# THE RHEOLOGICAL PROPERTIES OF COMPLEX GELS OF GELATIN AND POLYSACCHARIDE

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The investigation of the mutual influence of gelatin and polysaccharides on the rheological properties of hydrogels is interesting both from the fundamental and the applied points of view. On the one hand it is curious to trace the correlation of the structural features and the rheological characteristics of such gels. On the other hand the creation of new gelling agent, stabilizers, thickeners and emulsifiers on the basis of complex systems of gelatin with addition of polysaccharides is of great practical interest for a number of industries (particularly food).

The aim of this work was to investigate the influence of polysaccharide carrageenan and chitosan on the rheological properties of gelatin gels for using these results in food technologies.

Rheological measurements were performed using a rate-controlled rheometer with external submersible-type rotor named «Brookfield RVDV–II+Pro» in the range of shear rates $\dot{\gamma}$ from 0.09 to 40 $s^{-1}$. Rheological methods of exploration of complex gels of gelatin with polysaccharides were supplemented by photometric (the turbidity spectrum method) and spectrometric measurements. These measurements were performed on a spectrometer «T70 UV/Visible Spectrometer».

The experimental flow curves for gels (i.e. dependencies of the effective viscosity η and shear stress τ on the shear rate $\dot{\gamma}$) were approximated by rheological models like Cross, Herschel-Bulkley and Casson models. Some of the flow curves are shown in Figure 1. It has been found that polysaccharides in the certain concentration range cause the increase of viscosity and yield stress.

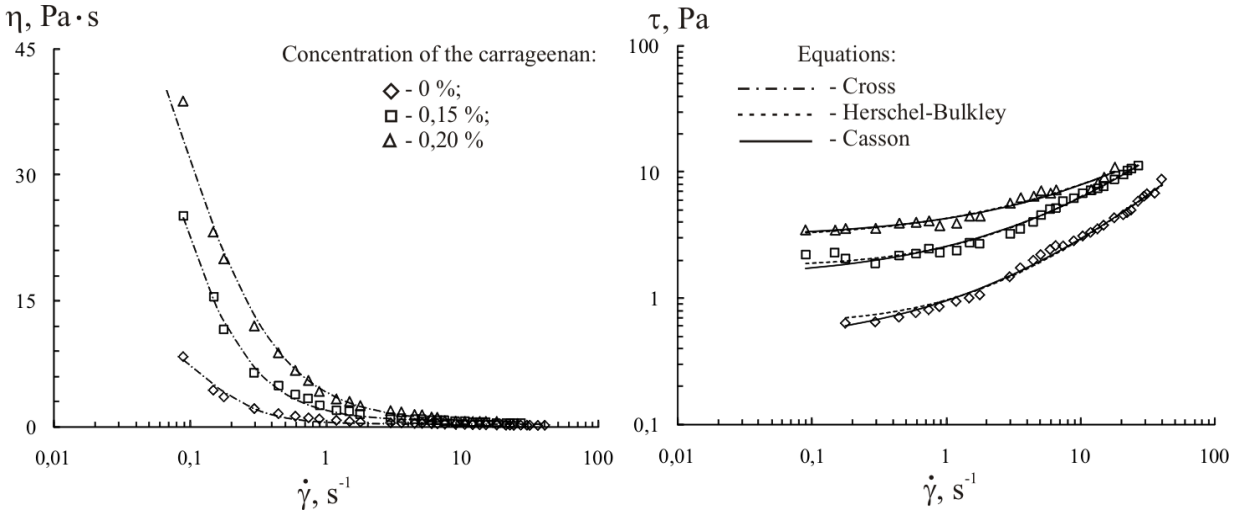


Fig.1. Flow curves of gelatin gels (1% wt.) with the addition of carrageenan. t = 14 °C

It has been shown that the combined use of two gelling agents such as protein (gelatin) and polysaccharide (carrageenan or chitosan) gives a synergistic effect of the rheological behavior of complex gels in the case of steady flow. This synergistic effect can be used to create formulations of complex structure formers named «protein-polysaccharide» for their application in the food industry.