

Determining the compression behaviour of fillers and talc

Abstract

The aim of this study was to determine how do the type of filler, presence of lubricant, size of compression force and compression with dwell time or without dwell time influence values of energy compression of tablets. Materials used were microcrystalline cellulose (Avicel PH 200), lactose monohydrate (Tabletose[®] 70) and talc. Mixtures with the 0%, 0,5% and 1% concentration of talc were prepared in a blending cube. Tablets with a weight of 500 mg were compacted in the compaction machine T1 - FRO 50 with the compaction force of 5 kN, 10 kN and 15 kN. Force-displacement curves were obtained from the resulting values of measurements of individual compaction processes, and numerical values of a plastic energy (E_2), an elastic energy (E_3), and E_{lis} ($E_2 + E_3$) were calculated from them. Obtained data were statistically evaluated according to the Stats-Otto method.

It results from these calculated values that the plasticity increases and the elasticity decreases during the compression with dwell time. Parameters E_2 , E_3 and E_{lis} increase with an increasing applied pressure. As expected, energy E_2 and E_{lis} did not decrease and energy E_3 did not increase with the raising concentration of lubricant. This is caused by the character of the used lubricant. The obtained results also characterize properties of both fillers, where lactose monohydrate has a lower plasticity and a higher elasticity than microcrystalline cellulose.