

The Effects of Compensatory Growth on Carcass Merit and Pork Quality

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Introduction

Most on-farm feeding systems try to maximize feed intake during the growing and finishing phase. However, Therkildsen et al. (2002) observed improved feed efficiency, protein synthesis, meat quality and tenderness when pigs were limit fed during the growing period. This trial further investigated the performance, carcass and meat quality ramifications of limit feeding during the growing period.

Objectives:

The project is evaluating the effects of feeding strategy (full versus limit feeding) and gender (gilt versus barrow) on growth performance, feed intake, carcass and meat quality and economic returns.

Experimental Procedures (first experiment):

One hundred and eight feeder pigs (32.9 ± 3.3 kg) were randomly assigned to eighteen pens with six pigs per pen. A specific gender (gilt or barrow) and feeding strategy was assigned to each pen to provide three replications (pens) for each treatment combination. Corn, soybean meal (SBM) and a vitamin/mineral premix were used to formulate an 18% CP (0.9% lysine) diet which was fed to all pigs. The following feeding strategies were evaluated during the first experiment:

- a) **Control Group:** - Pigs were fed *ad libitum* until the pigs (within pen) were marketed @ approximately 110 kg BW.
- b) **Limit Fed Group (85% of control):** - feed allocation was limited to 85% of *ad libitum* feed intake consumed by the control group until the pigs weighed 60 kg (pen average weight). The pigs were then fed *ad libitum* until they were marketed at 110 kg BW.
- c) **Limit Fed Group (70% of control):** - feed allocation was limited to 70% of *ad libitum* feed intake consumed by the control group until the pigs weighed 60 kg (pen average weight). The pigs were then fed *ad libitum* until they were marketed at 110 kg BW.

Hot carcass weights were recorded prior to overnight chilling at 1°C. The left-hand side of each carcass was probed prior to chilling between the third and fourth last ribs to estimate carcass lean content. After an overnight chill, carcass measurements (fat and muscle depth, loin eye area, were taken by an experienced evaluator.

A section of the loin was cut into chops for determination of drip loss, subjective evaluations (color, marbling, wetness, firmness), and pH. An objective measure of lean colour was determined using a Minolta Chroma Meter (Model CR 400). Lean color was measured at 2 locations for each chop with color data collected in the CIE, $L^* a^* b^*$ scale. A second chop was used to determine intramuscular fat content while the third and fourth chops were used for Warner-Bratzler shear force determinations to evaluate tenderness.

Results to date:

- 1) Compensatory gain (Table 1) was observed during the finishing period (> 60 kg) when limit feeding was practiced during the growing phase for R₇₀ pigs (versus control) resulting in improved feed efficiency (F/G).
- 2) Control fed pigs (FF) had an increased yield index while muscle depth was increased for FF versus R₇₀ (63.0 vs. 59.9 mm).
- 3) Loin colour, pH, and loin eye areas were similar for each dietary treatment with increased loin tenderness for pigs limit fed in the growing period [4.7 (FF), 4.2 (R₈₅) and 4.2 (R₇₀)].

Table 1. Effects of feeding strategy and gender on pig performance, carcass and pork quality.

	Feeding Strategies			Genders	
	Control (FF)	85% of Control Intake (R ₈₅)	70% of Control Intake (R ₇₀)	Barrow	Gilt
Growth Performance					
Days to Market	73.0	74.2	72.4	70.9 ^d	75.5 ^e
Average Daily Gain (kg)	1.03	1.03	1.05	1.09 ^d	0.99 ^e
ADG – finishing period (kg)	1.02 ^a	1.06 ^a	1.16 ^b	1.16 ^d	1.00 ^e
Feed to gain (F/G) – over both periods	2.6 ^a	2.6 ^a	2.4 ^b	2.6	2.5
Carcass and Meat Quality					
Yield Index (%)	61.0 ^a	60.1 ^b	59.8 ^b	59.7 ^c	60.9 ^d
Grade Fat (mm)	18.1 ^a	19.5 ^{ab}	20.3 ^b	20.4 ^c	18.1 ^d
Muscle depth (mm)	63.0 ^a	60.2 ^{ab}	59.9 ^b	59.2 ^c	63.0 ^d
Loin colour L*	48.1	48.7	48.9	48.6	48.6
Shear Force (kg)	4.7 ^a	4.2 ^b	4.2 ^b	4.3	4.5

^{a,b}LS means within row for feeding strategy that do not share a common superscript differ (P<0.05).

^{c,d}LS means within row for gender that do not share a common superscript differ (P<0.05).

References

Therkildsen, M., B. Riis, A. Karlsson, P. Ertbjerg, P. P. Purslow, M. Dall Aaslyng, and N. Oksbjerg. 2002. Compensatory growth response in pigs, muscle protein turn-over and meat texture: effects of restriction/realimentation period. *Anim. Sci.* 75:367-377.

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