

0.01) whole intestine weights, mainly due to the reduction ($P < 0.02$) in rinsed stomach and full large-intestine weights. Lowering dietary DDGS and Middlings during a 19 d withdrawal period increased yield through reduced large intestine weight and content, improved carcass yield, and jowl IV. The addition of CWG improved G:F; however, CWG did not improve carcass characteristics.

Table 1.

	d 0 to 73:							SEM
	1 Low	2 High	3 High	4 High	5 High	6 High	7 High	
	3% Added Fat							
	d 73to 92:		3	4	5	6	7	
	Low	Low	Med	High	Low	Med	High	
ADG, kg	0.85	0.84	0.85	0.84	0.86	0.84	0.85	0.013
G:F	0.34	0.33	0.33	0.33	0.34	0.34	0.35	0.004
Final BW, kg	124.5	123.0	123.8	124.0	124.9	124.8	124.5	1.499
Carcass yield, %	72.6	72.6	71.8	71.9	73.0	72.3	71.5	0.305
HCW, kg	90.6	89.4	89.0	89.2	91.2	90.6	88.9	1.332
Lean, % ^a	52.8	53.0	53.3	53.4	53.0	52.6	53.4	0.305
Backfat, mm ^a	18.9	17.5	17.0	17.0	18.6	17.7	16.5	0.603
Jowl IV	69.4	77.8	78.5	79.2	77.3	78.6	81.2	0.502

^aAdjusted to a common HCW.

Key Words: DDGS, fiber, wheat middlings, pig

161 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^{*1}, C. Chen¹, L. J. Johnston², B. J. Kerr³, T. E. Weber³, and G. C. Shurson¹, ¹University of Minnesota, St. Paul, ²West Central Research and Outreach Center, Morris, MN, ³USDA-ARS-NLAE, Ames, IA.

Lipid peroxidation in animal feed can reduce 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 (α -tocopheryl 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. Pens within blocks were assigned randomly to 1 of 6 dietary treatments in a 2×3 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). All diets were formulated on a standardized ileal digestible (SID) AA and available P basis with similar calculated ME content. Compared with 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 with 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 with pigs fed CON. Dietary vitamin E levels did not 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 with CON, feeding DDGS increased α -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 reduce growth performance. However, supplementation of additional vitamin E in the diet did not counteract these effects, but did improve G:F and α -tocopherol level in LM at the 10X NRC level.

Key Words: DDGS, growth performance, pig, vitamin E

162 Effects of dietary L-carnitine and dried distillers grains with solubles (DDGS) on growth, carcass characteristics, and loin and fat quality of finishing pigs. W. Ying^{*1}, J. M. DeRouchey¹, M. D. Tokach¹, S. S. Dritz¹, T. A. Houser¹, R. D. Goodband¹, J. L. Nelssen¹, and J. C. Woodworth², ¹Kansas State University, Manhattan, ²Lonza Inc., Allendale, NJ.

A total of 1,104 barrows and gilts (PIC 337 \times 1050, initially 36 kg BW) were used to evaluate the effects of dietary L-carnitine and corn DDGS on growth, carcass traits, and loin and fat quality. Dietary treatments were arranged as a 2×3 factorial with main effects of added DDGS (0 or 30% in phases 1, 2, and 3 and 20% in phase 4) and L-carnitine (0, 50, or 100 mg/kg). Each treatment had 7 mixed gender pens with 26 or 27 pigs per pen. Overall (d 0 to 109), pigs fed L-carnitine had increased ($P < 0.02$) ADG and final BW. A DDGS \times L-carnitine interaction (quadratic, $P < 0.01$) was observed for G:F. Pigs fed 50 mg/kg L-Carnitine without DDGS had better G:F than pigs fed 0 or 100 mg/kg, but in diets with DDGS, pigs fed 50 mg/kg L-carnitine had poorer G:F compared with those fed 0 or 100 mg/kg. Increasing dietary L-carnitine increased HCW (quadratic, $P < 0.03$), carcass yield (quadratic, $P < 0.07$), and backfat (quadratic, $P < 0.04$), with the maximum response observed at 50 mg/kg. Increasing L-carnitine increased (linear, $P < 0.03$) purge loss of the loin, indicative of decreased water holding capacity. Adding L-carnitine to diets did not affect drip loss, color or marbling score of the loin. Feeding dietary DDGS tended ($P < 0.06$) to decrease visual loin marbling score. Feeding DDGS increased ($P < 0.001$) linoleic acid, PUFA, unsaturated fatty acid:saturated fatty acid ratios, and jowl iodine value; however, feeding L-carnitine did not alter jowl fatty acid profile. In conclusion, feeding L-carnitine improved ADG and HCW, with the maximal response observed at 50 mg/kg, but dietary L-carnitine did not improve loin or fat quality.

Table 1. Effect of L-carnitine and DDGS on growth and carcass traits

	DDGS, %:			L-Carnitine, mg/kg:			SEM
	0	0	0	0	50	100	
ADG, g	814	853	842	828	845	841	11
ADFI, kg	2.40	2.42	2.47	2.46	2.55	2.41	0.04
G:F	0.34	0.35	0.34	0.34	0.33	0.35	0.01
HCW, kg	92.4	95.4	93.2	92.6	94.2	94.1	0.9
Yield, %	74.7	75.9	75.0	75.0	75.2	75.1	0.3
Loin depth, cm ^a	6.36	6.39	6.34	6.23	6.21	6.23	0.10
Backfat, mm ^a	16.7	17.5	17.2	16.5	17.2	16.5	0.3
Purge loss, %	2.71	3.38	3.47	2.46	2.92	3.45	0.38
Iodine value, g/100g	66.5	66.9	66.9	74.7	73.3	74.0	0.6

^aAdjusted to a common HCW.

Key Words: DDGS, L-carnitine, pig

163 Effect of replacing soybean meal (SBM) with corn high protein dried distillers grains with solubles (HPDDGS) on growth performance, carcass characteristics, and carcass fat quality in finishing pigs. D. L. Goehring^{*1}, M. D. Tokach¹, J. M. Nelssen¹, J. M.