutical ingredient) particles in a dry powder formulation, they have to exhibit an aerodynamic diameter of 1 μm – 5 μm . Only this order of magnitude guarantees a penetration to the deeper parts of the lungs. Particles of this scale are very cohesive and possess rather poor flow properties [1], which lead to difficulties concerning volumetrically dosing. To handle cohesivity, the drug particles may be coated with particles in the nanometer range. Nanoparticles will act as spacers between the contacting API particles and may cause a reduction of the interparticle forces. Already implemented experiments showed that Aerosil® particles can enormously alter the particles' flow characteristics. [2–4]. Due to the fact that Aerosil® is not approved in DPI formulations, there is a rising demand for substances, which can be used as an alternative.

The aim of this work is to create nanoparticles via a novel spray drying technique. With the help of this apparatus, it is feasible to produce API particles in the nanometer range. The intended benefit is the absence of any excipient, because both, the drug itself (1 μm – 5 μm) and the nanoparticles, acting as flowability enhancers, are made of the same API substance. During a mixing process [5] the nanoparticles are attached on the microparticles' surface. This alternative DPI formulation should facilitate a reproducible dosing, which is a quite important requirement for using DPI's.

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