

Pharmaceutical Particle Engineering *via* Spray Drying

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Abstract. This review covers recent developments in the area of particle engineering via spray drying. The last decade has seen a shift from empirical formulation efforts to an engineering approach based on a better understanding of particle formation in the spray drying process. Microparticles with nanoscale substructures can now be designed and their functionality has contributed significantly to stability and efficacy of the particulate dosage form. The review provides concepts and a theoretical framework for particle design calculations. It reviews experimental research into parameters that influence particle formation. A classification based on dimensionless numbers is presented that can be used to estimate how excipient properties in combination with process parameters influence the morphology of the engineered particles. A wide range of pharmaceutical application examples—low density particles, composite particles, microencapsulation, and glass stabilization—is discussed, with specific emphasis on the underlying particle formation mechanisms and design concepts.

KEY WORDS: dispersibility; microencapsulation; particle formation; respiratory drug delivery; stabilization.