

Small Ruminant: Nutrition

173 Blood chemistry, milk yield and composition, and milk fatty acids profile of lactating Anglo-Nubian goats fed *Moringa oleifera* leaf as a protein source. T. A. Morsy^{*1}, A. E. Kholif¹, G. A. Gouda¹, A. Z. M. Salem², S. M. Kholif¹, and A. M. Kholif¹, ¹Dairy Science Department, National Research Centre, Giza, Egypt, ²Facultad de Medicina Veterinaria y Zootecnia, Universidad Autónoma del Estado de México, Toluca, Estado De México, Mexico.

Low availability and increased price of protein sources are a serious problem for animal producers. Therefore there is a need to find alternative ingredients for protein sources. *Moringa oleifera* leaf contains about 25% crude protein (CP) with low degradability, which make it a good source of protein in ruminant diets. In a 4 × 4 Latin square design, 16 lactating Anglo-Nubian goats (36.2 ± 0.7 kg BW) were used to evaluate the effect of replacing sesame meal (259.0 g CP/kg DM; 279.1 g neutral detergent fiber (NDF)/kg DM) with *M. oleifera* (241.2 g CP/kg DM; 336.6 g NDF/kg DM) at 0% (control-M0), 50% (M50), 75% (M75) and 100% (M100). The experimental period consisted of 17 d for adaptation + 5 d for milk yield and sampling. All goats were sampled for blood at the last day of the experimental period 4 h after morning feeding. Goats were hand milked daily at 0900 and 2100 h for determination of milk yield. There was no effect of treatment on serum total proteins, albumin, globulin, glucose, creatinine, and triglycerides concentrations, with quadratically increasing GOT and GPT concentrations ($P < 0.05$) and decreasing urea-N (linear, $P = 0.0339$; quadratic, $P < 0.0001$) and cholesterol (linear, $P = 0.0009$; quadratic, $P < 0.0001$) concentrations. Milk yield and energy corrected milk were linearly increased ($P < 0.001$) when goats fed on Moringa vs. control. Milk yield was greatest for M75 which had also higher total solids, solids not fat, and lactose versus other treatments. Milk components yield were increased with goats fed Moringa compared with control ($P < 0.01$). Moringa treatments increased ($P < 0.01$) milk fat content from C14:1, C18:1n-9 *trans*, C18:1n-9 *cis*, C18:2 *trans*-10,*cis*-12, and C18:2 *cis*-9,*trans*-11 with decreased C16:0 concentrations. Moreover, decreased ($P < 0.05$) saturated with increased unsaturated fatty acids and conjugated linoleic acids (CLA) were obtained when goats fed Moringa diets vs. control. It could be concluded that replacing 75% of sesame meal with *M. oleifera* as a protein source increased milk yield with enhancing milk content of healthy fatty acids (CLA and n-3), without detrimental effects on animal performance.

Key Words: milk fatty acid, milk composition, *Moringa oleifera*

174 *Moringa oleifera* leaf as a protein source in the diet of Anglo-Nubian goats affects feed intake, digestibility, and ruminal fermentation. A. E. Kholif^{*1}, G. A. Gouda¹, A. Z. M. Salem², T. A. Morsy¹, and S. M. Kholif¹, ¹Dairy Science Department, National Research Centre, Giza, Egypt, ²Facultad de Medicina Veterinaria y Zootecnia, Universidad Autónoma del Estado de México, Toluca, Estado De México, Mexico.

Recently, the availability and price of concentrates especially of protein sources are a serious problem for animal producers especially small farms. Therefore there is a need to find alternative ingredients for protein sources. *Moringa oleifera* leaf contains about 25% crude protein (CP) with low degradability, which make it a good source of protein in ruminant diets. Therefore, in a 4 × 4 Latin square design, the effect of including *M. oleifera* leaf as a protein source in diets of Anglo-Nubian goats on intake, digestibility and ruminal fermentation given was evalu-

ated. Sixteen goats (36.2 ± 0.7 kg BW) were fed 4 diets (n = 4 goats) where sesame meal (259.0 g CP/kg DM; 279.1 g neutral detergent fiber (NDF)/kg DM) was replaced with *M. oleifera* (241.2 g CP/kg DM; 336.6 g NDF/kg DM) at 0% (control-M0), 50% (M50), 75% (M75) and 100% (M100). The experimental period consisted of 17 d adaptation + 5 d for feed intake measurements and feces collection. Water was always available to goats. All goats were sampled for rumen liquor at the last day of each experimental period after 0, 3 and 6h of morning feeding. Goats fed on M75 and M100 diets increased feed intake of all nutrients (linear, $P < 0.001$; quadratic, $P < 0.05$). Moreover, increased dry matter (quadratic, $P = 0.0014$), organic matter (linear, $P = 0.0117$), and crude fibers (linear, $P = 0.0119$; quadratic, $P = 0.0018$) digestibility were obtained with goats fed on M75. However, goats fed on Moringa (M50, M75, M100) had a linearly decreased CP digestibility ($P < 0.0001$). Diets nutritive values as total digestible nutrients ($P = 0.0049$), digestible CP ($P = < 0.0001$), metabolizable energy ($P = 0.0054$) and net energy of lactation ($P = 0.0049$) were quadratically decreased with M50, M75 and M100 vs. M0. Goats fed on Moringa diets had increased ($P < 0.05$) ruminal pH, volatile fatty acids, propionate and methane production vs. control. It could be concluded that inclusion of *M. oleifera* leaf as a protein source at 75% of sesame meal increased feed intake, nutrients digestibility and ruminal fermentation of Anglo-Nubian goats.

Key Words: digestibility, *Moringa oleifera*, ruminal fermentation

175 Effect of dietary forage-to-concentrate ratios on urinary excretion of purine derivatives and microbial nitrogen yields in the rumen of Dorper crossbred sheep. Tao Ma^{*1}, Kai-dong Deng², Yan Tu¹, Nai-feng Zhang¹, Cheng-gang Jiang¹, and Qi-yu Diao¹, ¹Feed Research Institute, Chinese Academy of Agricultural Sciences/Key Laboratory of Feed Biotechnology of the Ministry of Agriculture, Beijing, China, ²College of Animal Science, Jinling Institute of Technology, Nanjing, Jiangsu, China.

This study investigated the effects of various dietary forage-to-concentrate ratios (F: C) on urinary excretion of purine derivatives (PD) and microbial nitrogen (MN) yields from the rumen of Dorper × thin-tailed Han crossbred sheep. Twelve Dorper × thin-tailed Han crossbred ram lambs (47.2 ± 1.0 kg) fitted with ruminal and duodenal cannulas were randomly assigned to 12 levels of dietary F:C in a balanced incomplete block experimental design (12 lambs × 4 periods). Digestibility trials were conducted and MN was estimated using either ¹⁵N or PD as markers. Urinary excretion of allantoin and total PD increased ($P < 0.05$) with decreasing F:C. Urinary excretion of uric acid or xanthine plus hypoxanthine was unaffected by F:C ($P > 0.05$). MN yields estimated using ¹⁵N as a marker were greater than those predicted from urinary PD (12.5 vs. 11.5 g/d, $P < 0.05$), but the former was more variable than the latter (SE = 0.66 vs 0.45, respectively). A linear correlation existed between MN estimated by ¹⁵N and urinary excretion of PD: MN (g/d) = -0.521 + 1.493 × PD (mmol/d) ($r^2 = 0.86$). The purine nitrogen index (PNI: PD nitrogen/urinary N) was linearly correlated with nitrogen capture efficiency calculated from either ¹⁵N or PD ($r^2 = 0.60$ and 0.77, respectively). Results suggest that urinary PD is an accurate indicator of MN from the rumen of Dorper crossbred sheep, and PNI reflected the conversion of nitrogen degradation to MN in the rumen.

Key Words: forage-to-concentrate ratio, microbial N yield, purine derivative

176 Effects of reducing dietary cation-anion difference plus vitamin D on plasma Ca and its modulators and growth performance of goats. Wen-xuan Wu*, Lun-qin Zhu, Xing-zhou Tian, and Ruo-yu Liu, *College of Animal Science, Guizhou University, Guiyang, Guizhou Province, China.*

This study was conducted to evaluate the effects of reducing dietary cation-anion difference (DCAD; $\text{Na}^+\text{K}^-\text{Cl}^-\text{S}$, mmol/kg DM) with vitamin D (VD) supplementation on plasma levels of Ca and its modulators, and ration palatability for goats. Eighteen healthy female goats were randomly allocated to 3 treatments with 6 goats per treatment and were fed 3 DCAD levels at 150, -150, -150 for control, treatment 1, and treatment 2, respectively. Anionic salts were included to reduce DCAD level for treatment 1, and VD was added in treatment 1 for treatment 2. Urine pH; plasma Ca, P, PTH, CT, $1,25\text{-(OH)}_2\text{D}_3$, vitamin D receptor (VDR), Ca-binding protein (CaBP-D9k) concentrations; and dry matter intake (DMI) were measured in the trial. Urine pH was reduced ($P < 0.05$) as DCAD decreased for treatment 1 (6.71) and treatment 2 (6.67) over control (7.63). Compared with control, plasma Ca was increased for treatment 1 ($P > 0.05$) and treatment 2 ($P < 0.05$). There was no difference in plasma P and PTH for control, treatment 1, and treatment 2 ($P > 0.05$). Treatment 2 had increased plasma $1,25\text{-(OH)}_2\text{D}_3$ relative to control and treatment 1 ($P < 0.05$) and tended to reduce plasma CT over treatment 1 ($P < 0.1$). Moreover, reducing DCAD plus VD for treatment 2 resulted in higher plasma VDR and CaBP-D9k than that of control ($P < 0.05$). Levels of DMI were unaffected among 3 treatments ($P > 0.05$). These results suggested that plasma Ca homeostasis could be more available to maintain by reducing DCAD plus VD in the present study.

Key Words: dietary cation-anion difference, plasma Ca, goat

177 Iodine supplementation of the pregnant ewe alters serum IgG concentration and expression of genes associated with antibody transfer in the ileum of the newborn lamb. Fiona M. McGovern¹, Torres Sweeney², Francis P. Champion¹, Marion T. Ryan², Stephen Lott¹, and Tommy M. Boland*¹, ¹*School of Agriculture and Food Science, University College Dublin, Dublin, Ireland,* ²*School of Veterinary Medicine, University College Dublin, Dublin, Ireland.*

Ruminant neonates require the passive acquisition of maternal immunoglobulins (Ig) derived from colostrum, to confer immunity against infectious disease in early life. Excess iodine in the diet of the pregnant dam is known to negatively affect neonatal serum IgG concentrations. This experiment examined the mechanisms underpinning the reduced IgG in the progeny of iodine supplemented dams at 24h postpartum. In a randomized complete block design, twin bearing ewes were split into 2 dietary groupings (n = 32 per group). The first group had no iodine supplement and the second was supplemented with 26.6mg per ewe per day of supplementary iodine in the form of calcium iodate for the final 4 weeks of gestation. Ewes were hand milked at 1, 10, and 18 h postpartum and colostrum intake of the lambs was recorded. At 24h postpartum a subset of lambs (n = 12 per group) were euthanized. Duodenal and ileal sections were collected to determine morphology and the expression of a panel of genes associated with antibody transfer. At 24h postpartum and fortnightly until 28 d postpartum IgG concentration was quantified from the serum of the remaining progeny. Iodine supplementation had no effect on colostrum yield, composition or lamb colostrum intake within the first 18h postpartum ($P > 0.05$). Despite this, the progeny from the iodine-supplemented ewes had lower serum IgG concentrations up until d 28 postpartum ($P > 0.001$) when compared with the progeny of the non-supplemented dams. Progeny of supplemented dams had increased expression of *PIGR* and *FCAMR* while the expression of *B2M*, *THRB* and *ALB* declined in the ileum when compared with non-supplemented

progeny ($P < 0.05$). A reduction in villus height and villus height:crypt depth ratio was observed in the ileum of the supplemented progeny ($P < 0.01$). In conclusion, the results of this study presents novel data describing the relationship between maternal iodine nutrition and the subsequent failure of passive transfer leading to reduced serum IgG concentrations

Key Words: lamb, immunoglobulin G, ileal gene expression

178 Metabolizable energy requirements of maintenance, energy efficiency of weight gain and fat deposition in Pelibuey and Katahdin ewes in tropical Mexico. Jose Valentin Cardenas Medina*, Pablo Ivan Duarte Arzapalo, Dahiavis Mena Arceo, and Olivier Santiago Ramos Trejo, *Instituto Tecnológico de Tizimin, Tizimin, Yucatan, Mexico.*

The objective was to estimate metabolizable energy requirements for maintenance (ME_m), energy efficiency of weight gain (EEWG) and fat deposition, in Pelibuey and Katahdin ewes in Yucatan, Mexico. Eight non pregnant, non lactating, multiparous ewes, with average live weight and standard deviation of 35 ± 2 kg, were distributed in a complete randomized design with a 2×3 factorial arrangement, 2 breeds and 3 feed levels (100, 120 kcal of ME $\text{kg}^{0.75}$ and ad libitum), during 3 periods of 28 d each; the diet were composed of 50% ground *Panicum maximum* hay and 50% of a concentrate, based on corn, wheat and soybean meal, containing 2.0 Mcal/Kg⁻¹ of ME and 10% of CP. Feed intake was measured by offered-rejected daily food weighing, to asses ME intake (MEI), ewes were weighed every 14 d, to asses changes in live weight (CLW) and thickness of subcutaneous fat (SF) was measured between 12th and 13th dorsal vertebra. The EM_m was estimated by regressing values of CLW against MEI ($Y = B_0 + B_1 \times X$), EEWG was estimate as gram of weight gain (WG) per Mcal of MEI. There were no differences ($P > 0.05$) between breeds in EM_m (110 ± 4 and 122 ± 4 kcal/kg^{0.75}, for Pelibuey and Katahdin; MEI [kcal/kg^{0.75}] = $119.748 + 0.264107 \times \text{WG}$, $r = 0.81$) and EEWG (33 ± 8 and 17 ± 8 g/Mcal of MEI, for Pelibuey and Katahdin); differences were found ($P < 0.01$) in average SF despite ewe breed (5.6 ± 0.2 and 4.7 ± 0.2 mm, for Pelibuey and Katahdin). There are not difference between breeds in energy requirements for maintenance and weight gain, but difference in body composition could be advantageous for Pelibuey ewes, fat reserves could be used with high efficiency for maintenance and lactation during dry season, in sheep systems in tropical Mexico.

Key Words: sheep, energy, requirement

179 Effect of dry matter content and feeding level on dry matter digestibility and intake of perennial ryegrass fed to sheep. Brian Garry*^{1,2}, René Baumont³, Tommy Boland², Michael O'Donovan¹, and Eva Lewis¹, ¹*Teagasc, AGRIC Moorepark, Fermoy, Co. Cork, Ireland,* ²*School of Agriculture and Food Science, University College Dublin, Dublin, Ireland,* ³*INRA, UMR1213 Herbi-vores, Saint Genès Champanelle, France.*

Optimising animal performance from pasture requires a high intake of highly digestible grass. In vivo dry matter digestibility (IVDMD) of grass is affected by the level of dry matter intake (DMI). The objective of this experiment was to analyze the effect of dry matter (DM) content of grass on IVDMD at 2 feeding levels in wether sheep. A Latin square design, with 4 periods and 4 treatments, was used. There were 4 sheep per treatment per period (n = 16) with 4 treatments in a 2×2 factorial grass type; wilted or fresh grass offered at one of 2 feeding levels; ad libitum or maintenance. Each 12-d period consisted of a 6 d adaptation

phase and a 6 d measurement phase (MP). Grass was cut daily each morning. Approximately half the grass was artificially wilted for 5 h using a centrifugal fan at 18°C (wilted). The other half of the grass was stored at 4°C (fresh). The fresh and wilted grass was fed to the sheep daily at 4 p.m. The DM content of the wilted and fresh grass was 27.8% and 18.6%, respectively. Ad libitum sheep were offered 110% of the previous day's DMI. Maintenance fed sheep were fed 40 g grass DM/kg metabolic BW. Sheep were housed in stalls to allow for individual feeding and total fecal collection. During the MP in each period, a sample of the grass fed to and feces voided by each sheep was collected daily. The daily grass and feces samples were dried and bulked to give one sample per treatment and per sheep per period. Data were analyzed using a mixed model procedure in SAS. Period, feeding level, grass type and their interactions were fixed effects and sheep was a random effect. Wilted grass (757 g/kg) had greater IVDMD than fresh grass (746 g/kg; $P < 0.01$) and maintenance level feeding (759 g/kg) resulted in greater IVDMD than ad libitum (744 g/kg; $P < 0.001$). When fed ad libitum, wilted grass (1.50 kg DM/day) resulted in greater DMI than fresh grass (1.40 kg DM/day; $P < 0.05$) but fresh grass had greater fresh weight intake than wilted grass ($P < 0.001$). This indicates that reducing perennial ryegrass moisture content results in increased IVDMD and increased DMI in sheep fed indoors.

Key Words: digestibility, intake

180 Effects of feeding varying levels of deoiled distillers dried grains with solubles on dry matter intake, rumen fermentation, blood chemistry profile, growth, feed efficiency and carcass quality of meat goats. Jarvis G. Scott*, Nar K. Gurung, Byeng R. Min, Errol G. Rhoden, and Wendell H. McElhenney, *Tuskegee University, Tuskegee, AL.*

The feeding value of deoiled distillers dried grains with solubles (D-DDGS) has been investigated for dairy, beef cattle, pigs and poultry, but no study has been conducted with meat goats. Objectives were to determine the effects of feeding varying levels of D-DDGS on dry matter intake, rumen fermentation, select blood metabolites, growth, feed efficiency and carcass quality. Twenty-four (24) Kiko wethers (26.67 ± 1.21 kg with initial BW and 5 to 6 mo of age) were randomly assigned to one of the 4 experimental diets (n = 6) containing 50% bermudagrass hay plus 50% concentrate mix with 0, 10, 20 or 30% D-DDGS in the diet on an as-is basis. The body weights were recorded every 4 weeks. The rumen volatile fatty acid were determined at the beginning, mid-point and at end of the trial while blood chemistry profiles were determined at the beginning and end of the trial. After 84 d, goats were slaughtered for carcass traits evaluation. Data were analyzed using the MIXED procedure of SAS. There was quadratic response in dry matter intake ($P < 0.05$) with increasing level of D-DDGS but no differences ($P = 0.49$) were detected in ADG (111.8, 128.4, 140.3 and 98.9 g/day for control, 10, 20 and 30% D-DDGS, respectively). Similarly, no significant differences ($P > 0.05$) were observed for gain to feed ratios among treatments. Molar proportion of acetate (A), propionate (P), and A: P increased linearly ($P < 0.05$) while the overall rumen pH response was quadratic ($P < 0.05$). The blood chemistry profile showed that gamma-glutamyl transferase and glucose decreased linearly ($P < 0.05$) with D-DDGS while the trend was reversed ($P > 0.05$) with aspartate aminotransferase, creatine kinase and cholesterol. However, both rumen volatile fatty acid and blood chemistry profile were within the normal range. There were no significant differences ($P > 0.05$) between treatments for percent transport loss, percent carcass shrink, 12th rib fat thickness, LMA and dressing percent. The findings suggest that up to 30% of D-DDGS can

be included in the diet for meat goats without any compromise in rumen fermentation, performance and carcass quality.

Key Words: goat, D-DDGS, performance

181 Economic analysis of feedlot finished lambs receiving diets based on different *Cynodon* hay grasses. Euclides Reuter Oliveira¹, Flávio Monção², Andreia Gabriel¹, Jefferson Gandra*¹, Rayanne Souza¹, Lais Moura¹, Loan Silva¹, Leandro Silva¹, Vadim Carbonari¹, and Thais Lemos¹, ¹*Universidade Federal da Grande Dourados, MS, Brazil, Dourados, MS, Brazil,* ²*Universidade Estadual Julio de Mesquita, Jaboticabal, SP, Brazil.*

This study aimed to evaluate the economic viability of the performance of crossbred lambs (1/2 Santa Inês+ 1/2 Suffolk), feedlot, fed different diets of hay *Cynodon dactylon*. The experiment was conducted at the agricultural sciences college, Federal University of Grande Dourados. Thirty non-castrated, crossbred Suffolk lambs were used, identified with ear tags, with an average age of 90 d, with average body weight (21.5 kg ± 1.61). The animals were blocked by weight and randomly assigned to one of the 6 hays. Hays of each cultivar (Jiggs, Vaquero, Tifton 68 Coast-cross, Tifton 85, and Russell) were harvested at 42 d of age or stage of maturity were fed as 60% of the diet with a standard concentrate making up 40% of the diet. The treatment diets were distributed in a fully randomized block with 5 replications. Means were analyzed as mixed models using the MIXED procedure of SAS software, 9.2 version, and the average compared by Scott Knot test at 5% probability. The intake of dry matter varied from 0.858 kg for Tifton 68 to 1.06 kg for Jiggs. There were significant differences between diets for total cost on feeding, and the Jiggs presented the highest values (\$17.11/animal). The animals fed Tifton 68 hay showed higher net income (\$41.84/ animal and \$44.70), when the animal was sold for slaughter in the refrigerator or alive for rearing in contrast to the other treatments. The animals fed diets with hay Tifton 68 had a higher rate of return (2.16%) and profitability (34.63%) compared with the other diets. In conclusion, the use of Tifton 68 hay in diets of lambs in finishing stage, feedlot, brings higher economic returns compared with other diets containing *Cynodon* hay grasses.

Key Words: economic, hay, lamb

182 Effect of concentrate supplementation during early lactation on intake, rumen function and milk production of twin suckling ewes. Francis P. Campion*¹, Fiona M. McGovern¹, Eva Levicnik³, Aileen McCarron¹, Philip Creighton², and Tommy M. Boland¹, ¹*University College Dublin, Dublin, Ireland,* ²*Teagasc Athenry, Co. Galway, Ireland,* ³*University of Ljubljana, Ljubljana, Lithuania.*

Ewe milk production peaks approximately 3 weeks postpartum, with intake potential peaking approximately 6 weeks postpartum. The aim of this study was to investigate the effect of concentrate supplementation on ewe DMI during early lactation. Fifty-four twin suckling ewes were allocated to one of 3 dietary treatments (n = 18) in a randomized block design on d 7 (+/- 2 d) of lactation as follows: GO: Ad-lib zero grazed grass, GC: Ad-lib zero grazed grass and 500g fresh weight (FW) of concentrate feed for 49 d postpartum and GC21: Ad-lib zero grazed grass and 500g FW of concentrate feed for 21 d postpartum. Ewes were penned with their progeny from 72 h postpartum until d 49 lactation. Lambs were offered free access to a creep area bedded with straw and were offered fresh water and zero grazed grass. Grass was harvested each morning using a single chop zero grazer from perennial ryegrass based swards with an average pre-grazing herbage mass of 1100kg DM/

ha with an average DM, protein and neutral detergent fiber content of 18.0, 18.4 and 45.0% respectively. Individual ewe intakes were recorded daily from d 7 to 49 of lactation. Rumen fluid samples were taken before and 7 d post-dietary introduction to assess rumen fermentation. Milk yield and composition was measured at 7 d intervals starting on d 14 (\pm 2 d) of lactation. Statistical analysis was carried out using generalized least squares means in SAS v9.4. Ewes from GO treatment had higher grass DMI (1.96kg) compared with GC (1.65kg) ewes ($P < 0.05$) and tended to have higher grass DMI than GC21 (1.84kg) ewes ($P < 0.10$). However, total DMI did not differ between treatments ($P > 0.05$). Rumen pH for GC and GC21 ewes decreased between d 0, 6.65, and d 7, 6.09 ($P < 0.01$). Milk production tended to be lower during early lactation for GC21 (1.85kg) ewes compared with GC (2.11kg) ewes ($P < 0.10$). No difference was observed between treatments in milk fat, protein or net energy ($P > 0.05$). Concentrate supplementation did not lead to increased DMI but rather acted as a substitute for grazed grass.

Key Words: DMI, milk yield, rumen function

183 An investigation into the effect of crude protein intake, dry matter intake and body reserve mobilization on the ewe colostrum and IgG production in the first 18 hours postpartum.

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Colostrum is essential to neonatal survival and future performance, providing energy and immunity in early life. Late gestation nutrition has been shown to influence colostrum production and immunoglobulin G yield (IgGY). This study aims to determine the key drivers of colostrum production, specifically the relationship with dry matter intake (DMI), crude protein intake (CPI), and body reserve mobilization during the final 6 weeks of gestation. Data from 7 late pregnancy nutrition studies carried out over 12 years using twin-bearing ewes were merged into a single data set. All studies recorded ewe colostrum production and IgGY at one, 10 and 18 h postpartum. Regression coefficients were estimated using PROC MIXED (SAS v9.4). The model included the fixed effects of ewe, year, ewe breed (Belclare, Leicester and Suffolk crosses) and time point as well as the continuous variables of gestation length, maternal age, average lamb birth weight (BW), live weight change (LWC) and body condition score change (BCSC) during late gestation. Colostrum volume changed by 0.02 l for every 10 g change in CPI ($P < 0.01$), and 0.02 l for every 100 g change in DMI ($P < 0.01$). Body reserve mobilization (LWC and BCSC) did not influence colostrum volume ($P > 0.10$). Breed ($P < 0.01$), time point ($P < 0.01$), breed by time point interaction ($P < 0.01$) and maternal age ($P < 0.05$) had significant effects on the effect of CPI and DMI on the volume of colostrum produced by the ewe. The IgGY was also driven by CPI and DMI ($P < 0.05$). Each 10g change in CPI gave a 0.50 g change in IgGY ($P < 0.05$) and there was 0.80 g

change in IgGY for each 100 g change in DMI ($P < 0.01$). Breed did not influence IgGY ($P > 0.10$) despite a breed by time point interaction ($P < 0.01$). Gestation length did not affect colostrum volume or IgGY ($P > 0.10$). These results indicate that intake as opposed to body reserve mobilization is the major driver of colostrum production by the ewe.

Key Words: colostrum, immunoglobulin, gestation

184 Biochemical parameters of newborn goats raised from Saanen does supplemented with selenium and vitamin E during the transition period.

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The objective of this study was to evaluate biochemical parameters of newborn goats from does that were supplemented with Selenium and Vitamin E. Twenty 4 kids from Saanen does that were supplemented starting on the fourth month of pregnancy until birth. The animals received the treatments based on the dams treatments and were divided into 3 groups: Control milk (base diet with 50% forage and 50% concentrate); Se milk (2.5 mg of Se/kg Dm added to the diet) and Sev milk (2.5 mg of Se/kg DM and 1000 IU/day of vitamin E/kg DM). The kids started receiving ad libitum access to feed from 7 d postpartum. The experiment took 28 d. After birth blood samples were collected before ingesting of colostrum and 48 h, 7, 14, 21 and 28 d postpartum. Blood samples were analyzed for serum protein analysis, albumin, gamma-glutamyl transferase (GGT), total cholesterol, high density lipoproteins (HDL), low density lipoproteins (LDL), triglycerides, aspartate aminotransferase (AST), creatine phosphokinase (CK), glucose, lactate, urea, creatinine, β -hydroxybutyrate (BHB), nonesterified fatty acids (NEFA) and total antioxidant status (TAS). The experimental design was a complete randomized design with repeated measures, with 8 replications. Data were analyzed by ANOVA and the means were compared by Tukey test ($P \leq 0.05$). There was no significant effect of treatment ($P > 0.05$) for the parameters of GGT, LDL, triglycerides, CK, glucose, urea, creatinine, BHB, NEFA and TAS. For serum protein and albumin parameters the Sev treatment provided significant increase ($P < 0.05$) when compared with the other treatments. There was a significant effects for Sev treatment ($P < 0.05$) for lactate, total cholesterol, HDL and AST, showing, therefore, a better oxidant activity in the group treated with selenium and vitamin E.

Key Words: antioxidant, birth, nutrition