

Title: Reducing feed cost by maximizing dietary byproduct feeding length prior to market.

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The overriding objective is to improve the industry-wide lack of knowledge in utilizing high levels of by-products (DDGS and wheat middlings) in late finishing diets prior to marketing to further reduce feed cost. In order to accomplish this overall objective, two experiments were conducted to determine the optimum time period of dietary fiber reduction prior to marketing as determined by growth performance, carcass characteristics (primarily yield), digestive tract weights, carcass fat iodine value and economics.

These data did provide new information in that switching pigs fed a high fiber diet to a corn-soybean meal diet for as little as 5 days prior to slaughter will restore over half of the lost carcass yield. Further, switching to a corn-soybean meal based diet 15 days prior to slaughter fully restored carcass yield. In Exp. 2 while no statistical differences were found, numerical patterns to that of Exp. 1 were seen, where pigs changed to a corn-soybean meal diet for 9 days restored over half of the lost carcass yield, with 14 to 19 days of fiber diet withdrawal fully restoring carcass yield.

To help explain the change in yield, digestive track weights were measured in Exp. 1. First, when the large intestine was weighed full of digestive contents, the pigs fed the high fiber diet had 2.64 lb more of digestive contents remaining in the large intestine than that of pigs only fed the corn-soybean meal diet throughout the trial. After a 5 day withdrawal to the corn-soybean meal diet from the high fiber diet, full large intestine weight dropped by 2 lb. Secondly, and more minor influence, while not statistically different, the rinsed large intestine weighed 0.27 lb more from pigs fed the high fiber diet compared to the corn-soybean meal diet throughout finishing. Since both the weight of intestinal contents and the actual weight of the large intestine negatively influence carcass yield, both can help explain why pigs fed high fiber diets have lower carcass yield than those fed a low fiber diet. From a packer perspective, feeding a high fiber diet until marketing increases the amount of waste generated and disposed of through either their own or multiple sewer systems.

For carcass fat quality, it was expected that pigs fed the high fiber diet would have softer carcass fat due to the increased level of unsaturated fat from the DDGS and wheat middlings in that diet. Our research did in fact find this result. However, when evaluating the withdraw times of the high fiber to the corn-soybean meal diet, the iodine value of pigs did decrease (become more firm) in belly and backfat as the withdrawal days increased, but did not become fully restored to the corn-soybean meal diet fed throughout. This was not surprising as previous research has shown that once pigs are fed unsaturated fat in early and middle finishing, the withdraw days to a low unsaturated fat containing diet are more substantial to return to a baseline iodine value level.

From an economic prospective when measured as income over feed cost (IOCF = revenue/pig – feed cost/pig), in Exp. 1 a linear improvement in IOFC was reported as the days of withdrawal increased from the high to low fiber diet prior to marketing. The maximum return of IOCF was for pigs fed the 20 day withdrawal treatment at \$27.76 per pig, which was \$1.64 higher per pig than fed only the corn-soybean meal diet and \$2.97 over that of pigs fed the high fiber diet until

marketing. In Experiment 2, no statistical differences were found, but similar to Exp. 1, the maximum return on an IOCF basis was for pigs fed the 19 day withdrawal strategy at \$28.88 per pig, which was \$2.92/pig higher than pigs fed only the corn-soybean meal diet and \$2.30 over pigs fed the high fiber diet until marketing.

Key Findings:

- Pigs fed the high-fiber, lower energy diet had poorer F/G, lower carcass yield and softer carcass fat compared with pigs fed the corn-soybean meal control diet.
- Withdrawing pigs from the high-fiber diet and switching them to a corn-soy control diet restored carcass yield when done for the last 15 to 20 d prior to harvest
- Pigs fed the high fiber diet had 2.64 lb more of digestive contents remaining in the large intestine than that of pigs only fed the corn-soybean meal diet throughout the trial. After a 5 day withdrawal to the corn-soybean meal diet from the high fiber diet, full large intestine weight dropped by 2 lb.
- Income over feed costs was maximized when finishing pigs were fed the high fiber, low energy diet until 20 days prior to marketing and switched to a corn-soybean meal diet.
- Carcass fatty acid composition and iodine value were impacted by diet type and with increasing withdrawal time of a high fiber diet containing DDGS and wheat middlings to a corn-soybean meal diet, but not back to the baseline level for pigs only fed the corn-soybean meal diet.