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NebGuide

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Alfalfa in Swine Diets

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The performance and economic considerations of alfalfa in swine diets are detailed here, and information on mixing diets is provided.

Nebraska ranks first in dehydrated alfalfa meal and seventh in alfalfa hay production in the United States, with production in all counties of the state. With this availability of alfalfa, its use in swine diets should be considered.

Alfalfa hay and dehydrated alfalfa have limitations in swine diets because of their lower metabolizable energy and their fiber content that is higher than that found in the grain they replace.

Pigs have a simple stomach, which means they have limited capacity and microbial activity to reduce fibrous components into useful energy. However, as swine mature, their ability to use fibrous feeds increases.

The major nutritional components of early bloom alfalfa hay and dehydrated meal are shown in *Table 1.* Based on its nutritional components, only high quality alfalfa should be used in swine diets. The nutritional content varies considerably due to stages of maturity, soil fertility, variety, physical handling and other factors.

Alfalfa harvested in the pre-bloom or early bloom stage will contain a higher crude protein and lower fiber content than that harvested at later maturity. The nutritional quality of alfalfa hay is reduced when it is not harvested and stored properly.

Lysine, the first limiting amino acid for swine, usually is correlated with the protein content and quality of alfalfa. As lysine and protein content of alfalfa decreases, quality of protein declines.

Performance and Economic Considerations

Growing Pigs — When pigs digest alfalfa, more body heat is produced than when they consume grain. In winter this extra heat aids in maintaining the body temperature of the pig, but during the summer it is a burden. For that reason the value of alfalfa in diets for growing pigs depends upon the temperature in which they are housed.

Alfalfa generally will not improve rate of gain and feed efficiency in pigs fed properly balanced, grain-soybean meal diets. Instead, performance either remains the same or decreases depending on the quantity of alfalfa in the diet.

Growing-finishing diets should not contain more than 10 percent alfalfa during the spring and fall. During the winter slightly more alfalfa could be provided, while less than 10 percent should be considered for summer conditions. Starter diets may contain 10 percent alfalfa hay if

Table 1. Major Nutritional Components of Alfalfa Products

	Hay	*Dehydrated Meal*
Metabolizable Energy kcal/lb	800	773
Crude Protein percent	16.0	17.4
Lysine percent	0.68	0.85
Calcium percent	1.3	1.4
Phosphorus percent	0.20	0.23
Fiber percent	24.0	24.0

edema disease and nutritional scours are a problem.

Some producers routinely include alfalfa in swine diets to insure the presence of certain vitamins and minerals. Also, the green color of alfalfa allows producers to evaluate their mixing efficiency by observing the distribution of the green color throughout the feed.

The value of alfalfa in a growing-finishing pig diet relative to housing temperature is shown in *Table 2*. To use the table, assume a corn-soybean meal diet costs $6/cwt and the maximum daily temperature in which the pigs are housed averages below 50° F. Feeding a diet with 10 percent alfalfa should reduce cost of gain if it could be incorporated into the diet for less than $6.11/cwt.

Sows — Lactating sows need to maximize their energy intake, so alfalfa should be limited to 10 percent of their diet. However, since gestating sows are limited in the amount of energy they consume, a low energy feed ingredient like alfalfa is often an attractive alternative to grain and supplemental protein in their diet. Several important benefits have been observed when alfalfa is added to sow gestation diets. They include:

1. Larger litters at birth and weaning.
2. Improved sow feed intake during lactation and sow longevity in the herd.
3. More docile sows.

The relative value of alfalfa hay or dehydrated meal in sow gestation diets is presented in *Table 3. The benefits of improved reproductive performance are not included in the economic analysis.* To use the chart, consider that corn is worth $2.50/bushel and 44 percent soybean meal costs $200/ton. Alfalfa would be an economical substitute for corn and soybean meal, if it could be incorporated into a sow diet for less than $61.20/ton. Depending upon the value placed on increased litter size at weaning and sow longevity in the herd, the value of alfalfa in the sow diet would increase. Also, the ability to conveniently process, mix and feed diets that contain alfalfa plays a major role in deciding to feed alfalfa to sows.

Mixing Diets

Alfalfa used for swine must be good quality hay harvested in the early bloom stage, with minimum leaf loss. Because hay quality varies widely, a crude protein analysis is recommended for proper diet formulation. The quality of dehydrated alfalfa meal is more uniform than hay. Products such as hay and sun-cured alfalfa pellets will be subject to more leaf loss, and thus more variable in quality.

Because of the wide calcium to phosphorus ratio in

Table 2. Value of Alfalfa ($/cwt) in 14 percent Growing-Finishing Swine Diet[a]

	Average Maximum Daily Ambient Temperature, °F	
Corn-Soy Diet ($/cwt)	*50 or Lower*	*70 or higher*
4	3.49	.49
6	6.11	2.11
8	8.19	2.19
10	10.37	2.37

[a]Alfalfa hay or meal at 10 percent of the diet. Fixed cost = $.068/pig/day.

Table 3. Value of Alfalfa in a Sow Gestation Diet[a,b]

	Corn, $/bushel				
44 percent SBM($/ton)	*1.50*	*2.00*	*2.50*	*3.00*	*3.50*
150	41.28	48.40	55.50	62.60	69.60
200	46.98	54.10	61.20	68.30	75.30
250	52.68	59.80	66.90	74.00	81.00
300	58.38	65.50	72.60	79.70	86.70
350	64.08	71.20	78.30	85.40	92.40
400	69.78	76.90	84.00	91.11	98.10

[a]Assumes no improvement in reproductive performance.

[b]Hay or meal @ 25 percent of diet; Daily feed intake for corn-soy and corn-soy-alfalfa diets 4 and 4.5 lb., respectively.

alfalfa (6:1), care must be taken when formulating diets with alfalfa. A supplement or base mix designed for use with grain and soybean meal should not be used with alfalfa without first consulting the manufacturer of the feed or a reputable nutritionist. Substituting alfalfa for grain on a pound-for-pound basis is not recommended because the calcium to phosphorus ratio may become too wide and possibly affect bone structure.

Improvements in sow reproductive performance are most likely if gestation diets contain a minimum of 20 to 25 percent alfalfa. Alfalfa hay can be included in gestation diets at levels up to 66 percent without decreasing reproductive performance. Most producers who grind their hay limit the quantity of alfalfa to about 20 to 25 percent of the diet because of labor costs associated with grinding and the difficulty with handling bulky feeds. Also, at the 20 to 25 percent inclusion rate, an alternative source of phosphorus, such as monosodium phosphate, is not required to achieve an adequate calcium to phosphorus ratio in the diet. Monosodium phosphate is a good, but relatively expensive, source of phosphorus that contains no calcium. Example diets with 25 and 50 percent alfalfa hay are shown in the *Nebraska Swine Diet Suggestions Publication (EC 88-210)* available at all local extension offices.

The quantity of dehydrated alfalfa meal in gestation diets should not exceed 25 percent because sows may not readily consume the diet. Furthermore, the cost of dehydrated alfalfa meal will be a limiting factor in using it at higher levels in gestation diets.

Sun-cured alfalfa pellets may offer a more economical alternative than dehydrated alfalfa meal, and they are easier to handle and grind than hay.

Alfalfa haylage can represent up to 40 percent of a sow's diet (on a 100 percent dry matter basis) during gestation without decreasing reproductive performance. Alfalfa haylage should be harvested at the bud or early bloom stage and stored in an oxygen-limiting structure to ensure excellent quality.

Since alfalfa contains less metabolizable energy than grain, higher quantities of a diet containing alfalfa should be provided. An extra 0.5 to 1.5 lb./day of a complete feed containing alfalfa hay or meal is necessary to provide the same energy as one without alfalfa.

Recent research with alfalfa haylage indicates that sows should be provided about 2 lb. of dry matter from haylage per day and about 3 lb. of a concentrate. The amount of concentrate should be adjusted according to sow condition and housing environment.

To obtain the most nutritional value from alfalfa, it should be ground using a 1/4" to 3/8" screen and mixed into a complete diet. If grinding equipment is not available, long-stemmed alfalfa hay can be provided to sows separate from the concentrate feed. However, if proper management is not used, much of the alfalfa will be wasted. Haylage is best used if chopped using a 2" screen.

Possible Limitations to Feeding Alfalfa

In addition to direct economic considerations, other factors may limit the ability of producers to use alfalfa in swine diets. These include:

1. Some on-farm mixing equipment can't physically handle alfalfa.
2. Grinding hay is time consuming and dusty.
3. High alfalfa diets are bulky and may bridge in bulk bins and feeders.
4. Due to the lower digestibility of diets containing alfalfa, manure storage pits will need to be emptied more frequently.

Alfalfa can be successfully used in many swine operations provided the limitations and economics involved are given serious consideration.

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