

# Interaction Among Lactose, Plasma Proteins and Crowding in Weanlings

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## Summary

The addition of 4 % plasma and 30 % lactose to the diets of weanling pigs modestly improved performance; however this effect was observed only during the initial 7 days post-weaning. There were no interactive effects of plasma with lactose, and the results were independent of starting weight. Crowding decreased performance by day 49 of the nursery period.

## Introduction

Lactose and porcine plasma are two key ingredients in current starter programs that may become even more important if antibiotic use in the diet is restricted. Feed additives such as plasma and lactose could have differential effects depending on the weight or age of the pigs. Floor space allowance is always an important variable in pig production. This experiment was designed to 1) determine the interactive effects of plasma proteins and lactose on weanling pig performance when fed antibiotic-free diets 2) compare the response to lactose and plasma proteins in crowded and non-crowded pigs 3) determine the impact of weaning weight on the response to lactose and plasma proteins.

## Experimental Procedures

Pigs (n=360) were weaned at an average age of 17.5 days (BW = 5.75 kg) and assigned to one of 6 unmedicated treatment diets; 2 levels of plasma proteins (day 0 to 7, 2 or 4 %; day 8 to 21, 2 or 0 %) and 3 levels of lactose (day 0 to 7, 10, 20 or 30 %; day 8 to 21, 0, 10 or 20 %). From day 22 to 49 all pigs received a common,



unmedicated starter diet. Pens (5.4 m<sup>2</sup>) housed either 18 or 24 pigs, and pigs were blocked at day 0 on the basis of bodyweight.

## Results and Discussion

Overall, the performance of the pigs in this trial was less relative to the performance typically observed in this barn, probably a reflection of the absence of antibiotics in the feed. The inclusion of plasma and/or lactose in the diet had no effect on performance over the entire experimental period (d0 to 49). However, there were interactions between plasma proteins and days, and lactose and days, indicating that an early response to these two products was observed, but this was not sustained through to the end of the nursery period. As expected, heavier pigs grew faster than lightweight pigs; interestingly, this effect was independent of diet. A detrimental effect on performance of increased numbers of pigs per pen (18 or 24 pigs per pen) was observed, but

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Table 1. The effect of including plasma protein and / or lactose in the diet, and initial body weight on the performance of nursery pigs over two phases of growth.

Phase	Plasma (%)			Lactose (%)			Initial Weight			
	2/0 <sup>a</sup>	4/2	SEM	10/0	20/10	30/20	SEM	Light	Heavy	SEM
<b>ADG, kg/day</b>										
d 0-22	0.22	0.25	0.01	0.24	0.24	0.23	0.01	0.21	0.26	0.01
d 23-49	0.59	0.58	0.01	0.60	0.57	0.59	0.01	0.55	0.63	0.01
<b>ADFI, kg/day</b>										
d 0-22	0.28	0.31	0.02	0.29	0.30	0.30	0.03	0.26	0.33	0.02
d 23-49	0.83	0.82	0.02	0.84	0.82	0.82	0.03	0.78	0.86	0.02
<b>Feed Conversion, gain/feed</b>										
d 0-22	0.79	0.80	0.02	0.82	0.79	0.78	0.02	0.80	0.79	0.02
d 23-49	0.73	0.72	0.02	0.73	0.71	0.73	0.02	0.71	0.74	0.02
<b>Coefficient of Variability, (CV) %</b>										
d 49	13.9	14.1	0.5	13.5	14.2	14.3	0.6	15.6	12.4	0.5

<sup>a</sup>Refers to the % in the diet, day 0-8/ day 9-22.

Table 2. Economic analysis of including lactose and plasma proteins in the diet of nursery pigs

Treatments				
No.	Lactose <sup>a</sup>	Plasma <sup>a</sup>	Total Feed Cost, \$ <sup>b</sup>	Cost, kg gain <sup>c</sup>
1	30/20	4/2	15.58	0.724
2	20/10	4.2	14.28	0.667
3	10/0	4/2	14.00	0.638
4	30/20	2/0	14.28	0.682
5	20/10	2/0	13.96	0.657
6	10/0	2/0	13.64	0.616

<sup>a</sup>Refers to percent in the diet, day 0-8/day 9-22.

<sup>b</sup>Total cost of feed/pig for period indicated.

<sup>c</sup>Calculated on a per pig basis, therefore numbers of pigs removed/treatment has not been considered.

only during the final two weeks of the experiment (day 36 to 49).

The plasma and lactose increased the cost of these starter diets. Therefore, due to the lack of an overall effect of these ingredients on performance, the cost per kg of gain increased with their inclusion.

### Conclusion

A modest improvement in performance during the initial 7 days post-weaning was observed with the addition of 4% plasma and 30 % lactose in the diet of weanling pigs. There were no interactive effects of plasma with lactose, and the results were independent of starting weight. Although not directly tested in this experiment, the performance of the pigs in this trial indicates that plasma protein and lactose dietary supplementation do not replace antibiotics in a nursery diet. Providing pigs with less than recommended floor space allowance will decrease performance. The detrimental effect of crowding becomes increasingly evident as the pigs grow.

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