Maize and methionine supplementation alter milk production of ewes

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Survival of neonatal lambs is a key profit driver on farm with lamb mortality rates varying between 5-70% of all lambs born and is commonly around 30% in twins (Hinch and Brien 2014). Survival of lambs following parturition is determined by the ewe's ability to produce enough quality and quantity of colostrum and milk for energy production and immunity transfer. Initially, colostrum provides the sole source of immunity transfer supplying immunoglobulins for immune protection and energy for growth and heat production. Starvation of lambs is a prominent cause of mortality causing up to 70% of all neonatal lamb deaths (Hinch and Brien 2014).

Multiple bearing ewes are often unable to meet energy requirements due to foetal rumen compaction and increasing energy demand for foetal growth and colostrum production. In pastoral conditions these ewes are often in energy deficit at a time when energy intake is crucial for maintaining production. To meet this shortfall previous work has supplemented maize to ewes pre-lambing to increase colostrum production (Banchero *et al.* 2002, 2004a, 2004b, 2007). Maize has increased colostrum production through provision of starch acting as a glucose precursor when catabolised in the small intestine. Methionine, a limiting amino acid in milk synthesis has increased milk yields (Goulas *et al.* 2003), but the effects on colostrum have not been determined. The aim of this experiment was to identify if short-term supplementation of maize, methionine or a combination of maize and methionine to twin bearing ewes could increase colostrum and milk production.

Thirty-seven, three to five-year-old, naturally mated Merino ewes carrying multiple foetuses were supplemented for 14 days prior to the start of lambing until four weeks post lambing. All ewes were fed a daily maintenance basal diet of ewe/lamb pellets and oaten chaff. The four treatments were: control (n=10, no supplement), maize (n=10, 500g/hd.day cracked maize), methionine (n=8, 3g/hd.day rumen protected methionine) and both (n=9, 500g/hd.day cracked maize and 3g/hd.day rumen protected methionine). Ewes were milked out on one-side of the udder 3 hours post-lambing, with lambs partitioned off until ewes were re-milked 4 hours later to determine colostrum production. The process was repeated weekly until 4 weeks post lambing to determine weekly milk yield. Data was analysed in R Studio using linear mixed modelling with replicate (ewe age/pen location) as a random effect. Number of lambs reared and lambing day plus interaction were included and removed in a stepwise manner if not significant (P>0.05).

	Control	Maize + Methionine	Maize	Methionine	P-Value
Colostrum production	187 ± 27.0	252 ± 28.6	199 ± 27.2	239 ± 30.1	0.120
Milk production	210.1 ± 13.10[a]	253.8 ± 12.94[b]	247.2 ± 13.37[ab]	228.8 ± 14.22[ab]	0.0091

Table 1. Ewe 4-hour weekly spot testing of colostrum and milk production (mL) estimates of treatments (data presented as mean ± SE)

Milk production increased with maize and methionine supplementation compared to control; however, there was no effect on colostrum production as shown in Table 1. Our hypothesis that supplementation would increase colostrum/milk production is partially supported. Interestingly, maize only supplementation did not increase colostrum/milk production compared to control; however, milk production was similar in maize only and methionine + maize treatments. It is evident the maize and methionine supplementation increased milk and colostrum production in comparison to the control which may lead to increased survival of lambs; however, the evidence suggests there is no advantage to supplementing maize and methionine compared to maize only. The results need evaluation with a larger group of ewes to determine the effects of supplementation on production.

References

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