

Title: Replacing dietary antibiotics with L-glutamine and synbiotics following weaning and transport in pigs – NPB #18-020

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Scientific Abstract:

Dietary antibiotic use has been limited in United States swine production due to concerns regarding antibiotic resistance. However, this may negatively impact the health, productivity and welfare of pigs. Therefore, the study objective was to determine if combining dietary synbiotics and 0.20% L-glutamine would improve pig growth performance and intestinal health following weaning and transport when compared to traditionally used dietary antibiotics. Because previous research indicates that L-glutamine improves swine growth performance and synbiotics reduce enterogenic bacteria, it was hypothesized that supplementing diets with 0.20% L-glutamine (GLN) and synbiotics [SYN; 3 strains of *Lactobacillus* (1.2×10^9 cfu/g of strain/pig/day) + β -glucan (0.01 g/pig/day) + fructooligosaccharide (0.01 g/pig/day)] would have an additive effect and improve pig performance and intestinal health over that of dietary antibiotics. Mixed sex pigs (N = 226; 5.86 ± 0.11 kg BW) were weaned (19.4 ± 0.2 d of age) and transported for 12 h in central Indiana. Pigs were blocked by BW and allotted to 1 of 5 dietary treatments (5 to 6 pigs/pen); antibiotics (A; chlortetracycline [441 ppm] + tiamulin [38.5 ppm]), no antibiotics (NA), GLN, SYN, or the NA diet with both the GLN and SYN additives (GLN+SYN) fed for 14 d. From d 14 post-weaning to the end of the grow-finish period, all pigs were provided common antibiotic-free diets. Data were analyzed using PROC MIXED in SAS 9.4. Overall, haptoglobin was greater ($P = 0.03$; 216%) in NA pigs compared to A pigs. A diet x day effect was detected where on d 13, GLN and A pigs tended to have reduced ($P = 0.07$; 75.2 and 67.3%, respectively) haptoglobin compared to NA pigs. On d 34, the jejunal goblet cell count per villi and per mm tended to be greater ($P < 0.08$; 71.4 and 62.9%, respectively) in SYN pigs compared to all other dietary treatments. Overall, jejunal mucosa TNF α gene expression tended to be greater ($P = 0.09$; 40.0%) in NA pigs compared to A pigs on d 34. In addition, jejunal mucosa TNF α gene expression tended to be greater ($P = 0.09$; 33.3, 41.2, and 60.0%, respectively) in GLN pigs compared to SYN, GLN+SYN, and A pigs on d 34. Although it was determined that some metrics of pig health were improved by the addition of GLN and SYN (i.e., haptoglobin, goblet cell count), overall there were very few differences detected between dietary treatments and this may be related to the stress-load incurred by the pigs.

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