

THE SUPPLEMENTATION OF SHEEP OF LOW PHOSPHORUS STATUS

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Several studies have shown phosphorus (P) supplementation to have no effect on digestion, Cohen (1975) suggests this emphasises the role of endogenous P in maintaining rumen P levels. However, Tomas *et al* (1967) and Poppi & Ternouth (1979) found rumen P levels reflected P intake. The results reported here are part of a study to determine the response in sheep of low P status to a short period of P supplementation.

Three 10 month-old lambs (13-16 kg) and two adult wethers (33 & 35 kg) consuming low P basal diets *ad lib* were fed an additional 3.1 and 2.9g P/kg DM respectively as mono-sodium phosphate during week 2 of two consecutive seven week periods. The lambs were fed a basal diet containing 0.53g P, 4.9g Ca and 170g CP/kg DM for 7 months prior to the study. The adult sheep were fed a basal diet supplying 0.47g P, 5.4g Ca and 110g CP/kg DM for 9 months prior to the study and before this were subjected to 9 months P depletion by a parotid saliva replacement technique. Feed, feed refusals, faecal and urine samples were bulked for days 3-7 of weeks 1,2,3 and 7 in each period and blood samples were collected on day 7 of each week for determination of plasma inorganic phosphorus (Pi). Although different depletion regimens were used, the only significant difference between the two age groups of sheep was the greater increase (2.52 mg/100 ml) in Pi of the lambs when fed additional P. As there was also no differences between periods combined mean values are shown in Table 1.

TABLE 1. The effect of supplementation of low P status sheep

P in diet	Weeks of Experiment				SE of means	Sig. of diff. (weeks)
	1 low	2 high	3 low	7 low		
Intake DM (g/d)	309.1	419.6	421.6	298.6	23.6	2,3 >> 1,7
P (g/d)	0.162	1.706	0.230	0.150	0.042	2 >>> 1,3,7
Digestibility DM	0.703	0.768	0.713	0.713	0.012	2 >> 1,3,7
Balance P (g/d)	- 0.056	1.323	- 0.168	- 0.076	0.038	2 >>> 1,3,7
Pi (mg/100 ml)	2.44	7.32	2.69	2.36	0.41	2 >>> 1,3,7

NS, not significant; >>, $P < 0.01$; >>>, $P < 0.001$

The tenfold increase in P intake resulted in a 36% increase in DM intake. These results support those of Field *et al* (1975) who observed depressions in food intake when lambs were fed low P diets. The higher DM intakes were maintained during week 3 although Pi was low and the P balance negative.

The concomitant increases in intake and DM digestibility suggest that ruminal digestion was stimulated by extra dietary P. The 9% increase in DM digestibility occurred in spite of the increase in food intake. Although the period of supplementation was short, if carryover effects were present and the supplement did not stimulate digestibility, then the digestibility would be below 0.70 in week 3.

These results show that P supplementation of low P status young and mature sheep will improve food intake and digestibility.

COHEN, R.D.H. (1975). *World Rev. Anim. Prod.* 11:27.

FIELD, A.C., SUTTLE, N.F. and NISBET, D.I. (1975). *J. agric. Sci.* 85:435.

POPPI, D.P. and TERNOUTH, J.H. (1979). *Aust.J.agric.Res.* 30:503.

TOMAS, F.M., MOIR, R.J. and SOMERS, M. (1967). *Aust.J.agric.Res.* 18:635.

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