RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Nutritional strategies to reduce nursery-finisher disease severity - **#20-114 IPPA**

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Date Submitted: April 5th, 2022

Scientific Abstract:
This research was to better understand how to nutritionally manage poor-health pig flows that are prone to rotavirus and PRRS virus exposure to obtain maximal performance in the face of disease pressures. Two objectives were addressed in three experimental studies. Nursery pigs are frequently faced with disease challenges and producers are seeking nutritional strategies to help pig performance and health. In Objective 1A, we evaluate five dietary formulation strategies that may improve performance in poor health nursery flow pigs (confirmed Rotavirus A and hemolytic E. coli positive at d 14). A total of 431 weaned pigs (5.5 ± 1.25 kg BW) were assigned to pens (10-11 pigs/pen) and one of five diets (n=8 pens/treatment) over a 63-day test period consisting of 4 diet phases using a complete randomized design. In phase 1 and 2, treatments were: 1) 15-25% low soybean meal (LSBM), 2) 35-45% high soybean meal (HSBM), 3) 130% increase in valine and isoleucine branched-chain amino acids (BCAA) to Lys, 4) 2.1% combination of C8, C10 and C12 medium chain fatty acids (MCFA), and 5) 20% modified oats (MO). All pigs were fed a common diet for phases 3 and 4. Within phase, all diets were isocaloric with similar SID Lys:ME. Pen was considered the experimental unit and data were analyzed with contrast statements comparing each diet against the LSBM control. Across all phases, compared to LSBM, HSBM, BCAA and MO did not alter ADG, ADFI and G:F ($P > 0.10$). However, MCFA reduced ($P < 0.05$) ADG in phase 1 (0.20 vs 0.16 kg) and 2 (0.45 vs 0.39 kg) and phase 2 ADFI (0.66 kg vs 0.58 kg) compared to the LSBM treatment. Overall (0-63 days), compared to the LSMB, the MCFA treatment reduced ADG (0.46 vs 0.42 kg, $P = 0.004$) and ADFI (0.75 vs 0.68 kg, $P = 0.009$). Diet did not affect mortality. These data report that MCFA attenuated nursery pig performance, while HSBM, MO and BCAA diets fed in phases 1 and 2 had no longitudinal impact on pig performance or health. In objective 1B, 72 newly weaned pigs, 19-21 days of age (PIC 337 x 1050), were selected from a pig flow and determined positive for coccidia, rotavirus A, B and C, and toxigenic F18 E. coli. Pigs were housed in individual pens and randomly allotted to one of four dietary treatments (Table 3) for 14 days (n=18 pigs/trt): 1) Control, containing 5% oat groats, 2) #1 plus 3000 ppm zinc and 200 ppm copper, 3) As #1, no oats, but 5% soyhulls and 4) As #1, no oats, but 5% sugar beet pulp. Body weights and feed intake recorded to calculate ADG, ADFI and feed efficiency (G:F) on day post-weaning 0, 7 and 14. Daily feed intake was recorded by weighing feed disappearance daily. In objective 2, increasing dietary SID Lys:ME augments growth performance of Porcine Reproductive and Respiratory Syndrome virus (PRRSV) challenged pigs when diets with greater SID Lys concentrations are in place at time of infection. Our objective was to evaluate the delayed implementation of increased SID Lys:ME diets post PRRSV challenge on pig performance. 491 grower pigs (45.8 ± 7.4 kg BW) were assigned to one of three dietary strategies (n=16 pens/treatment, 10-11 pigs/pen). All pigs received a common diet

from day post inoculation (dpi) -14 to dpi 21 (Phase 1), that met SID Lys:ME recommendations. From dpi 21 to 77 (market body weight), dietary treatments were implemented in two dietary phases (P2 and P3). The three treatments were 2.23 g/Mcal (100%), 2.56 g/Mcal (115%), 2.90 g/Mcal (130%) in P2; and 1.92 g/Mcal (100%), 2.21 g/Mcal (115%), 2.49 g/Mcal (130%) in P3. On dpi 0, all pigs were inoculated with PRRSV. Pig BW, feed disappearance and feed efficiency were determined in each phase. Data were analyzed with pen as the experimental unit in a complete randomized design. During P1, ADG, ADFI, or G:F did not differ ($P<0.05$). In P2 and P3, ADG, ADFI, or G:F did not differ between the 100%, 115% and 130% treatments ($P > 0.10$). Overall, ADG (0.90, 0.90 and 0.92 kg/d, $P = 0.44$) and ADFI (2.61, 2.57 and 2.57 kg/d, $P = 0.48$) did not differ between the 100%, 115% and 130% treatments, respectively. However, overall G:F was significantly higher for the 130% compared to the 100% and 115% treatments (0.36 versus 0.34 and 0.35, respectively; $P = 0.021$). Mortality was similar across treatments ($P = 0.717$). In conclusion, delayed feeding of diets with increased SID Lys:ME post infection was not beneficial to pig performance and this diet strategy needs to be in place near time of disease challenge.