

Measurement of Flow Properties of Horse Arterial Blood with Different Hematocrit Values Using Falling Needle Rheometer

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The flow properties of blood are an important factor in the evaluation of blood disease on the medicine, but the method of viscometry and the data collection are not so easy. In particular, Human arterial blood is so difficult practically. This study has been described on the viscosity measurement and their evaluations for horse arterial blood. A compact-sized falling needle rheometer with quick operation and automatic flow analysis has been developed for viscometry of blood, and the relationship between the apparent viscosity and physical properties of blood have also been evaluated. Measured flow properties of blood are evaluated as a flow curve showing the relationship between the shear stress and shear rate. Observed flow curves of bloods show three typical fluid regions, these are, the Non-newtonian fluid region for a low shear rate range, the transition region and the Newtonian fluid region for a high shear rate range. Flow properties of blood in the Casson fluid region and the apparent viscosity in the Newtonian fluid region are measured, and they are compared between horses. A non-linear relationship between the hematocrit value, that is, the volume percentage of red corpuscles in the horse arterial blood, and the apparent viscosity are observed. Finally, Flow properties of other mammalian bloods including horse blood are discussed on the effect of hematocrit values to blood viscosities.