# Effect of Ractopamine in Finishing Diets: Performance and Carcass Composition

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**SUMMARY**

Ractopamine at 5 ppm/kg feed improved growth and feed efficiency by 13% when fed for an average of 26 to 27 days. Ractopamine decreased backfat and improved loin thickness. Transit losses were higher in the ractopamine fed group.

**INTRODUCTION**

Paylean® is a feed additive that was recently registered in Canada. The active ingredient of Paylean® is ractopamine, a beta-adrenergic agonist known to stimulate muscle growth and inhibit lipid deposition. It has been registered in numerous countries around the world and is actively used by the pork industry in those countries to improve the profitability of pork production. Because the marketing and grading systems in Canada differ from those in other countries, there was a need to evaluate this product locally.

The overall objective of this experiment was to evaluate the effectiveness of Paylean, fed to deliver 5 ppm ractopamine, on performance, carcass characteristics, carcass quality, and the economics of pork production in finishing pigs.

**MATERIALS AND METHODS**

The experiment was designed so that the average starting weight within a treatment would be 87 kg. This was to provide an average of 28 days on Paylean prior to slaughter. All available pigs in two rooms (1 room started each week) at PSC Elstow were randomly allocated within gender to one of 8 pens. Only pigs with obvious health problems were excluded from the experiment so the variation observed was typical of normal practise.

At the end of the room turn, all remaining pigs were weighed and any feed remaining in the feeder was weighed. Any pigs failing to achieve the minimum market weight at the end of the room-turn were marketed and carcass information obtained from the packing plant. The number of "light" or "tail-ender" pigs was recorded by gender and treatment.

All animals were fed a diet comparable to the barn's normal gilt finisher, The experiment consisted of two treatments: control or 0.25% Paylean®, equivalent to 5 ppm ractopamine (RAC). Except for total lysine which was increased to 1.00 % and the 5 ppm ractopamine; the Paylean-fed pigs were fed a diet formulated to the same specification as the controls.

*'The faster growth associated with pigs fed Paylean reduced tail-enders from 7.5% to less than 1%.'*

**RESULTS AND DISCUSSION**

A total of 271 barrows, and 259 gilts started the experiment (Table 1). During the experiment 5 pigs were removed from the experiment, all for reasons unrelated to the trial. Three RAC gilts died during transport to market, and two RAC barrows were condemned at the plant. In this size of experiment, we can't conclude that these deaths were a result of treatment or were a random effect. However, it has been suggested by others that RAC pigs may be more susceptible to stress during shipping.

Average daily gain was 13% higher in the RAC pigs, relative to the controls ($P < 0.001$); genders responded similarly. There was no effect of treatment on feed intake, thus feed conversion also increased by 13% in the RAC pigs ($P < 0.001$). Because they grew more efficiently, the RAC pigs used about 11.5 kg less feed than the control pigs to reach market weight. Thus, this experiment confirms that even at 5 ppm, RAC has positive effects on growth rate in both barrows and gilts. The RAC pigs were on test an average of 26.5 days; the control pigs, 30.1 days (Table 1), thus tail-enders were reduced in the RAC group.

Table 3 shows weekly pig performance, within treatment, according to the week in which the pig was marketed. It can be seen that during the first week of the experiment, except for those pigs shipped during week 5, the RAC pigs consistently outperformed the control treatment. However, these slower growing pigs appeared to respond to RAC during their second week on test. For the pigs marketed during the 5th and

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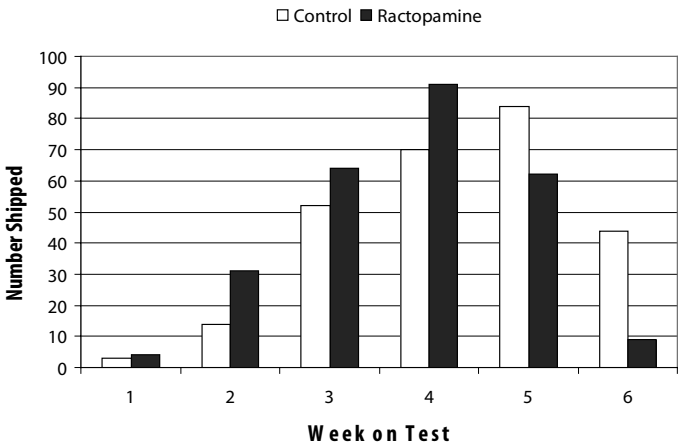


**Figure 1**. Number of pigs, receiving either the control or ractopamine diets, shipped per week.

6th weeks of the experiment, the response to RAC had diminished. As shown in Figure 1, because of the faster growth by the RAC pigs during the initial weeks of the experiment, more control than treatment pigs were shipped during the final two weeks. This decline in the response to RAC with longer exposure to the product is well documented. The faster growing pigs (> 1.3 kg/d) demonstrated a 13 % increase and the slower growing pigs (< 1.3 kg/d) had a 7 % improvement in growth rate during the first two weeks of the experiment.

The faster growth of the RAC pigs reduced the number of tail-end pigs from 7.5 % to 0.8%, a noteworthy response because of the heavy penalties associated with marketing lightweight pigs.

Table 4 describes the carcass response to RAC. Dressing percent was unaffected by treatment (P > 0.20). RAC reduced backfat thickness by an average of 1 mm (P < 0.02); however, this decrease was 1.8 mm in barrows and only about 0.3 mm in gilts (treatment by gender, P = 0.06). Loin thickness was increased by 2.5 mm, lean yield was improved (P < 0.001) and carcass index tended to improve in the RAC treated pigs (P = 0.06). This results are consistent with the mode of action of RAC

## CONCLUSION

Including RAC in the diet at 5 ppm, results in faster growth rate, increased carcass lean and faster barn throughput. The response to RAC diminishes if pigs receive it for more than 28 days.

## ACKNOWLEDGEMENTS

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council and Saskatchewan Agriculture and Food Development Fund. Specific funding for this project from Elanco Animal Health is gratefully acknowledged.

**Table 1**. The effect of 5 ppm ractopamine on descriptive statistics of experimental animals

| | Control | 5 ppm Ractopamine |
|---|---|---|
| **No. Pigs started**[a] | | |
| Males | 135 | 136 |
| Females | 131 | 128 |
| *Total* | *266* | *264* |
| **No. Pigs Shipped**[b] | | |
| Males | 135 | 135 |
| Females | 130 | 126 |
| *Total* | *265* | *261* |
| **Days on test**[b c] | | |
| Males | 28.3 | 25.3 |
| Females | 32.1 | 27.6 |
| *Total* | *30.1* | *26.5* |
| **Tail-enders**[d] | | |
| Males | 2 | 0 |
| Females | 18 | 2 |
| *Total* | *20* | *2* |
| **No. Condemned** | | |
| Males | 0 | 2 |
| Females | 0 | 0 |
| *Total* | *0* | *2* |
| **No. pigs DOA** | | |
| Males | 0 | 0 |
| Females | 0 | 3 |
| Total | 0 | 3 |

[a] Started on test diets when the average weight of the room was 86 kg. Target was for pigs to be fed ractopamine for an average of 28 days.

[b] Pigs were shipped at 116 kg, or on test for 6 wks.

[c] Effect of treatment (P < 0.001; gender, P < 0.0001; gender by treatment, P = 0.23), SEM = 1.78.

[d] Number of pigs not reaching the minimum live shipping weight of 116 kg, within the available 6 week experimental period.

**Table 2**. The effect of 5 ppm ractopamine on the overall growth performance

| | Control | 5ppm Ractopamine | S.E.M. | Treatment | Gender | Trt X Gender |
|---|---|---|---|---|---|---|
| **Initial Weight, Kg** | | | | P Values [a] | | |
| Males, min | 60.7 | 54.0 | | | | |
| Males, max | 114.7 | 109.1 | | | | |
| Females, min | 57.9 | 62.2 | | | | |
| Females, max | 103.6 | 107.0 | | | | |
| **Final Weight, kg** | | | | | | |
| Males | 118.9 | 118.5 | | | | |
| Females | 117.9 | 117.8 | | | | |
| *Average* | 118.4 | 118.1 | 0.03 | 0.51 | 0.04 | 0.65 |
| **Overall ADG, kg/d** | | | | | | |
| Males | 1.14 | 1.30 | | | | |
| Females | 1.01 | 1.14 | | | | |
| *Average* | 1.08 | 1.22 | 0.03 | 0.001 | 0.001 | 0.81 |
| **Overall ADFI, kg/d** | | | | | | |
| Males | 3.61 | 3.59 | | | | |
| Females | 3.12 | 3.14 | | | | |
| *Average* | 3.37 | 3.36 | 0.04 | 0.93 | 0.001 | 0.74 |
| **Overall Feed Conversion Efficiency** | | | | | | |
| Males | 0.32 | 0.36 | | | | |
| Females | 0.32 | 0.36 | | | | |
| *Average* | 0.32 | 0.36 | 0.01 | 0.001 | 0.33 | 0.89 |
| **Kg feed/pig started** | | | | | | |
| Males | 102.5 | 90.5 | | | | |
| Females | 99.5 | 87.8 | | | | |
| *Average* | 101.0 | 89.2 | | | | |

[a] Model included the effects of treatment, gender and the treatment by gender interaction. Room (n=2) was considered random. Pen (n=32) was the experimental unit. Initial weight and kg feed/pig started refer to entire cohort within treatment, therefore not analyzed statistically.

**Table 3**. The effect of ractopamine on average weekly growth rate according to the week of shipping

| | | | Weeks on Test | | | | | |
|---|---|---|---|---|---|---|---|---|
| Week Shipped | Treatment | n=[a] | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | C | 3 | 1.43 | | | | | |
| | T | 4 | 1.68 | | | | | |
| 2 | C | 14 | 1.31 | 1.33 | | | | |
| | T | 31 | 1.41 | 1.56 | | | | |
| 3 | C | 52 | 1.22 | 1.14 | 1.13 | | | |
| | T | 64 | 1.34 | 1.43 | 1.25 | | | |
| 4 | C | 70 | 1.19 | 1.11 | 1.03 | 1.10 | | |
| | T | 91 | 1.30 | 1.30 | 1.15 | 1.15 | | |
| 5 | C | 84 | 1.17 | 1.05 | 1.07 | 0.99 | 1.12 | |
| | T | 62 | 1.08 | 1.32 | 1.08 | 0.99 | 1.03 | |
| 6 | C | 44 | 1.00 | 0.95 | 0.91 | 0.86 | 0.99 | 0.89 |
| | T | 9 | 1.15 | 1.12 | 0.93 | 0.86 | 0.91 | 1.07 |

[1] Number of pigs shipped within that week. For example in the second group of animals shipped, 14 pigs were shipped from the control group, they gained 1.33 kg/d the week prior to shipping, and 1.31 kg/d the first week on test.