THE EFFECT OF A SUPPLEMENTARY VITAMIN AND/OR MINERAL MIXTURE ON PRODUCTIVITY AND ON VITAMIN AND GLUTATHIONE STATUS IN EWES AND LAMBS

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Vitamins A (VA) and E (VE), glutathione(GSH) and certain minerals play important roles in animal health and productivity through their involvement in a defense system against free radicals. The present study was conducted to investigate the effects of supplementary vitamins and minerals on the antioxidant status and performance in ewes.

Four hundred grazing Merino ewes (aged from 2 to 6 years old) were divided into four treatment groups; control group (fed NaCl;C), vitamin supplemented group (fed VA and VE with NaCl;V), mineral supplemented group (fed mineral mixture;M) and vitamin and mineral supplemented group (fed VA and VE with mineral mixture;VM). The supplementary mineral mixture and NaCl were provided weekly in troughs and supplied at 25g per head per day. The supplementation was started in November and finished in May. Live weight, wool weight, number of lambs born per ewe mated and newborn lamb weight were measured. Blood and liver biopsy samples were obtained from 16 ewes in every treatment and the plasma VA and VE concentrations, liver VA and VE concentrations and whole blood and liver GSH concentrations were analysed. Five ewes from each group were slaughtered in their last month of pregnancy and the liver VE and GSH concentrations of their fetuses were analysed.

	Initial value	Treatment group				Significance		
		C	V[a]	M[b]	VM[ab]	V	M	VxM
	November	March (gestation day 100)						
Liver VA (I.U./g)	567	380	694	450	817	**	NS	NS
Plasma VA (I.U./100ml)	119	101	109	136	137	NS	**	NS
Liver VE (μg/g)	18.8	6.7	16.2	5.9	12.3	**	**	NS
Plasma VE (μg/100ml)	247	138	364	125	243	**	**	**
Liver GSH (μM/g)	1.16	0.71	0.66	0.56	0.55	NS	NS	NS
Whole blood GSH (μM/ml)	0.90	0.36	0.38	0.33	0.26	NS	NS	NS
Adjusted liveweight (kg)	66.7	57.1	57.0	57.6	57.8	NS	**	NS
Wool weight (kg)		5.47	5.31	5.52	5.56	NS	*	NS
Fetus liver VE (μg/g)		1.98	3.15	1.92	3.38	**	NS	NS
Fetus liver GSH (μM/g)		1.25	1.05	1.01	1.18	NS	NS	NS
Lambs born per ewe mated		1.07	0.86	0.94	0.97	*	NS	NS
Single lamb birth weight (kg)		4.97	4.93	5.39	5.39	NS	**	NS

[a]20000I.U. VA fed as Rovomix A-500 and 300mg VE fed as Rovomix E-50 per head per day. [b]Siromin™ multi-element mineral mix. * P<0.05; ** P<0.01; NS, not significant.

The VA, VE and GSH concentrations in liver and blood of the control group decreased during the summer (P<0.05). The vitamin supplementation significantly increased the concentrations of VA and VE in the liver of ewes and VE concentrations in the livers of fetuses but decreased the number of lambs born per ewe mated. The mineral supplementation significantly increased the liver and plasma VA concentrations, liveweight, wool weight and single lamb birth weight. Neither vitamin nor mineral supplementation had an effect on the concentrations of GSH in livers of ewes and fetuses.

These results indicate that the mineral supplementation improved ewe performance and the vitamin supplementation prevented the decline in vitamin status during summer in ewes and fetuses. However, the vitamin supplementation decreased lambing rate in ewes by up to 20% in the absence of the mineral supplementation.

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