

# ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Department of: Pharmaceutical technology

Consultant: PharmDr. Petra Svačinová, Ph.D.

Student: Jana Hájková

Title of Thesis: The evaluation of viscoelastic properties of two types of pregelatinized corn starch using stress relaxation test

This thesis deals with viscoelastic properties of two partially pregelatinized starches (Starch 1500<sup>®</sup> and Lycatab<sup>®</sup> C) and with the evaluation of the tensile strength of tablets. In the theoretical part are described characterisations of used starches, lubricants and their effect on compression of starches. There is also described compression process and its evaluation with stress relaxation test.

Experimental part of this thesis is focused on tablet compression and evaluation of their viscoelastic properties and tensile strength of tablets. For evaluation of viscoelasticity was used stress relaxation test. Tablets were compressed at compression forces of 13, 15 and 17 kN. Magnesium stearate and stearyl fumarate in 0,5 % and 1,0 % concentrations were used as lubricants. The differences in parameters of elasticity ( $A_{1-3}$ ) and plasticity ( $P_{1-3}$ ) between both types of partially pregelatinized maize starches, effect of lubricants and different compression forces were observed. In all three phases of compression process, Lycatab<sup>®</sup> C and its mixtures implies higher values of parameters  $A_i$  and  $P_i$  than Starch 1500<sup>®</sup> and its mixtures. The differences in values of parameter  $A_1$  and  $P_1$  for both substances and their mixtures are significant especially at higher compressing force. Values  $A_2$  and  $P_2$  of Lycatab<sup>®</sup> C decreased after addition of lubricants and also with growing compression force. Parameters  $A_2$  and  $P_2$  of Starch 1500<sup>®</sup> decreased at 13 and 17 kN and increased at 15 kN. Higher values were measured when sodium stearyl fumarate was used.  $A_3$  and  $P_3$  values of Lycatab<sup>®</sup> C are influenced just at compressing force 15 kN, where increased after addition of lubricants. At compression force 17 kN decrease of these values was detected. At compression forces of 13 and 17 kN values of  $A_3$  and  $P_3$  after adding of lubricants to Starch 1500<sup>®</sup> decreased and at 15 kN increased. Addition of sodium stearyl fumarate leads to higher values. Tensile strength of tablets from both used fillers decreased with addition of lubricants. Higher tensile strength have tablets which are prepared from Lycatab<sup>®</sup> C and its mixtures. Moreover decrease in tablets tensile strength was observed at longer mixing time.