**The study of rheological behavior of pectin solutions**

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Polymer solutions and melts are characterized by complex rheological behavior. They obey Newton's flow law, in which there is a direct proportionality between the shear stress t and the shear rate, only in the region of large dilutions and small molecular weights. The proportionality coefficient h in this equation is called "viscosity". For Newtonian fluids, viscosity is a constant value that characterizes how a given fluid resists flow. The viscosity of polymer liquids depends on many factors: the chemical nature of the polymer, the degree of macromolecules branching, the value of molecular weight and polydispersity coefficient, the degree of intermolecular interaction, polymer concentration etc. However, in some cases, the viscosity of polymer systems depends on the stress and shear rate.

Thus, when the polymer concentration in solution or the molecular weight values increase, polymer solutions or melts demonstrate non-Newtonian behavior due to the variability of viscosity values. They usually behave like pseudoplastic liquids, the viscosity of which decreases with increasing shear rate. The decrease in viscosity with an increase in the shear rate is mainly due to the orientation of macromolecules in the direction of flow and the unraveling of macromolecules with an increase in the shear rate.

Experimental determination of rheological properties of polymer liquids obtained by using rotary viscometers (rheometers) in a wide range of shear rates is a difficult task. The problem lies in the fact that the range of shear rates that is realized during the processing or operation of polymer liquids is very large. For example, the deposition of small particles suspension of a medicinal substance in a polymer solution is carried out at a shear rate of about 10-6-10-5 s-1, and when this suspension is applied to the body – 104-105 s-1.It turns out that when developing a liquid dosage form based on a polymer, it is necessary to understand the rheological behavior of the system in the range of shear rates from 10-5 to 105 s-1. It is almost impossible to find a rheometer that works in such a wide range of shear rates. Meanwhile, having obtained experimental data on the dependence of the shear stress on the shear rate and accurately selecting the equation connecting these two parameters, it is possible to determine the degree of deviation of the system from Newton's law and calculate the viscosity values at such shear rates that are difficult to determine experimentally.

In this work, the natural polysaccharide pectin of citrus origin produced by SIGMA-ALDRICH with a galacturonic acid content of 74.0 % and a characteristic viscosity value determined at 25 °C equal to [η] = 5 dl/g was selected as the object of research. Distilled water was used as a solvent, the choice of polymer was due to its wide application in the food industry, medicine and pharmacy. Rheological measurements of aqueous pectin solutions were carried out on a modular dynamic rheometer Haake Mars III at a temperature of 20 ± 1 °C in the shear mode at shear rates from 0.01 to 10 s-1.

In the course of the study, concentration limits in which pectin solutions behave like Newtonian liquids, as pseudoplastic liquids and liquids with a yield point were established, and empirical rheological equations to approximate experimental data were chosen.