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PII: S0378-5173(18)30324-7
DOI: https://doi.org/10.1016/j.ijpharm.2018.05.026
Reference: IJP 17497

To appear in: *International Journal of Pharmaceutics*

Received Date: 25 January 2018
Revised Date: 2 May 2018
Accepted Date: 10 May 2018

Please cite this article as: N. Tarlier, I. Soulairol, N. Sanchez-Ballester, G. Baylac, A. Aubert, P. Lefevre, B. Bataille, T. Sharkawi, Deformation behavior of crystallized mannitol during compression using a rotary tablet press simulator, *International Journal of Pharmaceutics* (2018), doi: https://doi.org/10.1016/j.ijpharm.2018.05.026

Deformation behavior of crystallized mannitol during compression using a rotary tablet press simulator

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Keywords: Mannitol crystal, tablet press simulator, lubrication, deformation,

Abstract:

Mannitol is commonly used as a pharmaceutical excipient for tablets; the most widely used oral dosage form for drug delivery. For tableting, mannitol is provided in two different forms: native crystals and textured particles. In order to optimize its formulation, a good understanding of the mechanical behavior mechanism of mannitol is necessary. Thus, the aim of this study is to evaluate the deformation mechanism of native mannitol crystals presenting different particle sizes. Pharmaco-technical and compression studies were performed using mannitol with different mean diameters (160 µm, 50 µm and 25 µm). Lactose (monohydrate) and microcrystalline cellulose were used as brittle and plastic reference materials, respectively. Tableting tests and mathematical models, HECKEL and WALKER, were used to study the deformation mechanism of mannitol (β). Mean Yield Pressure (Py) and WALKER coefficient (W) values showed that the studied crystalline