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RHEOLOGICAL PROPERTIES OF PROCESSED LIQUID EGG WHITE PRODUCTS

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ABSTRACT Recently the food industry increasingly uses ready-to-process egg products as basic materials instead of shell eggs. Subsequent to breaking shell eggs and completing pasteurization they are put on the market as liquid egg products or in powdered form as dried eggs. Consumers prefer a liquid egg that preserves the advantageous properties of natural eggs but its viscosity can be too high due to denaturized egg protein. The aim of present study was to investigate flow properties of liquid egg white produced by recently accepted industrial technologies (pasteurized; long term heated at 53°C; powdered and rehydrated) in comparison with carefully heat treated products (at 53, 57, 63°C temperature for 5, 10, 15 minutes) using raw liquid egg white as control. Rheological measurements were performed using MCR 51 (Anton-Paar, GmBH, Germany) rheometer, controlled by Rheoplus software. A concentric cylinder measurement system (CC 27, 27 mm in diameter, 18 ml measuring cell) was used. Rotational measurements were carried out in controlled shear rate mode at 4°C, increasing the shear rate logarithmic from 500 to 1000 1/s, using five replicates per sample. The Herschel-Bulkley model was fitted to the flow curve of egg white products. Main parameters of the model: yield stress, consistency and power law index, and also the correlation coefficient (R) were determined. Results indicate that structural viscosity of raw liquid egg white was destroyed by all of the industrial pretreatments used. In the case of carefully heat treated products above 53°C and for longer duration times of 5 minutes or higher viscosity compared with control was observed, indicating that due to heat stress egg proteins are denaturized, aggregated producing high viscosity. Based on rotational measurements the optimal heat treatment for liquid egg white products could be predicted, providing objective method for qualifying egg products for industrial purposes.

Keywords: liquid egg, industrial processing, rotation, viscosity