

GLUCOSE METABOLISM IN GROWING LAMBS
FED FORMALDEHYDE-TREATED CASEIN SUPPLEMENTS

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Demand for glucose is high in growing animals (Kempton et al, 1978). This study investigated the effects of amino acid availability on glucose metabolism in growing lambs.

Six lambs (live weight range : 20-30 kg) fed to calculated metabolisable energy requirement with hammermilled lucerne hay, were supplemented with either 60 or 120 g formaldehyde-treated casein in a split 3 x 3 Latin square crossover experiment. The lambs were surgically prepared with chronic indwelling catheters in the jugular vein, femoral artery and lateral saphenous vein to facilitate the simultaneous use of the isotope dilution and arteriovenous (AV) difference technique on the hind-limb model described by Teleni and Annison (1986). [U-¹⁴C] glucose was continuously infused into the jugular vein for nine hours after which arterial and venous blood samples were taken from the femoral and lateral saphenous vessels respectively, over the last three hours of infusion to determine 'plateau' glucose and CO₂ specific radioactivities and their AV concentration difference across the hind-limb muscle bed. Results are presented in the following table.

Mean liveweight (LW) daily intakes of digestible energy (DEI) and digestible crude protein (DCP), glucose entry rate (GER), muscle glucose uptake and CO₂ output and whole body glucose oxidised.

	Control	60 g	120 g
LW (kg)	25	25	25
DEI (MJ)	6.24	6.34	6.85
DCP (g/d)	66 ^a	91 ^b	119 ^{bc}
GER (mmole/h)	25 ^a	34 ^b	43 ^{bc}
Glucose uptake (mM)	0.14 ^a	0.18 ^b	0.21 ^b
CO ₂ output (mM)	1.28	1.59	1.52
Glucose oxidised (%)	15 ^a	25 ^b	29 ^{bc}

Different superscript indicates significant differences (P<.05)

The strong relationship between GER and the levels of DCP eaten ($r = 0.77$, $P < 0.001$) suggests that a significant proportion of absorbed amino acids were utilised for glucose production. Glucose oxidised increased significantly with increased levels of casein organic matter intake ($r = 0.80$, $P < 0.001$).

The study suggests that supplementing growing sheep with protected protein can significantly increase glucose production and utilisation.

KEMPTON, T.J., SMITH, G.H. and LENG, R.A. (1978) - Proc. Aust. Soc. Anim. Prod. 12: 139.

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