

Role of Crystalline Amino Acids in Reducing Grow-Finish Feed Costs

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Concern about how to manage high soybean meal (SBM) prices continues among pork producers. For many years, pork producers have reduced grow-finish feed costs by using crystalline lysine (3 lb per ton of complete feed) to replace a portion of the lysine from SBM. Three pounds per ton is the maximum addition rate, unless other amino acids (tryptophan, threonine, or methionine) are added to the diet.

The price of crystalline threonine has dropped recently due to greater supplies. This may present pork producers an opportunity to economically supplement grow-finish diets with threonine and further replace lysine from SBM with crystalline lysine in excess of 3 lb per ton conventionally used.

To help producers decide on the use of crystalline amino acids in grow-finish diets, corn/SBM-based diets were formulated without or with crystalline amino acids (Tables 1-3). The diets contained 1.2, 0.9 or 0.6% total lysine to represent a range of grow-finish diets. Three diets were formulated for each of the three dietary lysine levels: 1) without crystalline amino acids, 2) with 3 lb of L-lysine•HCL added per ton, and 3) with as much crystalline L- lysine, L-threonine and dl-methionine added as possible while avoiding a tryptophan deficiency. The extent that crystalline amino acids can replace those in SBM depends on two major factors: 1) the amino acid concentrations of corn and soybean meal and 2) the amounts of tryptophan, threonine, or methionine required in the diet relative to lysine. Corn and SBM amino acid concentrations and the amino acid ratios used in formulation are presented in Tables 29 and 17, respectively, of the Nebraska and South Dakota Swine Nutrition Guide (<http://ianrpubs.unl.edu/swine/ec273.htm>).

The 1.2 and 0.9% lysine diets can contain more than 3 lb of L-lysine•HCL per ton of feed without causing an amino acid deficiency and reducing pig performance as long as L-threonine and DL-methionine are added (Tables 1 and 2). In contrast, the 0.6% lysine diet can contain only slightly more than 3 lb of L-lysine•HCL per ton (Table 3). Tryptophan is second limiting in this

diet. Currently, crystalline tryptophan is too expensive to include in grow-finish diets.

To determine if crystalline amino acids can reduce grow-finish feed cost, calculate the cost of each of the diet options shown in Tables 1-3. Pig performance should be similar for diets that contain the same lysine level, therefore, choose the least expensive option. Using prices available at press time, including 3 lb of L-lysine•HCL per ton of feed reduced the cost of diets containing 1.2, 0.9 or 0.6% lysine by \$2.71 per ton of feed (Tables 1-3). Diets containing more than 3 lb of L-lysine•HCL per ton of feed were only slightly less expensive in most cases. Therefore, there is a clear cost advantage to including 3 lb of L-lysine•HCL in a ton of grow-finish feed. Greater use of L-lysine•HCL provided only a marginal cost advantage for two of the three diets under consideration. However, your ingredient price relationships may differ from those used in this analysis, especially during this summer, and therefore may justify including more than 3 lb of L-lysine•HCL per ton of grow-finish feed.

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Table 1. Ingredient content (lb per ton) and cost (\$ per ton) of diets containing 1.2% total lysine formulated without (-) or with (+) crystalline amino acids^a

	Crystalline amino acid		
Lysine	-	%	%
Threonine	-	-	%
Methionine	-	-	%
Corn	1233	1316	1367
Soybean meal, 46.5% CP	715	627	570
L-lysine•HCL		3.0	5.0
L-threonine			1.2
DL-methionine			0.7
Diet cost	173.83	171.11	172.08

^aCorn, \$3.02 per bushel; SBM, \$300 per ton; L-lysine•HCL, \$2.00 per lb; L-threonine, \$1.60 per lb; DL-methionine, \$1.20 per lb.

Table 2. Ingredient content (lb per ton) and cost (\$ per ton) of diets containing 0.9% total lysine formulated without (-) or with (+) crystalline amino acids^a

	Crystalline amino acid		
Lysine	-	%	%
Threonine	-	-	%
Methionine	-	-	-
Corn	1464	1547	1598
Soybean meal, 46.5% CP	488	400	346
L-lysine•HCL		3.0	4.8
L-threonine			1.0
DL-methionine			
Diet cost	152.26	149.54	149.39

^aCorn, \$3.02 per bushel; SBM, \$300 per ton; L-lysine•HCL, \$2.00 per lb; L-threonine, \$1.60 per lb; DL-methionine, \$1.20 per lb.

Table 3. Ingredient content (lb per ton) and cost (\$ per ton) of diets containing 0.6% total lysine formulated without (-) or with (+) crystalline amino acids^a

	Crystalline amino acid		
Lysine	-	%	%
Threonine	-	-	-
Methionine	-	-	-
Corn	1696	1779	1786
Soybean meal, 46.5% CP	261	173	166
L-lysine•HCL		3.0	3.2
L-threonine			
DL-methionine			
Diet cost	130.73	128.02	127.74

^aCorn, \$3.02 per bushel; SBM, \$300 per ton; L-lysine•HCL, \$2.00 per lb; L-threonine, \$1.60 per lb; DL-methionine, \$1.20 per lb.