

Abstract

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Title of Thesis: The influence of the tableting speed on the compaction process

The main aim of this thesis was to determine the influence of tableting speed on the compaction process of four substances. The compaction process was evaluated by three-exponential equation. The parameters of this equation describe the individual phases of compression, the precompression phase, the phase of elastic deformation and the phase of plastic deformation. Furthermore, the effect of tableting speed on the compressibility of the material was studied using the force-displacement record. Finally, the influence of tableting speed on tensile strength of the prepared tablets was evaluated. Four materials were used for the evaluation. Microcrystalline cellulose Avicel PH-102 and dicalcium phosphate dihydrate DI-CAFOS were used as model fillers. Theophylline and paracetamol were used as model drugs. The course of the compaction process was evaluated at five compaction speeds.

The results of this evaluation revealed different behavior of used materials. Furthermore different influence on the compaction process by changing compaction speed was observed. Compaction of the plastically deformable substances (microcrystalline cellulose and theophylline) was influenced much more by compaction speed than in the substances, where fragmentation dominates (dicalcium phosphate dihydrate and paracetamol). The biggest influence of the compaction speed change was observed in microcrystalline cellulose. This is primarily due to the higher air content in the particles of this filler. The air remains in tableting material at the higher tableting speeds and increases its elasticity.