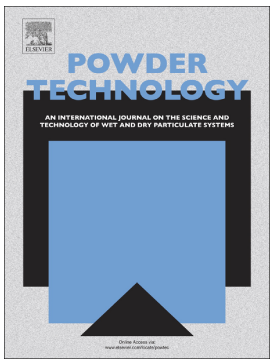

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SPATIAL MORPHOLOGY OF MALTODEXTRIN AGGLOMERATES FROM X-RAY MICROTOMOGRAPHIC DATA: REAL STRUCTURE EVALUATION VS. SPHERICAL PRIMARY PARTICLE MODEL

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Abstract

The morphology of agglomerates has been mainly investigated by approximating constituent primary particles with equivalent spheres. However, this simplified spherical primary particle model (SPPM) is questionable, because most agglomerates in food, pharmaceutical and chemical industry are made of irregularly shaped primary particles. Therefore, in the present work the SPPM is compared with a model that is based on complete data of the real structure (real structure model, RSM). Individual agglomerates of different sizes, produced from maltodextrin powder in a spray fluidized bed, have been scanned in an X-ray microtomographic device. After a series of image processing steps, the data has been used to derive various 3D morphological descriptors (such as coordination number, coordination angle, radial distribution of primary particles and open porosity) by both the SPPM and the RSM. The results of the two models delineate noticeable differences, indicating that the SPPM may not provide a precise characterization of maltodextrin agglomerates. Therefore, the RSM is the more appropriate method to study the morphology of agglomerates that consist of soft and deformable primary particles of varying size and irregular shape.