

MUNGBEANS

as a

POULTRY FEED

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Each year, a quantity of split and broken mungbeans** becomes available on Oklahoma farms. These beans, and surplus supplies of whole mungbeans, can be profitably used in animal and poultry feeding. They are rich in protein and in some of the essential minerals and vitamins. Feeding tests show they are an excellent source of vegetable protein for chickens and turkeys when properly supplemented with animal protein, calcium, and phosphorus.

This publication reports feeding tests conducted at the Oklahoma Agricultural Experiment Station to determine the feeding value of mungbeans for growing chicks, laying hens, and breeder hens. From results of these tests, and others reported in the list of references on page 8, the following feeding recommendations have been summarized.

Feeding Recommendations

Split and broken mungbeans are just as good as the whole beans for feeding poultry. This makes it possible to use beans which cannot be sold for sprouting.

Mungbeans may be ground and used instead of cottonseed meal or soybean meal in poultry mashes, or they may be fed whole as part of the scratch grain mixture. Feeding tests indicate that cooking the beans improves their value as a feed, but the improvement is not great enough to pay for the extra time and labor.

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** Mungbeans (*Phaseolus aureus*) are of two major types, called "golden" and "green" because of the color of the seed. This publication deals throughout with the green type. The golden type is used chiefly for forage. (See Ligon in "References," page 8.)

IN MASHES

Poultry mash formulas which include ground mungbeans are listed in Table I. Mungbeans to be used in a poultry mash should be ground in a hammer mill fitted with a $\frac{1}{4}$ -inch screen. Ground mungbeans can make up as much as 30 percent of the mash with satisfactory results. If a mixture other than the ones in Table I is made, two points are important:

(1) Mungbeans contain less protein than cottonseed meal or soybean meal. Therefore 1.6 pounds of ground mungbeans are required to replace 1 pound of these other meals.

(2) Any poultry mash using ground mungbeans must also include animal protein concentrates and a source of phosphorus.

It is essential that these two points be kept in mind if satisfactory feeding results are to be obtained.

IN SCRATCH GRAIN

Mungbeans are a good source of carbohydrates as well as of protein. Therefore whole or cracked beans can be used to replace part of the corn or wheat in scratch grain mixtures. As much as one half of the corn or wheat normally used in a grain mixture can be replaced pound for pound with whole mungbeans.

Some difficulty may be experienced in getting the hens to eat the whole beans when a grain mixture of this kind is fed for the first time. However, the hens soon become accustomed to the whole beans and eat them as readily as they will other kinds of whole grain.

Supplements Required in Chick Mash

Results of feeding tests with chicks (Table II) indicate that raw mungbeans gave satisfactory growth when supplemented with animal protein and phosphorus. A combination of meat and bone scrap and dried buttermilk was most effective in supplementing the green mungbean protein. Dried buttermilk alone was inferior to a combination of the two. When phosphorus was added in the form of steamed bone meal, however, growth was equal to that produced by the combination of meat and bone scrap and dried buttermilk. Meat and bone scrap alone, although it contains adequate phosphorus, was not equal to the combination of meat and bone scrap and dried buttermilk. This was probably due to differences in protein quality. Experience has shown, however, that satisfactory growth can be obtained with meat and bone scrap

TABLE I.—Poultry Mash Formulas Using Ground Mungbeans.

| | Chick starter | Chick growers* | | Chicken and turkey layer and breeder mashes* | | Turkey starter | Turkey grower* |
|-----------------------------|---------------|----------------|-------|--|-------|----------------|----------------|
| | MB1 | MB2 | MB3 | MB4 | MB5 | MB6 | MB7 |
| Ground yellow corn or kafir | 13.0 | 22.0 | 10.5 | 15.5 | 16.0 | 10.0 | 12.0 |
| Wheat shorts | 10.0 | ----- | 20.0 | 10.0 | 20.0 | 12.0 | ----- |
| Wheat bran | 10.0 | ----- | 10.0 | 10.0 | 25.0 | 10.0 | ----- |
| Ground whole wheat | ----- | 12.0 | ----- | ----- | ----- | ----- | 15.0 |
| Alfalfa leaf meal | 10.0 | 10.0 | 10.0 | 10.0 | 6.0 | 6.0 | 15.0 |
| Pulverized oats or barley | 10.0 | 10.0 | 10.0 | 10.0 | ----- | 10.0 | 15.0 |
| Ground mungbeans | 30.0 | 30.0 | 30.0 | 30.0 | 23.5 | 25.0 | 30.0 |
| Soybean meal | ----- | ----- | ----- | ----- | ----- | 5.0 | ----- |
| Cottonseed meal | ----- | ----- | ----- | ----- | ----- | 5.0 | ----- |
| Meat and bone scrap | 8.0 | 10.0 | 8.0 | 5.0 | 6.0 | 10.0 | 7.0 |
| Dried buttermilk | 8.0 | 5.0 | ----- | 5.0 | ----- | 5.0 | 8.0 |
| Salt | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Pulverized limestone | ----- | ----- | ----- | 2.0 | 2.0 | 1.0 | 1.0 |
| Steamed bone meal | ----- | ----- | ----- | 1.0 | ----- | ----- | 1.0 |
| Vitamin A & D feeding oil** | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.5 | 0.5 |
| Manganese stock solution | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 |

* Feed scratch grain with these mashes.

** 3000A—400D.—Omit if green feed is available and birds have access to direct sunlight.

as the only protein supplement after the fourth week of the growing period. Protein quality requirements are less exacting at this time.

Mungbeans which had been heated at 15 pounds pressure for 30 minutes were nutritionally superior to the raw unprocessed beans (Table II). Under practical feeding conditions, however, this difference is not significant. The added expense of processing is not justified by the added growth obtained.

Table II.—Summary of Feeding Tests with Chicks.
(Average Weight in Grams)

| Supplement | Test I** | Test II† | Test III** |
|---|-------------|-------------|------------|
| Control | 632 | 306 | 639 |
| Meat and bone scrap, plus dried buttermilk | 656 666* | | 456 |
| Meat and bone scrap, plus dried buttermilk, plus steamed bonemeal | | 256 | |
| Meat and bone scrap | 616 568* | | 356 |
| Meat and bone scrap, plus steamed bone meal | | 239 | |
| Dried buttermilk | 447 | | |
| Dried buttermilk, plus steamed bone meal | | 314 316* | |

* Mungbeans autoclaved at 250 degrees F. for 30 minutes.

** At 8 weeks.

† At 6 weeks.

Table III.—Results of Egg Quality Studies.

| | Fresh | | | After 8 months storage | | |
|-------------------|---------|----------|------|------------------------|----------|------|
| | Control | Mungbean | | Control | Mungbean | |
| | | I | II | | I | II |
| Yolk Color Index* | 15.5 | 15.2 | 15.7 | 17.8 | 17.4 | 17.7 |
| Albumen Index** | 1.7 | 1.8 | 1.7 | 3.6 | 3.4 | 3.4 |

* Heiman and Carver Yolk Color Index.

** Van Wagenen Score.

Table IV.—Summary of Feeding Test with Breeder Hens.*

| Ration | Av. Weights of Hens (lbs.) | | Eggs per pen Nov. 1 to May 1 | Feed Consumption per Hen | | Test** | Percent Hatchability | |
|--|-------------------------------|-------|------------------------------------|-----------------------------|-------|--------|-------------------------|------|
| | Nov. 1 to | May 1 | | Mash | Grain | | | |
| Control | 4.8 | 6.0 | 1,344 | 18.8 | 28.9 | { | 1 | 77.5 |
| | | | | | | | 2 | 79.5 |
| 30 percent of mungbeans in the mash | 4.9 | 6.4 | 1,035 | 18.8 | 26.5 | { | 1 | 69.8 |
| | | | | | | | 2 | 74.3 |
| Control plus scratch grain containing whole beans | 4.9 | 5.9 | 1,111 | 19.1 | 31.7 | { | 1 | 74.2 |
| | | | | | | | 2 | 70.3 |

* Fifteen hens per pen. Mortality—one hen in control pen.

** Two different hatchability tests were conducted over a period of two months.

Effect on Egg Quality

Mungbeans had no detrimental effect on egg quality when used as a source of vegetable protein in laying mash for hens. Table III shows the yolk color index and the albumen index of eggs from a control lot and from two mungbean-fed lots, at the time the eggs were laid and also at the end of an 8-month storage period. The differences are insignificant, both in the fresh eggs and after storage.

Effect on Egg Production and Hatchability

Satisfactory egg production and hatchability were maintained in a layer or breeder flock both when ground mungbeans were fed as a source of vegetable protein in the mash and when the whole beans were used in the scratch grain as a substitute for corn or wheat. Table IV gives the results of a series of feeding hens with breeder hens.

References

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