

935 The effects of the leucine catabolite, β -hydroxy- β -methylbutyrate (HMB), on the growth and health of growing lambs. S. Nissen*, D. Morrical, and J. C. Fuller, Jr. Iowa State University, Ames, Iowa.

Approximately 5% of the leucine oxidized in normally growing animals is through conversion of α -ketoisocaproate (KIC) to β -hydroxy- β -methylbutyrate. While this metabolic pathway is a minor part of leucine metabolism in the body, it may play a major role in the metabolic regulation attributed to leucine. HMB has been shown to improve growth and/or health in other animal species. Therefore, an experiment was conducted to determine the effect HMB might have on growing lambs. One-hundred-sixty-two lambs were housed 9 per pen and blocked by sex and weight. Treatments were applied as a top dress to the daily feed such that the lambs received either 0, .5, or 1.5 g HMB per animal per day. Eight blocks contained treatment levels of 0 and .5 g/d while the 1.5 g/d level was only replicated in 2 of the blocks. There was no effect of HMB on lamb gain. Feed efficiency was however improved ($P < .01$) by up to 3.9% in HMB-fed lambs when compared with control-fed lambs. Lambs were slaughtered when the average weight of lambs in a block was 54.5 kg and dressing percentage was not affected by HMB feeding. An outbreak of soremouth disease (Contagious Ecthyma) occurred during week 4 of the study and incidence and severity (0=no disease to 3=multiple large lesions) were recorded. Incidence and severity were decreased ($P < .02$) by up to 56 and 63%, respectively, in HMB-fed lambs when compared with control-fed lambs. In conclusion, HMB improved feed efficiency in growing lambs similar to that seen when KIC is fed to lambs, but at only half the dosage of KIC needed for a similar response and no rumen protection of HMB was necessary. Therefore, HMB may be the compound responsible for some of the effects of nonprotein uses of the amino acid leucine in the body.

	Control	.5 g HMB/d	1.5 g HMB/d	SEM	P value
Gain (kg)	31.6	31.3	30.0	0.75	.50
Feed:gain	4.66	4.48	4.56	0.05	.01
Dressing percentage	54.0	54.4	54.8	0.15	.42
Sore mouth incidence (%)	38.9	17.2	19.7	0.05	.01
Sore mouth severity	0.60	0.29	0.22	0.09	.02

Key Words: β -hydroxy- β -methylbutyrate, lamb, growth, health

937 Evaluation of slow ammonia release from urea/calcium compounds. J.L. Cass* C.R. Richardson and K.J. Smith, Texas Tech University, Lubbock TX and Holladay and Holladay, Lamesa, TX.

Laboratory studies and a lamb metabolism experiment were used to compare two slow ammonia release compounds to feed grade urea and cottonseed meal (CSM). The two compounds (A and B) contained 23% N and 7% Ca, and 10% N and 11% Ca, respectively. Corn starch (CS) and ground corn (GC) were used as in vitro substrates with nitrogen sources added to achieve 10 and 14% CP fermentation mediums. Samples taken after in vitro digestion at 2, 4, 6 and 8 h were analyzed for ammonia concentration by a Bechman DU-50 Spectrophotometer. No differences ($P > .05$) in ammonia release were found when the 10% ground corn medium was used, whereas the 10% corn starch medium resulted in urea having higher ($P < .05$) levels than all other treatments at 8 h. Using GC as the substrate in the 14% CP medium showed that ammonia release was somewhat higher than that found for the 10% CP medium. Ammonia release values using CS and the 14% CP medium are given below.

Time	Urea	Comp. A	Comp. B	CSM	SEM	P=
	----- mg/dl -----					
2h	73 ^a	43 ^b	18 ^c	1 ^d	8.26	.0001
4h	67 ^a	18 ^b	12 ^c	1 ^d	7.66	.0001
6h	32 ^a	8 ^b	1 ^c	<1 ^c	3.95	.0001
8h	21 ^a	1 ^b	1 ^b	1 ^b	2.61	.0001

^{a,b,c,d} Means in the same row with different superscripts differ ($P < .05$) Results of the lamb metabolism experiment showed that compound B decreased ($P = .003$) feed intake and N retention as compared to all other treatments. No differences ($P > .05$) were found in DM, CP digestibility, plasma urea nitrogen, Ca digestibility or Ca retention across treatments. In conclusion, these in vitro data show that the urea/calcium compounds release ammonia at less than 50% of the rate of feed grade urea when a 14% CP medium with corn starch as the substrate is used.

Key Words: Ammonia release, urea, ruminants

936 Rumen-protected amino(RPAA) acid supplementation to dairy cows pre- and post-parturition. L.M. Rode¹, T. Fujieda², H. Sato², H. Suzuki², W.E. Julien³ and C.J. Sniffen⁴. ¹Agric. Canada Res. Station, Lethbridge, AB, T1J 4B1, ²Ajinomoto Co. Inc, Tokyo 104, Japan, ³Julien & Assoc., Omaha, NE, 68122, ⁴W.J. Miner Institute, Chazy, NY.

Three groups of multiparous, Holstein cows were fed a low-CP TMR (11.7% CP) from 6 wk pre-parturition until 3 wk prepartum, followed by a high-CP (12.6% CP), high-UIP TMR from 3 wk pre-partum until parturition. Two of the groups received RPAA (19 /d lysine-HCl and 6.5 g/d methionine) from 3 wk post-partum to 10 wk post-partum. At parturition, one of the RPAA groups (LP-RP) was fed a low-CP (15.7% CP) TMR while the non-RPAA group (Control) and other RPAA group (HP-RP) were fed a high-CP (18.8% CP) TMR. Several (Control=5/11; RPAA=4/16) cows encountered metabolic problems at parturition and died or were removed from the study, possibly due to the high UIP content of the pre-partum diet. Supplementation with RPAA appeared to ameliorate metabolic problems. Milk and milk protein yields were greater ($P < .05$) for HP-LP compared to Control cows after 10 wk (35.9 and 1.09 vs 31.0 and 0.96 k/d) and after 20 wk (33.6 and 1.01 vs 26.3 and 0.80 k/d). Similarly, cows receiving the LP-RP diet produced more ($P < .10$) milk and milk protein than Control cows after 10 wk (34.3 and 1.07 vs 31.0 and 0.94 k/d) and after 20 wk (30.8 and 0.94 vs 26.3 and 0.80 k/d). After 20 wk DMI was similar for HP-RP, LP-RP and Control (22.0, 22.4 and 21.7 kg/d). RPAA had a positive effect on the health and production of early lactation cows.

lysine, methionine, rumen protected amino acids, cows,

Key Words: milk, milk protein

938 Effects of protein source and sorbitol supplementation on performance of incoming feedlot steers. D.W. Boyles, C.R. Richardson and L.M. Schake*. Texas Tech University, Lubbock and Roquette Corporation, Gurnee, IL.

A 28d experiment was conducted to determine the effects of protein source and level of sorbitol supplementation on performance of incoming crossbred steers (262 kg, N=260) using a randomized block design with 2x3 factorial arrangement of treatments. Pen location within the feedlot served as blocks. Protein sources were a low ruminally degradable protein mixture (LD) consisting of (15% blood meal, 8% corn gluten meal, 22% cottonseed meal, 33% hydrolyzed feather meal and 22% meat and bone meal); and a more readily ruminally degradable protein source (RD) consisting of soybean meal. Sorbitol (granular) was supplemented via a premix at 0, 30 or 60g steer⁻¹ d⁻¹. There were five replications (pens) of eight or nine steers per pen on each of the six treatments. Upon arrival at the Texas Tech feedlot steers were weighed, ear tagged, dewormed, immunized against BVD, IBR, PI and clostridium perfringens type C and D and randomly placed by weight group and breeding on their respective treatment. A steam-flaked grain sorghum and cottonseed hull based diet was fed. No interactions existed between protein source and sorbitol level for ADG ($P = .20$) and gain efficiency (G:F; $P = .18$). The LD protein tended to reduce DMI, not effect ADG and improve G:F (8.0 vs 8.21; $P = .20$; 2.09 vs 2.06; $P = .69$; 262 vs 250, $P = .21$; DMI, ADG and G:F for LD vs RD, respectively). Feedlot performance of steers was not improved by sorbitol level (7.96, 8.30, 8.04, $P = .27$; 2.02, 2.16, 2.04, $P = .44$; 254, 260, 255, $P = .90$; DMI, ADG and G:F for 0, 30 and 60g of sorbitol, respectively). In conclusion, feed intake and performance of steers during the first 28 d after arrival at the feedlot were not improved by feeding a LD protein or sorbitol supplementation. The lack of a response by steers in this experiment may be contributed in part to the somewhat low DMI (2.8% of mean BW).

Key Words: Sorbitol, protein, steers