Abstract

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Title of the Diploma Thesis:	A study of directly compressible tableting materials with the combination of chitosan and silicified microcrystalline cellulose

This thesis deals with the study of compressibility of directly compressible tableting materials with chitosan and silicified microcrystalline cellulose Prosolv® SMCC 90 in a ratio of 3:1, their lubricant sensitivity and the tensile strength of tablets. Retardant components of the tableting materials are sodium alginate in concentrations of 30, 40 and 50 % or its combinations with hypromellose 15M in a ratio of 1:1 in the same concentrations. Magnesium stearate in a concentration of 1 % is used as a lubricant, indomethacin in a concentration of 20 % is used as a model drug. Tablets without the lubricant and the drug are compressed by compression forces of 3, 3,5 and 4 kN, tablets with the lubricant and the drug are compressed by compression force of 4 kN. T1-FRO 50 Zwick/Roell material testing equipment is used for the compression of the tablets. The compressibility is evaluated by the energy profile of the compression process, the lubricant sensitivity is evaluated by values of the lubricant sensitivity ratio.

The total energy of compression increases with the compression force. The highest values are measured for the combination of chitosan and Prosolv® SMCC 90 without retardants. The values decrease with the rising concentration of retardants and furthermore with addition of the lubricant and indometacin. The plasticity values decrease with the compression force. The combination of chitosan and Prosolv® SMCC 90 alone has the highest values. The values decrease with the addition of retardants and furthermore with addition of the lubricant and indometacin. The tensile strength increases with the compression force. The highest values are measured for the tableting materials with the combination of sodium alginate and hypromellose 15M and for the combination of chitosan and Prosolv® SMCC 90 without retardants. The addition of sodium alginate significantly decreases the values. Magnesium stearate reduces the tensile strength of all tablets except for the combination of chitosan and Prosolv® SMCC 90 alone, which has the lowest lubricant sensitivity. The highest LSR values are shown by the

tableting materials containing sodium alginate, the lubricant sensitivity increases with its concentration.