Can short-term DDGS withdrawal limit associated carcass yield loss?

Bottom Line

with
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IN an article published in the *Journal of Animal Science*, Coble et al. discussed the possibility of using high-fat diets in the short term to improve carcass yield for finishing pigs fed relatively high levels of dried distillers grains with solubles (DDGS).

In this paper, the Kansas State University researchers designed a study using 1,258 pigs and diets fed 20 days prior to slaughter to evaluate the effects on growth performance and on slaughter parameters. The premise behind this study was to evaluate the probable impact of dietary fat addition to improve carcass yield as a strategy to potentially offset the negative impact of DDGS on carcass yield.

Diets were designed in a factorial arrangement, including low fiber (corn/soybean meal) or high fiber (corn/soybean meal/30% DDGS) with either 0% or 5% added fat for the last 20 days of the finishing period.

Prior to study initiation, pigs had all received the same diet set, including 30% DDGS to mimic diet designs commonly used in the pig industry and, of course, to set up the animals for the normally observed yield impact seen with high DDGS use, which was essential to this study. After 20 days on the experimental diets, pigs were harvested at a commercial facility, and data were captured for carcass weight and standard carcass measurements.

Pigs in this study exhibited a DDGS-by-fat addition interaction for average daily gain (ADG). In this criterion, pigs receiving the 30% DDGS with no added fat diet had lower ADG, while the three other treatments were very similar in actual growth rate (Table). In evaluating the potential cause for this reduction in ADG, it is always interesting to examine any differences between targeted nutrient content and actual nutrient content.

Crude protein (CP) was analyzed, and in group 1, the measured content was in close approximation to formulated values, with a modest elevation in CP noted in the DDGS diets compared to the calculated diet design. In group 2, all diets were elevated in CP compared to formulated values. Of course, CP is only a surrogate for understanding the amino acid content of the actual diets.

The proximate analysis of the DDGS sources used, however, did appear to have moderate fat (ether extract) levels, ranging from 9.2% in the DDGS used in group 1 to 6.9% for the DDGS used in group 2. There was no report on formulated fat for either the DDGS matrix value or for the final diet, so no meaningful evaluation can be concluded with respect to the actual fat levels reported in the diet.

One could postulate that some challenge in energy matrix assignment in formulation was possible, given that ADG and gain:feed were clearly improved within the DDGS diet series when fat was added to the diet, whereas that improvement was minimal within the corn/soybean meal diet series.

Clearly, DDGS sources tend to have more variation in nutrient content than many other raw materials and would be the likely raw material playing a role in any formulation matrix error. Of course, it is reasonable to conclude that if ADG was not affected by the 30% DDGS/0% added fat diet, the disadvantage in carcass weight observed for pigs fed that diet would also have been minimized.

Diets without DDGS resulted in heavier hot carcass weight ($P = 0.026$) compared with diets containing 30% DDGS and showed no interaction with dietary fat addition. Similarly, the carcass yield percentage was improved by diets without DDGS, but again, there was no interaction with fat addition to the diet.

Back fat depth tended ($P = 0.06$) to be increased in both the corn/soybean meal and DDGS diet series with additions of fat to the diet. The authors chose to use hot carcass weight as a covariate in the analysis of back fat effects, although this covariate blunts some of the actual treatment differences.

These points were key observations within this study helping to test whether simple short-term use of high-energy diets can overcome the carcass yield effects that high DDGS inclusion can cause.

The researchers speculated further within the discussion that high-fiber (and maybe high-fat) diets may affect yield through the specific effects of fiber on gut fill, as demonstrated by prior work both within and external to their own data. This explanation would ultimately suggest that feed residue and associated water and digestive components largely are responsible for yield decreases. There was no focus on the potential impact of fiber level on gut tissue hypertrophy also playing a role within the normal carcass yield impact seen with high DDGS use.

However, other data exist (Overholt et al., 2016; Agyekum et al., 2012) that do suggest that high DDGS feeding programs result in increased empty gut weight, along with increased fill of the digestive tract, which would also play a role in carcass yield changes.

DDGS can be fed successfully in many different situations, but as this data set shows, use of DDGS can come with several layers of concern, from performance equivalency to carcass yield and, in some situations, carcass fat quality or iodine value.

Clearly, the economic opportunity to improve the cost of production is the driving factor behind the decisions. Various economic models can be used to evaluate the opportunity costs associated with the decision to use DDGS. It is difficult to assign a specific economic value to this data set regarding the decision to use DDGS for the last 20 days preharvest without a cohort treatment that was not fed DDGS throughout the course of the growing and finishing periods to provide a valid point of reference on performance.

However, if one considers the improved hot carcass weight associated with DDGS withdrawal of 0.95 lb., the extra value at today's prices would be approximately 70 cents per head. The extra carcass weight required an extra input of only about $1.40 in feed costs when considering the corn/soybean meal treatments versus the 30% DDGS treatments. The feed cost differential between a withdrawal diet and a diet containing DDGS can be substantial and must be evaluated along with other effects of withdrawal to determine the potential economic benefit of implementing this type of program.

The Bottom Line

DDGS use can have a marked formula cost advantage, making it a very attractive option in many swine feeding programs today. DDGS use in late-finishing diets has been a topic of extreme interest, with trade-offs centering on the economic value of using this ingredient. These values can include lowering the

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Selected growth and carcass data*

	---0% DDGS---		---30% DDGS---		Std. error	----------P-value----------		
Added fat, %	**0**	**5**	**0**	**5**	**of means**	**DDGS x added fat**	**DDGS**	**Added fat**
Days 0-20								
ADG (kg)	0.99	1.01	0.93	1.01	0.014	0.054	0.056	0.001
Gain:feed	0.308	0.317	0.297	0.328	0.004	0.008	0.902	0.001
Hot carcass weight** (kg)	91.9	92.3	90.7	91.6	0.55	0.556	0.026	0.122
Carcass yield, %	73.0	73.2	2.7	72.7	0.13	0.294	0.001	0.633
Back fat depth** (mm)	19.9	20.2	19.3	19.9	0.28	0.522	0.19	0.061

*Data excerpted from Coble et al., 2017.
**Hot carcass weight was used as a covariate.

cost of nutrient inputs and also can include costs associated with carcass yield impact, along with fat quality, mycotoxin concentration potential and growth performance implications.

These multifaceted points need to be included in the evaluation of DDGS use, including opportunities to manage these challenges.

The present study helps point toward two potential ways to address yield concerns with diet design. First, the study clearly confirms prior reports that changing from DDGS addition for the last 20 days of finishing can positively affect carcass yield. Second, dietary fat addition with high DDGS use will help improve growth characteristics; however, it would appear that fat addition in the last 20 days of finishing cannot totally compensate for carcass yield drag issues.

These data suggest that an excellent return potential exists to consider a DDGS withdrawal option for the last three weeks of growth.

References

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