

# Vitamins for Turkeys

## nutritive requirements for adequate rations under continuing study

F. H. Kratzer

As new vitamins are recognized they are tested with turkeys to determine their place in the feeding program because adequate vitamin intake is particularly essential for poults and breeder hens.

Turkeys require larger amounts of vitamins as a general rule than do chickens, and the usual rations for the latter can not be taken as a guide in turkey diets.

Vitamin A is important for turkeys of all ages. Four thousand international units for each pound of feed are recommended both for poults and breeding hens. There is some evidence that vitamin A is more effective for turkeys than carotene—from which vitamin A is derived—on an international unit basis but the recommended level is considered adequate, even when carotene is used. Good grade alfalfa, fresh greens and fish oil are the most common sources of this vitamin.

Turkeys require vitamin D in substantial amounts and 800 A.O.A.C.—Association of Official Agricultural Chemists—units of vitamin D for each pound of feed are recommended for both poults and breeders.

### Certain Limitations

In some experimental rations in which the phosphorus was supplied by plant sources, activated animal sterols were more active for poults than vitamin D from fish oil. This difference was not found when adequate inorganic phosphorus was present.

In practical rations the recommended levels are considered adequate regardless of the source. Feeding oils and dry products of standardized potency are the common sources of this vitamin. Plant sources of vitamin D which may be used for mammals are not effective sources for poultry.

Available evidence indicates that there is adequate vitamin E in practical turkey rations, but suggests that rancid fat—or feed containing rancid fat—rapidly destroys vitamin E and should not be fed. Vitamin K also is a fat soluble vitamin and is necessary to maintain the proper clotting properties of the blood. Since alfalfa is an excellent source of this vitamin there is no danger of a deficiency in practical rations.

Thiamin—the first of the water soluble vitamins to be recognized—is not an important consideration in turkey rations

since practical rations contain adequate amounts.

The need for riboflavin in turkey rations is recognized. Poults which are fed a ration deficient in this vitamin exhibit slow growth, weakness and high mortality.

When breeder hens are taken from a normal ration and placed on one deficient in riboflavin, the hatchability will drop to zero in three weeks. Egg production, fertility, body weight and mortality are not influenced by a mild deficiency. When riboflavin again is supplied, the hatchability returns to normal in two to three weeks. It is possible that the level of riboflavin in practical rations may be adequate for good egg production and health of the hen, but will not be high enough to permit adequate riboflavin to be deposited in the egg to allow the embryo to develop normally.

### Adequate Amounts Necessary

The recommended amount of riboflavin is two milligrams for each pound of feed for poults, and 1.6 milligrams for each pound of feed for breeders. Alfalfa meal, milk products, fermentation by-products, liver meal and synthetic riboflavin are among the important sources of the vitamin in turkey rations.

The recommended allowances refer to the amount in the complete ration and to supply 1.6 milligrams of riboflavin for each pound of feed to birds fed equal parts of grain and mash, the mash must contain 2.7 milligrams to each pound. Levels of the water soluble vitamins above the recommended allowances will cause no harm, but will unnecessarily increase the cost of the ration.

Pantothenic acid is required by poults for normal growth and survival. In some cases dermatitis is observed on the eyelids and at the corners of the mouth as a symptom of deficiency, but mortality usually is so great in poults lacking in this vitamin that dermatitis is not commonly seen. A safe allowance for poults is six milligrams for each pound of feed. Milk products, alfalfa meal, wheat bran molasses and liver meal are among the sources of pantothenic acid in practical rations.

Nicotinic acid has been reported to be required by turkeys for good growth and the prevention of perosis or slipped ten-

don. Since many common feedstuffs are good sources of the vitamin, it is not likely that this factor will be lacking. Danger of a deficiency is greater in rations containing high levels of corn than in rations containing the other cereals.

A deficiency of pyridoxine has been produced experimentally in poults by feeding a specially treated ration. Deficient poults grow slowly, show typical convulsions and die. Preliminary results show that pyridoxine is required for good hatchability in breeder turkeys. The poult requirement of approximately two milligrams for each pound of feed is adequately supplied by the usual ingredients of turkey rations.

Biotin is required by turkeys for the prevention of a dermatitis of the feet, the prevention of perosis and for normal growth and survival. Evidence indicates that the usual turkey feedstuffs are well supplied with biotin.

The importance of choline in preventing perosis and improving growth in turkeys has been shown and the recommended allowance for poults is 900 milligrams of choline for each pound of feed. Oil cake meals, fish meal, liver meal and synthetic choline are among the common sources of this factor.

Folic acid—pteroylglutamic acid—is the most recent vitamin studied with turkeys. Without adequate folic acid poults exhibit slow growth, a paralysis of the neck, and anemia. Research work at another university showed that two rations, one low in folic acid and the other considered to be adequate in this vitamin, gave no differences in egg production and hatchability. Survival of the poults from hens fed the folic acid-high ration was much better than from the folic acid-low ration. Approximately one half milligram for each pound of feed is required by poults. Although it is possible to formulate practical rations which are low in folic acid, rations which contain alfalfa and soybean oil meal are likely to be adequate.

### Essential Factor

Experiments with turkeys have indicated that the animal protein factor also is essential for good growth of poults. Fish meal, condensed fish solubles, milk products, meat scraps and cow manure have been found to be sources of this factor. Until more conclusive evidence is available, it is recommended that rations for poults and breeder turkeys contain some of these products to supply the animal protein factor to the ration.

To make certain that every turkey hen in the breeding flock receives an adequate supply of the vitamins required for good hatchability of her eggs, it is recommended that all the vitamins which are

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## SAFFLOWER

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tinctly superior to the California strain. It is interesting to note that the spined materials have a higher oil content than those without spines. Weeds were never a problem in this test; the safflower grew ahead of them.

### Cultural Practices

From the results presented in this report, safflower would appear to be a promising crop. However, more data must be obtained to properly evaluate it. Experience with the crop for one year in California and results obtained in other states would suggest that the crop should be grown under the following described conditions and cultural practices:

1. Climatic conditions should be the same as those required for barley. Dry weather after blossoming favors high seed-setting. The crop will stand frosts down to 10°F.

2. Soils should be fertile. Compared to other crops safflower makes poorer growth on soils lacking in fertility or moisture supplies.

3. Seed of this crop will be difficult to obtain. Processors of oil bearing seeds may have seed supplies. The only seed available on a commercial scale will be spined.

4. Before seeding the seed should be treated with a fungicide at the same rate used for barley.

5. The seeding date should be the same as for small grains. Weeds may be a problem with early seedings because of the slow growth of safflower in cool weather. Seedings after about the middle of January will not mature until August.

6. Rows may be spaced from six to 36 inches apart with little difference in yield. Wider spacings probably will require cultivation to control weeds.

7. For row-spacings up to 18 inches a seeding rate of 15 to 35 pounds per acre should be satisfactory. Above a row-spacing of 18 inches the rate should be eight to 20 pounds per acre.

8. Seed should be sown one to 1½ inches deep. Ordinary grain drills may be used.

9. Combine harvesting is preferred, and is essential with spined varieties. Because the crop will not shatter or lodge seriously, harvesting may be delayed 10 days to two weeks. If the straw is too brittle it will break up into small segments that are difficult to separate from the seed. Less cracking of the seed will occur if the cylinder speed is reduced to about 500 revolutions per minute. At this speed the clearance between the cylinder and concaves should be about one quarter inch.

A market for safflower has not been firmly established. Because of this, any-

one interested in growing the crop should make previous arrangements for disposal of the seed. The entire crop in the past has been bought by processors of oil-bearing seeds. During the past two years safflower has sold for approximately three quarters of the price of flax seed on a poundage basis.

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*The above progress report is based upon Research Project No. 1041.*

## EGGS

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For the present time all eggs that have ever been dirtied can be considered only as potential sour eggs and should be kept out of storage, and no washed eggs should be mixed with clean eggs during the storage season. All washed eggs should be cased and labeled separately, or better, washing should be discontinued entirely during the months that eggs are being stored.

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## TURKEYS

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needed be included in the breeding mash. In some cases in which free choice supplements have been depended upon to supply the necessary vitamins, poor results have been observed. By including the necessary factors in the mash the variable intake of free choice supplements will not cause some hens in the flock to receive deficient amounts of the nutrients.

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## NEW PUBLICATIONS



*A copy of the publications listed here may be obtained without charge from the local office of the Farm Advisor or by addressing a request to Publications Office, College of Agriculture, University of California, Berkeley 4, California.*

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**HOME VEGETABLE GARDENING.** By John H. MacGillivray. Cir. 26, November, 1948.

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