0744 Effects of sugar beet pulp on reproductive performance of gestation sows. Z. Cheng*, D. Hou, Y. Chen, H. Zhang, B. Wang, Y. Wang, S. Bai, H. Lei, S. Jiang, and W. Jin, *Animal Nutrition & Feed Center, COFCO Nutrition and Health Institute, Beijing, China.*

Sugar beet pulp is widely used as feed ingredient in dairy feeds. However, its use in sow feeds may benefit sows because of its high level of fiber. The purpose of the study was to investigate the use of sugar beet pulp to see if there is any benefits for gestation sows fed sugar beet pulp. One hundred gestation sows were divided into three treatments with 33, 34, and 33 sows per treatment, they were fed diets containing 0, 7.5, or 15% of sugar beet pulp at breeding, respectively, for 3 mo. The diets contained the same calculated levels of crude protein and digestible energy. On d 91, they were fed the same lactating sow diets for another 25 d until farrowing. Total number of pigs born were 12.48 ± 2.44, 12.28 ± 2.21, and 13.24 ± 2.26 for sows fed diets containing 0, 7.5, or 15% of sugar beet pulp, respectively. Total pigs born live weight were 17.66 ± 2.87 kg, 17.86 ± 3.82 kg, and 18.45 ± 2.98 kg, for sows fed diets containing 0, 7.5, or 15% of sugar beet pulp, respectively. There were no significant differences in total pigs born and total pigs born live weight among all treatments (P = 0.063). Total number of pigs born alive were 11.76 ± 2.23, 12.00 ± 2.08, and 13.05 ± 2.40, for sows fed diets containing 0, 7.5, or 15% of sugar beet pulp, respectively; total number of pigs born alive were significantly increased ($P < 0.032$) by supplementing 15% sugar beet pulp into gestation sow diets as compared to control sow diets.

Key Words: sugar beet pulp, gestation sows, reproductive performance

0745 Utilizing meta-analyses to generate prediction equations for pork carcass back, belly, and jowl fat iodine value. C. B. Paulk*[1], J. R. Bergstrom[2], M. D. Tokach[1], S. S. Dritz[1], D. D. Burnett[1], J. M. DeRouchey[1], R. D. Goodband[1], J. L. Nelssen[1], and J. M. Gonzalez[1], [1]*Kansas State University, Manhattan,* [2]*DSM Nutritional Products, Inc., Parsippany, NJ.*

Iodine value (IV) is a measure of unsaturated fatty acids and is currently the industry standard for assessing pork fat quality. The objective of this meta-analysis was to use data from existing literature to generate equations to predict back, belly, and jowl fat IV of finishing pigs. The final database resulted in 24 papers with 169 observations for backfat IV, 21 papers with 124 observations for belly fat IV, and 29 papers with 197 observations for jowl fat IV. Some observations (back n = 36, belly n = 37, and jowl n = 45) changed dietary fatty acid composition during the experiment (i.e., switching from higher to lower or lower to higher iodine value product diet), where initial diets (I) were defined as those fed before the change in diet composition and final diets (F) were defined as those fed after the change in diet composition. The predictor variables tested were divided into five groups: 1) diet fat composition (dietary percent C16:1, C18:1, C18:2, C18:3, EFA, and unsaturated fatty acids, and iodine value product) for both I and F diets; 2) duration of feeding of the I and F diets; 3) ME or NE content of the I and F diet; 4) performance criteria (initial BW, final BW, ADG, ADFI, and G:F); and 5) carcass criteria (HCW and backfat thickness). PROC MIXED (SAS institute, Inc., Cary, NC) was used to develop regression equations, and experiment within paper was included as a random effect. Statistical significance for including terms in the models was determined at $P < 0.10$. Evaluation of models with significant terms was then conducted based on the Bayesian Information Criterion (BIC), where the lowest BIC were preferred. Optimum equations to predict back (BIC = 739), belly (BIC = 558), and jowl (BIC = 758) fat IV were: backfat IV = 84.83 + (6.87 × I EFA) − (3.90 × F EFA) − (0.12 × I d) − (1.30 × F d) − (0.11 × I EFA × F d) + (0.048 × F EFA × I d) + (0.12 × F EFA × F d) − (0.0060 × F NE) + (0.0005 × F NE × F d) − (0.26 × backfat depth); belly fat IV = 106.16 + (6.21 × I EFA) − (1.50 × F d) − (0.11 × I EFA × F d) − (0.012 × I NE) + (0.00069 × I NE × F d) − (0.18 × HCW) − (0.25 × BF); and jowl fat IV = 85.50 + (1.08 × I EFA) + (0.87 × F EFA) − (0.014 × I d) − (0.050 × F d) + (0.038 × I EFA × I d) + (0.054 × F EFA × F d) − (0.0066 × I NE) + (0.071 × I BW) − (2.19 × ADFI) − (0.29 × backfat depth). These regression equations may be used to predict the back, belly, and jowl fat IV of finishing pigs fed different diets.

Key Words: Iodine value, meta-analysis, pork quality

0746 The effects of copper source (copper sulfate or methionine hydroxy analogue chelate; Mintrex) on growth performance, carcass characteristics, and barn cleaning time in finishing pigs. K. F. Coble*[1], J. M. DeRouchey[1], M. D. Tokach[1], S. S. Dritz[1], B. Lawrence[2], J. Escobar[2], J. C. Woodworth[1], R. D. Goodband[1], and N. Boettger[2], [1]*Kansas State University, Manhattan,* [2]*Novus International, St. Charles, MO.*

Copper source and feeding duration on growth performance, carcass characteristics, and pen wash time were determined using 1196 pigs (initially 25.7 kg BW) in a 111-d study. Pigs were allotted to one of six dietary treatments, based on initial pen weight in a randomized incomplete block design with 26 pigs/pen and seven to eight pens/treatment. A negative control diet was supplemented with 17 ppm Cu from the basal trace mineral. Remaining diets were formulated by supplementing the negative control with 50 ppm Cu from $CuSO_4$ or Mintrex, or 125 ppm Cu from $CuSO_4$. The 50 ppm Cu as CuSO4 diet was fed for 111 d. The 50 ppm Mintrex and 125 ppm CuSO4 diets were fed for either 42 or 111 d. Diets were formulated 0.05% below the estimated standardized ileal digestible Lys

Table 0746. Copper source, level and duration for finishing pigs

Cu source		$CuSO_4$	Mintrex Cu	$CuSO_4$	Mintrex Cu	$CuSO_4$		
Added Cu, ppm		50	50	125	50	125		Treatment,
Duration, d	0–111	0–111	0–42	0–42	0–111	0 -111	SE	*P* <
d 111 BW, kg	122.7	124.6	124.3	122.5	125.3	125.0	1.33	0.16
ADG, kg	0.890	0.907	0.901	0.883	0.909	0.901	0.008	0.12
ADFI, kg	2.25[c]	2.33[a]	2.26[bc]	2.25[c]	2.30[abc]	2.31[ab]	0.027	0.02
G:F	0.397[ab]	0.389[c]	0.399[a]	0.393[abcc]	0.396[abc]	0.390[bc]	0.003	0.04
HCW, kg	89.0	89.3	88.9	89.4	89.7	90.2	0.92	0.71
Wash time, s	345	332	323	365	324	352	15.2	0.26

[1] Means within row with different superscripts differ, $P < 0.05$.

requirement. Average daily gain was not affected ($P > 0.12$). Pigs fed either 50 or 125 ppm of Cu from $CuSO_4$ from d 0–111 had greater ADFI ($P < 0.02$) than pigs fed the control or diet with 50 ppm of added Cu from Mintrex from d 0–42. Feed efficiency was poorer ($P < 0.04$) for pigs fed either 50 or 125 ppm of added Cu from $CuSO_4$ fed throughout compared with those fed 50 ppm of Cu from Mintrex from d 0 to 42. There were no differences in final BW, HCW, or pen wash time. In summary, pigs fed 50 ppm of Cu from Mintrex for the first 42 d of the finishing period had improved G:F compared with pigs fed 50 or 125 ppm of Cu from $CuSO_4$ for the complete finishing period; however, G:F for those pigs was not improved when compared to those not fed added Cu.

Key Words: finishing pig, copper, wash time

0747 Immunocastration affects testicular mass, serum concentrations of testosterone, and average daily gain of boars. D. Lugar*[1], S. Clark[2], S. Callahan[1], L. Wittish[1], and M. Estienne[3], *[1]Virginia Tech, Blacksburg, [2]Virginia–Maryland Regional College of Veterinary Medicine, Blacksburg, VA, [3]Virginia Tech, Suffolk.*

The objective of this study was to determine the effects of an immunological castration product (Improvest, Zoetis) on reproductive steroid hormones, reproductive organs, and growth. A total of 72 Landrace x Yorkshire boars (69 d of age, 22.76 ± 4.64 kg BW) were used in two successive replications. This study was a randomized design with three treatment groups: single injection (SI) of Improvest at 10 wk of age, double injection (DI) of Improvest at 10 and 15 wk of age, and intact controls (no Improvest; CNT) ($n = 24$ per group). At wk 10, 15, 20, and 25, blood was collected and serum harvested to evaluate testosterone concentrations via RIA, and BW were determined. At wk 25, 18 pigs ($n = 6$ per group) were sacrificed and testicles were removed, weighed, and measured for length, width, and circumference. Statistical analysis was performed using JMP Pro 10. Testosterone concentrations at wk 20 and 25 were less ($P < 0.0001$ and $P = 0.0003$, respectively) for DI (0.065 ng/mL and 1.178 ng/mL, respectively) compared to SI (1.589 ng/mL and 6.372 ng/mL, respectively) and CNT (1.356 ng/mL and 5.920 ng/mL, respectively). Testosterone concentration for wk 10 and 15 were similar ($P = 0.5332$ and $P = 0.7875$, respectively) among the three treatments. Body weights were greater ($P = 0.017$) for DI compared to CNT at wk 25 (122.0 kg and 117.6 kg, respectively), while SI (120.1 kg) was not different ($P = 0.398$) from DI and tended ($P = 0.119$) to be greater than CNT. The ADG from birth to the initiation of the treatments (10 wk of age) was not different ($P = 0.7631$) among treatments; ADG from 10 to 25 wk of age was greater ($P = 0.0093$) for DI compared to CNT and there was a tendency ($P = 0.067$) toward a greater ADG for SI compared to CNT. Both left and right testicle length, width, and circumference were less ($P < 0.0001$) for DI compared to SI and CNT. Testicle wt (g/kg BW) was less ($P < 0.0001$) for both the left and right testicles for DI compared to SI and CNT. The results of the current study indicate that immunological castration has a major impact on ADG and that a single injection tended to cause a greater ADG when compared to intact males

Key Words: boars, immunocastration, swine

0748 New perspectives to the enterotoxigenic *E. coli* F4 infection model in weanling piglets in relation to the susceptibility genotypes and bacterial shedding. P. J. Roubos*, R. H. G. M. Litjens, J. W. Resink, and Y. M. Han, *Nutreco Research & Development, Boxmeer, Netherlands.*

Post-weaning diarrhea caused by enterotoxigenic *E. coli* (ETEC) is a major problem in weaner piglets. Responses of individual animals to ETEC infection are very different and show high varieties in animal experiments with ETEC infection. The aim of this study was to optimize the ETEC F4ac infection model in piglets by combining the genotype susceptibility with performance and bacterial shedding.

Before weaning 120 male piglets (individual housed) were tested for susceptibility or resistance towards ETEC O149:F4ac by a DNA marker based test. After weaning (27 ± 2-d-of-age) the piglets were orally infected with 5 mL of an inoculum suspension (containing $1.5*10^8$ CFU/ml ETEC F4ac in a 2.5% sucrose solution) at d 7, 8, and 9 after weaning. Fecal bacterial shedding was determined at d 7 (before challenge), 10, and 13 by spreading on CBA plates. Hemo-