

Flaxseed Meal in Swine Rations: Standardized Ileal Amino Acid Digestibility

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SUMMARY

Flaxseed meal (FSM) is a good source of dietary protein for hogs, containing 34% crude protein (CP). With the exception of a characteristic low Lysine content (3.6% of CP), the CP fraction of FSM is comparable to that of canola meal in terms of both quantity and quality (Standard Ileal Digestibility values), making it an attractive alternative to conventional protein sources.

INTRODUCTION

Recently, there has been a growing interest in the use of flaxseed and its related products such as FSM within the swine industry. Flaxseed meal is a by-product of the flaxseed crushing industry, and depending on the oil extraction process used, the meal may contain up to 12% oil with 34% CP. Prior to the routine acceptance and inclusion of FSM by the pork industry, a full nutritional profile must be made available to producers and nutritionists. A major component of this nutritional profile includes the apparent (AID) and standardized ileal amino acid digestibility (SID) content of the meal.

“Flaxseed meal is an attractive alternative to conventional protein sources”



Flaxseed meal

MATERIAL AND METHODS

This experiment used a total of 5 growing barrows (38 kg initial weight) fitted with T-cannulas at the terminal ileum. The pigs were housed in metabolism pens, and following a 7 day recovery period from surgery, were fed a semi-synthetic diet containing 40% FSM. Feeding of the test diet lasted for 7 days, including a 4 day adaptation period followed by 3 days of digesta collection. Following this, the pigs were then fed a nitrogen-free diet for a similar time period in order to correct the digestibility calculations for basal endogenous losses. Chromic oxide was included in both diets as an indigestible marker.



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RESULTS AND DISCUSSION

Table 1 shows the apparent and standardized ileal amino acid digestibilities for FSM, along with the quantity of AID and SID amino acids found in FSM. The AID digestibility values ranged from 25.1 to 86.1% on a DM basis, whereas SID values ranged from 67.6 to 93.8%. The digestibilities of Threonine and Cysteine are both low, with the AID values falling below 60% and the SID values at 73%; however, many of the amino acids are over 80% digestible.

CONCLUSION

Flaxseed meal contains 34% CP and also contains appreciable amounts of many of the essential amino acids. The SID coefficients for the essential amino acids range from 67 to 94%, which affects the overall protein quality of the product; however, the amounts of SID essential amino acids in FSM are very similar to those reported for canola meal (NRC, 1998). Flaxseed meal is characterized by a low lysine content (3.6% of CP) in comparison to other meal products and when compared to the requirements of the pig (5.3% of CP for pigs 25 to 50 kg), and will likely be the limiting factor for the dietary inclusion of FSM into swine rations. This is also confounded by the fact that FSM has a low Lysine digestibility (74%). It will be critical to consider this low Lysine content and digestibility when formulating rations to ensure the requirements of the animals are met.

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Table 1. Apparent and standardized ileal digestibility of amino acids in flaxseed meal and its digestible amino acid content (dry matter basis)

Nutrient	Amino Acid Digestibility, (%)			Amino Acid Content, g/kg DM		
	AID	SID	SD	AID	SID	SD
Indispensable						
Arginine	86.1	90.3	2.9	28.2	29.6	1.0
Histidine	67.3	76.4	4.4	5.0	5.7	0.3
Isoleucine	73.6	82.3	5.7	10.8	12.1	0.8
Leucine	71.3	80.6	4.9	14.8	16.8	1.0
Lysine	61.7	73.9	2.9	8.6	10.3	0.4
Methionine	75.3	81.8	3.9	4.9	5.3	0.3
Phenylalanine	78.4	84.7	4.2	12.9	14.0	0.7
Threonine	58.9	73.5	3.7	7.5	9.4	0.5
Tryptophan	25.1	70.5	4.4	1.0	2.9	0.2
Valine	71.2	79.8	4.4	12.3	13.8	0.8
Dispensable						
Alanine	65.5	81.3	3.9	10.4	12.2	0.6
Aspartic Acid	70.3	84.1	4.4	22.4	25.4	1.4
Cysteine	51.6	73.0	10	3.0	4.0	0.6
Glutamic Acid	78.8	86.9	3.5	52.6	56.2	2.3
Glycine	59.6	78.8	4.5	12.2	15.4	0.9
Proline	51.8	95.0	6.1	6.9	12.5	0.8
Serine	65.7	80.4	3.5	9.8	11.4	0.5
Crude Protein	61.4	78.0	3.4	222.5	282.7	12.3



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