

# Kansas Agricultural Experiment Station Research Reports

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Volume 0  
Issue 10 *Swine Day (1968-2014)*

Article 852

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2001

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### Recommended Citation

Main, R G.; Tokach, Michael D.; Goodband, Robert D.; Nelssen, Jim L.; and Dritz, Steven S. (2001) "Effects of feeding graded levels of Ractopamine (paylean TM) on pig performance in a commercial finishing facility," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 10. <https://doi.org/10.4148/2378-5977.6692>

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## Effects of feeding graded levels of Ractopamine (paylean TM) on pig performance in a commercial finishing facility

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## EFFECTS OF FEEDING GRADED LEVELS OF RACTOPAMINE (PAYLEAN™) ON PIG PERFORMANCE IN A COMMERCIAL FINISHING FACILITY

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### Summary

A total of 880 pigs were used in a 21-day trial conducted in a commercial research facility to determine the influence of feeding graded levels (0, 4.5, 6.75, and 9.0 g/ton) of ractopamine HCl (Paylean™, Elanco Animal Health) on pig performance and carcass composition. Ractopamine supplementation improved ADG 17 to 22% and F/G 12 to 20%. Increasing ractopamine dosages resulted in improved F/G, but similar ADG. With the exception of a tendency to increase yield, carcass parameters were not different among treatments. Ractopamine supplementation resulted in improved economic returns (\$2.55 to \$3.20/pig), which were due to the improvements in carcass weights (80%) and lean premium (20%).

(Key Words: Ractopamine, Paylean, Economics.)

### Introduction

Ractopamine is a feed additive approved in December 1999 for use in growing swine. This product is classified as a beta-adrenergic agonist. This product was well studied in the late 1980s during the initial phases of the approval process. Ractopamine supplementation has been demonstrated to improve lean accretion, feed conversion, and decrease fat deposition. Our objective was to determine the impact of feeding graded levels of ractopamine during the last 21 days of the finishing period. An economic analysis was completed to better

understand potential effects on producer profitability.

### Procedures

This experiment was completed in a commercial finishing research facility. Forty pens (20 barrow pens, 20 gilt pens) of pigs (PIC C22 x 337) were allotted to treatment with an average pig weight of 235 lb. Pens had totally slatted floors, were 10 × 18 ft, and contained 20 to 23 pigs per pen. Each pen was equipped with a 50-inch dry feeder (Staco) and cup waterer. This double curtain sided finishing barn is a deep-pitted facility.

The four dietary treatments were based on level of ractopamine (0, 4.5, 6.75, or 9.0 g/ton) added to the diet. Diets were corn-soybean meal-based with no added fat and included 3 lb/ton of synthetic lysine. The diets were formulated to 0.7 % and 0.9 % total dietary lysine, .54 % and .56% calcium, and 0.49 and 0.52% phosphorus for the control and ractopamine supplemented diets, respectively. Vitamin and trace mineral supplementation was similar across treatments.

Ten pens (5 barrow, 5 gilt) were assigned to each treatment and blocked based on average pig weight. On the day prior to allotment, the heaviest pigs had been removed from each pen. Pen weights were obtained at the beginning and end of the 21-day evaluation. Feed delivery was recorded daily, and feed remaining at the end of the trial was measured. Average daily gain,

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ADFI, F/G and carcass composition were measured in this evaluation.

At the conclusion of the trial, pigs in each pen were identified with a unique tattoo to obtain carcass information on a pen basis. At slaughter, fat and loin depth were measured with an optical probe and used to calculate lean percentage. Fat, loin depth, and lean percentage were adjusted to a common carcass weight for statistical evaluation. Data were analyzed using GLM procedures of SAS in a randomized complete block design. An economic evaluation was completed using actual feed costs and carcass revenue information attained from the pens in this evaluation.

## Results and Discussion

Ractopamine supplementation improved ( $P<0.01$ ) ADG and F/G compared with those fed the control diet (Table 1). However, differences were not observed in ADG ( $P>0.27$ ) among the three ractopamine treatments. Pigs fed 9.0 g/ton of ractopamine had improved F/G ( $P<0.02$ ) compared to pigs fed the 4.5 g/ton, with pigs fed 6.75 g/ton having intermediate F/G. No differences in ADFI ( $P>0.47$ ) were observed among treatments. Gender differences were not observed ( $P>0.37$ ) in ADG or F/G in this 21-day evaluation. There was no gender  $\times$  ractopamine interaction ( $P>0.37$ ) for any of the parameters measured in this study.

Ractopamine supplementation did not affect ( $P>0.49$ ) lean percentage, backfat, or loin depth (Table 1). However, a tendency for improvement in yield ( $P<0.12$ ) was observed. Carcass weights were greater ( $P<0.01$ ) for pigs fed ractopamine, regardless

of level. However, no differences in carcass weight ( $P>0.50$ ) were observed among pigs fed the 3 levels of ractopamine. Gender differences in lean percentage (54.5 vs. 56.2  $\pm 0.3\%$  for barrow vs. gilt, respectively;  $P<0.01$ ) and backfat (0.76 vs. 0.65  $\pm 0.01$  in;  $P<0.01$ ) were observed.

Our economic evaluation used actual feed cost and carcass revenue information at the time the trial was performed. Sort loss was fixed, and carcass base price was \$59.14 cwt. Diet costs including manufacturing and delivery costs increased due to both the increased lysine fortification and increasing levels of ractopamine (Table 2). Cost per lb of gain also was increased with the ractopamine-supplemented diets. Although feed cost increased, the margin over feed costs improved with the ractopamine treatments. Approximately 80% of the improved margin was due to the 5-lb increase in carcass weights of pigs fed ractopamine. The remaining 20% of the improvement was due to the numerical improvements observed in carcass lean, and the resulting increase in lean premium.

Feeding ractopamine at 4.5 to 9.0 g/ton for 21 days prior to slaughter improved ADG and F/G. Increasing dosages from 4.5 to 9.0 g/ton resulted in similar ADG, but improved F/G. Ractopamine supplementation 21 days prior to slaughter appears to be an opportunity to enhance producer profitability. Approximately 80% of the margin improvement in this study was due to the increased carcass weight. Therefore, feeding ractopamine offers the most opportunity to producers that are short of finishing space or selling pigs below an optimum market weight.

**Table 1. Effects of Ractopamine on Growth, Efficiency, and Carcass Performance**

Item	Paylean™ g/ton				SE
	Neg	4.5 g	6.75 g	9.0 g	
Weight on test, lb	235.2	235.4	234.4	234	1.1
ADG, lb	1.69 <sup>b</sup>	1.98 <sup>c</sup>	2.00 <sup>c</sup>	2.07 <sup>c</sup>	0.07
ADFI, lb	6.14	6.18	6.00	5.96	0.11
F/G	3.57 <sup>b</sup>	3.13 <sup>c</sup>	2.94 <sup>c,d</sup>	2.86 <sup>d</sup>	0.1
Sale wt, lb	272.6 <sup>b</sup>	278.2 <sup>c</sup>	277.1 <sup>c</sup>	278.9 <sup>c</sup>	1.76
Avg. carcass wt, lb	207.0 <sup>b</sup>	212.2 <sup>c</sup>	212.0 <sup>c</sup>	213.2 <sup>c</sup>	1.3
% Yield <sup>e</sup>	75.7	76.2	76.3	76.6	0.23
Backfat <sup>f</sup> , in	0.72	0.71	0.70	0.69	0.02
Loin depth <sup>f</sup> , in	2.38	2.42	2.46	2.43	0.04
% Lean <sup>f</sup>	54.9	55.2	55.5	55.6	0.34

<sup>a</sup>A total of 40 pens (20 pens of barrows and 20 pens of gilts) were fed graded levels of ractopamine (Paylean™) during the last 21 days of the finishing period.

<sup>b,c,d</sup>Means in the same row without a common superscript differ (P<0.02).

<sup>e</sup>Yield was calculated using live carcass pen-weights attained at the slaughter plant.

<sup>f</sup>Backfat, loin depth and percent lean were adjusted to a common carcass weight.

**Table 2. Economic Evaluation of Ractopamine Supplementation Fed 21 Days Prior To Slaughter<sup>a</sup>**

Item	Paylean™ g/ton			
	Neg	4.5 g	6.75 g	9.0 g
Diet costs, \$/ton <sup>b</sup>	\$92.90	\$109.97	\$115.47	\$120.96
Feed cost/lb of gain, \$/lb <sup>b</sup>	\$0.168	\$0.172	\$0.172	\$0.174
Added revenue due to carcass weight <sup>cd</sup>		\$3.10	\$3.02	\$3.73
Added revenue due to lean premium <sup>cd</sup>		\$0.55	\$0.73	\$1.01
Added feed costs <sup>bd</sup>		\$1.09	\$1.07	\$1.55
Margin advantage <sup>d</sup>		\$2.55	\$2.68	\$3.20

<sup>a</sup>This economic evaluation was completed using actual feed costs and carcass revenue information attained from this evaluation.

<sup>b</sup>Cost information: corn,\$1.85/bu; SBM 46.5%, \$150/ton; feed manufacturing and delivery, \$ 12/ton.

<sup>c</sup>Revenue information: carcass base price, \$59.74/cwt; sort loss was fixed across treatments; lean premium, Swift, Inc (Worthington, MN) lean premium grid at the time of sale.

<sup>d</sup>Added revenue, added cost, and margin advantage information are all in comparison to the negative control group.