

THE INFLUENCE OF MILK PROTEIN CONTENT ON THE SURFACE TENSION AND VISCOSITY

Rodica Caprita, A. Caprita, I. Benschik, Iuliana Cretescu

University of Agricultural Sciences Timisoara, Calea Aradului, 119, RO-1900, Timisoara, ROMANIA

From the organic milk components the proteins influence mostly the surface tension (σ) and the dynamic viscosity (η). The physical properties of milk are influenced by the dispersion degree of the components. Casein (diameter 0.1-0.005 μ) and albumin (diameter 0.015-0.005 μ) form colloid dispersions. Lactose (diameter 0.00067 μ) is molecular dispersed. Therefore is the viscosity and surface tension influenced by protein and not by lactose.

Milk samples from 16 dairy cows, with ages between 3-10 years, in different physiological states were analysed. The experiment was repeated at an interval of two weeks, four times.

For the measuring of η the dynamic stalagmometric method was used (stalagmometer Traube). The dynamic viscosity was determined with the Ostwald viscometer [1]. A positive correlation between the protein content and the two biophysical parameters was observed.

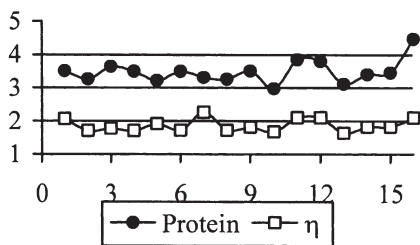


Figure 1. The positive correlation between protein (g%) and η (cP)

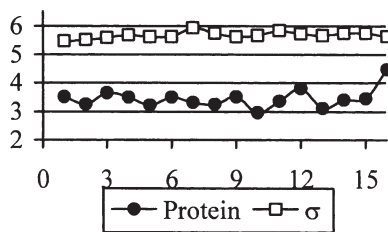


Figure 2. The negative correlation between protein (g%) and σ (10^{-1} dyn/cm)

The highest viscosity is 2,2639 cP (230% higher than η of water. Casein reduces η to 75% from the value for water σ .

We concluded that the viscosity is a biophysical parameter that can be used in appreciation the protein content of milk. Milk with high protein content (>3 g%) has a η round 2 cP. Milk with low protein content (<3 g%) has a η round 1.5 cP and below.

[1]. Rodica Caprita, Iuliana Cretescu, Methods in biophysics, Ed. Mirton, Timisoara, 2000