

ABSTRACT

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Title of diploma thesis: Strain- stress curves of human hair

Department of Biophysics and Physical Chemistry Faculty of Pharmacy of Charles University in Hradec Králové studies since many years the influence of mechanical stress on biological structures. Human hair is one of these biological structures that turns out to be interesting for the further research. The subject of the thesis is to measure biomechanical properties of hair and their qualitative comparison by using Young's modulus E [MPa] and maximal stress σ_{\max} [MPa]. The aim of the thesis is to evaluate measuring potential of dynamic viscometer for measurement of static characteristics (strain-stress curves) of human hair.

The theoretical part focuses on the anatomy of skin and describes biomechanical properties and structure of basic hair protein – keratin. The following chapter is devoted to the anatomy of hair and describes its cross-section area layers. Considering that hair is also subjected to various cosmetics rituals, the theoretical part of the thesis lists out the most common cosmetic treatments and hygiene habits concerning hair and their possible influence on the biomechanics of hair. The last chapter of the theoretical part discusses properties of strain-stress curves

The experimental part describes the attachment of the sample and measuring process of strain-stress curves. The author conducted a survey via questionnaires in order to obtain data about basic hygiene and cosmetic habits of samples' donors. The following evaluation was obtained on the basis of comparison of arithmetic means of the Young's modulus E values, which was acquired as the slope of linear function of measured strain-stress curve or max stress depending on data collected from survey participants. The most important turned out to be the Young's modulus and maximal stress dependency on the cross-section area.

At the end, you can find overview of thesis results. The summary and commented results are to be found in the discussion.