

Abstract

Charles University, Faculty of Pharmacy in Hradec Králové

Department: Pharmaceutical Technology

Student: Eliška Kučerová

Consultant: Assoc. Prof. PharmDr. Jitka Mužíková, Ph.D.

Title of the Diploma Thesis: Influence of mixing conditions of microcrystalline celluloses with lubricants on compression process and tablet strength.

This work evaluates the influence of a type of mixing device and mixing time of three types of microcrystalline celluloses (MCC) with lubricants on compression process and tablet strength. Microcel[®] MC 102, MC 200 and Prosolv[®] SMCC 90 are used as dry binders. Magnesium stearate and sodium stearyl fumarate at 1% concentration are used as lubricants. Two types of mixing devices are used to mix powders, a mixing cube and a 3D Turbula mixer. Mixing time is 2 or 4 minutes. All tablets are compressed by compression force of 5 kN on the Zwick / Roell T1-FRO 50 material tester. The compressibility is evaluated by the energy profile of compression process, sensitivity to the addition of lubricants is characterized by lubricant sensitivity ratio values (LSR).

The total energy of compression of all MCC decreases with the addition of both types of lubricants and with longer mixing time, more in the case of mixing in the cube. The highest values of the total energy of compression and at the same time their smallest decrease due to the addition of lubricant show formulations with Prosolv[®] SMCC 90. Greater decrease in tablet strength is seen in all MCC at the mixing in the cube. Longer mixing time and the use of magnesium stearate also lead to greater decrease in tablet strength. Prosolv[®] SMCC 90 shows the lowest lubricant sensitivity, Microcel[®] MC 200 shows the highest.