

MAY YOU LIVE IN INTERESTING TIMES

by Amber Pugh, Senior Ingredient Specialist

Bumper crops have led to substantially lower feed costs this year. Corn is close to \$3/bu. and soybean meal at \$300/ton. These prices are quite different than what we have experienced in the past 9 months. Let's take a look back...

DRIED DISTILLERS GRAINS WITH SOLUBLES (DDGS)

For several months DDGS did not offer as large of savings as we had enjoyed in the past. We witnessed highest pricing around the middle of March, due to domestic buyers competing with exports going to China. Over the next three months we saw weekly declines in the \$5 range (Table 1). Then China decided to shut off distiller grain imports and we saw a \$40 drop during the week of June 23rd. Suddenly ethanol plants had large volumes and nowhere to go with it. Declines continued, dropping \$5 to \$10 each week until we hit the first bottom in August. In September we saw a bump in pricing due to annual shutdown maintenance schedules, which most ethanol plants do before new crop rolls in. Supplies were less and sellers could ask for higher prices. This didn't last long and harvest began. Currently, we have ample supply and ethanol plants are running at the max. If China stays out of the market, we should see pricing stay at the current lows. There is willingness for sellers to lock in long term, which could be a sign that they do not think China will be back in the market anytime soon. Due to lower pricing, DDGS are offering diet savings at this time. Producers should consider formulating at 30% in swine diets if they aren't already. Not only do you reduce the amount of "hard to get" synthetic amino acids that are needed, but savings are around \$20 /ton when compared to a corn/soy based diet.

Table 1. 2014 DDGS PRICES, \$/TON

March	\$240
June	\$145
August	\$105
September	\$125
October	\$100

AMINO ACIDS

Amino acids have been quite erratic in price and availability over the past six months.

- A shortage of DL-Methionine due to high usage and plant troubles overseas.
- L-Lysine has moved up in price. Hydrochloric acid is used in making Lysine HCL and is also used in the fracking industry which has caused tightness in supply and higher prices.
- Most Threonine is made in China and seems to be in tight supply at present.
- Tryptophan was hard to acquire six months ago, but now there seems to be an ample stream being found in the market.

Cheaper soybean meal combined with expensive methionine will reduce crystalline amino acid use, which should hopefully relieve some pressure. Overall though, the outlook for all amino acids over the next 3 to 4 months will be the same. Supply will still be tight and in some cases unavailable. Pricing will continue to push upward until either new production comes on line as expected or producers go back to more corn and soybean meal based diets. Below (Table 2) is what an average pricing per pound looked like six months ago vs. today for key amino acids.

Table 2.

AMINO ACID PRICE COMPARISON, \$/LB (6 MONTHS AGO VS. OCT. 28, 2014)

DL-Methionine	\$1.69 vs. \$2.50
L-Lysine	\$0.65 vs. \$1.16
Threonine	\$1.22 vs. \$2.30
Tryptophan	\$10.00 vs. \$8.50

GRIND

The grinding of grain/corn reduces its particle size. Particle size is measured in microns, which are the average geometric diameter of particles. Particle size is determined by shaking a 100 gram sample through a series of screens and weighing the portion which remains on each screen. The reduction in particle size (lowering the micron size) increases the surface area of the corn, which allows for greater interaction with the pig's digestive enzymes. This increase in interaction leads to better utilization of the energy and amino acids of the corn leading to improvement in feed conversion.

In growing and finishing pigs reducing particle size from 900 microns to 500 microns improves feed conversion by about 1.2% for every 100 micron reduction in particle size (Figure 1). It does not seem to have

much effect on average daily gain. In lactating sows, litter weight goes up as particle size goes down. In gestating sows, we are not aware of any research done with particle size, but you could speculate that the advantage would be less than in grow-finish pigs because gestating sows are limit-fed and have more digestive enzymes available per pound of feed.

If we assume moving from a 700 micron grind to a 500 micron grind improves feed efficiency by 2.4%, this would move your feed conversion from 3.0 to 2.93. Another way to think about it is, with feed costing \$160 dollars/ton reducing the corn micron size from 700 to 500 makes that ton of feed go 2.4% farther, saving about \$4 per ton or \$1.50 per head wean to finish..

One downside to grinding finer particle size is that typically the finer the grind the more poorly the feed flows. This phenomenon seems to be diminished with roller mills and especially reduced with triple pass mills. A triple pass mill has 3 pairs of rolls which provides a more consistent particle size. We can speculate that the more uniform particle size reduces the feed's inclination to pack.

LAST THOUGHTS

The changes in the ingredient markets make it critical to keep formulations updated.

Figure 1.

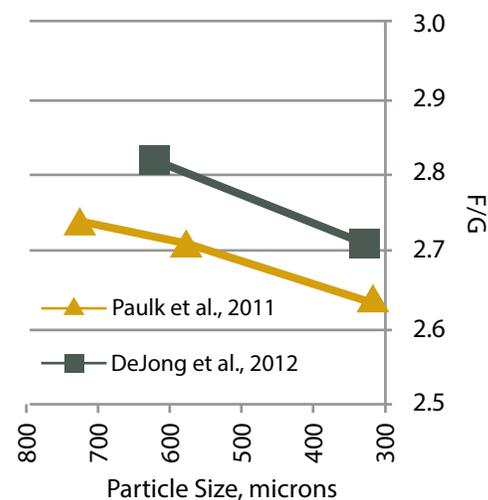


Figure 1. Influence of particle size on F/G. Data from 2011 and 2012.

Serum samples were analyzed for virus concentration by the University of Minnesota Diagnostic Laboratory. Results are presented using a logarithmic scale (Figure 2). All gilts were positive for PRRS virus 3-dpi and virus load was high, as indicated by a value in excess of log 6.0 virus particles per ml of serum. Control and betaGRO-fed gilts had similar serum PRRS concentrations. At 15-dpi virus concentration had dropped by 98% ($p < 0.05$) in gilts fed the diet containing betaGRO but had dropped only 56% (non-significant) in control gilts. This resulted in an 86% lower ($p < 0.05$) virus load in betaGRO-fed gilts at 15-dpi compared to the control gilts. Thus, betaGRO-fed gilts cleared virus from their systems more rapidly.

Serum samples were analyzed for cytokines by the University of Minnesota Diagnostic Laboratory. Interleukin 1 β (IL-1 β) and Interleukin 18 (IL-18) are pro-inflammatory cytokines, which increase systemic inflammation during disease outbreaks. Due to their pro-inflammatory action they produce fever, inflammation and tissue destruction. Reduced levels of these pro-inflammatory cytokines can reduce the negative impact of the disease attack. Control and betaGRO-fed gilts had similar levels of IL-1 β and IL-18 at 0-dpi but by 3-dpi levels of these pro-inflammatory cytokines were increasing in control gilts and decreasing in betaGRO-fed gilts. By 15-dpi betaGRO-fed gilts had 41% lower IL-1 β and 39% lower IL-18 than gilts fed the control diet. Reduced pro-inflammatory cytokine levels in gilts fed betaGRO was supported by the observation of lower rectal temperatures than control gilts at 3-dpi (102.10 vs. 101.76, $p < 0.10$).

Feed intake was estimated by taking weight of feed delivered to the bins and subtracting an estimate of feed inventory at the end of the trial. Gilts fed the diet containing betaGRO had 20% higher feed intake than gilts on the control diet.

While clinical signs are not objectively measured response parameters, personnel with a trained eye can discern differences. At 15-dpi, control gilts were observed to be lethargic, rough-haired and uncomfortable in their movements whereas the betaGRO-fed gilts appeared to be active and healthy.

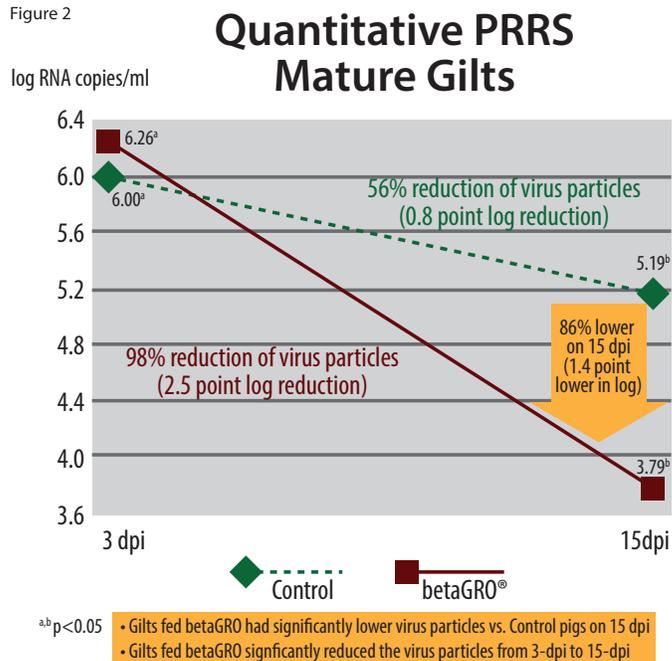
TRIAL SUMMARY

- PRRS season is here and producers are looking for tools to lessen the severity of PRRS breaks in their sow herds
- Feedback from three large production systems has been that when they fed betaGRO at 2-5 lb per ton during PRRS challenges clinical signs of PRRS were reduced
- A recent trial conducted by NUTRIQUEST with assistance from the University of Minnesota showed that mature gilts fed betaGRO exhibited
 - o Reduced PRRS virus load by 98% by day 15 post infection
 - o Reduced levels of key pro-inflammatory cytokines
 - o Reduced rectal temperature
 - o Increased feed intake
 - o Reduced clinical signs of PRRS

WHAT IS THE RESPONSE TO BETAGRO IF DISEASE CHALLENGE IS NOT EXHIBITED THIS YEAR? IS THERE A COST:BENEFIT FOR THE USE OF BETAGRO WITH NO PRRS CHALLENGE?

A NUTRIQUEST-led research project being conducted at its New Horizon Farms research facility in Minnesota has been investigating the

Figure 2



impact of feeding betaGRO to sows in gestation and lactation on sow and offspring performance. This trial utilized 254 sows with about one-half fed standard gestation and lactation diets and the others fed similar diets with betaGRO added at 2 lb/ton. While the project is 2 months from conclusion, observations made to this point are of value to answer these questions.

Feeding betaGRO to sows in gestation and lactation resulted in:

- Reduction in stillborns (5.37% reduced to 3.57%, $P = 0.07$)
- Fewer pigs less than 2.5 lb at birth (33.3% reduced to 29.6%, $P = 0.05$)
- Numerical improvement in pre-weaning mortality (12.8% reduced to 11.4%, $P = 0.27$) and pigs weaned per litter (11.5 increased to 11.9, $P = 0.22$)
- Increased weaning weight of pigs (12.15 increased to 12.68 lb, $P = 0.005$)
- Reduction in wean to estrus interval (5.6 reduced to 4.5 days, $P = 0.05$)

Nursery results (weaning at d20 thru 54 days in nursery) showed pigs from sows fed betaGRO:

- Grew faster (ADG increased from 0.75 to 0.82 lb/day; $P < 0.001$) and ate more feed (ADFI increased from 1.10 to 1.20 lb / day; $P < 0.001$)
- Gained 3.5 lb/pig more in the nursery (40.64 increased to 44.10 lb gained; $P < 0.01$)

In summary these research projects demonstrate the economic advantage of feeding betaGRO to the sow herd to provide support during disease challenge and enhance sow performance and offspring growth performance year round. We look forward to providing the final results of this project early in 2015.

For more detailed information on using betaGRO in pig and sow diets, contact your NUTRIQUEST representative.