SRB1, *ACAT1, PON1,* and *APOB100* remained unaltered between groups at all time points ($P > 0.05$). Assessing reproductive competence through mRNA abundance of genes required for growth and ovulation (*SRB1, FSHR,* and *LHR*) in GCs remained unchanged ($P > 0.05$). Taken together, transition period features increasing cholesterol, triglycerides and decreasing glucose and glutathione compared to pre-calving period. Further studies, including liver function assays, are required to thoroughly investigate the relationship between liver health, reproductive health, and alterations in circulating metabolic indicators.

Key Words: transition cow, liver, ovarian function
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121 Impact of estrus expression and conceptus presence on plasma and uterine glucose concentrations up until maternal recognition of pregnancy in beef cattle. E. J. Northrop[1,*], J. J. J. Rich[1], R. A. Cushman[2], G. A. Perry[1], *[1]Department of Animal Science, South Dakota State University, Brookings, [2]USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE.*

Glucose is an essential component of uterine luminal fluid (ULF); it is a major energy source utilized by the conceptus for growth and development. Previously, we reported increased concentrations of glucose in the ULF of cows that exhibited estrus and observed differences in glucose transporter transcript abundance within the uterine endometrium. Our objective was to determine the relationship between plasma and uterine glucose concentrations throughout the estrous cycle and early stages of pregnancy. Beef cows/heifers were synchronized with the CO-Synch protocol and artificially inseminated (d0). Cows were classified by expression of estrus (estrus and no estrus). Blood was collected to determine glucose concentrations (d0, d5, d8, d10, d12, d16) using the Glucose Liquicolor assay. Uteri were flushed to collect d16 conceptuses nonsurgically (Rep 1; $n = 29$) or following slaughter (Rep 2; $n = 37$). Flush media were analyzed for glucose concentration. Data were analyzed using the MIXED procedure in SAS. There was an effect of replicate on glucose concentration ($P < 0.006$). There was no effect of time ($P = 0.79$) or conceptus ($P = 0.16$) on glucose concentration; however, there was a tendency for estrus cows to have lower glucose concentrations compared to no estrus cows ($P = 0.06$). There were no two-way interactions between time, conceptus, and estrus ($P > 0.24$). There was no correlation between uterine and plasma glucose concentrations in either replicate on d10, d12, and d16. In summary, there was no effect of time or conceptus on glucose concentration in beef cows, while estrus cows tended to have decreased glucose concentration. There was no correlation between uterine and plasma glucose concentration; therefore, the increased uterine glucose concentration among estrus cows on d16 is most likely due to changes in specific glucose transporter expression in the uterine endometrium. USDA is an equal opportunity provider and employer.

Key Words: maternal recognition of pregnancy, estrus, glucose
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GROWTH, DEVELOPMENT, MUSCLE BIOLOGY AND MEAT SCIENCE SYMPOSIUM:

IS BIGGER BETTER? A DISCUSSION ABOUT THE BENEFITS AND IMPLICATIONS OF PIGS BECOMING HEAVIER

122 Heavy weight market pigs: Status of knowledge and future needs assessment. F. Wu*, K. R. Vierck, J. M. DeRouchey, T. G. O'Quinn, M. D. Tokach, R. D. Goodband, S. S. Dritz, J. C. Woodworth, *Kansas State University, Manhattan.*

Marketing weight is an important economic variable that impacts the productivity and profitability of finishing pig production. Marketing weight has been increasing worldwide over the past decades driven by the dilution of fixed production cost and the improvement of genetic selection of lean-type pigs. A literature review was conducted based on studies reporting production of finishing pigs with marketing weight greater than 130 kg. Sensitivities of growth, carcass, and pork quality traits in response to increasing marketing weight by 10 kg increments were generated using simple linear regression. Average responses were calculated as the mean among studies. Increasing marketing weight affected overall pig growth; in particular, cumulative ADG over the finishing period decreased by 4.0 g/d, ADFI increased by 78.1 g/d, and G:F decreased by 0.011 for every 10 kg increase of marketing weight. Increasing marketing weight by 10 kg increased carcass yield by 0.41% units, backfat by 1.8 mm, LM area by 1.8 cm^2, carcass length by 2.2 cm, and belly yield by 0.32% units but decreased percentage of fat-free-lean by 0.78% units, loin, shoulder, and ham yields by 0.13, 0.16, and 0.17% units, respectively. Studies evaluating the effects of marketing weight on pork quality observed decreased pH by 0.02 and 0.01 at 45 min and 24 h postmortem, respectively, and an increased a* value by 0.28 per 10 kg marketing weight increase. Heavier pigs had increased concentrations of SFA and intramuscular fat. Conflicting results for L* and b* values, drip loss, Warner-Bratzler shear force, and sensory properties were reported. Also, there has been limited evaluation of nutrient requirement for pigs greater than 140 kg BW. Increased weight and size of heavy pigs require adjustments on barn and facility design; specifically, greater floor space (0.2 m^2), feeder space

(0.45 cm), drinker height (1 cm), truck space (1.4 m^2), and ventilation requirement are needed for every 5 kg increase in BW from 125 to 150 kg. Increasing marketing weight also creates challenges for processing facilities and equipment, but no published data are available to address the chilling rate requirement, pork safety, and consumer preference associated with heavier carcasses. In conclusion, increasing marketing weight creates both opportunities and challenges to current finishing pig production, and future research is needed to provide nutritional and management guidelines as well as understand how meat quality may be influenced.

Key Words: marketing weight, heavy pig, meat quality
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GROWTH, DEVELOPMENT, MUSCLE BIOLOGY AND MEAT SCIENCE

123 Performance and docosahexaenoic acid (DHA) content in longissimus dorsi and backfat tissues of grow-finish pigs fed diets differing in heterotrophically grown algae content.

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Algae sources high in DHA provided in diets fed pigs can potentially produce a more nutritionally desirable pork product for consumers. The objective of this study was evaluation of performance and DHA content of longissimus dorsi (LD) and backfat of grow-finish pigs fed diets containing 0, 0.25, or 0.50% unextracted *Aurantiochytrium limacinum* CCAP 4087/2 algae (FORPLUS™, Alltech Inc). Diets were formulated not to exceed maximums permitted in Europe and contained no antibiotic growth promoters. The study involved 144 pigs (72 gilts and 72 barrows) of 27.9 ± 2.5 kg initial weight. The trial lasted 121 d (112 d and 9 d to slaughter of all pigs). Pigs remained on assigned test diets during the 9d between final weight measurement and slaughter. The study was divided into two growing periods (0□56 and 56□112 d, respectively) for calculation of average daily gain (ADG) and efficiency (feed:gain) on all animals. At trial end carcass characteristics from 72 animals were evaluated. Carcasses from only half the animals were evaluated owing to logistic and economic practicalities. The animals were selected based on live weight near treatment means within gender. DHA content of LD and backfat were sampled from each right side carcass at the 13th rib. Data were subjected to ANOVA with means separated using student's *t* test and Tukey test. ADG, feed:gain, feed, and water intake were unaffected by dietary treatment ($P > 0.05$). Carcass lean content revealed a treatment × gender interaction ($P < 0.05$): gilt backfat tended to increase with algae level with a trend toward lower LD thickness while the opposite was true for barrows. DHA content of LD differed with gender ($P < 0.05$), though differences are only apparent in higher values for barrows given 0.5% algae. In gilts, loin DHA content increased with dietary algae (3.3X control values at 0.25% algae, and 4.5X control values at 0.5%; 0.0054, 0.0178, and 0.243 g/100 g tissue, respectively, $P < 0.0001$). Corresponding values in barrows at 0, 0.25, and 0.5% dietary algae were 0.0059, 0.0178, 0.0297 g DHA/100 g tissue. Backfat DHA increased in response to algae level $P < 0.05$. Values were 0.047, 0.187, and 0.307 g/100 g fat for pigs given 0, 0.25, and 0.5% algae, respectively. It was concluded that DHA content of LD and backfat in pigs fed throughout the grow-finish period increased with dietary algae content. DHA increases in LD of 3.3X and 4.5X allow dosage to be calculated to meet target DHA values.

Key Words: algae, fatty acids, grow-finish
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124 Docosahexaenoic acid content in longissimus dorsi and backfat tissues of grow-finish pigs fed diets containing 0, 0.25 or 0.5% heterotrophically grown algae: Study 2.

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Higher DHA content of pork is of interest to consumers and could provide an added value product for producers and retailers. The study evaluated performance and some aspects of carcass characteristics and composition of grow-finish pigs fed diets containing 0, 0.25, or 0.50% unextracted *Aurantiochytrium limacinum* CCAP 4087/2 algae (FORPLUS™, Alltech Inc). A total of 144 pigs (72 gilts and 72 barrows) of 24.1 ± 2.6 kg live weight were fed for 117 d (112 d study plus 5 d to slaughter date). Pigs remained on assigned test diets from the final weight measurement at 112 d to slaughter at 117 d. Average daily gain (ADG), efficiency (feed:gain), and feed intake were measured at 112 d on all animals. Each dietary treatment was replicated in 8 pens (4 pens of gilts and 4 pens of barrows) of 6 animals. At trial end carcass characteristics from 72 animals (3 per pen, half barrows, half gilts) were evaluated. Carcasses from half the animals were used owing to logistical and economic practicalities. Animals were selected with live weights near treatment means within gender. Samples for DHA analysis of LD and backfat were obtained from each right carcass at the 13th rib. ADG, feed intake, and feed:gain were unaffected by algae addition ($P > 0.05$). Algae had no effect on backfat and LD thickness or lean meat content. DHA content (g/100 g of tissue) increased in LD and backfat of both genders ($P < 0.05$). LD DHA values were 0.0074, 0.0172, and 0.0252 g/100 g tissue for 0, 0.25, and 0.50% dietary algae, respectively. Total omega-3 FA and omega-3:omega-6 ratio were also increased in LD ($P < 0.05$). In backfat, total omega-3 FA and the omega-3:omega-6