Lambs were bled (to measure plasma concentration of glucose, and NEFA) and weighed on d 1 d 15 and d 60. Data was analyzed using a mixed model of SAS, using a linear and quadratic polynomial contrast for mean separation. There was a quadratic linear effect (P=0.01) for BW. Ewes supplemented with 1% PUFA were heavier than ewes supplemented with 0 or 2% (94.8 vs 91.0 and 89.8 ± 1.06, respectively). There were no difference in BCS, milk production, fat or protein concentration, but there was a trend for increased (linear P=0.06) lactose concentration. There was no difference in lamb BW, or plasma glucose and NEFA concentrations (P>0.1). However, there was a time by treatment interaction on ADG (P <0.05). Lambs of ewes supplemented with PUFA at 1% showed a higher ADG (0.36 kg/d) than the 0% (0.31 kg/d) or 2% (0.33 kg/d) supplementation from birth to d 15. The ADG from d 15 to d 60 was similar for the three treatments. This suggests that the supplementation of EPA and DHA during gestation affects ewe and lamb growth, and these effects may be dose dependent. The fact that the 1% EPA and DHA supplement showed a heavier BW for the ewes and the highest ADG for the lambs without affecting in the same manner MY or composition arises more questions to be answered on the biological effects of PUFA.

Key Words: n-3 PUFA, fetal programming, Energy

482 Determination of the Minimum Inhibitory Concentration of Various Medium Chain Fatty Acid-Based Products in E. coli, Enterotoxigenic E. coli, and Campylobacter coli.

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Research has demonstrated medium chain fatty acids (MCFA) are bactericidal and potential antibiotic alternatives. However, it is unknown how the type or level of MCFA impact bacteria growth. This can be tested through a minimum inhibitory concentration (MIC) benchtop assay, which identifies the lowest concentration of a chemical that prevents visible growth of a bacterium. Our objective was to determine the MIC of pure MCFA (Experiment 1) and products containing MCFA (Experiment 2) against generic *E. coli*, enterotoxigenic *E. coli* (ETEC), or *Campylobacter coli* (campy). Experiment 1 used a 4 × 3 factorial with four types of pure MCFA (C6:0, C8:0, C10:0, or 1:1:1 blend of C6:C8:C10) against the three bacteria and was repeated 3 times. All interactions and main effects were significant ($P<0.05$). The most effective ($P<0.05$) pure MCFA tested against generic *E coli* was the 1:1:1 blend of C6:C8:C10, and against ETEC was C6:0. All tested pure MCFA had similar ($P>0.05$) MIC against campy. This demonstrated that MCFA efficacy varies with MCFA type and bacteria. Pure MCFA are expensive and not easily available to producers. Thus, 24 commercially-available and developmental products were analyzed for MCFA concentration, with 5 selected based on their C6:0, C8:0, and C10:0 concentrations. In Experiment 2, these products were used in a 5 × 3 factorial to determine their MIC using the same procedures in Experiment 1. There were 5 MCFA products (4 developmental products + coconut oil) tested against three bacteria (*E. coli,* ETEC, and campy). Only the main effect of treatment was significant, resulting in products 1 and 2 having a lower ($P<0.05$) MIC than products 3, 4, and coconut oil. In summary, pure MCFA were bactericidal to *E. coli,* ETEC, and campy. However, their efficacy varied between bacteria. The efficacy of potential commercial products can be predicted based on their MCFA concentration, with the shorter chain MCFA having greater efficacy in the tested bacteria.

Experiment 1. Mean Minimum Inhibitory Concentration of Synthetic MCFA, %

Item	*E. coli*	ETEC	Campy	Pooled SEM	*P* =
C6:0	0.70[c]	0.53[ef]	0.50[fg]	0.0316	<.0001
C8:0	0.85[b]	0.67[cd]	0.47[fg]		
C10:0	1.00[a]	1.00[a]	0.90[b]		
C6:C8:C10 Blend	0.60[de]	1.00[a]	0.43[g]		

Experiment 2. Mean Minimum Inhibitory Concentration of Developmental MCFA Products, %

Item	*E. coli*	ETEC	Campy	Pooled SEM	*P* =
Product 1	0.37	0.33	1.20	0.4730	0.486
Product 2	1.20	1.30	0.33		
Product 3	3.33	3.83	2.75		
Product 4	4.17	4.33	3.33		
Coconut oil	>5.00	>5.00	>5.00		

Key Words: Medium Chain Fatty Acids, E. coli, Swine

483 Effects of Standardized Ileal Digestible Lysine on 7-15 Kg Nursery Pigs Growth Performance.

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	SID Lys, %						
Item	1.10	1.20	1.30	1.40	1.50	1.60	SEM
ADG, g[1]	365	398	397	450	425	437	13.04
ADFI, g[2]	542	589	559	606	573	577	18.27
G:F, g/kg[3]	675	676	711	744	745	759	1.59

[1] ADG linear: $P<0.001$, quadratic: $P=0.106$; [2] ADFI linear: $P=0.253$, quadratic: $P=0.183$; [3] G:F linear: $P<0.001$, quadratic: $P=0.613$.

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A total of 300 pigs (DNA 241 × 600; initial pen average BW of 6.98 ± 0.12 kg) were used in a 22 d growth trial to determine the standardized ileal digestible (SID) Lys requirement of nursery pigs from 7 to 15 kg. Pigs were weaned at approximately 21 d of age and allotted to pens based on BW and gender. There were 10 replicate pens per treatment and 6 pigs per pen. Pigs were fed a common diet for 10 d post-weaning. Pens were then randomly assigned to 1 of 6 experimental diets in a randomized complete block design based on BW. The 6 dietary treatments were formulated to 1.10, 1.20, 1.30, 1.40, 1.50, and 1.60% SID Lys by increasing the inclusion of crystalline amino acids at the expense of corn. Experimental diets were fed for 11 d. Data were analyzed using generalized linear and non-linear mixed models, fitting the data with heterogeneous residual variances as needed. Competing models included linear (LM), quadratic polynomial (QP), broken-line linear, and broken-line quadratic. For the overall treatment period, increasing SID Lys linearly improved ($P<0.001$) ADG and G:F, with no evidence for differences observed in ADFI ($P>0.05$). For ADG, the best-fitting models were LM [predicted equation: 239.95 + 124.74 × (SID Lys)] and QP [predicted equation: -321.14 + 975.22 × (SID Lys) – 315.70 × (SID Lys)^2]. The maximum ADG was estimated at 1.54% (95% CI: [1.34, >1.60]%), with 99% of the maximum ADG achieved at 1.43% SID Lys in the QP model. Similarly, the best-fitting models for feed efficiency were the QP [predicted equation: 89.81 + 261.27 × (SID Lys) – 63.50 × (SID Lys)^2] and the LM [predicted equation: 222.26 + 86.18 × (SID Lys)], estimating the requirement at greater than 1.60% for both models. In conclusion, the mean SID Lys required for nursery pigs from 7 to 15 kg ranged from 1.54% to at least 1.60% depending on the model and response criteria considered.

Key Words: Lysine, Nursery Pig, Growth

484 Effects of Medicated and Control Feed on Weight Gain and Digestibility in Early Gestation Goats.

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Coccidia has caused major un-thriftiness and substantial weight loss in susceptible small ruminant animals, such as goats, in both large- and small-scale farming. Intestinal damage due to coccidia infections reduce ability of intestines to absorb nutrients such as proteins. Protein within the diet is important in providing amino acids and nitrogen that are essential for weight gain. Weight gain is essential for gestating goats, not only for the health of the female but the health of the kid before and after birth. Decoquinate, a nontoxic quinolone anticoccidial treatment, can decrease these numbers of coccidia cases by developing a resistance towards the parasite. The current study, examined the effect of decoquinate inclusion in the diet on weight gain in mature, gestating, female goats. Twenty early gestation goats between the ages of 1 to 3 years were separated into two groups (n=10) to be fed a medicated (MED) or non-medicated (CON) diet to investigate weight gain. Medicated feed had decoquinate at 22.7 g/ton. Initial body weight of the goats ranged between 38.1 and 75.7 kg. Body weights were taken on 1 d, and 28 d after being on the feed trial, and every 7 d after, until 47 d was reached. The twenty cross-bred goats were housed in a single pen at the University of Findlay's Dr. C. Richard Beckett Animal Science Building. During feeding, goats were placed into individual feeding stalls, each goat received feed at 0.91 kg per 45.4 kg of body weight. All goats were fed twice daily at 0700 and 1800 hours. Overall, average weight gain for CON treatment was not different from the MED treatment, 17.0 lbs and 17.5 lbs respectively (P=0.773). With protein digestibility, no difference was seen in week one between medicated and non-medicated feed; 0.5540 and 0.5989 respectively. However, in weeks 2, 3, and 4, medicated feed had better protein digestibility with means; 0.5000 MED and 0.5989 CON, 0.4900 MED and 0.6011 CON, and 0.5750 MED and 0.6844 CON (P=0.013). Whether decoquinate is added in feeds or not, the effects on the weight gain of gestating goats would be similar to that of an equal nutritional feed. However, protein digestibility increased with inclusion of decoquinate in the diet, leading to a better overall gut health of gestating goats.

Key Words: Goat, Digestibility, Decoquinate