

16th International Conference and Exhibition on

Pharmaceutical Formulations

July 26-27, 2018 | Rome, Italy

Comparison of flow and consolidation properties of microcrystalline cellulose and cellets

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Microcrystalline cellulose (MCC) is one of the most commonly used excipients in pharmacy, particularly in direct compaction of tablets. Many types of MCC with different particle size and flow properties are produced by pharmaceutical companies. The aim of this work was to characterize flow and consolidation properties of three types of powder microcrystalline cellulose - MCC 101, MCC 102, MCC 200, and Cellets 100, the pellets made of microcrystalline cellulose. All materials were characterized for the moisture content and microscopy characteristics. Flow properties: the bulk, tapped and true density, the angle of repose, and the flow rate through an orifice were evaluated in accordance with Ph. Eur. 9.0. The dynamic of apparent density change under gravity tapping was used to describe the powder bed consolidation behaviour in detail. The results showed that Cellets have significantly higher bulk density and better flow properties than MCC particularly when compared with MCC 101 and 102. The reduction of powder bed volume by gravitational tapping was faster as well. The narrow particle size distribution, the smooth spherical shape and the good flow behaviour of Cellets make them the promising drug carrier material. In our experience, unfortunately, their compaction properties are poor. The binar or ternar mixtures with MCC will be studied in further to enhance compactability and to reach tablets of acceptable mechanical properties.

Biography

Žofie Trpělková is in the 2nd year of her Doctoral studies Faculty of Pharmacy in Hradec Králové Charles University, Czech Republic. She pursued her Master studies in Pharmacy (2016) and defended her master thesis in the Department of Pharmaceutical Technology at the same university, Czech Republic, where she studied compressibility of pellets made of microcrystalline cellulose. Recently, she studies the fractal aspects of flow and consolidation behaviour of different excipients including cellets. Her results were presented at the Central European Symposium on Pharmaceutical Technology in Belgrade and at conferences in the Czech Republic and Slovakia.

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