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Abstract

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Keywords

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EFFECTS OF EXPANDING AND PELLETING DIETS ON FINISHING PIGS FED FROM WET/DRY FEEDERS[1]

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Summary

Pigs fed pelleted and expanded diets from wet/dry feeders had 4.4% greater ADG and 7.9 % greater efficiency of gain than pigs fed a mash diet. Also, trends for greater efficiencies of gain occurred among pigs fed expanded pellets vs standard pellets and expandate vs expanded pellets.

(Key Words**:** Expanding, Pelleting, Wet/Dry Feeders, Finishing Pigs.)

Introduction

Previously reported data from our lab demonstrated that pelleting improved efficiency of growth by about 6% compared to meal diets. However, in other experiments, we observed similar improvements in efficiency of gain when a mash diet was fed through wet/dry feeders. Thus, we designed an experiment to determine if thermal processing (pelleting and expanding) are of benefit when pigs are fed from wet/dry feeders.

Procedures

A total of 208 finishing pigs (initial wt of 133 lb) was used in a 55-d growth assay. The pigs were blocked by initial weight and allotted to pen (based on gender and ancestry)with 13 pigs per pen and four pens per treatment. Treatments were: 1) mash, 2) standard pellet, 3) expandate, and 4) expanded pellets. The pigs were house in 6-ft × 16-ft pens with 50% solid concrete and 50% concrete slat flooring. Each pen had a wet/dry shelf feeder (Crystal Spring®, model F-5000, Omaha, NE) with a nipple waterer located at the base of the trough. Water meters (Neptune, Trident™, 5/8 in. × 3/4 in., North Kansas City, MO) were installed in all pens to allow measurement of water disappearance.

Corn was ground through a roller mill (Roskamp Manufacturing, Model D, Ceder Falls, IA) to approximately 600 microns and used in diets formulate to .95% lysine, .6% Ca, and .5% P for 133 to 194 lb and .8% lysine, .5% Ca, and .45% P for 194 to 248 lb body weight. The pelleted diets were processed through a 30-horsepower pellet mill (30 HD Master Model, California Pellet Mill, San Francisco, CA) equipped with a die having 3/16-in. opening. Conditioning temperature was 180°F, and retention time in the conditioning chamber was 10 to15 seconds. Expandate was steam-conditioned processed through a 100 horsepower expander (Amandus-Kahl, Model OE15.2) at 333 psi and ground through a hammermill equipped with a 1/2-in screen. Expanded pellets were steam conditioned to 180°F for 10 to15 seconds at 333 psi and pelleted in the same pellet mill used for standard pellets. Production rate was held constant at 3000 lb/hour.

From d 46 to 51 of the experiment, pigs were fed their diets with .25% chromic oxide added as an indigestible marker. On d 51, samples of feces were collected (by rectal massage) from four pigs in each pen, pooled, and frozen for later analyzes. Concentration

[1]Appreciation is extended to Gro Master, Inc., Omaha, NE, for financial assistance with this project.

of Cr, DM, and N in the feces and diets were determined to allow calculation of apparent digestibilities of DM and N.

On d 55, the pigs were slaughtered and hot carcass weights were recorded to allow calculation of dressing percentage. Last rib backfat thickness was measured with a ruler at the midline on each half of the split carcass. Hot carcass weight and last rib backfat thickness were used to calculate percentage fat-free lean (NPPC, 1994).

All data were analyzed using the GLM procedure of SAS with pen as the experimental unit. Hot carcass weight was used as a covariate for analyses of dressing percentage, last rib backfat thickness, and fat-free lean index.

Results and Discussion

For 133 to 194 lb, ADG was not affected by the dietary treatments, but pigs fed the thermally processed diets (pellets, expandate, and expanded pellets) tended (P<.10) to have greater efficiency of growth. From 194 to 248 lb, pigs fed thermally processed diets had 9.4% greater ADG and 11.4% lower F/G (P<.001) compared to those fed the mash control. For the overall experiment (133 to 248 lb), pigs fed thermally processed diets had 4.4% greater ADG (P<.04) and 7.9% greater efficiency of gain (P<.001) vs those fed the mash control. Expanding increased efficiency of growth beyond that seen with standard pellets (P<.01), and expandate improved efficiency beyond that observed for expanded pellets (P<.02). Pigs fed thermally processed diets had 3.7 and 4.6 % greater digestibilities of DM and N compared to pigs fed the mash diet (P<.001) but digestibility of DM was greatest for pigs fed standard pellets (P<.01).

Pigs fed thermally processed diets had greater (P<.001) dressing percentage than pigs fed the mash control, and pigs fed expanded pellets had the greatest (P<.002) dressing percentage of all treatments. However, last rib backfat thickness and percentage carcass lean were not affected by diet (P>.57). In conclusion, thermally processed diets (pelleted and expanded) improved growth performance and digestibility of nutrients in finishing pigs fed from wet/dry feeders. Of the three thermal treatments, expandate supported the best gain/feed.

Table 1. Diet Compositions[a]

Ingredient, %	For 133 to 194 lb	For 194 to 248 lb
Corn	75.62	80.78
Soybean meal (46.5% CP)	20.71	15.62
Soybean oil	1.00	1.00
Lysine-HCl	.16	.15
L-threonine	.05	.03
Monocalcium phosphate	1.00	.84
Limestone	.69	.55
Salt	.35	.35
KSU vitamin premix	.15	.15
KSU mineral premix	.15	.15
Antibitotic[b]	.13	.13

[a]Formulated to .95% lysine, .6% Ca, and .5% P for 133 to 194 lb and .8% lysine, .5% Ca, and .45% P for 194 to 248 lb.
[b]Provided 100g/ton tylosin.

Table 2. Effects of Expanding and Pelleting Diets for Finishing Pigs Fed from Wet/Dry Shelf-Feeders[a]

Item	Mash	Standard Pellet	Expandate	Expanded Pellet	SE	Contrasts[b] 1	2	3
For 133 to 194 lb								
ADG, lb	2.15	2.23	2.13	2.13	.06	–[c]	–	–
ADFI, lb	5.80	5.85	5.28	5.46	.16	–	.08	–
F/G	2.70	2.62	2.48	2.56	.07	.10	–	–
Water usage, gallons/pig	1.7	1.7	1.5	1.9	.1	–	–	–
For 194 to 248 lb								
ADG, lb	1.88	2.01	2.06	2.08	.05	.01	–	–
ADFI, lb	6.33	6.27	6.06	6.32	.11	–	–	.13
F/G	3.37	3.12	2.94	3.04	.05	.001	.06	.06
Water usage, gallons/pig	1.9	1.9	1.7	2.1	.3	–	–	–
Overall								
ADG, lb	2.02	2.12	2.11	2.10	.03	.04	–	–
ADFI, lb	6.06	6.05	5.67	5.88	.11	–	.08	–
F/G	3.01	2.86	2.70	2.81	.03	.001	.01	.02
Water usage, gallons/pig	1.8	1.8	1.6	2.0	.3	–	–	–
Apparent digestiblity, %								
DM	87.5	91.7	89.9	90.6	.4	.001	.01	.06
N	84.6	89.2	87.6	88.8	.6	.001	–	–
Carcass Characteristics								
Dressing percentage	72.9	73.5	73.3	74.2	.1	.001	–	.002
Last rib fat thickness, in	.91	.93	1.01	.93	.13	–	–	–
Fat free lean index, %	49.1	49.0	48.2	49.1	.3	–	–	–

[a]A total of 208 finishing pigs (13 pigs/pen and four pens/treatment) with an average initial wt of 133 lb and average final wt of 248 lb.

[b]Contrasts were: 1) nonthermal (mash) vs thermal processing (pelleting and expanding); 2) standard pellets vs expandate and expanded pellets; and 3) expandate vs expanded pellets.

[c]Dashes indicated P>.15.