(0.36 vs 0.35) compared to pigs not fed carnitine and the response was additive to that of RAC. In analysis of the treatments common to all experiments, pigs fed diets containing RAC had increased ($P < 0.01$) ADG (1.03 vs 0.93 kg) and G:F (0.40 vs 0.35) compared to pigs not fed RAC. Carnitine tended to increase ($P < 0.07$) ADG (1.00 vs 0.96 kg) and improved ($P < 0.01$) G:F (0.38 vs 0.37) compared to pigs not fed carnitine. These results suggest that carnitine and RAC improve growth performance of finishing pigs with the greatest response to carnitine occurring in commercial environments.

Key Words: Carnitine, Ractopamine, Pigs

195 Interactive effects of dietary L-carnitine and ractopamine HCl (Paylean®) on finishing pig carcass characteristics and meat quality.

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Three experiments utilizing 1,356 pigs were conducted to determine the interactive effects of dietary carnitine and ractopamine HCl (Paylean®, RAC) on carcass and meat quality. Experiments were arranged as factorials with main effects of carnitine and RAC. Carnitine levels were 0, 25, or 50 ppm in Exp. 1 and 2 and 0 or 50 ppm in Exp. 3. Ractopamine levels were 0, 5, or 10 ppm in Exp. 1 and 0 or 10 ppm in Exp. 2, and 3. Dietary carnitine was fed from 38 kg to market (Exp. 1 and 3) or for 4 wk before market (Exp. 2). Ractopamine was fed for 4 wk. Experiments 1 and 2 were conducted at university research facilities and Exp. 3 in a commercial research barn. A carnitine × RAC interaction ($P < 0.02$) was observed for visual color, L*, and a*/b* in Exp. 1. In pigs fed RAC, increasing carnitine decreased L* and increased visual color scores and a*/b* compared to pigs not fed RAC. Ultimate pH tended to increase (linear, $P < 0.07$) with increasing carnitine. Drip loss decreased (linear, $P < 0.04$) in pigs fed increasing carnitine. In Exp. 2, a carnitine × RAC interaction was observed ($P < 0.04$) for visual firmness and drip loss. Visual firmness scores decreased in pigs fed increasing carnitine and no RAC, but increased with increasing carnitine when RAC was added to the diet. Drip loss decreased with increasing levels of carnitine when fed with RAC. Percentage lean was higher ($P < 0.01$) for pigs fed RAC. A carnitine × RAC interaction ($P < 0.03$) was observed in Exp. 3 for fat thickness and percentage lean. Fat thickness decreased and lean percentage increased in pigs fed carnitine or RAC, but the responses were not additive. Pigs fed carnitine tended ($P < 0.06$) to have decreased drip loss. Pigs fed RAC had decreased ($P < 0.05$) 10th rib and average backfat and decreased drip loss compared to pigs not fed RAC. These results suggest that ractopamine increases carcass leanness and supplemental carnitine reduces drip loss when fed in combination with ractopamine.

Key Words: Carnitine, Ractopamine, Pigs

196 Effects of fish oil on growth performance, immune, adrenal and somatotrophic responses of weanling pigs after lipopolysaccharide challenge.

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Seventy-two crossbred pigs weaned at 28 d of age were used to investigate the effects of fish oil on growth performance, immune, adrenal, and somatotrophic responses following E. coli lipopolysaccharide (LPS) challenge in a 2 × 2 factorial arrangement of treatments. The main factors consisted of oil type (7% corn oil or fish oil) and immune challenge (LPS or saline). Pigs were randomly assigned to treatments. On d 14 and 21 postweaning, pigs were i.p. injected with either 200 μg/kg BW of LPS or an equivalent amount of sterile saline. At 3 h post-injection, blood plasma samples were collected for analysis of IL-1β, cortisol (CS), GH, and IGF-I. On d 2 after LPS challenge, blood samples were collected for lymphocyte proliferation and antibody responses to Albumin Bovine V Boehringer (BSA). The performance parameters of ADG, ADFI, and G:F were also evaluated during the 28 d experiment. Our results indicated that LPS-challenge depressed ADG ($P \leq 0.05$) from d 14-28 and ADFI ($P \leq 0.05$) from d 14-21. On both d 14 and 21, plasma IL-1β ($P \leq 0.01$), CS ($P \leq 0.001$), and blood lymphocyte proliferation ($P \leq 0.05$) were increased, whereas IGF-1 ($P \leq 0.01$) was decreased after LPS-challenge. LPS-challenge also resulted in decreased plasma GH ($P \leq 0.05$) on d 14. Neither LPS-challenge or oil type affected serum antibody response to BSA ($P \geq 0.10$). Fish oil did improve ADG and ADFI during the first LPS-challenge period (d 14-21; $P \leq 0.10$). No LPS-challenge × oil type interactions were observed for any of the growth performance parameters during the 28 d period ($P \geq 0.10$). Fish oil decreased blood lymphocyte proliferation incubated with 16 μg/mL concanavalin A during the first challenge period ($P \leq 0.10$); however, no LPS-challenge × oil interaction was observed ($P \geq 0.10$). On both d 14 and 21, feeding fish oil decreased plasma CS ($P \leq 0.05$) and plasma IL-1β ($P \leq 0.10$) in LPS-challenged pigs. Pigs fed fish oil also had higher plasma IGF-1 ($P \leq 0.10$) as compared to pigs fed the corn oil diet on both d 14 and 21. No LPS-challenge × oil interaction was observed for plasma GH ($P \geq 0.10$). These data suggest that fish oil alters indices of the immune axis that may lead to improved growth performance during an inflammatory challenge.

Key Words: Pigs, Fish Oil, Lipopolysaccharide

197 Evaluation of a botanical extract in non-medicated diets for pigs 15 to 113 kg body weight.

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A botanical extract (Xtract) addition to antibiotic free diets was evaluated in 3 trials. In Exp. 1, 549 pigs (15.1 ± 0.82 kg) were allotted to 1 of 3 treatments (n = 8), either non-medicated diet (Non-Med), Non-Med + 182 g/t Xtract, or medicated with Tylan at 44 g/t (Med). During the 21-d trial, ADG tended to be lower ($P < 0.10$) for the Non-Med (571 g/d) compared with Xtract (610 g/d) and Med (615 g/d) pigs. Intake was similar ($P > 0.10$) across treatments (927 ± 59.9 g/d) resulting in an improvement in gain/feed ($P < 0.01$) for the Xtract (0.65) compared with Non-Med (0.62) treatments. Gain/feed was highest ($P < 0.05$) for the Med (0.68) treatment. In Exp. 2, 254 pigs (30.2 ± 1.46 kg) were used to evaluate Xtract vs. Non-Med in a 91-d trial (n = 6). No treatment differences were detected ($P > 0.10$). Pigs had an ADG of 914 ± 41.8 g/d with a gain/feed of 0.39 ± 0.03. In Exp. 3, 351 pigs (24.3 ± 0.76 kg) were allotted to Non-Med, Xtract, or Med treatments (n = 6) in a 100-d trial. In Exp. 3, the Med group consisted of a rotation of 660 g/t chlortetracyline for 7 d followed by 44 g/t of Tylan for 21 d. Cumulative ADG (885 ± 29.6 g/d) and gain/feed (0.39 ± 0.02) were not different ($P > 0.10$) across treatments. However, during period 3 (day 43 to 64) an undiagnosed digestive disturbance occurred. During this period, gain/feed was improved ($P < 0.05$) for the Xtract (0.42) and Med (0.42) treatments compared with Non-Med (0.38). The improvement in gain/feed was the result of a numerical improvement ($P > 0.20$) in ADG (889 vs 928 and 942 g/d) and numerical decrease ($P > 0.31$) in intake (2.38 vs 2.25 kg/d). Results of these experiments suggest that during periods of disease challenge, Xtract may improve ADG and gain/feed compared with Non-Med pigs. This improvement may be intermediate to, or equal to that observed with in-feed antibiotics. When no disease challenge is present, pig performance may not be improved by either Xtract or the antibiotic programs evaluated in these trials.

Key Words: Botanical Extract, Pigs, Antibiotics

198 Effect of milk supplementation with *Lactobacillus brevis* 1E-1 on intestinal microflora, intestinal morphology, and pig performance.

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Two experiments were conducted to determine the effect of milk supplementation with *Lactobacillus brevis* 1E-1 on pig performance, intestinal microflora, and gut morphology. Litters were allotted to two treatments at farrowing: 1) control milk supplement, and 2) as 1 with 1E-1. At weaning, pigs from the two lightest blocks were offered the control treatment for 5 d. One pig/litter was sacrificed at 10, 22 (weaning), and 28 d of age to assess gut morphology and intestinal microflora populations. In Exp. 1, pigs fed 1E-1 had a greater ADG ($P \leq 0.05$) compared to the control in the first 5 d postweaning. Small pigs provided milk supplement also had increased ADG ($P \leq 0.05$) in the first 5 d postweaning compared to normal-sized pigs. Gain:feed was greater ($P \leq 0.05$) from d 0 to 14 after weaning when small pigs were previously fed 1E-1 compared to control pigs, while previous supplementation did not affect performance of normal-sized pigs (interaction, $P \leq 0.05$). Data previously reported from this experiment indicated that 1E-1 decreases *E. coli* populations in the jejunum pre-weaning and at weaning