Proc. Nutr. Soc. Aust. (1992) 17

THE IMPORTANCE OF LIGNIN CONTENT OF OAT HULLS IN RUMINANT NUTRITION

J.B. ROWE and L.COSS

The lignin content of oat hulls is genetically determined and is around 10 g/kg in low-lignin cultivars and approximately 60 g/kg in high-lignin cultivars (Crosbie et al. 1985). The digestibility of oat grain of high lignin content fed to sheep is nearly 15% lower than similar grain of low lignin content (Rowe et al. 1988). The main objective of the experiment reported here was to determine the effect of oat hull lignin content on gut fill, carcase and live weight gain. A comparison was made between the two types of oat grain, other common feed grains barley and lupins, and chaffed oat hay.

One hundred sheep weighing around 33 kg were fed chaff (1 kg/d) for three weeks before being allocated to one of five diets: chaff, barley, high- or low-lignin oats or lupins. Apart from the lupins all other feeds were mixed with 10 kg/t of urea and ammonia sulphate (9:1, w:w). One kg chaff and 800 g of each grain was fed each day. After three weeks on the diet, 10 animals from each treatment group were slaughtered. After a further six weeks on the experimental diets, the remaining animals were slaughtered. Each week measurements were made of feed intake and liveweight gain. At slaughter the weight of rumen and reticulum (with contents) was measured and the weight of the dressed carcase was recorded.

The results are summarised in the Table. Sheep consumed higher levels of lupins and high-lignin oats than barley or low-lignin oats. It is not clear why the intake of the oat grain of lower digestibility was over 20% higher than for low-lignin grain over the 8 week feeding period. Accounting for differences in feed intake the low-lignin oat grain produced nearly twice the gain in carcase weight compared to the high-lignin grain. The effect of lignin content on intake of oat grain is not likely to be factor when it is fed in restricted amounts as a supplement.

	Chaff		Grains†					
	Mean	SE	Lupins	High lignin oats	Low lignin oats	Barley	SEM	P
Weeks 1 to 3 (21 d)								
Initial weight	33.0	0.58	32.7	34.1	32.7	33.0	0.8	NS
Mean intake#	994	2.5	798	758	708	625	27.4	***
Live wt change (kg)	-0.19	0.28	0.57	-1.01.	-1.72	-2.06	0.36	***
Carcase wt (kg)	13.4	0.32	14.8	13.7	13.3	13.6	0.41	**
Reticulo rumen (kg)	5.13	0.26	3.65	4.62	4.20	3.17	0.29	**
Weeks 1 to 10 (64 d)								
Mean intake#	927	12.6	781	658	531	539	31.5	***
Live wt change (kg)	2.60	0.61	6.24	2.63	3.00	1.93	0.57	***
Carcase wt (kg)	13.6	0.34	17.2	14.1	14.6	14.9	0.28	***
Reticulo rumen (kg)	4.83	0.21	2.79	4.70	3.71	3.04	0.31	***
Weeks 4 to 10 (43 d)								
Mean intake (g/d)#	913	15.1	788	664	547	588	43.8	***
Live wt change (kg)	1.56	0.31	4.88	2.85	4.30	4.48	0.46	**
Carcase wt change (kg)	1.3	0.16	3.63	1.44	2.74	3.08	0.29	***

Used as covariate for analyses of liveweight change, carcase weight and reticulo rumen weight.
NS,*,**,***: Not significant, P<0.05, 0.01, and 0.001 respectively.
Analysis of covaiance, SEM and P refer only to the grains and not to the chaff.

CROSBIE, G.B. TARR, A.W., PORTMAN, P.A. and ROWE, J.B. (1985). Crop Sci. 25: 678.
ROWE, J.B. and CROSBIE, G.B. (1988). Aust. J. Agric. Res. 39: 639.

Cattle Industries, Department of Agriculture, Baron-Hay Court, South Perth WA 6151