



Effect Of Paylean On Pig Performance, Carcass Quality And Pork Quality



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Paylean

- ∅ Ractopamine hydrochloride is a compound that acts on cells to encourage increased growth of lean tissue and reduced growth of fat tissue.
 - ∅ Is sold in Canada under the trade name Paylean
 - ∅ Is suggested to be fed for 28 days prior to marketing at a rate of 5 parts per million of ractopamine hydrochloride or 0.025% Paylean.

- ∅ There has been a large amount of research on ractopamine hydrochloride, dating back at least to the early 1980's. However, Canadian pork producers still have some questions:
 - ∅ Much of this research has been undertaken in the USA at higher levels than currently recommended in Canada
 - ∅ 10 to 20 ppm versus 5 ppm
 - ∅ The marketing and grading system in the US differs substantially from that in Canada, potentially affecting the financial returns from the use of Paylean
 - ∅ There has been much less research on the impact of Paylean on the eating quality of pork, a topic that should be a priority in any food sector





Objectives

The overall objective is to evaluate the effectiveness of Ractopamine fed at 5 ppm to improve performance, carcass characteristics, carcass quality and the economics of pork production



Experimental procedures: Pigs

- Ø Finishing experiment conducted at PSC Elstow Research Farm.
 - Ø Provided a commercial environment for the experiment

- Ø Pigs were not “pre-selected” but rather represented all pigs (good and bad, big and small) within each of two farrowing weeks.
 - Ø Test animals typical of a normal group of pigs
 - Ø Week 1: 18 barrows or 16 gilts per pen
 - Ø Week 2: 16 barrows or 17 gilts per pen
 - Ø Total of 16 pens on control diet and 16 pens on Paylean diet

- Ø Pigs started experiment at about 85 kg
 - Ø Pigs were marketed once per week; must weigh minimum 116 kg (255 lb) to be shipped.
 - Ø Pigs marketed through Mitchell’s Gourmet Foods



Experimental diets

	Control	Paylean
Wheat	50.000	48.000
Barley	33.725	31.120
Soybean meal	12.893	16.623
Limestone	0.807	0.800
Dicalcium phosphate	0.463	0.681
Salt	0.500	0.500
Vitamin premix	0.400	0.450
Mineral premix	0.400	0.450
Lysine HCl	0.075	0.236
dl-methionine	-	0.053
l-threonine	-	0.099
Canola oil	0.738	0.738
Paylean	-	0.025



Experimental diets

	Control	Paylean
<u>Nutrients, calculated</u>		
D.E., Kcal/kg	3,300	3,300
<u>Nutrients, analyzed</u>		
Lysine, total, %	0.84	1.09
Calcium, %	0.58	0.63
Phosphorus, %	0.48	0.51
Ractopamine, ppm	undetected	4.9



Experimental procedures: Carcass and pork

- Ø Pigs tattooed by pen
- Ø All standard carcass information recorded
 - Ø Plugs noted and removed from the dataset
- Ø 64 pigs (32 per week) selected for detailed meat quality evaluation
 - Ø Conducted by Dr. Phyllis Shand and her colleagues at the University of Saskatchewan
 - Ø Identification through the plant maintained by ear tag
 - Ø Day after slaughter, carcass pulled from the chiller and loins harvested
 - Ø 11 samples (slices) selected from each loin for various tests
 - Ø One portion of the loin injected with brine to 110% of initial weight; served as “enhanced” loin samples



Animal numbers

	Control	Paylean
<u>No. pigs started</u>		
Males	136	136
Females	131	128
<u>No. pigs shipped</u>		
Males	135	135
Females	130	126
<u>Days on test</u>		
Males	28.3	25.3
Females	32.1	27.6
<u>Tail-enders</u>		
Males	2	0
Females	18	2



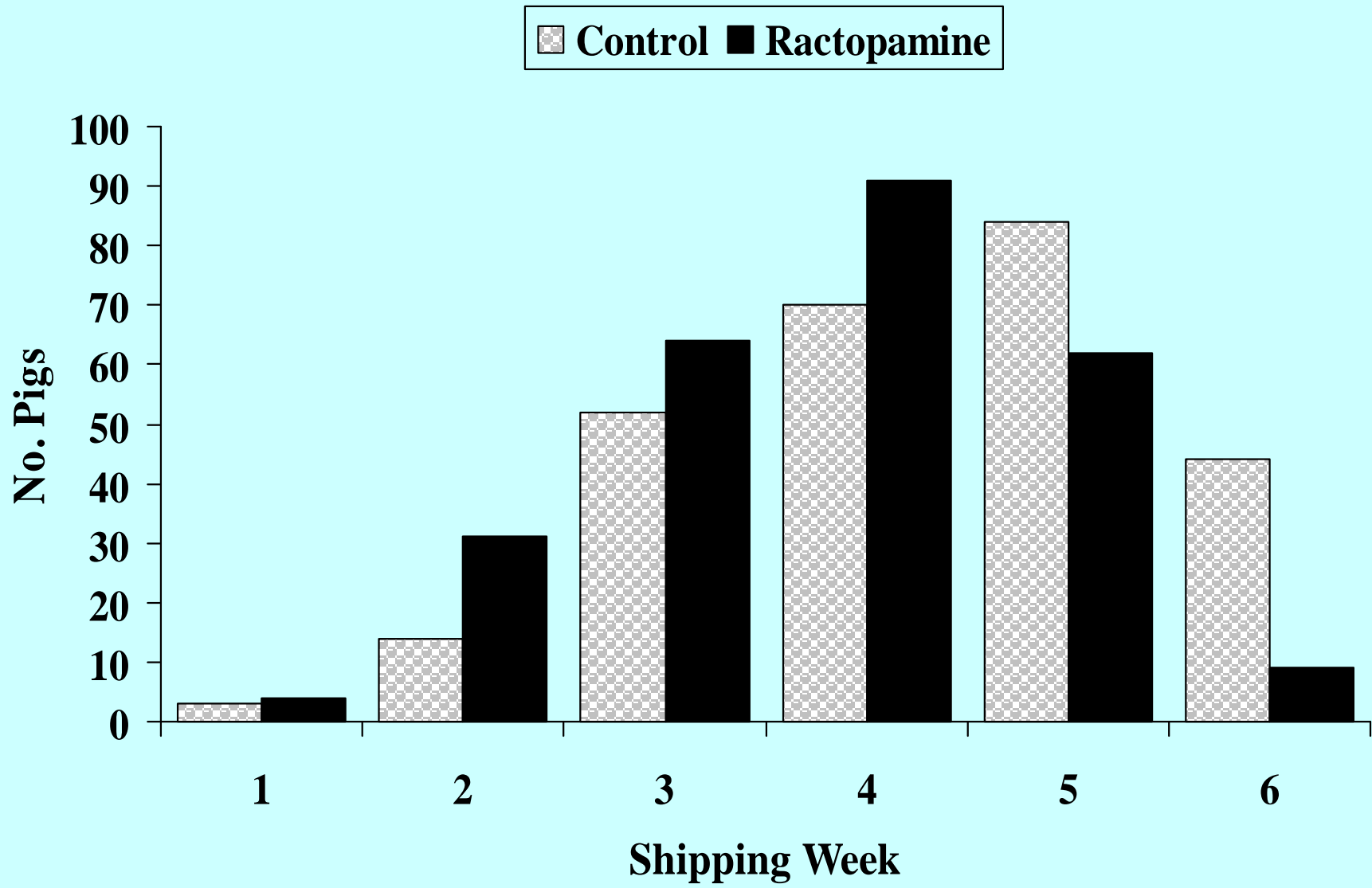
Effect of Paylean on finisher pig performance

	Barrows		Gilts	
	Control	Paylean	Control	Paylean
Init. wt., kg	86.7	85.7	85.6	86.3
Market wt., kg	118.9	118.5	117.9	117.8
A.D.G., kg/d ^{1,2}	1.14	1.30	1.01	1.15
A.D.F., kg/d ²	3.62	3.60	3.13	3.14
Feed:gain ¹	3.13	2.78	3.13	2.78
Total feed, kg	13,818	12,325	13,074	11,020

¹ Effect of Paylean significant, $P < 0.05$; ² Effect of gender significant, $P < 0.05$



Effect of Paylean on finisher pig growth rate





Effect of Paylean on finisher pig growth rate

Wk shipped	Trt	n=	% inc.	Week on test					
				1	2	3	4	5	6
1	C	3		1.43					
	P	4	17%	1.68					
2	C	14		1.31	1.33				
	P	31	13%	1.41	1.25				
3	C	52		1.22	1.14	1.13			
	P	64	15%	1.34	1.43	1.25			
4	C	70		1.19	1.11	1.03	1.10		
	P	91	11%	1.30	1.30	1.15	1.15		
5	C	84		1.17	1.05	1.07	0.99	1.12	
	P	62	2%	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	7%	1.15	1.12	0.93	0.81	0.91	1.07



Effect of Paylean on carcass quality

	Barrows		Gilts	
	Control	Paylean	Control	Paylean
Dressing %. ²	79.2	79.4	80.2	80.4
Backfat, mm ^{1,2}	20.3	18.5	15.8	15.6
Loin, mm ^{1,2}	67.1	69.7	69.5	71.8
Yield, % ^{1,2,3}	59.2	61.1	62.3	62.5
Index ^{2,3}	108.6	110.2	111.3	111.0
Premium, \$/pig ²	2.14	1.85	1.14	0.84

¹ Effect of Paylean significant, P<0.05; ² Effect of gender significant, P<0.05;

³ Paylean X gender interaction significant, P<0.05



Effect of Paylean on pork quality

	Control	Paylean
Probe pH	5.74	5.74
Purge loss, %		
- 24 hr	4.77	4.28
- 48 hr	6.73	6.21
CIE colour		
- L*	54.5	54.1
- a* ¹	8.2	7.4
- b* ¹	13.9	13.1
Visual colour		
- Canadian	2.7	2.7
- USA	2.9	3.0
- Japanese	2.8	2.8
Marbling	1.8	1.8

¹ Effect of Paylean significant, P<0.05



Effect of Paylean on cooking characteristics

	<u>Not enhanced</u>		<u>Enhanced</u>	
	Control	Paylean	Control	Paylean
Cook loss, %	20.3	20.5	17.6	18.2
Cook time, min ¹	15.2	15.8	14.4	14.4
WBSF ^{1,2}	64.9	72.8	44.6	54.0

¹ Effect of Paylean significant, $P < 0.05$; WBSF: Warner Bratzler Shear force



Effect of Paylean on pork eating quality

	Control	Paylean
Initial tenderness ¹	5.6	5.2
Overall tenderness ¹	5.7	5.3
Juiciness	5.2	5.2
Flavour intensity	5.2	4.9
Flavour desirability	5.6	5.5
Overall acceptability	5.6	5.3

¹ Effect of Paylean significant, $P < 0.05$



Economics

Ø Costs

- Ø Paylean cost \$77.50/kg, or \$19.38/tonne of finished feed
- Ø Increasing amino acids added \$6.60/tonne of finished feed
- Ø Increasing vitamins/minerals added \$2.31/tonne of finished feed
 - Ø Overall, adjusting for feed conversion improvement, feed cost per pig increased by \$1 per pig
- Ø Mortalities will be farm and trucker dependent

Ø Benefits

- Ø Increased feed conversion reduced feed requirement by 11.2 kg/pig
- Ø Increased growth rate improved barn turnover by almost one week
- Ø Effect on index, carcass value and premiums will be hugely farm dependent

Ø No effect

- Ø Carcass dressing percent

Note: Economic conclusions will depend on prevailing feed costs and other factors. An evaluation will be needed for any specific production operation.



Conclusions

1. Adding 5 ppm ractopamine as Paylean and fed for 26 days prior to marketing improved growth rate and feed efficiency by about 13%
2. Paylean reduced the proportion of tail-end pigs from 7.5% to 0.75%
3. Paylean reduced backfat by an average of 1 mm and increased loin by an average of 2.5 mm.
4. Paylean may increase DOA's so greater care must be taken when handling pigs fed Paylean
5. Paylean reduced tenderness of pork slightly, but had little other effect on pork quality or eating quality
6. The economic value of using Paylean will vary widely among farms, but a "typical" benefit appears to be in the range of \$2 per pig sold



So What?

Paylean is another tool in the pork producer's "tool kit" to be evaluated economically on a farm-by-farm basis and used accordingly.



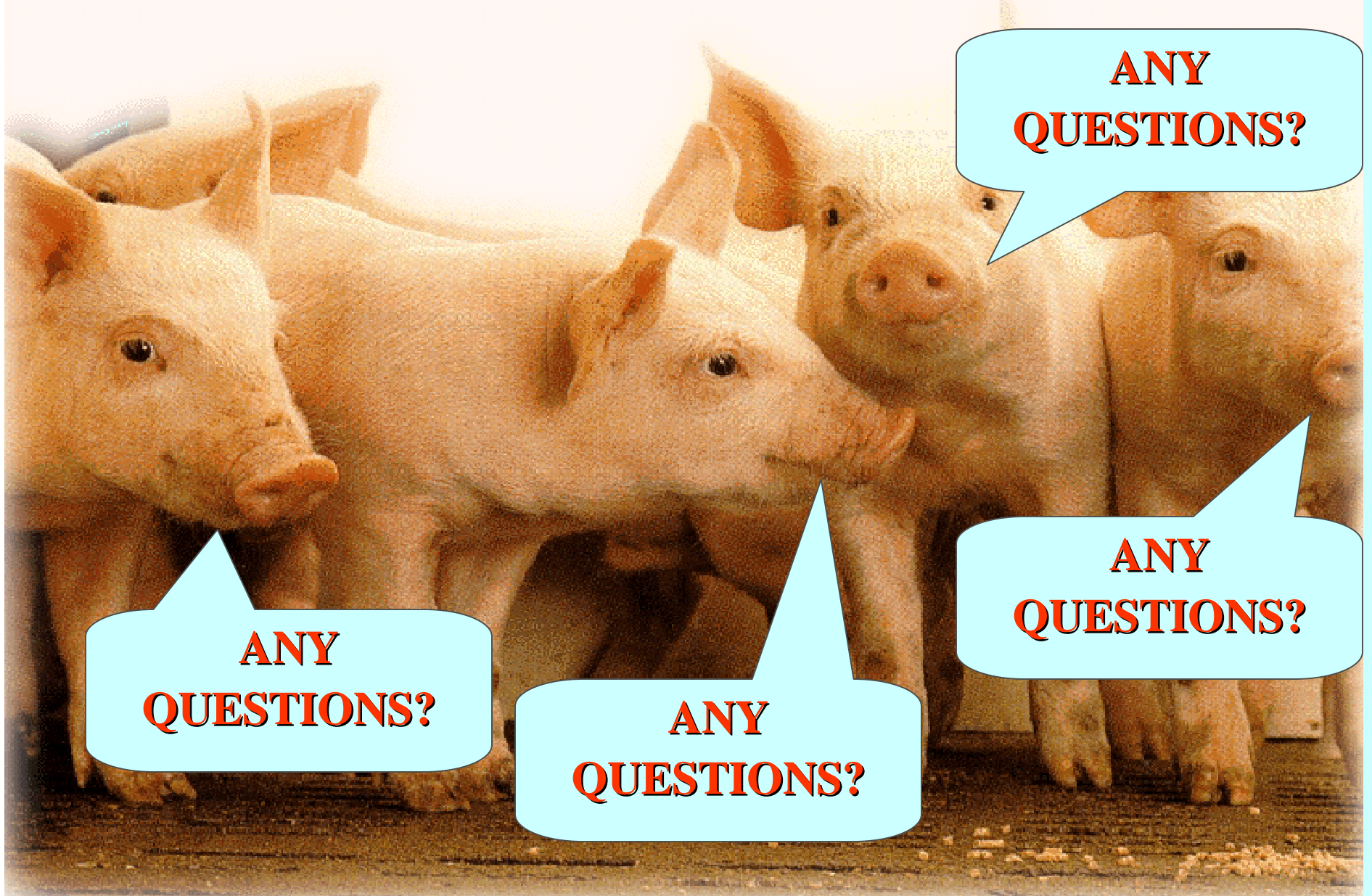


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Thank You!!



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