Evaluating the effects of pelleting and roller milling corn on nursery pig growth performance

Project Leaders

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Goals:
A. To quantify growth differences in pigs fed corn ground in a roller mill to approximately 300 µm vs. 600 µm
B. To determine the effects of pelleting or phase 2 and phase 3 diets.
C. To characterize a potential interaction between roller milled corn micron size and pelleting of the same ration.

Statement of Problem:
Swine feed efficiency is improved by 1.0 to 1.2% for every 100 micron reduction in corn particle size from a hammermill (De Jong et al., 2012; Paulk et al., 2011; Wondra et al., 1995; Cabrera et al., 1994). Few published experiments have evaluated if these effects are similar in a three-high roller mill. Pelleting diets improves swine grow-finish feed efficiency by an average of 4.0% (Paulk et al., 2011, Myers et al., 2011, Frobose et al., 2011). The quantity of improvement has not been confirmed in nursery pigs of modern genotypes. No data exists to quantify the interaction between particle size and diet form in nursery pigs of modern genotypes. There are potential additive effects of a 300 µm decrease in corn particle size and pelleting.

Treatments:
1) Mash diets including 300 µm roller mill ground corn
2) Mash diets including 600 µm roller mill ground corn
3) Pelleted diets including 300 µm roller mill ground corn
4) Pelleted diets including 600 µm roller mill ground corn

Pigs will be fed in a 2-phase feeding program (phase 2 = d 10 to 25, phase 3 = d 25 to 35 of the experiment). Corn particle size and both ground corn mash complete diet angle of repose will be determined. Data will be analyzed using the GLIMMIX procedure of SAS with treatment as the fixed effect. Pen will be the experimental unit. Main effects, the interaction, and individual treatment effects will be determined.

Current Activities:
There were no effects of corn particle size (P > 0.24) on any response criteria or of the interaction on ADG or ADFI (P > 0.17). However, pigs fed mash diets had improved overall ADG compared to those fed pelleted diets (P = 0.01; 0.43 vs. 0.39 kg/d), which was primarily driven by greater ADFI. Interestingly, feed efficiency was improved by pigs consuming mash diets compared to those consuming pelleted diets during phase 2 (P < 0.0001; 0.57 vs. 0.68), but there were no differences during phase 3 or overall. In addition, there was a corn particle size × feed form interaction, where pigs that were fed pelleted diets made from corn with a particle size of 700 microns had improved overall feed efficiency (P < 0.05) compared to pigs fed any of the other three treatments. As expected, the diet manufactured in mash form from the 700 micron corn resulted in the poorest feed efficiency numerically. This research suggests that feed efficiency is slightly improved by feeding 400 vs. 700 micron corn in mash diets.