

## Effects of feeding diets containing highly oxidized corn dried distillers grains with solubles (DDGS) with increasing vitamin E levels to wean-finish pigs on growth performance, carcass composition, and pork fat quality

R. Song<sup>1</sup>, C. Chen<sup>1</sup>, L. J. Johnston<sup>2</sup>, B. J. Kerr<sup>3</sup>, T. E. Weber<sup>3</sup>, and G. C. Shurson<sup>1</sup>

<sup>1</sup>University of Minnesota, St. Paul, MN

<sup>2</sup>West Central Research and Outreach Center, Morris, MN

<sup>3</sup>USDA-ARS-NLAE, Ames, IA

Lipid peroxidation in animal feed can negatively affect growth performance and meat quality. Weanling pigs (n = 432; BW=6.6±0.4 kg) were used to evaluate the effects of feeding highly oxidized DDGS with 3 levels of vitamin E ( $\alpha$ -tocopherol acetate) on growth performance, carcass composition, and pork fat quality. The DDGS source used in this study contained the highest thiobarbituric acid reactive substances (TBARS) value and peroxide value (5.2 ng/mg oil and 84.1 meq/kg oil, respectively) among 30 other DDGS sources sampled (mean values = 1.8 ng/mg oil and 11.5 meq/kg oil, respectively). Pens within blocks were assigned randomly to one of 6 dietary treatments in a 2 x 3 factorial design. Pigs were fed corn-soybean meal (CON) or 30% DDGS diets with 3 levels of vitamin E: none supplemented (No-E), NRC (11 IU/kg, 1X-E), or 10X NRC (110 IU/kg, 10X-E). Compared to CON, inclusion of 30% DDGS in diets reduced ( $P < 0.001$ ) final BW (110 vs. 107 kg), overall ADG (0.76 vs. 0.74 kg/d) and G:F (0.39 vs. 0.37). Increasing dietary vitamin E level increased overall G:F ( $P = 0.03$ ). Hot carcass weight, dressing percentage, backfat depth and loin muscle area were reduced ( $P < 0.01$ ) in pigs fed DDGS compared to CON, but percentage of fat-free carcass lean was not affected. Feeding DDGS increased ( $P < 0.001$ ) PUFA concentration, particularly linoleic acid ( $P < 0.001$ ), and iodine value ( $P < 0.001$ ) in belly fat and backfat compared to pigs fed CON. Dietary vitamin E levels did not significantly affect fatty acid profile in belly or back fat. Alpha-tocopherol concentration in LM was higher ( $P < 0.001$ ) in 10X-E than No-E or 1X-E dietary treatments. Compared to CON, feeding DDGS increased  $\alpha$ -tocopherol concentration in LM in pigs fed No-E (1.0 vs. 3.1  $\mu\text{g/g}$ ,  $P = 0.005$ ), but not in those fed 1X-E or 10X-E. These results indicate that feeding highly oxidized, 30% DDGS diets to wean-finish pigs may negatively affect growth performance, and supplementation of additional vitamin E in the diet did not counteract these effects, but did improve G:F and  $\alpha$ -tocopherol level in LM at the 10X NRC level.

**Key words:** DDGS, growth performance, pig, vitamin E