

## ABSTRACT

The aim of this work was to obtain viscoelastic characteristics of one of the most used auxiliary pharmaceutical material. The testing material was lactose Flow Lac 100. Its viscoelastic properties were valued by two tests: Creep test and test Stress relaxation. Plastic properties are necessary to ensure good compressibility of material, whereas elastic properties can make difficulties during a compaction.

In the theoretic part I dealt with energy of a tablet compaction. Elastic and plastic energy is acquired from measurement force – displacement, which represents continuance of a compaction process. The process of compaction can be classify into three parts according to the energy consumption:  $E_1$  is energy needed to prepressing,  $E_2$  is energy used for tablet forming and  $E_3$  means energy released from the tablet after compacting.

Creep test: tablets were compressed to the defined compacting pressure and this pressure was held constant for a period of 180 s. In process of this period changes in height of a tablet was recorded. The decreasing height of the tablet was used for a determination of parameters of plasticity and elasticity:  $E_{CT1C} = 72,1235$  [s],  $E_{CT2C} = 0,0117$  [s],  $P_{CT1C} = 1,0623 \cdot 10^7$  [MPa.s],  $FP_{CTC} = 0,4828$ .

Stress relaxation test: tablets were compressed to the defined compaction pressure and next the height of tablet was kept constant for a period of 180 s. During this period the decrease of a pressure left in a tablet was measured and recorded. Then the parameters of plasticity and elasticity were determined:  $E_{SR1C} = 1,7648$  [MPa],  $E_{SR2C} = 0,9880$  [MPa],  $E_{SR3C} = 0,7968$  [MPa],  $P_{SR1C} = 0,5074$  [MPa.s],  $P_{SR2C} = 4,4114$  [MPa.s],  $P_{SR3C} = 57,4715$  [MPa.s].

One of the outcomes in this work is a comparison of viscoelastic characteristics of three auxiliary materials: lactose (Flow Lac 100), microcrystalline cellulose (Avicel 200) and calcium phosphate dihydrate (Emcompress). Results of the tests say that the most elastic material is lactose and the most plastic material is calcium phosphate dihydrate. Elasticity increases and plasticity decreases in sequence calcium phosphate dihydrate (Emcompress) – microcrystalline cellulose (Avicel 200) – lactose (Flow Lac 100).