

## **ABSTRACT**

Charles University in Prague, Faculty of Pharmacy in Hradec Králové

Department of Pharmaceutical technology

Candidate: Mgr. Roman Adámek

Supervisor: Doc. RNDr. Milan Řehula, CSc.

Title of Doctoral Thesis: Viscoelasticity of fillers for direct tablet compacting

Keywords: stress relaxation, viscoelasticity, Maxwell-Wischert model, hydrogen bond, van der Waals bond

Important property of pharmaceutical fillers is viscoelasticity which can be evaluated in many ways. The Stress relaxation test is a method when a punch of compacting machine stops precisely in a moment of reaching set up pressure and decreasing pressure in a tablet during time is recorded. This action is mathematically described by a three-exponential equation which facilitates to separate the Stress relaxation test in three simultaneously running actions.

Each of these actions is described by the moduli of plasticity and elasticity which point out in detail on viscoelastic properties of measured materials. The Stress relaxation test was used for 20 pharmaceutical fillers by 11 compacting pressures. To infer clearer conclusions, tablet strength, Young's modul of elasticity and elastic potential energy were determined. With help of above mentioned compacting parameters conclusions of viscoelasticity and compacting properties of used materials were deduced.