

Flaxseed Meal in Swine Rations: Growth Performance and Carcass Fatty Acid Profile

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SUMMARY

Inclusion of up to 15% flaxseed meal (FSM) in the diets of growing and finishing pigs did not have any detrimental effects on overall growth performance, feed intake or feed conversion. Pigs fed diets containing FSM had increased levels of the omega-3 fatty acid α -linolenic acid (ALA) in both their backfat and loins. This may provide producers with an opportunity to sell their pork to specialized markets, and possibly attract a premium price for their product.

INTRODUCTION

Flaxseed meal is a by-product of the flaxseed crushing industry. There has been a growing interest in the use of flaxseed and its related products such as FSM within the swine industry. Flaxseed is the richest plant-based source of ALA, which has been implicated in having many potential health benefits. The primary goal for use of flaxseed and its by-products within the animal industry is to create a product enriched with omega-3 fatty acids. Although FSM is a defatted product, it may still contain up to 12% oil dependent on the processing method used, and thus may still have potential to create an ALA enriched pork product. The FSM used for this study was produced by a double pressure technique using a screw press. There will be an increased willingness within the pork industry to use FSM in the diets of growing and finishing pigs if its inclusion does not compromise growth performance.

Table 1. Dietary composition for each phase, 0 and 15% flaxseed meal inclusion levels

Phase	1 (32-60kg)		2 (60-85kg)		3 (85-115kg)	
FSM in Diet	0%	15%	0%	15%	0%	15%
Composition (g/kg as fed)						
Barley	100	100	150	150	300	300
Wheat	596	515	572	498	464	376
Peas	150	150	180	180	150	150
Soybean Meal	125	60	75	-	60	-
Flaxseed Meal	-	150	-	150	-	150
Premix	26.2	21.7	21.9	19.5	20.7	18.5
Lysine HCl	2.2	2.8	1.0	1.7	0.2	0.5
Canola Oil						
Analysis (% as fed)						
Crude Protein	18.2	18.1	17.3	17.7	16.1	16.3
Ether Extract	1.9	3.4	1.9	3.8	2.1	4.2
DE (Mcal/kg)	3.230	3.240	3.215	3.245	3.210	3.250
NE (Mcal/kg)	2.320	2.320	2.320	2.340	2.350	2.350
SID Lysine	0.83	0.85	0.67	0.66	0.54	0.54

MATERIALS AND METHODS

This experiment used a total of 200 pigs (100 barrows and 100 gilts) from 32 kg initial weight through to market (115 kg). Pigs were randomly assigned to one of four dietary treatments containing 0, 5, 10 or 15% FSM included at the expense of barley and soybean meal. The diets were formulated in three phases (32-60kg, 60-85kg, 85-115kg); all diets within phase were formulated to approximately equal net energy and SID (standardized ileal digestible) lysine. Dietary formulations are shown in table 1.

Pigs were housed by gender in groups of 5 pigs per pen. All pigs were weighed bi-weekly and feed intakes recorded. This allowed for calculations of average daily gain (ADG), average daily feed intake (ADFI) and feed conversion (F:G). At the time of market, 6 pigs per treatment were randomly selected for carcass fatty acid analysis.

“Incorporating flaxseed meal up to levels of 15% will not impact the growth performance of animals in the finishing barn”

RESULTS AND DISCUSSION

Table 2 shows the growth performance parameters. Average daily gain, average daily feed intake and feed conversion ratio were not statistically affected with the inclusion of up to 15% FSM during any phase. The days to market averaged 84, 84, 87 and 86 for 0, 5, 10 and 15% FSM ($P > 0.05$).

Figure 1. The Effect of Dietary FSM Inclusion on Backfat ALA Content

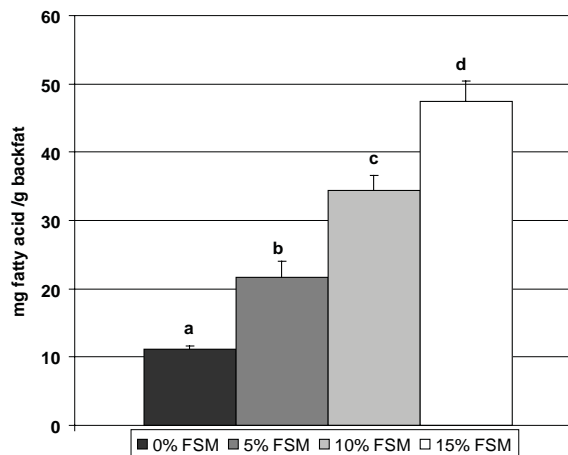


Table 2. The Effect of Dietary FSM Inclusion on Pig Performance

FSM in Diet	0%	5%	10%	15%	SEM	P-Value
Average Daily Gain (g/day)						
Phase 1	900	850	830	870	27	0.3
Phase 2	1,000	990	1,000	950	32	0.7
Phase 3	990	1,030	990	990	26	0.5
Total	950	940	910	920	21	0.6
Average Daily Feed Intake (g/day)						
Phase 1	2,070	1,990	2,010	2,060	102	0.7
Phase 2	2,780	2,730	2,750	2,740	111	0.8
Phase 3	3,180	3,210	3,080	3,150	99	0.4
Total	2,660	2,650	2,790	2,670	66	0.4
Feed:Gain						
Phase 1	2.29	2.38	2.50	2.32	92	0.3
Phase 2	2.68	2.81	2.82	2.93	128	0.6
Phase 3	3.14	3.07	3.37	3.19	143	0.5
Total	2.81	2.84	3.07	2.90	95	0.2

Phase 1 corresponds to pigs 32-60kg, phase 2: 60-85kg, phase 3: 85-115kg. Total refers to the entire experimental period (32-115kg).

Inclusion of just 5% FSM into the diets of growing and finishing pigs significantly increased the amount of ALA in backfat ($P < 0.0001$). Figure 1 shows the backfat fatty acid profile, showing a stepwise increase in the amount of ALA as the amount of FSM in the diet increased. The ALA increased from 11 mg/g of backfat up to 48 mg/g of backfat. Inclusion of 10% FSM in the diet significantly increased the amount of ALA in the loins of pigs ($P < 0.0001$), as shown in Figure 2. ALA content of the loin tissue increased from 5 to 10 mg/g of loin tissue as FSM increased from 0 to 15%. No increase in the total fat content of the loin samples was observed ($P = 0.29$), indicating that the fatty acid profile was enriched and not increased.

CONCLUSION

The inclusion of up to 15% flaxseed meal in grower/finisher rations will have no detrimental effect on pig growth performance and thus will not disrupt pig flow through a barn. FSM is able to improve the omega-3 fatty acid content of pork without increasing total fat. This may allow producers to potentially market a product that can be sold in specialized markets and attract a premium price.

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Figure 2. The Effect of Dietary FSM Inclusion on Loin ALA Content