

ANIMAL SCIENCE

Title: Refining a model to investigate the interactive effects of health status and nutrition on nutrient and energy utilization in pigs - **NPB: #14-237**

Investigator: Thomas Burkey

Institution: University of Nebraska - Lincoln

Co-Investigators: Phil Miller, Daniel Ciobanu, Samodha Fernando

Date submitted: December 8, 2016

Scientific Abstract

To refine a model to investigate the interactive effects of health status and nutrition on nutrient and energy utilization in pigs, three experiments were conducted. For Exp. 1, a total of 156 crossbred barrows (Large White x Landrace) were screened for PCV2 specific immunoglobulin G and M. Pigs ($n = 100$) with a sample-to-positive ratio (S/P) lower than 1.26 for passive IgG, and 1.0 for passive IgM were used for the study. At d 17 of age, 40 piglets were vaccinated for PCVAD with a single dose of Ingelvac CircoFLEX vaccine and the remaining 60 pigs were not vaccinated for PCVAD. At weaning, all pigs were fed a simple corn-soybean meal diet (without antibiotics) until approximately 30 d of age at which time all pigs were transferred to the UNL Animal Science Complex (Lincoln, NE) where the experimental infection was conducted. Upon arrival at the UNL Animal Science Complex, pigs ($n = 100$; average BW = 7.1 kg; average age = 34.3 d) were sorted by initial BW and PCV status (vaccinated or inoculated) and randomly assigned to 24 pens (4-5 pigs/pen). At the conclusion of Exp. 1, pigs were selected from Exp. 1 to be used in the subsequent 2 experiments based on a statistical analysis to determine growth residuals between actual and predicted final BW using initial and final BW, day of infection, litter, pen, and maternal IgG from Exp. 1. For Exp. 2, vaccinated ($n = 16$) and inoculated ($n = 16$) pigs (average BW, 31.5 ± 1.26 kg), with a low net residual BW were selected, and were housed 2 pigs/pen by treatment for a total of 36 pigs. For Exp. 3, additional vaccinated ($n = 16$) and inoculated ($n = 16$) pigs were selected from Exp. 1 pigs. The pigs selected for Exp. 3 included an equal number of pigs with high (positive) BW residuals (average BW, 33.6 ± 3.22 kg) and with low (negative) residuals (average BW, 27.6 ± 4.48), greater or lesser final BW compared with predicted BW, respectively. Therefore, Exp. 3 included 4 treatment groups: 1) vaccinated pigs with high BW residuals; 2) vaccinated with low BW residuals; 3) inoculated with high BW residuals; and 4) inoculated with low BW residuals. Pigs were individually housed in a different room within the UNL Animal Science Complex. Growth performance, apparent total tract digestibility and carcass traits (Exp. 2 and 3 only) were evaluated. For Exp. 1, no differences in BW, ADG, ADFI, or G:F were detected. Apparent total tract digestibility for GE and DM at 14 dpi was increased ($P < 0.045$ and $P < 0.042$, respectively for GE and DM) in inoculated pigs compared to vaccinated pigs. For Exp. 2, ADFI was similar for both treatment groups with the exception that ADFI was greater ($P < 0.01$) for inoculated pigs during the finisher 1 (wk 6 to 10) phase compared to vaccinated pigs. For feed efficiency, vaccinated pigs had greater ($P < 0.05$) efficiency compared to inoculated pigs during the last three grow-finish phases. No differences were observed in DM or GE digestibility with the exception that vaccinated pigs had greater ($P < 0.05$) DM and GE apparent total tract digestibility compared to

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org

inoculated pigs at the end of the Finisher 1 (wk 10) phase. No differences were observed for carcass traits. For Exp. 3, indicated that the pigs with initial low residual body weight consumed more feed, had greater ADG and feed efficiency, and had numerically increased final BW irrespective of PCV status (vaccinated vs inoculated). No differences in digestibility for GE and DM were observed. High residual inoculated pigs and low residual vaccinated pigs tended to be leaner compared to their counterparts.