

## NUTRITIONAL MANIPULATION OF BODY COMPOSITION OF LAMBS OFFERED STRAW-BASED DIETS

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Manipulation of body composition depends primarily on changing the rate of deposition or mobilisation of body fat (Thornton 1987). A large body fat reserve may be advantageous for animals with high nutrient demands (e.g., during late pregnancy or early lactation), especially when nutrient supply is low.

Dietary fat, in a form which has little effect on rumen fermentation (e.g. Ca salts of long chain fatty acids; CaLCFA), may be used efficiently for fat deposition in ruminants (Milligan 1971). The availability of protein and glucose post-ruminally also can be expected to affect body composition. The interactions of LCFA, glucose and protein on performance and body composition of lambs fed straw-based diets is largely unknown and was examined in the present study.

Eight groups of eight lambs (mean initial live-weight (LW) 29.8±2.1 kg), each received a straw-based diet with various supplements (see Table). Measurements were made of feed intake, LW gain and wool growth. Animals were slaughtered and body composition determined on days 150 to 153.

Grp no.	Supplements <sup>§</sup> (g/d)			Daily DMI (g/kg LW)		LW gain (fleece free) (g/d)	Clean wool growth (g/d)	Body composition (kg) corrected to a mean empty body weight of 27.1kg at slaughter			
	Ca-LCFA	HCHO-casein	Na propionate	straw	total			water	fat	protein	ash
1	0	0	0	23.5	26.5	31	3.6	16.0	4.9	4.4	1.1
2	0	0	20	22.3	25.5	31	3.8	15.3	5.7	4.2	1.1
3	0	50	0	23.6	27.4	59	6.5	16.0	4.7	4.5	1.1
4	0	50	20	21.9	26.0	58	6.2	16.0	4.8	4.6	1.1
5	30	0	0	21.1	24.8	35	3.5	15.2	6.0	4.2	1.1
6	30	0	20	20.3	24.1	40	3.6	15.2	5.9	4.2	1.1
7	30	50	0	21.0	25.3	73	7.0	15.8	5.1	4.5	1.1
8	30	50	20	20.0	24.6	74	6.7	15.2	5.6	4.4	1.1
Sign.¶:	CaLCFA	-	-	***	***	***	ns	**	*	*	ns
	-	casein	-	ns	ns	***	***	ns	P<0.06	***	ns
			prop.	**	*	ns	ns	*	ns	ns	ns
	CaLCFA x casein x prop.			ns	ns	ns	ns	*	P<0.07	P<0.06	ns

§ Basal diet: 3% thermo-ammoniated barley straw *ad lib*, 75 g/d lucerne, mineral mix (depending on supplements).

¶ Two-way interactions not significant, except for wool growth (see text)

Total feed intake (g/kg LW) was depressed by supplementation with CaLCFA (-6%) and propionate (-4%). Fleece free LW gain was increased by supplementation with CaLCFA (+24%) and HCHO-casein (+94%) but was not affected by the addition of propionate. Clean wool growth was increased by supplementation with HCHO-casein (+83%). Supplementation with CaLCFA increased wool growth by 8% in the presence of HCHO-casein, but not in the absence of HCHO-casein (P<0.05).

Corrected means for water, fat and protein in the body were affected by a three-way interaction between the supplements, at significance levels close to or smaller than P=0.05. Body fat mass was increased and lean tissue mass (water + protein) decreased when propionate was fed as a sole supplement (group 2) or when it was fed in addition to CaLCFA + HCHO-casein (group 8). Supplementation with CaLCFA increased total body fat mass (+12%) and decreased lean tissue mass (-3%), whereas the reverse was the case for supplementation with HCHO-casein (-10% and +3%)

Small amounts of supplements altered composition of live-weight gain of lambs offered straw-based diets, thus changing energetic efficiency of growth.

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