

On the whole, the results of this experiment confirm for the third year that increased alfalfa meal in the protein supplement increases efficiency in dry-lot feeding, and that we may expect the addition of an antibiotic and vitamin B₂ supplements to make a good showing.

Metabolism of Carotenoid Pigments and Vitamin A by Swine (Project 311).

Provitamin A from Alfalfa and Yellow Corn, and Vitamin A in a Gelatin-Stabilized Product as Sources of Vitamin A for Weanling Pigs.

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This test was made to obtain further information on the utilization of Vitamin A from different sources by weanling pigs. Sources of Vitamin A were: (1) a gelatin-stabilized vitamin A product, (2) carotene as supplied by a high-quality dehydrated alfalfa meal, and (3) carotene and cryptoxanthin as supplied by yellow corn. Units of vitamin A were calculated from the carotene and cryptoxanthin analyses by multiplying micrograms of these pigments by 1.6 and 0.8, respectively.

In the 1957 test a purified cryptoxanthin was separated and determined, but in the 1956 test a crude cryptoxanthin, which contained some pigment in addition to cryptoxanthin, was determined. In the 1957 test vitamin A or provitamin A was added to the feed at 500 units per pound, but in 1956 only 400 units per pound were used. Feed was prepared several times during the two months of the study so that no batch was more than 16 days old before it was consumed.

Twenty-seven weanling pigs from gilts fed a vitamin A-restricted diet during gestation and lactation were distributed into three groups of three lots each so that lots among groups were balanced on the basis of litter, sex and weight. Gilts and weanling pigs were in good condition at the time of weaning, but vitamin A reserves were low.

The basal feed was 78 percent white corn, 16 percent soybean oil meal, 2.5 percent non-fat dry milk solids, 1.3 percent brewer's yeast, 0.4 percent iodized salt, 0.4 percent bone meal, and 0.4 percent calcium carbonate, plus vitamins and trace minerals. The feed conversion ratios (Table 6) indicate that this was a good basal ration. When yellow corn or alfalfa was used as a source of vitamin A, it was substituted in the formula for an equal weight of white corn. Each day a quantity of feed was offered to each lot slightly in excess of that which would be consumed. The test was similar to the 1956 test, but modified slightly as noted previously.

Data from the 1957 test are presented in Table 6 and for comparison the 1956 data also are shown.

Observations

1. Growing pigs fed stabilized vitamin A had much higher levels of serum vitamin A than those receiving provitamin A from yellow corn or dehydrated alfalfa. Results in 1957 using 500 units of stabilized vitamin A per pound of feed were similar to those in 1956 when 400 units were used. Vitamin A levels in serum of pigs receiving dehydrated alfalfa were similar both years, but vitamin A levels in serum of pigs fed yellow corn were higher in 1957, indicating that the crude cryptoxanthin fraction of yellow corn contained some vitamin A inactive pigment or pigments of low vitamin A activity.

2. In the 1957 test, pigs getting provitamin A from dehydrated alfalfa gained almost as well as those getting stabilized vitamin A, but they did not do so well in the 1956 test.

3. Gains and feed conversions were somewhat better in the 1957 test than in 1956.

Table 6
Average Body Weights, Feed Conversion Ratios, and Blood Serum Vitamin A Contents of Pigs.

Diet	Lot ¹	Ar. wt., lbs.		Average gain, lbs.	Feed conversion ratio		Vitamin A, mgs.	
		Start	End 2 mos.		By lot	By diet	per 100 ml. serum ²	By lot
1957 Data								
Vitamin A ³	1 ⁴	27	96	69	2.6		17.2	
	2	24	98	74	2.4		16.8	
	3	25	93	68	2.6	2.5	22.8	18.9
Dehydrated alfalfa	1a	27	94	67	2.6		2.5	
	2a	24	92	68	2.6		3.1	
	3a	24	92	68	2.6	2.6	2.9	2.8
Yellow corn	1b	27	91	64	2.8		4.3	
	2b	24	84	60	2.8		3.5	
	3b	25	82	57	3.0	2.9	3.2	3.7
1956 Data								
Vitamin A	1	23	92	69	2.7		21.6	
	2	25	95	70	2.6		22.2	
	3	25	87	62	2.9	2.7	17.9	20.6
Dehydrated alfalfa	1a	23	76	53	2.9		4.3	
	2a	25	87	62	2.8		3.1	
	3a	25	65	40	3.6	3.1	1.4	3.1
Yellow corn	1b	23	81	58	2.8		1.4	
	2b	25	89	64	2.9		1.3	
	3b	25	59	34	3.6	3.1	1.3	1.3

1. Three pigs per lot.

2. At end of test.

3. Gelatin-stabilized vitamin A was Pfizer A-10-F.

4. 1, 1a, 1b, etc., are groups balanced by litter, sex and age at start of test.