

Effects of dietary nucleotides on intestinal morphology and microbial activity in newly weaned pigs

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ABSTRACT: Two experiments were conducted to determine effects of nucleotides in diets for weanling pigs. In Exp. 1, 20 pigs were weaned at 19 d of age and fed a conventional starter diet (Diet 1) or this diet supplemented with nucleotides (Diet 2) in amounts that correspond to 100% of the quantities of nucleotides found in sow milk on d-14 of lactation (i.e., 117, 56, 185, 23, and 2,334 ppm of AMP, CMP, GMP, IMP, and UMP, respectively). AMP was supplied as 5'AMP disodium salt (Fisher Scientific, Hampton, NH) while the other nucleotides were supplied as purified nucleotides (Sigma-Aldrich Co, St. Louis, MO). Five pigs from each treatment group were sacrificed on d-14 post-weaning and the remaining pigs were sacrificed on d-28. Intestinal morphometry and microbiology were measured. On d-14, duodenal villus height (VH) was lower ($P = 0.03$) in pigs fed Diet 2 compared to pigs fed Diet 1 (353 vs. 426 μm), but ileal VH and VH:Lamina Propria Debt (LPD) were higher ($P = 0.01$) in pigs fed Diet 2 compared to pigs fed Diet 1 (321 vs. 239 μm and 1.56 vs. 1.23 μm , respectively). On d-28, duodenal LPD and VH:LPD were higher ($P < 0.05$) in pigs fed Diet 2 compared to pigs fed Diet 1 (398 vs. 326 μm and 1.78 vs. 1.38 μm , respectively). Exp. 2 was an in-vitro study that was conducted to determine the antimicrobial and prebiotic properties of nucleotides. Bacterial growth in broth with or without nucleotide supplementation was measured in duplicate samples. The broth supplemented with nucleotides increased ($P = 0.03$) total coliform count compared to broth without nucleotide supplementation at 8 h (10.22 vs. 10.12 \log_{10} cfu/g). At 16 h, the supplemented broth had a lower *Cl. perfringens* count ($P < 0.01$) compared to broth not supplemented with nucleotides (6.78 vs.

7.15 log₁₀ cfu/g). The results indicate that nucleotide supplementation during the post-weaning period positively influences gastrointestinal morphology and microflora.

Key Words: Intestinal morphology, Microflora, Nucleotides, Pigs