

M223 Effects of nonstructural carbohydrate and protein sources on performance, ruminal fermentation, total tract digestibility and feeding behavior in growing calves. A. Rotger, A. Ferret, S. Calsamiglia*, and X. Manteca, *Universitat Autònoma de Barcelona Edifici V, Campus UAB, Bellaterra 08193, Barcelona, Spain.*

Four rumen fistulated Holstein calves (BW 132.3 ± 1.61 kg) fed high concentrate diets (10 to 90, forage to concentrate ratio) were assigned to a 4 x 4 Latin square design to investigate the effects of nonstructural carbohydrate (barley or corn) and protein (soybean meal or sunflower meal) sources on ruminal fermentation and animal performance. The following 2 x 2 factorial arrangement of treatments (13.7% CP, 2.8 Mcal ME/kg DM) was used: 1) Barley-Soybean meal; 2) Barley-Sunflower meal; 3) Corn-Soybean meal and 4) Corn-Sunflower meal. Data were analyzed using the PROC MIXED procedure of SAS, main factors being nonstructural carbohydrate source, protein source and their inter-

action. Calf and period were considered random effects. Intake of DM was higher in the corn vs. barley based diets ($P < 0.05$), without affecting ADG (1.2 ± 0.12 kg/d). Consequently, feed efficiency was higher for the barley based diets. Average ruminal pH, total VFA and NH_3N concentration were not affected by main factors (6.6 ± 0.14 , 116.4 ± 5.27 mM and 5.9 ± 2.17 mg/dL, respectively). Total VFA per kg of DM intake was lower in the corn vs. barley based diets (20.07 vs. 25.42 mM/kg DMI, $P = 0.02$) and no significant effects were observed for the proportions of individual VFA. Nonstructural carbohydrate and protein sources did not affect total tract digestibility of DM and OM, estimated with chromium oxide (64.5 ± 2.67 and 65.1 ± 2.74 %, respectively). Feeding behavior, measured by scan sampling at 5 minute intervals, did not vary significantly among treatments. Calves spent 9.97, 2.11, 25.13 and 62.79% of the time eating, drinking, ruminating and resting, respectively. In conclusion, while nonstructural carbohydrate source affected intake, feed efficiency and total VFA per kg of DM intake, protein source did not affect these measurements.

Rabbit Species

M224 Effects of dietary mannan oligosaccharide in comparison to oxytetracyclin on cecal fermentation and performance of rabbits. A.P. Fonseca¹, L. Falcão¹, P. Spring*², and A. Kocher³, ¹*Universidade Técnica de Lisboa Instituto Superior de Agronomia, Lisboa, Portugal*, ²*Swiss College of Agriculture, Zollikofen, Switzerland*, ³*Alltech Biotechnology Center, Dunboyne, Co. Meath, Ireland.*

Digestive disorders in rabbits are quite frequent. Feed additives, which can lower the risk of digestive disorders and enhance performance are useful tools to the rabbit nutritionist. The aims of the present trials were to compare the effects of mannan oligosaccharide (MOS) and oxytetracycline (OTC) on rabbit performance and intestinal fermentation. Two trials were set up as complete randomized designs with Hybrid Hyla rabbits (31 to 70 days). Rabbits were housed individually in metabolic cages. Grower feed was offered through day 46 and finisher feed from day 47 to the end of the trial. The diets did either contain 2000ppm of MOS (Bio-Mos[®], Alltech Inc.) or OTC (20%) in the grower and 1000ppm of MOS or OTC in the finisher diet, respectively. Trial 1 was performed with 48 rabbits. Performance as well as purine derivatives excreted in the urine and caecotrophes (soft feces) composition was determined.

Trial 2 involved 24 rabbit. Performance, diet digestibility and cecal pH and VFA concentrations were determined. All data were subjected to ANOVA. Average daily gain and FCR did not differ between treatments. ADG was 41.7g and 44.1g for the MOS treatment vs. 42.7g and 43.9g for the OTC treatment in trial 1 and 2, respectively (RSD 4.2 and 2.9). Average feed conversion was 3.05 in trial 1 and 3.50 in trial 2 and was not affected by treatment. Composition of the soft feces did not differ among treatments. Diets did affect purine derivatives excretion. Allantoin and uric acid excretion did not differ between treatments; however, rabbits fed MOS did excrete significantly less hipoxantin and xantin. Diet digestibility in trial 2 was modestly affected by treatment, with a significant improvement in ADL digestibility for MOS compared to OTC. Average cecal pH was 6.2 for both treatments. Total VFA concentrations averaged 36 mmol/l and did not differ between treatments. Under the present trial conditions performance with MOS was similar to performance with OTC. MOS did show a reduction in mortality. Differences in cecal fermentation patterns and diet digestibility were modest between the two additives.

Key Words: Rabbits, Mannan Oligosaccharides, Performance

Production, Management and the Environment: Systems, Economics, and Miscellaneous

M225 Minimum dry period length to maximize performance. M. T. Kuhn*, J. L. Hutchison, and H. D. Norman, *Animal Improvement Programs Laboratory, Agricultural Research Service, USDA, Beltsville, MD.*

The objective of this research was to find the minimum dry period length while maintaining performance in the subsequent lactation. The number of days dry, month of calving in the subsequent lactation, linear and quadratic effects of the last somatic cell score in the previous lactation, linear and quadratic effects of previous days open, and linear and quadratic effects of age at subsequent lactation were included in the model to look at the effect of dry period length on actual milk yield in the subsequent lactation, adjusted for producing ability. Data included Holstein cows first calving from 1997 to 1999. There were 64,100 records with a second lactation, 28,376 with a third lactation, and 11,997 with a fourth lactation. Peak yield during the following lactation occurred at a dry period length of 45 to 60 days for parities 2, 3, and 4. A difference in milk production of +33, +50, and -16 kg between 56 to 60 and 61 to 70 days dry was not significant for lactations 2, 3, and 4, respectively. A dry period length over 70 days resulted in a 250, 622, and 727 kg decrease in milk production for lactations 2, 3, and 4, respectively. Although peak yield in subsequent lactation occurred between 45 and 60 days, the rate of increase from zero to 45 days was not linear. Cows that were dry from zero to 35 days following first, second, and third lactations showed an average decrease of 1111, 491, and 1802 kg in second, third, and fourth lactations, respectively. In contrast, cows that were dry from 35 to 45 days had an average loss of only 280, 172, and 182 kg in lactations two, three, and four, respectively. Further research

will determine optimum dry period length for lifetime yield, somatic cell score, female fertility, fat and protein percentages, and productive life.

Key Words: Dry Period Length, Milk Production, Performance

M226 Effect of photoperiod on milk production in lactating dairy cows. M. J. VanBaale*¹, D. V. Armstrong¹, R. M. Mattingly², and J. B. Fiscalini², ¹*The University of Arizona, Tucson*, ²*Fiscalini Dairy Farm, Modesto, CA.*

Ninety-eight multiparous and 60 primiparous Holstein animals were utilized in an extended lighting trial to investigate photoperiods impact on milk yield. After parturition all animals were housed in one pen until 20 DIM under normal daylight/nightlight conditions. On d 21, animals were randomly assigned into two treatment groups receiving supplemental light (SL) or normal daylight and darkness (NL). There were four groups of multiparous cows; two were assigned to SL and two to NL. There were only two groups of primiparous animals that were assigned to SL or NL. While in freestalls both multiparous and primiparous cows in the SL groups were exposed to 17h of natural light and SL above 15 foot candle (FC) and 7h of light below 5 FC in the freestall area. The light exposure for the NL groups followed the normal sunrise-sunset pattern common for the north 40th parallel of sunrise 0530 to 0730 and sunset 1700 to 1900, an average of 12h of light and darkness. Light intensity was measured every two wks at 2200 to 2300 at two points in the freestall barn (feed manger and outside lane at animal head level) and in the milking parlor holding pen (front, middle, and back). Diets for both treatments were balanced for 52 kg milk/d. There was no difference ($P = 0.48$) observed between primiparous animals assigned to SL (32.9 kg/d) or NL (32.7 kg/d) treatments. Multiparous cows in