RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Reducing feed cost by maximizing dietary byproduct feeding length prior to market - **NPB #12-167**

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Scientific Abstract:

Two experiments were conducted to determine the timing of high-fiber ingredient removal from the diet prior to marketing to optimize growth performance, carcass characteristics (primarily yield), carcass fatty acid composition, and economics. In Exp. 1, a total of 288 pigs (PIC 327 × 1050; initially 84.7 lb) were used in an 88-d study. Two diet types, a corn-soybean meal control diet with low NDF (9.3%) and a high-fiber, high-NDF (19%) diet that contained 30% dried distillers grains with solubles (DDGS) and 19% wheat middlings (midds) were used throughout the study. Pens of pigs were randomly allotted to 1 of 6 dietary feeding strategies with 8 pigs per pen (4 barrows and 4 gilts) and 6 replications per treatment. The 6 feeding strategies consisted of the corn-soy control diet or high-fiber diet fed for the duration of the study, or the high-fiber diet fed until 20, 15, 10, or 5 d prior to slaughter after which the pigs were switched to the corn-soybean meal control diet. Overall (d 0 to 88), ADG was not affected by diet type or withdrawal strategy. Pigs fed the high-fiber diet continuously tended ($P < 0.07$) to have increased ADFI compared with pigs fed the control diet. This led to an increase ($P < 0.01$) in F/G for pigs fed the high-fiber diet for the entire study compared to pigs fed the control diet. The caloric efficiency of live weight gain of pigs fed the high-fiber diet continuously was worse ($P < 0.03$) compared with pigs fed the control diet throughout. Withdrawing the high-fiber diet and switching to the control diet did not influence growth performance. For carcass characteristics, percentage yield and backfat were reduced ($P < 0.01$), whereas loin depth and jowl iodine value increased ($P < 0.01$) in pigs fed the high-fiber diet continuously compared with those fed the corn-soybean meal control diet. As days of withdrawal from the high-fiber diet increased, percentage yield improved (linear; $P < 0.01$), whereas jowl iodine value decreased (linear; $P < 0.01$) and backfat increased (quadratic; $P < 0.04$). These data suggest that 15- to 20-d of removal from high-fiber diets prior to slaughter was optimal in terms of percentage carcass yield. The full pluck from pigs fed the high-fiber diet continuously tended to weigh more ($P < 0.10$) than from those fed the control diet. In addition, pigs continuously fed the high-fiber diet had heavier ($P < 0.01$) whole intestines, specifically full large intestines, than pigs fed the control. For pigs fed the high-fiber diet and then switched to the corn-soy control, whole intestine weight tended to decrease (linear; $P < 0.06$) and full large intestine weight decreased (linear; $P < 0.02$) as withdrawal time increased.

For Exp. 2, a total of 1,089 mixed-sex pigs (PIC 337 × 1050; initial BW 98.2 lb) were used in a 96-d study. The two diet types fed during the study were a corn-soybean meal control diet with low NDF (9.3%) and a high-fiber diet with high NDF (19%) that contained 30% dried distillers grains with solubles (DDGS) and 19% wheat middlings (midds). Pens of pigs were randomly allotted to 1 of 6 dietary feeding strategies with 25 to 27 pigs per pen and 7 replications per treatment. The six dietary strategies consisted of the corn-soybean meal control diet or high-fiber diet fed for the duration of the study, or the high-fiber diet fed until 24, 19, 14, or 9 d prior to harvest, at which time the pigs were switched to the corn-soybean meal control diet for the remainder of the study. Overall (d 0 to 96), pigs fed the high-fiber diet through the entire study compared with the corn-soy control diet had lower ($P < 0.01$) ADG and poorer F/G. This reduction in growth performance led to a trend for poorer ($P < 0.10$) caloric efficiency and lower ($P < 0.01$) final BW in pigs fed the high-fiber diet throughout compared to the control. For pigs fed the high-fiber diet then switched to the corn-soy control, ADG and ADFI were not different between withdrawal days, but F/G tended (linear; $P < 0.07$) to improve as withdrawal days increased from 0 to 24 d. Pigs fed the high-fiber diet throughout had a 9.5-lb lighter ($P < 0.01$) HCW compared to those fed the corn-soy control. Neither percentage yield using the farm live weight or plant live weight were significantly influenced by withdrawal days from the high-fiber diet; however, HCW increased linearly ($P < 0.05$) as withdrawal days increased. Backfat and loin depth both decreased ($P < 0.02$) in pigs fed the high-fiber diet throughout compared with those fed the corn–soybean meal diet. Loin depth increased, then decreased (quadratic; $P < 0.04$) as high-fiber diet withdrawal time increased. Total feed cost per pig and feed cost per lb of gain was lower ($P < 0.01$) for pigs fed the high-fiber diet until harvest, but carcass gain value per pig also decreased ($P < 0.01$) by $7.34. Total feed cost tended ($P < 0.10$) to increase and carcass gain value increased ($P < 0.05$) as high-fiber diet withdrawal time increased. Although no significant differences were observed in income over feed cost (IOFC) between treatments, switching pigs from the high-fiber diet to the corn-soybean meal diet at 14 to 19 d before market numerically increased IOFC by $1.42 to $2.30/pig over pigs fed the high-fiber diet continuously and $2.04 to 2.92/pig over pigs fed the corn-soybean meal diet throughout.

In summary, pigs fed the high-fiber diet had increased F/G, poorer caloric efficiency, and lower carcass yield compared with pigs fed the corn-soy control. Withdrawing pigs from the high-fiber diet and switching them to a corn-soy control diet did restore carcass yield when done for the last 15- to 20-d prior to harvest.