

## Abstract

Charles University in Prague, Faculty of Pharmacy in Hradec Králové

Department of Pharmaceutical Technology

Consultant: Mgr. Pavel Ondrejček, Ph.D.

Student: Žofie Trpělková

Title: A study of a compaction process of microcrystalline cellulose pellets

This work is aimed at the comparison of two types of microcrystalline cellulose (Comprecel 102 a Avicel PH-200) with two types of pellets made of microcrystalline cellulose (Cellets 100 a Cellets 200). Important properties for the compaction into tablets were analyzed in these materials. The particle size distribution, the content of moisture, the bulk and tapped density, the flowability, the angle of repose and the Hausner ratio were evaluated. Furthermore, the compaction process was described by using the force displacement method and the three-exponential equation. Finally, the radial strength and the friability of tablets prepared by using two different compaction forces were evaluated.

The results proved that both types of pellets have much better flow properties than powdered microcrystalline celluloses. This is primarily caused by the narrow particle size distribution, higher bulk and tapped density and the significantly smoother surface of pellets. Better flow properties of the pellets also influenced the parameters of the force-displacement method and the parameters of the compaction equation. The parameters describing the pre-compression phase were the most affected ones. A lower energy consumption was observed in both types of pellets. There was also consumed less energy in the phase of compression during the compaction of pellets, which resulted in significantly lower radial strength of tablets. Pellets consumed more energy than both types of microcrystalline cellulose in the phase of plastic deformation evaluated by the compaction equation. The significant fragmentation of the pellets during the compression may be expected due to the low radial strength and the high friability of tablets.