

Preliminary analysis of the colostrum quality curve in Merino ewes

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On commercial Merino properties, high lamb mortality rates are observed within the first 24 hours postpartum, with up to 90% of these mortalities due to starvation, mismothering and birth trauma (Hinch and Brien, 2014). Colostrum is the first and most important source of energy, nutrition and immunoglobulins (IgG) (Banchemo et al., 2004, Castro et al., 2011) and is vital for lamb survival. It is therefore important that the first drink of life is of high quality. Colostrum quality is mainly measured by the amount of IgG present; however, IgG analysis requires technical skill and takes 48 hours to analyse, which is past the crucial period of colostrum feeding (Bielmann et al., 2010). In contrast, the hand-held refractometer (Brix) is a small device which gives rapid results regarding the percentage of total solids in colostrum and milk, which can be correlated to IgG content (Bielmann et al., 2010). The use of the Brix has been validated in cattle but not in sheep (Bartier et al., 2015). The objective of this study was to determine if the Brix can be used as an on-farm tool to measure colostrum quality in Merino ewes. Twelve Merino ewes had colostrum/milk samples collected at 0, 4, 8, 12, 24, 48, 72 hours and 7 days postpartum. Brix analysis was conducted at collection, and a radial-immunodiffusion assay was used to determine IgG concentration.

A paired T-test and Pearson's correlation determined the relationship between Brix percentage and IgG levels. There was a tendency ($P < 0.1$) for Brix to correlate positively with IgG at 0, 12 and 48 hours. To determine change over time, Brix analysis showed a significant, positive correlation in the 0 and 24 h samples ($P = 0.01$; $r^2 = 0.658$). Similarly, IgG concentrations at 12 h were positively correlated with IgG concentration at 24 ($P = 0.02$; $r^2 = 0.720$) and 48 ($P = 0.09$; $r^2 = 0.561$) hours.

Table 1: Correlation between total milk solids (Brix %) and IgG levels in from Merino ewes.

Time post-partum	Mean Brix (%)	Mean IgG (mg/mL)	r ²	Sig.
0 hours	36.53 ± 1.16	50.39 ± 3.95	.626	.071
4 hours	33.54 ± 2.12	34.37 ± 4.21	.299	.472
8 hours	32.16 ± 2.60	20.98 ± 3.49	.357	.386
12 hours	29.82 ± 2.31	29.73 ± 4.64	.705	.077
24 hours	22.10 ± 1.99	18.70 ± 3.42	.584	.129
48 hours	17.02 ± 1.13	8.85 ± 2.61	.901	.099
72 hours	13.12 ± 0.45	1.91 ± 0.65	.224	.628
7 days	12.71 ± 0.41	0.89 ± 0.11	.337	.459

While further research is required to identify stronger correlation between these two analysis techniques, the preliminary data suggests that the hand-held Brix refractometer has the potential to be implemented as an on-farm tool to measure colostrum quality in Merino ewes.

References

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