NUTRITION NOTES
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EVALUATION OF AMINO ACID IMBALANCES IN CORN AND LOW PROTEIN DIETS IN REDUCING GROWTH RATE AND FEED INTAKES IN LATE FINISHING PIGS

James Smith, Ph.D., Swine Nutritionist
Michael Edmonds, Ph.D., Vice President, Swine and Poultry Nutrition

Due to the Coronavirus (COVID-19) Pandemic, numerous packing plants have been shut down for extended periods of time due to employee safety concerns. These closures have placed a critical strain on the pork industry as market hogs are being held in barns longer than expected. It is important to reduce market hog growth rate to keep hog weights below the sort loss threshold in order to keep pigs marketable as plants reopen.

EXPERIMENTAL DESIGN:

The following experiment was designed to compare late finishing pigs fed Corn and Low Protein (LP) diets, which contain added levels of DL-Methionine to create an amino acid imbalance, which results in pigs consuming less feed, and thus reducing growth rates. Four experimental diets were evaluated involving two treatments at the Kent Nutrition Group Research Farm. The first treatment consisted of a diet utilizing Corn along with 18 lb/ton of added DL-Methionine during Days 0-7 with the level of added DL-Methionine increased to 22 lb/ton during Days 7-13. The second treatment consisted of a diet utilizing Low Protein (75 lb/ton of added soybean meal added to the corn) along with 18 lb/ton of added DL-Methionine during Days 0-7 with the level being increased to 22 lb/ton during Days 7-13. Previous Kent research in late finishing pigs (Nutrition Note, May 6, 2020) showed dramatic reductions in growth and feed intake when finishing pigs (initial weight of 273 lb) were fed Corn and LP diets with 33 to 63 lb/ton of added DL-Methionine during the first six days on test. In this current trial, salt was also added to all diets at 15 lb/ton to further add some reduction in performance. The initial starting weight of these pigs was 287 lbs. Most of the pigs in this trial had previously been on diets that varied in added DL-Methionine for 21 days with these pigs being balanced and allotted across the two treatments in the current trial.

Pictured above: Marketing the first load on May 29, 2020 after conducting research for 35 days past when they were originally due to be sold

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TABLE 1. EXPERIMENTAL DIETS

Treatment	Corn + 18 lb/ton DL-Met	Corn + 22 lb/ton DL-Met	Low Protein + 18 lb/ton DL-Met	Low Protein + 22 lb/ton DL-Met
Corn (7% Crude Protein (CP))	1931.0	1927.0	1854.0	1850.0
Soybean Meal (46.85% CP)	–	–	75.0	75.0
Limestone	18.0	18.0	18.0	18.0
Monocalcium Phosphate (21%)	10.0	10.0	8.0	8.0
Salt	15.0	15.0	15.0	15.0
NexGen 6/5 VTM PT	5.0	5.0	5.0	5.0
L-Lysine HCl	3.0	3.0	6.0	6.0
L-Threonine	–	–	1.0	1.0
DL-Methionine	18.0	22.0	18.0	22.0
Totals, lbs	2000.0	2000.0	2000.0	2000.0
Diet Costs*, $/ton	138.51	142.77	148.25	152.51
Crude Protein, %	7.5	7.6	9.1	9.2
Lysine, %	.33	.33	.55	.55
Methionine, %	1.03	1.22	1,05	1.24
Calcium**, %	.58	.58	.57	.57
Phosphorus**, %	.47	.47	.46	.46

*Ingredient prices assumed: corn, $3.15/bushel; soybean meal, $300/ton; L-Lysine HCl, $1,500/ton; L-Threonine, $2,100/ton; DL-Methionine, $2,240/ton

**Calcium is total calcium as the added phytase releases 0.11 units of calcium while phosphorus is total phosphorus as the added phytase releases 0.13 units of phosphorus

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TABLE 2. PERFORMANCE OF LATE FINISHING PIGS

Treatments (Days 0-7)	Corn + 18 lb/ton DL-Met	Low Protein (LP) + 18 lb/ton DL-Met
Treatments (Days 7-13)	**Corn + 22 lb/ton DL-Met**	**LP + 22 lb/ton DL-Met**
# Pens	**12**	**12**
Days 0-7		
Daily Gain[1], lb	.65	1.26
Daily Feed[2], lb	4.55	5.01
Feed/Gain[1]	8.02	4.24
Cost/lb Gain[1], $	.56	.31
Cost per Day[1], $	.31	.37
Days 7-13		
Daily Gain[3], lb	.54	.83
Daily Feed[2], lb	4.29	4.78
Feed/Gain[3]	9.52	6.23
Cost/lb Gain, $	.68	.48
Cost per Day[1], $	.31	.36
Days 0-13		
Daily Gain[1], lb	.58	1.06
Daily Feed[1], lb	4.42	4.90
Feed/Gain[1]	8.34	4.70
Cost/lb Gain[1], $	.59	.35
Cost per Day[1], $	.31	.37

[1]means with different superscripts in a row are significantly different (P < .001)
[2]means with different superscripts in a row are significantly different (P < .01)
[3]means with different superscripts in a row are significantly different (P < .05)

The data in Table 2 clearly show that in all three periods that pigs on LP with added DL-Methionine gained significantly more with marked improvements in feed efficiencies and cost of gains compared to those fed Corn diets with added DL-Methionine. It should be noted that during Days 7-13, the growth of pigs on both the Corn and LP diets with the higher levels of DL-Methionine (22 lb/ton) had lower growth rates compared to those pigs fed the diets with lower levels (18 lb/ton) of DL-Methionine during Days 0-7. Thus, by increasing the levels of DL-Methionine we were able to show further reductions in feed intakes by creating a higher level of amino acid imbalance. The cost per day ranged from $0.31 on the Corn diets to $0.37 on the LP diets.

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BOTTOM LINE:

1. The growth rate of finishing pigs is clearly different between using Corn or LP diets with added DL-Methionine with gains of nearly 0.6 lb/day on the Corn diets and just over 1.0 lb/day with the LP diet.
2. Feed cost/lb of gains are clearly lower for pigs on the LP diets compared to those on the Corn diets, thus providing further options for producers based on the price of market hogs and the packer's matrix on sort loss.
3. Growth and feed intakes were further reduced on both the Corn and LP diets when DL-Methionine was added at 22 lb/ton (compared to 18 lb/ton) confirming the effect of this amino acid in lowering performance as the amino acid imbalance in the diet is made more severe.

CONCLUSION:

Various diet schemes showed that using 18 to 22 lb/ton of DL-Methionine with Corn and Low Protein diets resulted in low growth rates, which can help swine producers manage their finishing hogs market weights during this unprecedented time facing the COVID-19 Pandemic.

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