Does the Inclusion of Lyso-Lecithin (Lecired) Improve the Growth of Newly Weaned Pigs?

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SUMMARY

The inclusion of lyso-lecithin (10% of dietary fat) into high or low energy diets fed to newly weaned pigs had no effect on growth or feed conversion regardless of whether the diets contained 2, 4 or 6 % tallow.

INTRODUCTION

The newly weaned piglet is abruptly transferred from a liquid milk diet, containing about 8% fat to a dry diet with approximately 5% fat. Moreover, fat digestibility of milk fat by the suckling pig approaches 95% while the digestion of dietary fat by the piglet shortly after weaning is only about 75% (cited by Price et al. 2013). Thus, supplementing dietary fat to the diet of the newly weaned piglet does not alleviate the deficit in energy intake experienced at this time.

Price et al. (2013) showed that the addition of lecithin to the diet of newly weaned piglets improved digestibility of long-chain fatty acids. However, similar to the results of others, this did not result in an improved growth rate. Lecithin, which is primarily phosphatidylcholine, is commonly added to food, because it is an emulsifier. It is listed in CFIA, Schedule IV. We hypothesized that Lyso-lecithin will improve digestibility of tallow, resulting in a performance response when the pigs are limiting in energy.

MATERIALS AND METHODS

The experiment used 12 treatments, 10 pens of 4 pigs (weaned at 26 days of age, n = 480) per pen per treatment. Each room (considered a block) contains 24 pens, thus the experiment required 5 nursery rooms, started 1 room per week. Pigs were assigned to pen based on body weight. Gender was not considered a blocking factor.

Piglets received a commercial phase 1 diet for 7 days before switching to the phase 2 diet for the remaining 21 days. Diets were formulated to be a minimum of 5% different in NE content (approximately 120 calories) within 2 phases (average BW of weight group, 5 to 12 kg BW, and 12 to 25 kg BW). Except energy, all other nutrients met requirements for piglets of this age. In order to minimize variation among the diets, 4 batches (diets 1 to 6, 7 to 12, 13 to 18 and 19 to 24) were prepared. These were then divided into smaller batches and appropriate amounts of corn starch, cellulose and tallow added. Piglets and feeders were weighed on day 0, 3, 7, and weekly until day 42 (nursery exit). This allowed the determination of growth rate, feed intake and feed efficiency.

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RESULTS AND DISCUSSIONS

Overall, there were minimal effects of treatment on performance of the piglets in this experiment. Because there were very few significant interactions of lecithin with either dietary tallow or energy, only the main effects of the lecithin are shown. Adding lecithin at 10% of dietary fat to the diet did improve growth and feed intake in the first 3 days of the experiment (Table 1. $P < 0.05$, d 7 to 10 post weaning). However, despite a significant effect of the lecithin, there were no interactions with either dietary energy or tallow during this time period. We had hypothesized that lecithin would improve digestibility of the tallow, and effects would be more apparent in a low energy diet. However, as can be seen in Figure 1, the effect of lecithin was greater in the high energy diet ($P < 0.05$).

Table 1. Treatment designation.

Treatment #	1	2	3	4	5	6	7	8	9	10	11	12
Tallow, %	2	2	4	4	6	6	2	2	4	4	6	6
Lecithin	0	10%	0	10%	0	10%	0	10%	0	10%	0	10%
NE, kcal/kg	2400	2400	2400	2400	2400	2400	2280	2280	2280	2280	2280	2280
Actual lecithin inclusion, %												
Lyso lecithin (Lecired)	0	0.2 (0.4)	0	0.4 (0.8)	0	0.6 (1.2)	0	0.2 (0.4)	0	0.4 (0.8)	0	0.6 (1.2)

NOTE: Lecired is 48% lecithin.

This experiment was designed to examine the effect of lecithin in the diet, because there is evidence that fat digestibility in the newly weaned pig is impaired because of a lack of lipase enzyme, and the observation that fat emulsification would improve fat digestibility and thus energy available to the piglet. For example, the addition of 0.02% lysolecithin improved growth performance and tended to improve fat digestibility when added to the diet of weanling pig (Jin et al. 1998). However, others (ie. Price et al. 1988) saw no effect of fat emulsification on the performance of newly weaned pigs. It was suggested that dietary energy was not limiting growth in these piglets. We included the energy treatment in our experiment to test this hypothesis. Tallow was used as a fat source in our experiment because it has been shown that the digestibility of tallow a saturated fat) was improved more by the addition of dietary lysolecithin to the diet than when an unsaturated fat was used (Jin et al. 1988).

CONCLUSIONS

In conclusion, the addition of 10% (of dietary fat) lyso-lecithin to high or low energy diets of weanling pigs had only modest effects on the performance of these piglets, regardless of the inclusion of tallow in the diet. Future experiments need to clarify if fat emulsification is limiting fat digestibility in piglets of this age.

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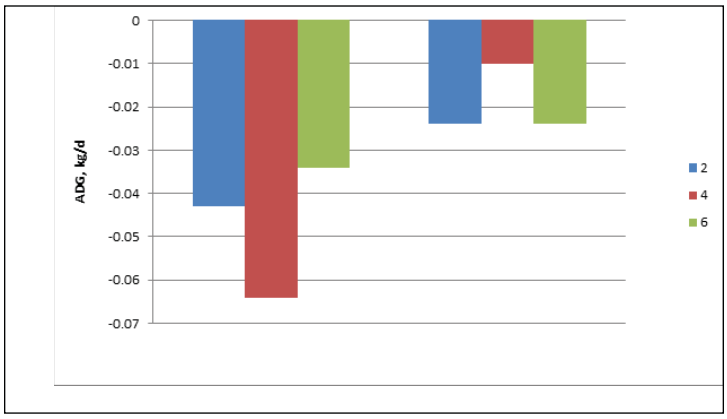

Figure 1. The interaction of lecithin (0 or 10 % of dietary fat) and tallow (P < 0.05) in the diet on the growth of weanling pigs, experimental d0 to 3 (d0 is d7 post-weaning)

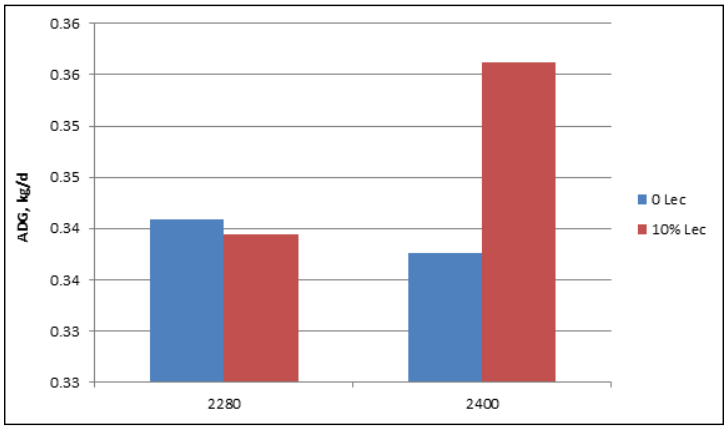

Figure 2. The interaction of lecithin (0 or 10 % of dietary fat) and dietary energy content (P < 0.05) on the growth of weanling pigs, experimental d0 to 28 (d0 is d7 post- weaning)

Table 2. Ingredient composition of phase 1 diets (5 to 12 kg BW)1

	Treatment					
	1,2	**3,4**	**5,6**	**7,8**	**9,10**	**11,12**
NE, kcal/kg	2400	2400	2400	2280	2280	2280
Tallow, %	2	4	6	2	4	6
Lecired*, %	0, 0.4	0, 0.8	0, 0.12	0, 0.4	0, 0.8	0, 0.12
Ingredients, % as fed						
Wheat	38.52	38.52	38.52	38.65	38.65	38.65
Barley	5.70	5.70	5.70	.....		.....
Soybean meal	23.00	23.00	23.00	23.70	23.70	23.70
SD whey	10.71	10.71	10.71	10.71	10.71	10.71
Canola meal	8.00	8.00	8.00	8.00	8.00	8.00
Lysine HCl	0.480	0.480	0.480	0.455	0.455	0.455
DL methionine	0.145	0.145	0.145	0.130	0.130	0.130
L-threonine	0.035	0.035	0.035	0.045	0.045	0.045
Corn starch	8.01	4.01	0.00	8.00	4.00	0.00
Cellulose (solka Floc)	.....	2.00	4.00	5.00	7.00	9.00
Tallow	2.00	4.00	6.00	2.00	4.00	6.00

[1] Diets also contained minerals and vitamins in amounts sufficient to meet requirements for pigs of this age.