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Goat colostrum immunological quality: on-farm evaluation

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➤ Goat dairy farms are often characterized by highly variable management practices and production systems.

➤ Kid mortality has not been identified as a priority issue, despite average losses of up to 30% in some regions

➤ Colostrum plays a crucial role in their survival and early-life health



The aims of the study:



1. to evaluate the relationship between **gamma-globulin** concentration through protein electrophoresis and **digital Brix** refractometer (% Brix) results
2. to analyse the animal-related factors affecting the immunological goat colostrum quality

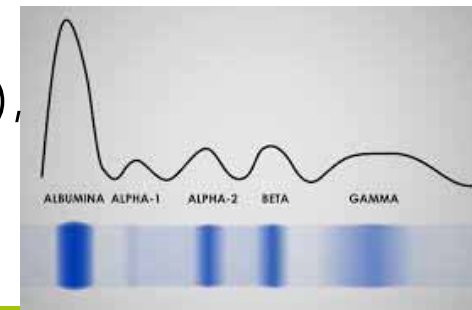




- A total of 238 colostrum samples
- 9 Italian goat dairy farms
- 47.5% of samples were from Alpine goats, 39.9% from Saanen and 12.6% from other breeds (Toggenburg and Nubian).



- ✓ The percentage of solids in colostrum was measured using a digital Brix refractometer (Misco, USA)
- ✓ gamma globulin (mg/ml) was performed in the colostrum serum by agarose gel electrophoresis
- ✓ Descriptive statistics were performed to describe the dataset using MEAN, CHART, and FREQ procedures (SAS software; v9.4, 2012)
- ✓ A correlation analysis (PROC CORR) was conducted to investigate the relationship between the two methods for evaluating colostrum quality
- ✓ GLM analysis was conducted only on Alpine and Saanen goats:
model: breed (A, S); farm (1-7, i.e. farms with Alpine and Saanen goats), parity (1, 2, 3+), number of kids (1, 2, 3+).

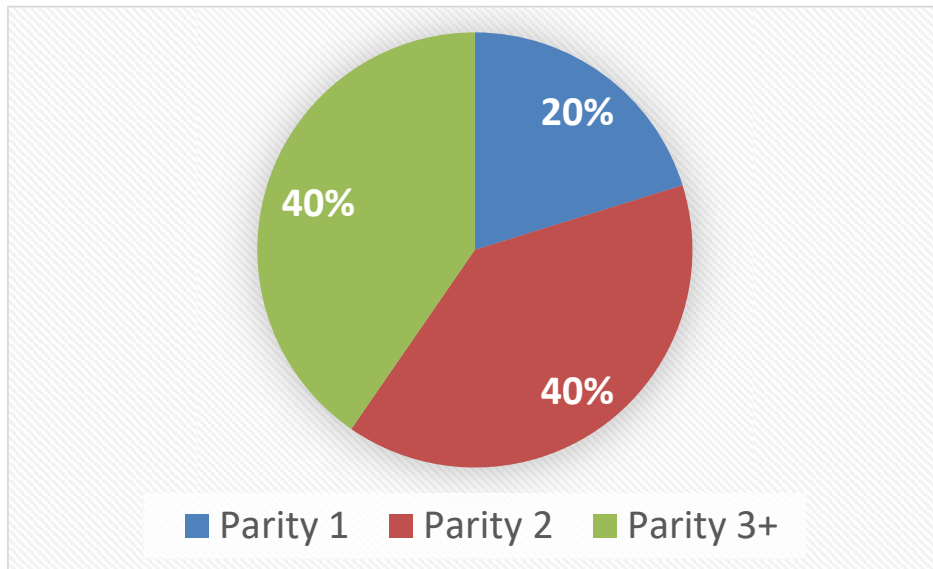




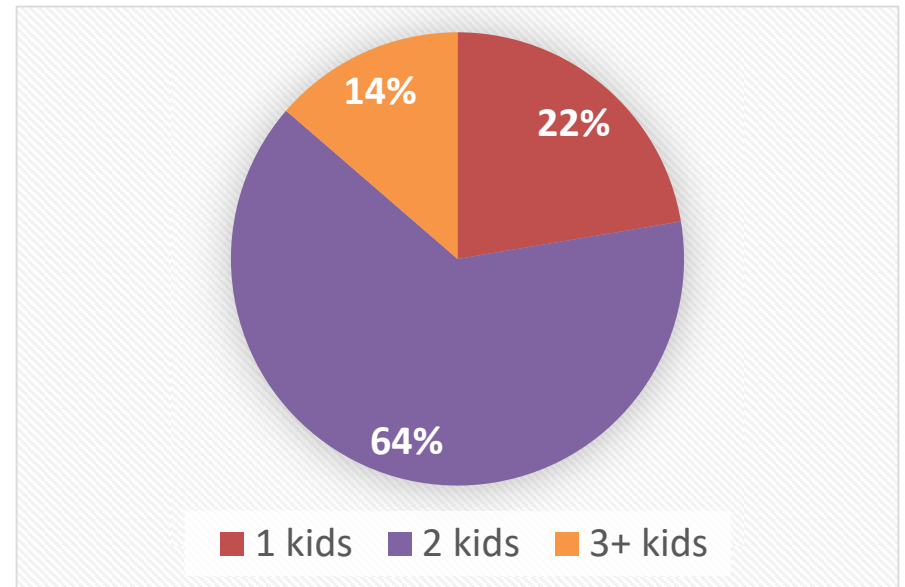
Results



PARITY DISTRIBUTION



N°KIDS DISTRIBUTION



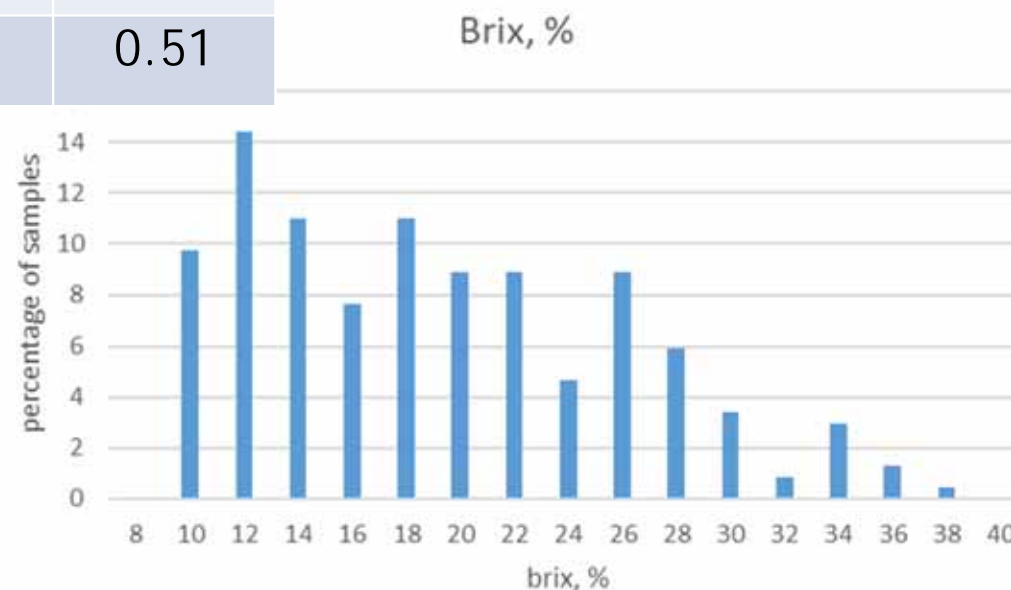
Colostrum quality

Variable		Mean	Std Dev
Parity	n	2.72	1.66
Number of kids	n	1.92	0.61
Colostrum quantity	l	1.94	1.03
Colostrum Brix values	%	19.2	6.86
LogColostrum Brix values	Log ₁₀	1.26	0.15
Colostrum gamma-globulin	mg/ml	32.5	24.4
LogColostrum gamma-globulin	Log ₁₀	1.30	0.51

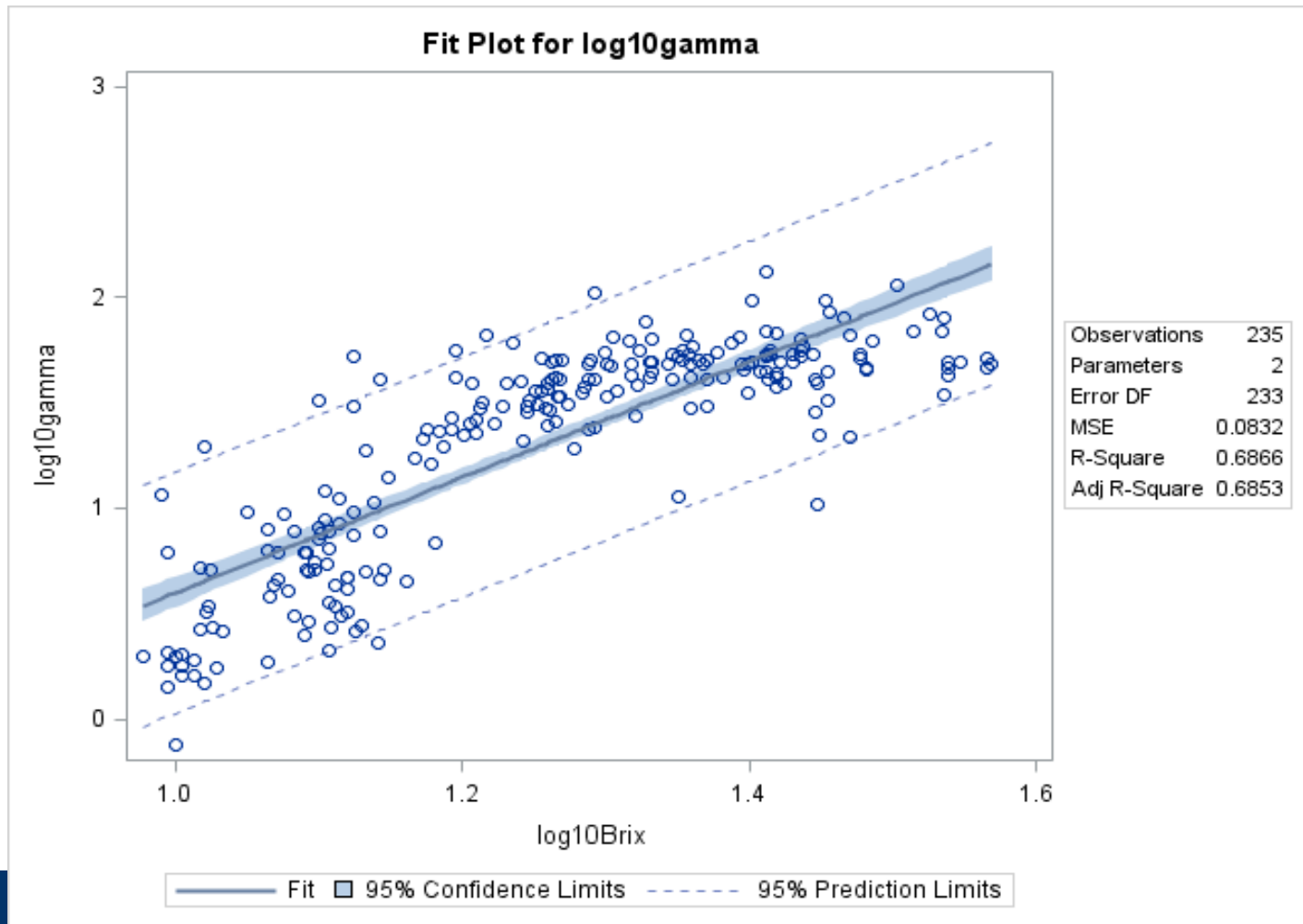


Threshold for cows: 50 mg of IgG/mL
(Morrill et al., 2012)

Threshold for goats: 20 mg of IgG/mL was
suggested for caprine colostrum by Kessler
et al (2020).



Rapid evaluation of goat colostrum quality: is it possible?



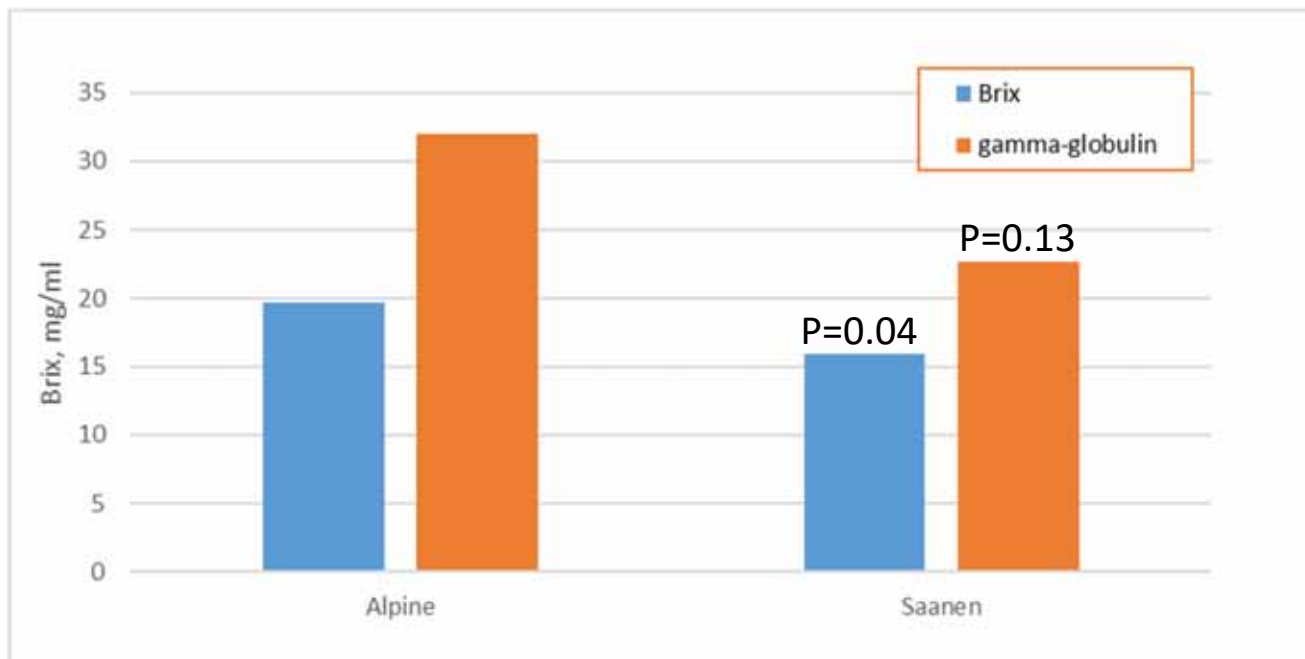
$$\text{Log10 Gamma-globulin} = -2.14945 + 2.74704 * \text{log10BRIX}$$

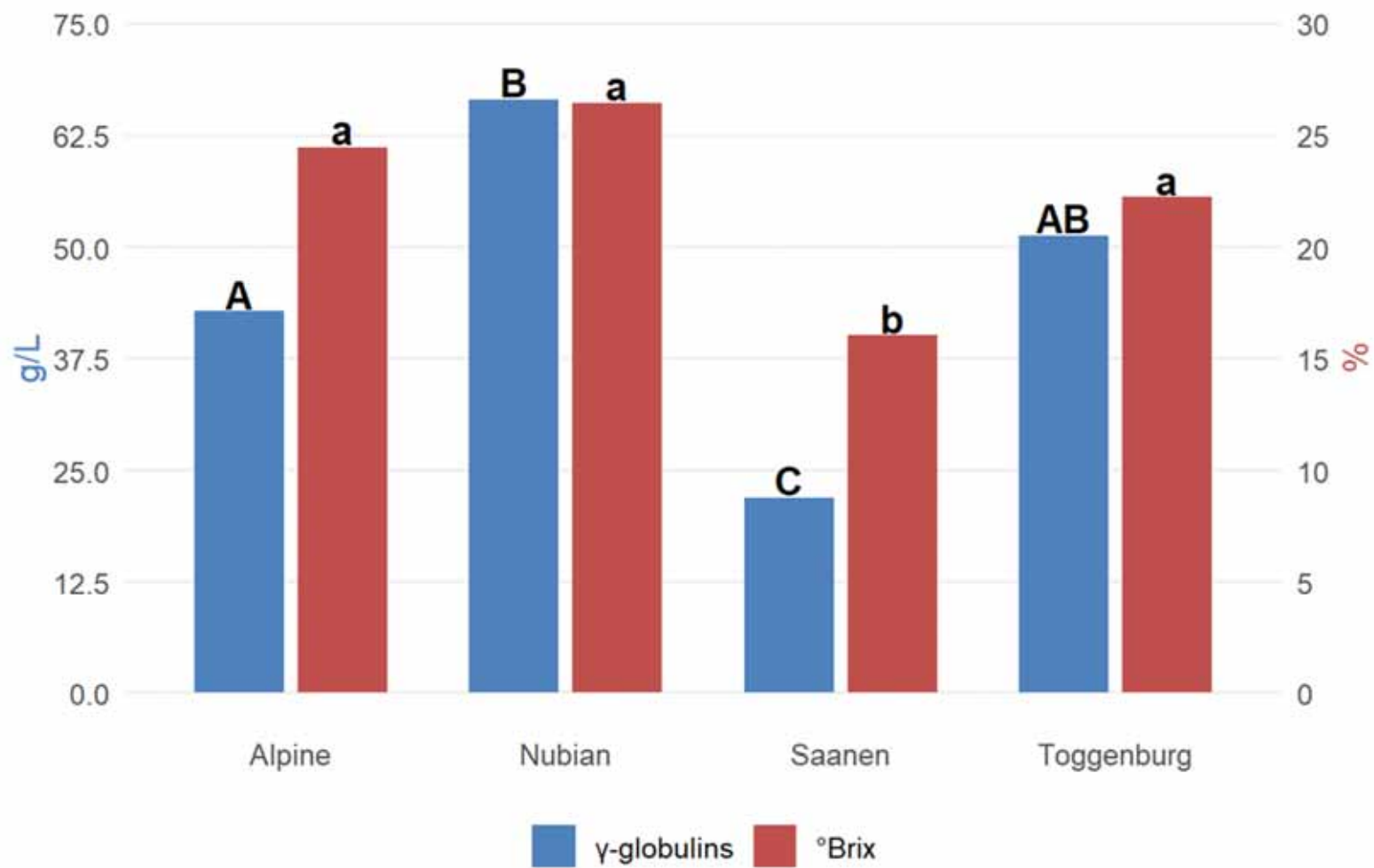


20 mg/ml gamma-globuline = 18 brix

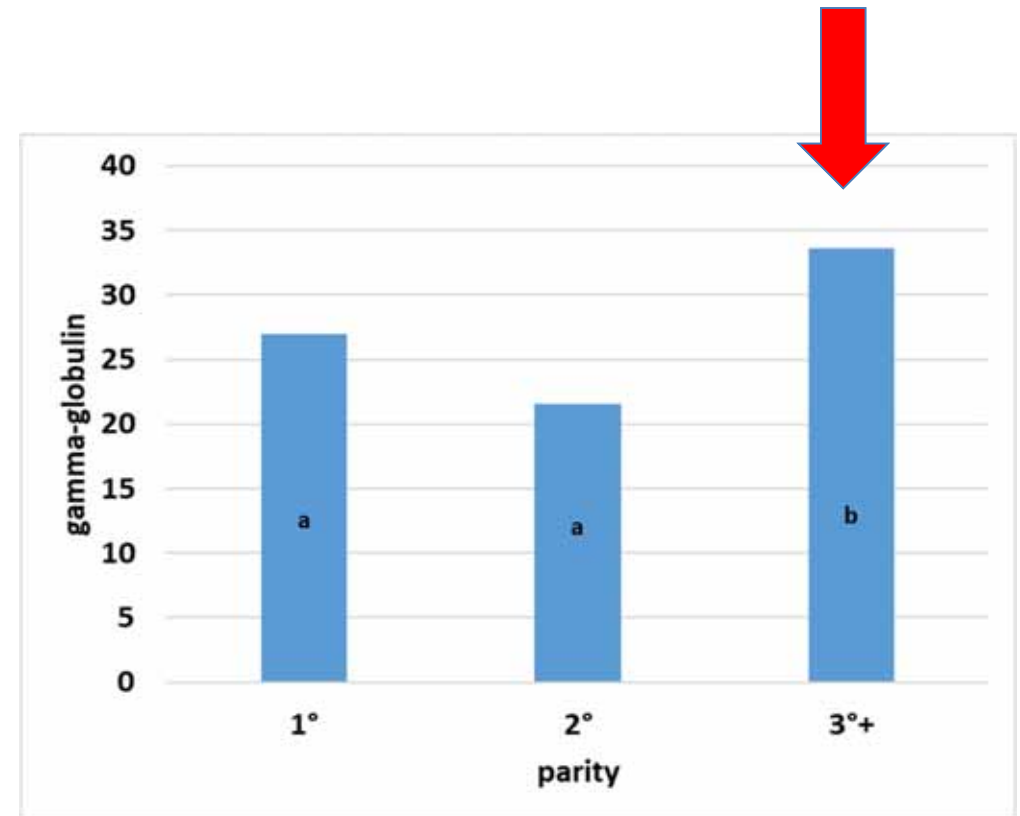
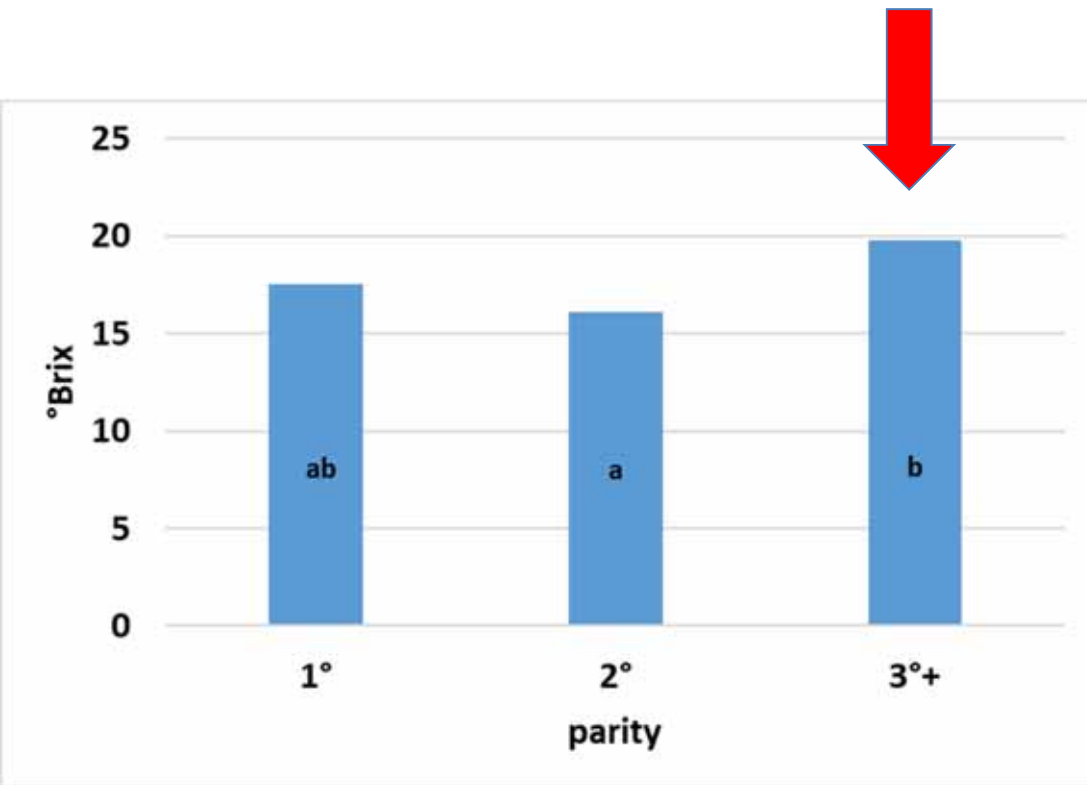


Animal-related factor affecting the immunological goat colostrum quality

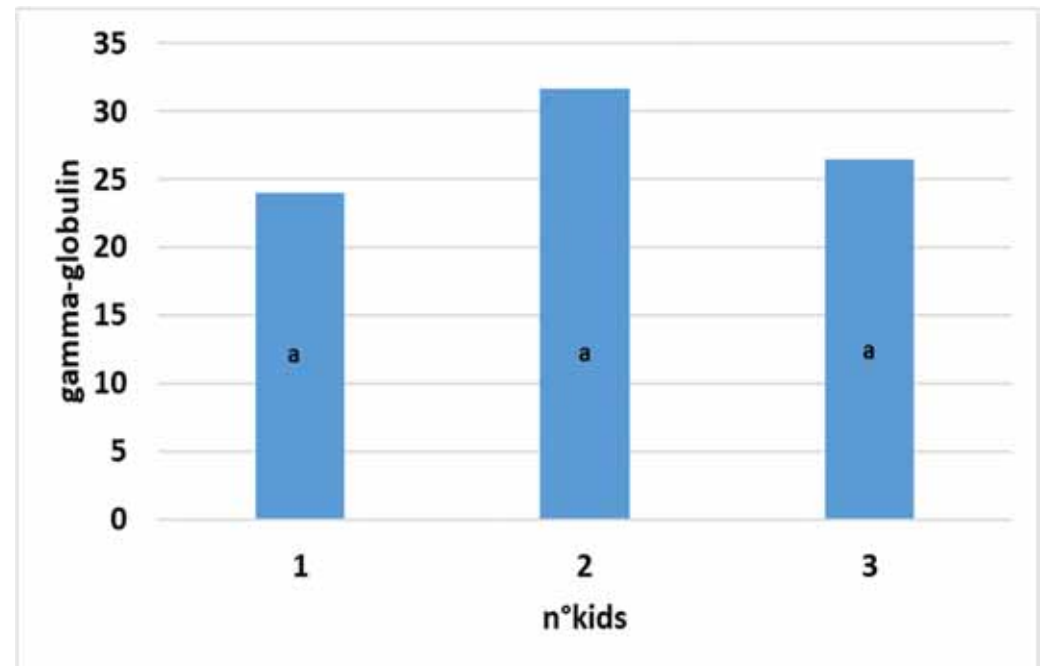
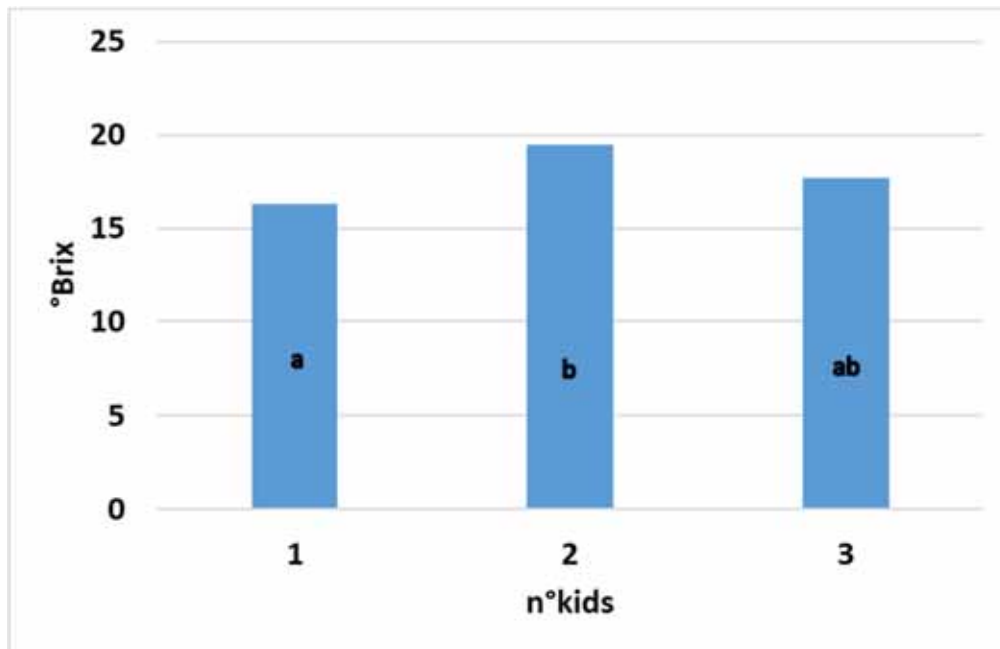




Colostrum quality and Parity

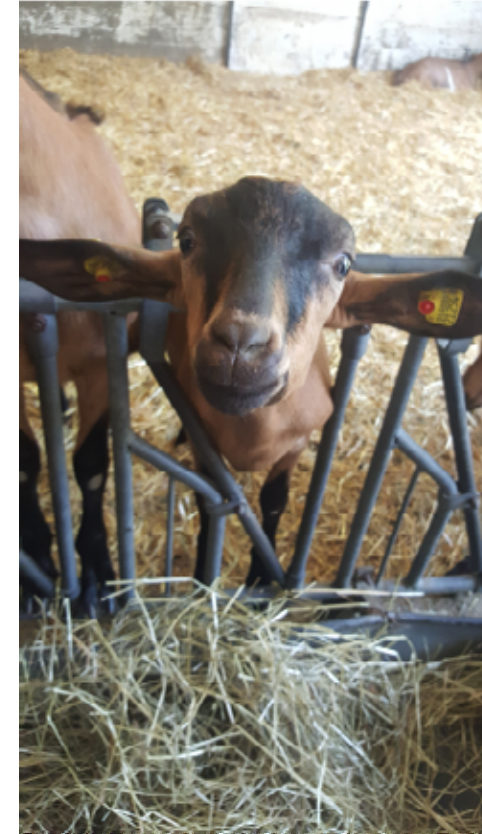


Colostrum quality and number of kids



Conclusion

- The study shows **high variability** in colostrum quality among farms.
- The variability among **breeds** suggests an effect of production specialization on colostrum quality.
- The number of **parity** influences colostrum quality.



- The wide **margin for improvement** highlights the importance of spreading good colostrum management practices, precision feeding and the role of dry-period diet in colostrogenesis.
- Future studies should further investigate the **transfer of passive immunity** to the kid, through blood serum analyses
- Validation of quality thresholds for goats colostrum



Thank you for your attention

