

Krichau Comments



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Spring snow impedes progress on mill

As the last "Progress" newsletter was published, the sun was shining and it looked like winter was finally coming to an end. It's funny how Mother Nature can fool you. We were surprised with snow, freezing rain, rain, and more snow over the past month. This has made it difficult to progress on the mill as planned. Today, May 7, the sun is shining and the weather seems to be conducive to work at StateLine Cooperative's Halfa Feed Mill.

The concrete crew finished pouring the final concrete on the ingredient and corn receiving scales as I am writing this article. The construction crews were preparing to set the finished feed distributor this morning, as well as erecting the legs for both meal and pelleted finished feeds. And the electricians were busy running conduit and wiring in the load out and grain leg areas. The crews are planning to set the scale decks later this week, and shortly thereafter, they will start on the base for the new corn bin.

The sunshine has brought excitement and anticipation back to all of us involved in the project. Everyone is working hard to get us to opening day at Halfa Feed Mill. Now, if we can only get the cooperation of Mother Nature!



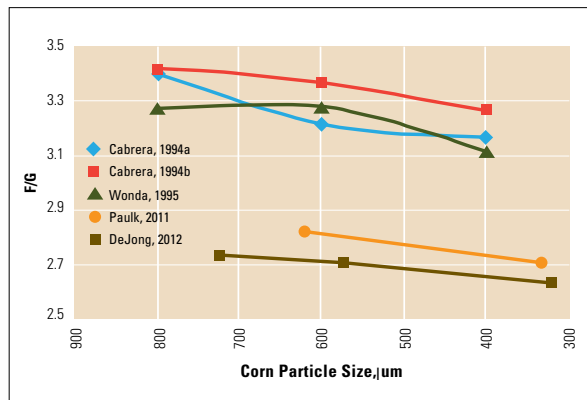
Progress

Research focuses on improving feed efficiency

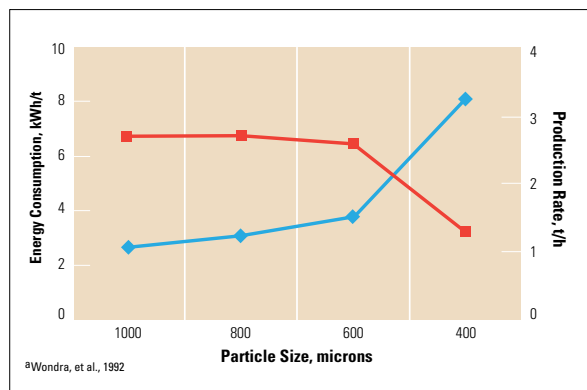
By Cassandra Jones, PhD, Assistant Professor, Kansas State University, Manhattan

The new era of high commodity and feed ingredient prices has prompted many to reevaluate the 'standard' feed processing technologies used for swine diets. Just a few years ago, Kansas State University was recommending that in order to maximize profit, producers should aim their corn to be ground to 700 μm . We have conducted numerous studies demonstrating that, regardless of starting micron size, a 100 μm decrease on corn particle size results in a 1.0 to 1.2% improvement in feed efficiency (F/G; Figure 1). Historically, these additional improvements in feed efficiency by grinding finer than 700 μm were generally not profitable to reach due to decreased mill production rate and increased feed mill energy production (Figure 2), potential ulcer concerns, and feed handling problems associated with mash diets. However, new generation hammermills and roller mills, including 3-high roller sets, may allow for some of these in-mill problems to be diluted. Additionally, genetic improvements have resulted in fewer ulcer problems associated with

Effects of Corn Particle Size on Feed Efficiency (Figure 1)



Effects of Corn Particle Size on Energy Consumption and Production Rate in a Feed Mill (Figure 2)



fine particle size grain. Furthermore, the relatively high cost of corn has caused the improvement in feed efficiency to be more valuable. Thus, many producers are choosing to grind much finer, and field reports suggest some profitably grinding to 200 to 300 μm .

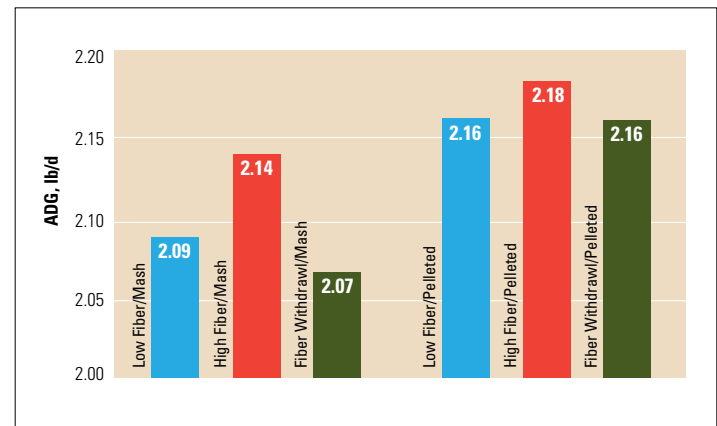
To further improve feed efficiency, as well as practically manage 200 μm corn, many producers are turning to pelleting all diet phases. Again, it was historically too expensive for most producers to pellet grower and finisher diets because the improvement in feed efficiency did not offset mill pelleting charges. However, in the era of \$7 corn and high ingredient prices, those same feed efficiency improvements are now often profitable. Within a period of 6 years, K-State conducted 12 experiments to compare the average daily gain (ADG) and F/G response from pelleting diets (Table 1). We found that, on average, pelleting improves ADG by 5.0% and F/G by 4.0%.

Effects of Pelleting on Growth Performance of Grow-Finish Pigs 2005 to 2011 (Table 1)

Reference	Meal		Pelleted	
	ADG	F/G	ADG	F/G
Groesbeck et al., 2005	0.83	1.25	0.90	1.22
Groesbeck et al., 2005	0.62	1.43	0.65	1.37
Groesbeck et al., 2006	0.80	1.25	0.78	1.17
Potter et al., 2009	1.95	2.12	2.05	2.07
Potter et al., 2009	1.92	2.83	2.04	2.68
Myers et al., 2010	1.81	2.76	1.94	2.82
Potter et al., 2010	1.92	2.86	2.03	2.70
Frobose et al., 2011	1.46	1.72	1.43	1.63
Frobose et al., 2011	1.29	1.51	1.38	1.40
Myers et al., 2011	1.96	2.73	1.97	2.67
Paulk et al., 2011	2.50	2.75	2.63	2.55
Paulk et al., 2011	2.31	2.50	2.44	2.40
Average	1.61	2.14	1.69	2.06

Certainly, one question that remains is if these improvements remain true over a wide range of ingredients. For example, today's diets generally contain much more fiber from by-products such as DDGS and wheat midds than our diets in 2005. One recent experiment conducted by J. Nemecek et al. (2013) examined this relationship and was presented at the Midwest ASAS Meetings. In this experiment, 288 pigs (PIC 327 \times 1050, 50 kg BW) were used in an 81-d experiment to determine the effects of pelleting and fiber feeding regimen on growth, carcass yield, and iodine value of finished pigs.

Effects of Fiber Level and Diet on ADG (Figure 3)



The treatments were:

- 1) low fiber mash (corn-soybean meal) from d 0 to 81,
- 2) high fiber mash (30% DDGS and 19% wheat midds),
- 3) fiber withdrawal mash (high fiber from d 0 to 64 and low fiber from d 64 to 81),
- 4) low fiber pelleted,
- 5) high fiber pelleted, and
- 6) fiber withdrawal pelleted.

There were no interactions between fiber level and pelleting ($P < 0.13$). Overall, feeding pelleted diets increased ($P < 0.03$) ADG and F/G compared to meal diets, with no difference ($P > 0.12$) in ADFI. Pigs fed low fiber throughout the trial had decreased ($P < 0.001$) ADFI and increased ($P < 0.001$) F/G compared with pigs fed the withdrawal regimen or high fiber throughout. Fiber regimen did not influence ($P > 0.35$) ADG. Pigs fed low fiber throughout or pigs withdrawn from high fiber diets had increased ($P < 0.001$) carcass yield compared to pigs fed high fiber throughout. Pigs fed meal diets had decreased ($P < 0.001$) belly fat IV compared with pigs fed pelleted diets. Compared with pigs fed high fiber throughout the trial, pigs fed the low-fiber regimen had decreased ($P < 0.001$) IV, with those fed the withdrawal regimen intermediate. In summary, feeding high-fiber diets increased ADFI and decreased F/G, regardless of withdrawal. Withdrawing DDGS and wheat midds allowed pigs to recover fully from losses in carcass yield, but only an intermediate improvement in belly fat IV was observed. Pelleting diets improved ADG and F/G, but worsened belly fat IV.

We will continue to explore these effects, and are currently planning a large set of experiments to begin this summer to evaluate the effects of particle size and pelleting wheat-based diets on finishing pig performance. A separate set of experiments will address if pelleting changes the fatty acid profile of feeds, thereby making some unsaturated fats more easily absorbed and affecting belly fat IV. Stay tuned for updates through this newsletter and at www.grains.ksu.edu and www.ksuswine.org as we report our findings.