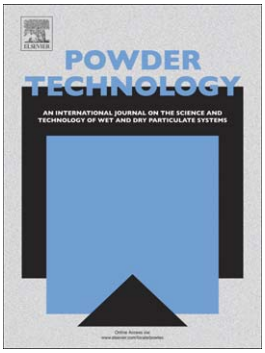

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Understanding the Process-Product-Performance Interplay of Spray Dried Drug-Polymer Systems through Complete Structural and Chemical Characterization of Single Spray Dried Particles

Sadegh Poozesh[a], Nico Setiawan[a], Freddy Arce[a], Pavithra Sundararajan[b], Joseph Della Rocca[b], Alfred Rumondor[b], Douglas Wei[c], Robert Wenslow[d], Hanmi Xi[b], Shawn Zhang[e], Joyce Stellabott[b], Yongchao Su[b], Justin Moser[b] and Patrick Jules Marsac[a*]

[a] University of Kentucky College of Pharmacy, Lexington, KY 40536, USA

[b] Merck Research Laboratories, West Point, PA 19486, USA

[c] Carl Zeiss Microscopy, One Zeiss Drive, Thornwood, NY 10594, USA

[d] Crystal Pharmatech, 675 U.S. Highway One, North Brunswick, NJ 08902, USA

[e] DigiM Solution LLC, 67 S Bedford St Suite 400 West, Burlington, MA 01803, USA

*Corresponding author.

Email: patrick.marsac@uky.edu

Tel: 859-218-4909

Abstract

A complete description of the particle formation process can only be realized with techniques that enable the measurement of the composition and structural dependence of individual particles.

The purpose of this publication is to highlight the utility of one such high resolution imaging technique; focused-ion scanning electron microscopy (FIB-SEM). As a model system, amorphous dispersion particles of felodipine and polyvinylpyrrolidone (PVP) were prepared by spray drying and used to interrogate single particles. Further, FIB-SEM was coupled with energy dispersive x-ray analysis (EDX) to characterize spatial chemical distributions in spray dried amorphous solid dispersion particles. Within a single spray drying batch, individual particles exhibited different phase behavior as a function of particle size. Larger particles showed notable amorphous-amorphous phase separation while smaller particles showed uniform composition. The morphology of particles was also found to be a function of particle size. Larger particles were consistently more porous in nature compared to smaller particles. The observed differences in compositional heterogeneity of different spray dried particles as a function of size