



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM
TIMISOARA
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH
IN APPLIED LIFE SCIENCES"
13-14 November 2025



Quality assessment of bovine colostrum using a refractometer and a colostrometer

Raul Botișan, Șerban Blaga, Anca Alexandra Tămaș, Simona Marc* and Oana Maria Boldura

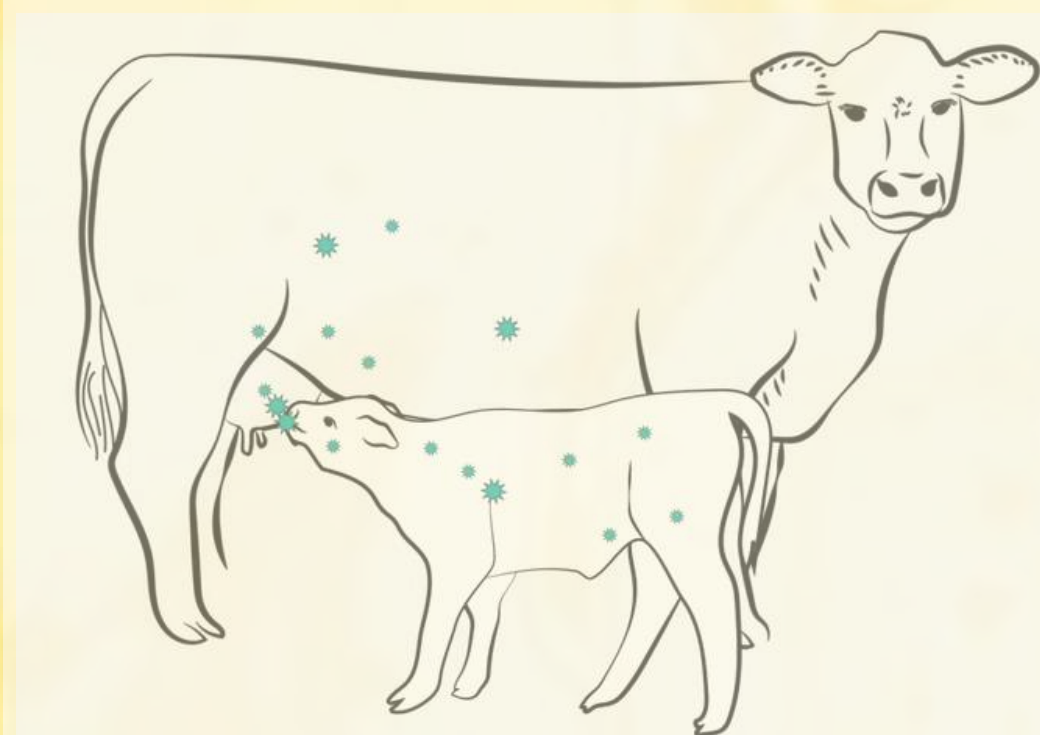
University of Life Sciences "King Mihai I" from Timisoara, Faculty of Veterinary Medicine, 300645, No.
119 Calea Aradului, Timișoara, România
E-mail: simona.marc@usvt.ro

Abstract: Colostrum, known as "liquid gold" is the milk produced in the first days after parturition in mammalian and is a rich natural source of macro- and micro-nutrients, immunoglobulins, lactoferrin, α -lactalbumin, β -lactoglobulin, lactoperoxidase, growth factors and other bioactive compounds. In cattle, due to the syndesmochorial placenta, the calf is agammaglobulinemic at calving and depends on colostrum for protection. The quality of colostrum along with the timing of administration are important management factors in determining the health and survival of the neonatal calf. The aim of the study is to evaluate the quality of colostrum from 10 Romanian Spotted cows at different time intervals (first day, second day, third day, and seventh day). The evaluation of colostrum was carried out using a refractometer for colostrum and a commercial colostrometer. Colostrum quality decreases significantly between the first and subsequent days after calving. Thus, the average colostrum quality on the first day was 21.04% Brix, on the second day 13.35% Brix, on the third day 12.65% Brix, and on the seventh day 10.6% Brix. Similar results were obtained with a commercial colostrometer, where the IgG concentration on the first day was 60 g/L. Due to the small number of cows, a correlation between colostrum quality and lactation number could not be achieved. The conclusion of this study is that colostrum quality declines significantly in the first 24 hours postpartum which highlights the importance of timing the administration of colostrum to the calf.

Keywords: colostrum quality, refractometer, colostrometer, immunoglobulin, bovine

• Introduction

Bovine colostrum is considered the first postpartum secretion or milk obtained from the mammary gland of dairy cows up to the third-five days post-partum, including the transition milk (1,2). Colostrum plays a key role in the endocrine system, metabolism, nutritional state, gut function, and colonization. Health-promoting products based on colostrum have gained significant interest.



The bovine placenta prevents the transfer of immunoglobulins (Ig) between the mother cow and her fetus. An adequate and timely supply of colostrum, within the first hours after birth, is essential for newborn calves and their later development (3).

The most important Ig in cow colostrum are immunoglobulin G (IgG) (with the subtypes IgG₁ and IgG₂), immunoglobulin A (IgA), and immunoglobulin M (IgM). IgG is the main component of cattle colostrum, accounting for 85 to 95% of the total Ig concentration. Bovine colostrum of high-quality is defined as colostrum with an IgG concentration ≥ 50 mg/ml (3).

There are different on-farm tests commercially available to estimate the colostrum quality:



The measurement of dissolved solids in colostrum determined by refractometry is a user-friendly way to indirectly assess the colostrum IgG concentration. **Digital Brix refractometry** uses the

refraction of a light beam to assess

how much dissolved solids are present in a fluid, detecting its relative density in % Brix (4).

Colostrometer measures the specific gravity and determines colostrum IgG concentration indirectly.

The specific gravity is influenced by the dissolved solids in colostrum. The greater the IgG concentration of colostrum, the higher its specific gravity and the greater the uplift of the colostrometer (4).



• Material and method

The 10 Romanian Spotted cows studied were raised in an extensive system.



Colostrum from these cows was collected at different time intervals (first day, second day, third day, and seventh day). The evaluation of colostrum was carried out using a refractometer for colostrum and a commercial colostrometer (Fig 1 and 2).



Table 1. Classification of the bovine colostrum quality.

Category	Color	Concentration of IgG (g/L)
Superior	Green	101 - 126
Moderate	Yellow	61 - 100
Inferior	Red	25 - 60

Fig.1.Colostrometer used for the 1st colostrum

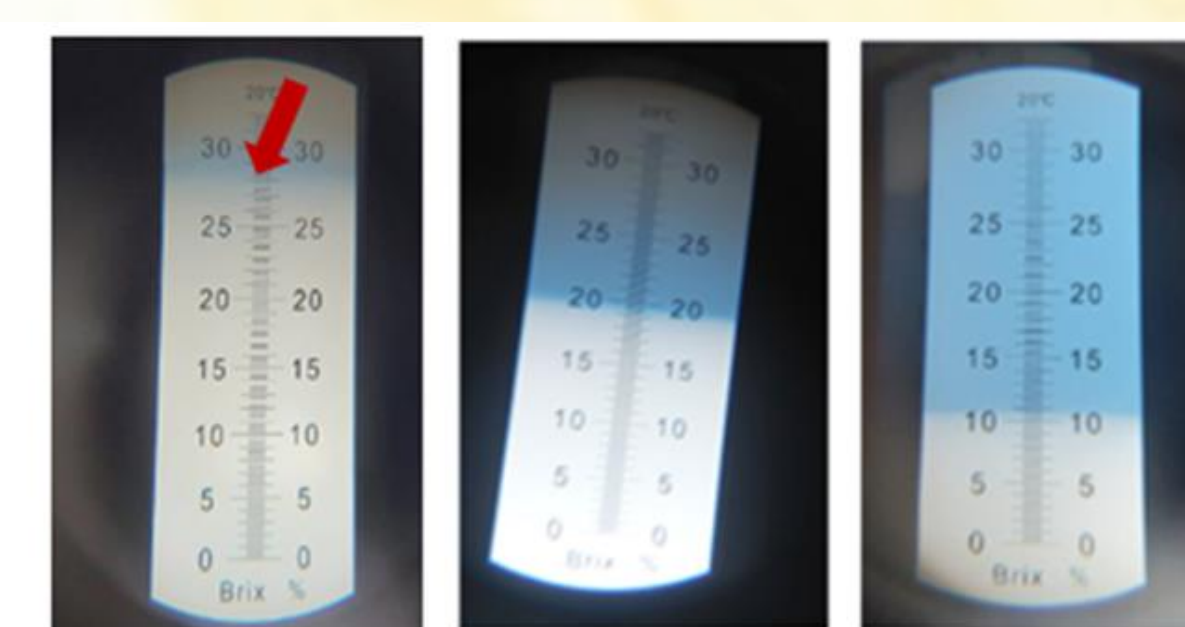
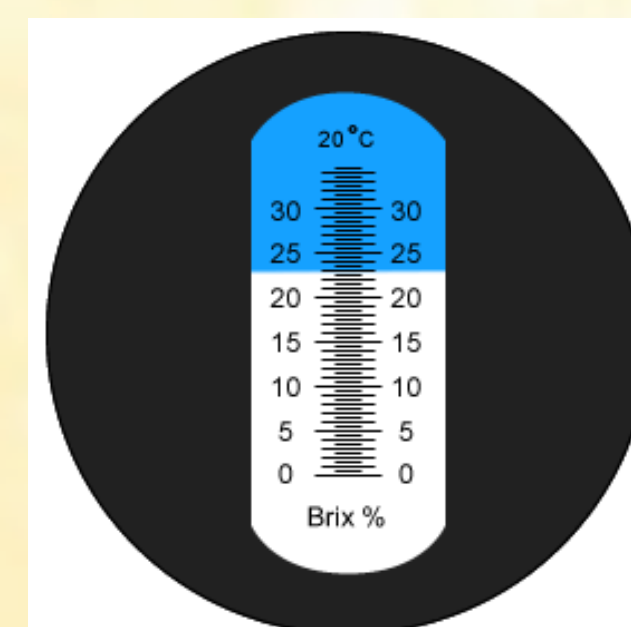


Fig.2. Brix value at 1st, 2nd, 7th day postpartum

• Results and discussions

The average colostrum quality on the first day was 21.04% Brix, on the second day 13.35% Brix, on the third day 12.65% Brix, and on the seventh day 10.6% Brix. Of the calves born, 60% were male and 40% female. The average birth weight was 36 kg for males and 34 kg for females. At 14 days post-partum the health of all calves was good, with no signs of diarrhoea.

The measurement of colostrum quality with on-farm tests should be easy to perform and it has to be accurate. A Brix value of 22% corresponds to 50 mg/mL, meaning colostrum with a Brix value above this cut off point can be considered high quality colostrum.

• Conclusions

The colostrum quality declines significantly in the first 24 hours postpartum which highlights the importance of timing the administration of colostrum to the calf.

References:

- MEHRA, R.; GARHWAL, R.; SANGWAN, K.; GUINÉ, R.P.F.; LEMOS, E.T.; BUTTAR, H.S.; VISEN, P.K.S.; KUMAR, N.; BHARDWAJ, A.; KUMAR, H. Insights into the Research Trends on Bovine Colostrum: Beneficial Health Perspectives with Special Reference to Manufacturing of Functional Foods and Feed Supplements. *Nutrients* 2022, 14, 659
- MIRANDA, C.; IGREJAS, G.; POETA, P. Bovine Colostrum: Human and Animal Health Benefits or Route Transmission of Antibiotic Resistance—One Health Perspective. *Antibiotics* 2023, 12, 1156. <https://doi.org/10.3390/antibiotics12071156>
- AHMANN J, STEINHOFF-WAGNER J, BÜSCHER W. Determining Immunoglobulin Content of Bovine Colostrum and Factors Affecting the Outcome: A Review. *Animals (Basel)*. 2021 Dec 18;11(12):3587. doi: 10.3390
- RÖDER M., BORCHARDT S., HEUWIESER W., RAUCH E., SARGENT R., SUTTER F. Evaluation of laboratory and on-farm tests to estimate colostrum quality for dairy cows, *Journal of Dairy Science*, 2023, Volume 106, Issue 12, 9164 - 9173