

THE EFFECT OF TWO ENERGY SUBSTRATE TYPES ON NITROGEN BALANCE OF LAMBS INFUSED WITH CASEIN INTO THE ABOMASUM

M.J. BOLAM^A, D.P. POPPI^A and S.R. MCLENNAN^B

^A Dept of Agriculture, The University of Queensland, Ar Lucia, Qld 4072

^B Dept of Primary Industries, Animal Research Institute, Yeerongpilly, Qld 4105

Liveweight gain and nitrogen retention responses to additional postruminal protein supplied to lambs fed high quality pasture have been demonstrated previously (Barry 1981). However the additional protein is often used with low efficiency (Poppi and McLennan 1995). This experiment aimed to compare isoenergetic infusions of glucose and acetate, at various levels, for their potential to increase the efficiency of use of postruminal protein for nitrogen retention in lambs.

Eight crossbred lambs (average liveweight (W) 30 kg) were used in an 8x8 Latin Square design. Two weeks prior to commencement of the trial lambs were fitted with rumen and abomasal cannulae under general anaesthesia. All lambs were fed a basal diet of ryegrass (*Lolium multiflorum* cv. Aristocrat) hay in metabolism crates at 2.5% of bodyweight daily (*in vivo* dry matter (DM) digestibility 67%, estimated metabolizable energy 9.4 MJ/kg DM, crude protein 15%). Treatments were control, casein 5 g/kgW^{0.75}.day (CA), CA + low acetate (LA), CA + medium acetate (MA), CA + high acetate (HA), CA + low glucose (LG), CA + medium glucose (MG) and CA + high glucose (HG). Energy treatments were calculated to provide a 4%, 8% and 12% increase in (ME) supply per day for the low, medium and high levels of both energy sources as a continuous infusion. Sodium caseinate and D-glucose were infused abomasally. Sodium acetate/acetic acid (50:50) mix was infused intraruminally. All treatments were adjusted to supply a sodium load equivalent to that for the HA lambs using NaCl. Each period consisted of a 5-day introductory and a 5-day collection phase.

Casein infusion resulted in a significant increase in nitrogen balance. of lambs. With each increment of glucose or acetate, there was a trend towards increased nitrogen balance in the lambs.

Table 1. Nitrogen balance (g/day) of lambs unsupplemented or receiving infusions of casein, glucose and acetate

Treatment	Nitrogen balance	SEM	Treatment	Nitrogen balance	SEM
Control	1.0	0.50	Casein	3.8	0.66
LG	3.5	0.56	LA	4.3	0.86
MG	5.2	0.98	MA	6.2	0.89
HG	5.6	0.64	HA	5.6	0.60

The slope of the regression relationship of nitrogen balance with metabolizable energy (ME) intake (excluding controls) was similar (0.24) for both acetate ($r^2 = 0.5$) and glucose ($r^2 = 0.4$). As lambs were fed and infused with casein at a set proportion of body weight, this suggests that there was a proportional increase in nitrogen retention with each increment of ME intake and the response was independent of energy source .

BARRY, T.N. (1981). *Br. J. Nutr.* 46: 521-31.

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