

## INVESTIGATION OF THE STABILITY OF COW BUTTER BY USING LASER REFRACTOMETRY

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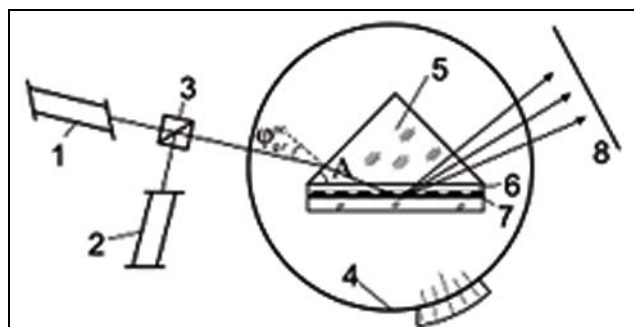
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### ABSTRACT



1 – He-Ne laser; 2-Laser pointer; 3-beam splitter; 4- goniometer;  
5- heavy flint-glass prism; 6-sample; 7- metal grating; 8-screen.

Figure 1  
Principle scheme of laser refractometer

An investigation of the change in the refractive index of “Fibella” cow butter was carried out over time by using a laser refractometer. Samples were stored at  $(t = -18 \pm 2)^\circ\text{C}$  and were taken from butter on days 5, 30, 60, 120 and 150.

Nonlinear regression models from type:

$$n = n_0 + A \cdot \exp\left(\frac{-t}{B}\right) \quad \text{were obtained.}$$

$$n_{g,r} = N_{g,r} \sin \left[ A \pm \sin^{-1} \left( \frac{\sin \varphi_{g,r}}{N_{g,r}} \right) \right], \quad (1)$$

where symbols “g” and “r” are for 532 nm and 632.8 nm wavelength, respectively; A is the prism (5) refracting angle, in our case – 65deg. Prism’s RI are  $N_g = 1.748$  and  $N_r = 1.735$ , made by heavy flint-glass TF-4. We have as a good approximation:

$$\Delta n_{g,r} \approx \cos A \cdot \Delta \varphi \leq \cos 60^\circ \cdot \Delta \varphi = 2 \cdot 10^{-4} .$$

Table 1  
Refractometric data for “Fibella” cow butter

Refractive index -n					
5 days		30 days		60 days	
532nm	632.8nm	532nm	632.8nm	532nm	632.8nm
1.4679	1.4619	1.4650	1.4586	1.4629	1.4552
1.4603	1.4570	1.4592	1.4532	1.4582	1.4503
1.4582	1.4555	1.4570	1.4520	1.4562	1.4492
1.4560	1.4492	1.4549	1.4473	1.4535	1.4460
1.4544	1.4397	1.4534	1.4393	1.4522	1.4389

Refractive index -n			
120 days		150 days	
532nm	632.8nm	532nm	632.8nm
1.4601	1.4531	1.4589	1.4525
1.4564	1.4488	1.4557	1.4486
1.4546	1.4461	1.4542	1.4458
1.4523	1.4446	1.4520	1.4444
1.4501	1.4381	1.4492	1.4377

**THE TECHNIQUES USED  
FOR INFORMATION AND EDUCATION  
OF CONSUMERS SUFFERING FROM FOOD ALLERGY AND  
INTOLERANCE IN HUNGARY**

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