

STUDY OF RHEOLOGICAL PROPERTIES OF SEMISOLID DOSAGE FORMS

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Introduction. The State Pharmacopoeia of Ukraine defines soft medicines (SM) as semisolid dosage forms (SDF) with specific rheological properties at a fixed temperature: non-Newtonian type of flow, certain structural viscosity, pseudoplastic (or plastic) and thixotropic properties.

Aim. Investigation of the rheological properties of semisolid drugs produced on different carrier bases.

Materials and methods of the study. The research objects were semisolids manufactured by the chemical-pharmaceutical plant Krasnaya Zvezda (Kharkov): Gyoxysone ointment, Prednisolone ointment, Diclofenac 1% gel, Tiotriazolin gel, Levomekol ointment. The rheological properties of the samples have been studied using Rheolab QC rotary viscometer (Anton Paar, Austria). With the help of the Casson's mathematical model, the point of the system flow and "viscosity at an infinite shear rate" were determined.

Results. All the studied samples of SDF, except the "Tiothriazoline" gel, had a plastic flow type, i.e. for the flow of the system, it is necessary to achieve some yield stress, expressed in shear rate. During an increasing shear rate, a shear stress occurs in the system, the shear stress at which the system begins to flow is called the flow point. The calculated point of flow according to the Casson's model for the "Gyoxisone" ointment is 126.35 Pa, for the ointment "Prednisolon" - 109.79 Pa, for the Levomekol ointment - 60.73 Pa, for the gel "Diclofenac 1%" - 93.93 Pa, for the gel "Tiotriazolin" - 1.60 Pa. The higher the value of the point of flow, the greater force must be applied to the tube to squeeze out the ointment, but at the same time, spontaneous leakage from the tube may occur at low values. Gel "Tiotriazolin" - has a pseudoplastic type of flow, the point of flow has a low value. In many models, to describe the rheological curve, it is assumed that the viscosity tends to a constant limit value at high shear rates. Therefore, it is often referred to as "viscosity at an infinite shear rate". The calculated "viscosity at an infinite shear rate" is equal to 0.18 Pa · s for a Gyoxisone ointment, 0.18 Pa · s for a Prednisolone ointment, 0.33 Pa · s for Levomekol ointment, for "Diclofenac gel 1%" - 0.52 Pa · s, for the gel "Tiotriazolin" - 2,03 Pa · s.

Conclusions. Thus, the study of the rheological properties of SDF has both theoretical value and practical application of the research results in the development of composition and technology.