

Kraków, dnia 15.07.2024

## Phd dissertation abstract

Thesis title: Rheological properties analysis of selected structural food liquids in situ conditions

The aim of this study was to analyse the rheological properties of selected foodmodel liquids under in-situ conditions using a prototype industrial-scale capillary-tube rheometer, supported by an ultrasonic velocity profile measurement system. The dissertation covers issues related to rheological classification of fluids, measurements of rheological properties, methods of velocity profile measurement. The dissertation also includes a literature review on the structure and rheological properties of carboxymethylcellulose, guar gum and xanthan gum. It also includes a description of the construction of a prototype measuring station and the software for control and data collection. The paper presents results on the rheological properties of glycerine, carboxymethylcellulose, guar gum, xanthan gum and ketchup during flow through a capillary-tube rheometer under in situ conditions. Results include pressure drop values during flow through the test section, flow curves, viscosity curves, flow laminarity control, theoretical velocity profiles, actual fluid velocity profiles in the tube obtained using Doppler methods and their compilation. In addition a comparison is presented of the flow curves for the fluids under study obtained using the capillary-tube rheometer and rotational rheometer at the same shear range. The results are supplemented by tables containing information on  $k$  and  $n$  parameters of the Ostwald-de Waele equation determined for the tested solutions, the velocity of sound propagation in the medium and the density of the examined solutions.

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