

Alfalfa Meal in Swine Rations

tested as source of energy one pound of alfalfa had an average replacement value for 0.28 pound of concentrate

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The value of alfalfa meal as a source of energy for swine was determined for three levels of meal—5%, 20%, and 40% of the ration; three stages of plant maturity—16% bud, 3% bloom, and 34% bloom; and three methods of preparation—suncured, dehydrated, and pelleted dehydrated, reground.

The study was stimulated by the growing interest in the use of home-grown alfalfa to replace the relatively high-priced concentrate feeds, and by work done in Nevada.

The Nevada experiments indicated that one pound of alfalfa replaced nearly one pound of grain in rations containing as high as 50% alfalfa meal. As the level of alfalfa meal was increased from 0% to 50%, rate of gain decreased but was still one pound per day or better with 50% alfalfa meal in the ration. Hogs receiving the higher levels of alfalfa meal consumed less feed daily and required more feed per unit of gain. In further experiments replacement values per pound of alfalfa varied from 0.13 pound to 0.51 pound of concentrate. For best results, good quality alfalfa was important.

California Experiments

The alfalfa—variety Caliverde—used in the California studies was the second cutting of a very uniform second-year stand. Stage of maturity was determined by a hand count of several hundred stems selected at random at time of harvest. Any stem with a bud or blossom was considered to be in the bud or bloom stage; thus, 3% bloom means that 3% of the stems actually counted had at least one blossom. The remainder of the stems would be more immature.

Pigs were housed in an experimental barn in groups of five or six. Twice daily they were placed in individual feeding stalls with free access to feed for a period of at least 90 minutes. Water was freely available.

Ration 1 contained five pounds alfalfa meal to 73¾ pounds ground barley; Ration 2 contained 20 pounds alfalfa to 58¾ pounds barley; and Ration 3, 40 pounds alfalfa to 38¾ pounds barley. The other ingredients—meat and bone scraps, soybean meal, cottonseed meal, sodium chloride, zinc sulfate, and irradi-

ated yeast—were kept the same in all three rations. Ration 1 was adequate; the alfalfa substitution for barley in Rations 2 and 3 tested alfalfa as a source of energy. The crude protein, lignin, and holocellulose contents of the various meals are given in the table in column 2.

Three replicates were run, each using 27 pigs. The pigs in replicates 1 and 3 were purebred Duroc barrows and gilts. Replicate 2 used crossbred Chester White-Yorkshire barrows and gilts. The average initial weights were 60, 70, and 75 pounds, and the experimental periods

Preparation	Stage of maturity				
	16% bud	3% bloom	34% bloom	Mean	
Suncured	Crude protein	24.1	23.9	19.8	22.6
	Lignin	6.4	7.1	8.4	7.3
	Holo-cellulose	39.5	38.7	40.6	39.6
	Mean				
Dehydrated	Crude protein	26.0	26.7	21.6	24.8
	Lignin	5.9	6.0	7.3	6.4
	Holo-cellulose	40.3	36.0	40.9	39.1
	Mean				
Pelleted dehydrated, reground	Crude protein	25.1	25.1	20.5	23.6
	Lignin	6.1	6.8	7.6	6.8
	Crude protein	25.1	25.2	20.6	23.6
	Lignin	6.1	6.6	7.8	6.8
Field samples*	Crude protein	27.1	26.4	22.0	25.2
	Lignin	5.6	7.0	8.0	6.9
	Holo-cellulose	41.8	40.3	45.9	42.7
	Mean				

* Taken at time of harvest of each stage of maturity.

were 63, 49, and 63 days for the three replicates.

At the end of each replicate backfat thickness was determined.

Significant Weight Gains

Differences in actual daily gain and daily feed consumption due to level of alfalfa meal were highly significant. When daily gains were adjusted for differences in feed consumption the differences were less, yet highly significant. The actual daily gains in the trials were reduced with increases in alfalfa-meal content of the ration about the same in magnitude as in some of the studies in Nevada, but this reduction was proportionally greater than that reported by most of the workers in Nevada.

Daily gain and feed consumption were not affected by stage of maturity under the conditions of this experiment. Daily gain was lower on the rations including suncured hay than on those containing hays prepared by the other two methods even though feed consumption remained unaffected by method of preparing.

Level	Alfalfa Preparation	Stage of alfalfa maturity		
		16% bud	3% bloom	34% bloom
5%	Suncured	1.41	1.52	1.51
	Dehydrated	1.60	1.53	1.58
	Pelleted*	1.51	1.67	1.59
20%	Suncured	1.23	1.15	1.28
	Dehydrated	1.33	1.22	1.32
	Pelleted*	1.44	1.35	1.30
40%	Suncured	0.80	0.90	0.92
	Dehydrated	0.88	0.85	0.87 ^b
	Pelleted*	0.98	0.86	0.91
		Summated means	Actual	Adjusted ^c
Level	5% alfalfa	1.55	1.42	1.42
	20% alfalfa	1.29 ^d	1.25 ^d	1.25 ^d
	40% alfalfa	0.88 ^d	1.05 ^d	1.05 ^d
Stage	16% bud	1.24	1.23	1.23
	3% bloom	1.23	1.24	1.24
	34% bloom	1.25	1.25	1.25
Preparation	Suncured	1.19 ^e	1.17 ^f	1.17 ^f
	Dehydrated	1.24	1.26	1.26
	Pelleted*	1.29	1.29	1.29

* Pelleted, dehydrated, reground.

^a Averages for 3 animals, one for each replicate.

^b Animal missing first replicate. Missing value calculated.

^c Adjustment by partial regression as explained in text.

^d Difference from other levels highly significant.

^e Difference from pelleted dehydrated, reground, meal significant and from dehydrated meal approaching significance.

^f Difference from other methods of preparation highly significant.

Since daily gains of pigs receiving different levels of alfalfa meal differed significantly when corrected to equal feed consumption, it follows that gain per unit of feed was reduced as more alfalfa meal was placed in the ration. Similarly, gain per unit of feed was less on rations containing suncured alfalfa meal than on those containing other meals.

Backfat thickness was greater in pigs fed 5% alfalfa meal, as would be expected because the pigs weighed more. The difference in backfat thickness between the pigs fed 20% and 40% alfalfa meal approached statistical significance.

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SWINE

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At the end of each replicate, TDN—total digestible nutrients—were determined. The results are summarized in the table in the second column on this

Average Daily Feed Consumption Pounds ^a				
Level	Alfalfa Preparation	Stage of alfalfa maturity		
		16% bud	3% bloom	34% bloom
5%	Suncured	6.28	6.53	6.60
	Dehydrated	6.88	6.03	6.36
	Pelleted*	6.12	6.40	6.06
20%	Suncured	5.35	5.43	5.60
	Dehydrated	6.03	4.93	5.56
	Pelleted*	6.13	5.51	5.80
40%	Suncured	4.11	4.18	4.37
	Dehydrated	4.06	2.52	3.93 ^b
	Pelleted*	3.68	3.71	3.64
		Summated means	Actual	
Level	5% alfalfa		6.36	
	20% alfalfa		5.59 ^c	
	40% alfalfa		3.80 ^c	
Stage	16% bud		5.40	
	3% bloom		5.03	
	34% bloom		5.32	
Preparation	Suncured		5.38	
	Dehydrated		5.15	
	Pelleted*		5.23	

*Pelleted, dehydrated, reground.

^a Averages for 3 animals, one for each replicate.

^b Animal missing first replicate. Missing value calculated.

^c Difference from other levels highly significant.

page. Stage of maturity and method of preparation had no effect. Since alfalfa was added to the two higher levels at the expense of barley, the relative TDN of barley and alfalfa can be estimated

by difference under the conditions of this experiment. In this experiment the average TDN of all alfalfa meals was 34 pounds less per hundred pounds than barley. This would be expected due to the low utilization of holocellulose by simple-stomached animals.

Total Digestible Nutrients of Various Rations ^a Dry matter basis, percent				
Level	Alfalfa Preparation	Stage of alfalfa maturity		
		16% bud	3% bloom	34% bloom
5%	Suncured	70	76	73
	Dehydrated	71	75	73
	Pelleted*	75	76	75
20%	Suncured	65	69	70
	Dehydrated	71	65	66
	Pelleted*	68	66	67
40%	Suncured	59	63	60
	Dehydrated	71	61	60
	Pelleted*	61	61	60
		Summated means	Actual	
Level	5% alfalfa		74	
	20% alfalfa		67 ^b	
	40% alfalfa		62 ^b	
Stage	16% bud		68	
	3% bloom		68	
	34% bloom		68	
Preparation	Suncured		67	
	Dehydrated		68	
	Pelleted*		68	

* Pelleted, dehydrated, reground.

^a Averages for 3 animals, one for each replicate.

^b Difference from other levels highly significant. F value for level = 36.02.

The replacement value of alfalfa meal as used in this experiment was calculated using average daily gain figures adjusted to an average daily feed consumption of 5.25 pounds by partial regression. Adjusted data were used because it reduces

variation due to differences in feed consumption and presumably would reduce differences due to composition of gain. Using feed utilization comparisons between the 5% and 20%, 5% and 40%, and 20% and 40% alfalfa meal levels, the replacement values were 0.24, 0.28, and 0.31 pound of concentrate per pound of alfalfa meal. This averages 0.28 pound of concentrate being replaced by one pound of alfalfa meal. This low replacement value is considerably less than would be predicted from commonly accepted TDN or net energy values of the ration ingredients involved and alfalfa meal.

Poor performance and a low TDN generally would be expected on a high roughage ration for swine. No reason can be advanced for the relatively good performance in some experiments. Quality of hay probably is important even though the quality of alfalfa used in these trials appeared excellent. Quality of hay as indicated by stage of maturity and method of preparation under the conditions of this experiment was of little or no effect. It has been suggested that breed and selection may play a part in utilization of higher levels of alfalfa meal.

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APPLE

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grown. In view of the distinctly greater tendency for reversion in the striped types—as compared to the solid red types—sports with the solid red color are preferred for districts, such as Watsonville, where conditions for good red color development are not usually optimum. Even with these sports, however, the scion wood should be selected with care, since—as shown with Richared Delicious—reversion may occur in these types.

A large number of sports of Delicious have been discovered in recent years and are being propagated. Most of those which are available to growers through nurseries are being tested in the several apple districts of California where Delicious is grown. Among these sports, Royal Red Delicious, Starkrimson Delicious, Wellspur Delicious, Redspur, Ryan Red, Houser Red Delicious, and Imperial Delicious have a solid red color. Red King Delicious, Hi-Early, Earlired

Red Delicious, Hi-Red, Topred Delicious, and Clarkrich are striped types. The trees of Starkrimson Delicious, Wellspur Delicious, and Redspur are also heavy spur producers and tend to be somewhat smaller than those of the other sports.

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OLIVE

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that the characteristics of larger fruit size, increased flesh-pit ratio, and an optimum processed fruit texture should far offset the single advantage of early harvest to produce a black rather than a brown olive, especially since the better

quality characteristics are more likely to be associated with brown olives than with black olives.

The present study does not entirely support the belief that olive fruits with a high oil content have a better flavor than fruits low in oil. In Manzanillo and Sevillano, the more highly colored fruit at harvest had a greater oil content, but no greater olive flavor in the processed fruit. Flavor ratings were essentially the same for Manzanillo fruits, with an oil content average of 11.6% and for Sevillano fruits, with an oil content average of 8.4%.

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