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C T. Dowell
VALUE OF RICE BY-PRODUCTS AS FEEDS

LOUISIANA STATE UNIVERSITY
AND
AGRICULTURAL AND MECHANICAL COLLEGE
AGRICULTURAL EXPERIMENT STATION

C. T. DOWELL
Director
VALUE OF RICE BY-PRODUCTS AS FEEDS
FOREWORD

This bulletin gives a summary of the work that this Station has done during the last four or five years on the feeding of rice by-products to beef cattle, hogs and poultry.

The experimental work in the feeding of these by-products to poultry has been completed. Work is now in process in testing further the feeding of these by-products to hogs. This Station has not done work in the feeding of rice by-products to dairy cattle. However, Mr. R. H. Lush of this Station has made a study of the work done elsewhere and has given a brief summary.

We are publishing this in summary form now before much of the work has been published in detail because we have many requests for information in regard to the feeding value of rice by-products.

The summaries of the work done at this Station were prepared by Dr. C. I. Bray of our Department of Animal Husbandry and by Mr. C. W. Upp of our Department of Poultry.
VALUE OF RICE BY-PRODUCTS AS FEEDS

BREWERS' RICE

Brewers' rice is an important fattening feed produced as a by-product in rice milling. The amount of brewers' rice is estimated at about 2% of the total rough rice produced. Some rice screenings and fine broken rice are occasionally sold as brewers' rice when prices are low, which will probably increase this amount. On the basis of 10,000 tons of brewers' rice produced annually in the United States, Louisiana produces approximately 4,000 tons per year.

Brewers' rice is usually considered to be equal to corn in feeding value for fattening cattle and hogs. It has less protein and less fat than corn, but a higher percentage of starch, and must be balanced with protein supplements the same as corn.

Brewers' rice was used satisfactorily in summer fattening experiments with steers on pasture in 1928 and 1929. In 1932 a comparison was made between brewers' rice and ground whole ear corn in feeding two groups of steers on pasture. The two lots made practically the same gains, 2.6 lbs. per day on brewers' rice and 2.69 lbs. per day on ground whole ear corn, both lots receiving some cottonseed meal.

If some feeding value should be credited to the ground cob and shuck on the ground whole ear corn, the brewers' rice was equal to yellow corn in feeding value. If the cob and shuck had no feed value, it required 106 lbs. brewers' rice to equal 100 lbs. of shelled corn. At $16.00 per ton, brewers' rice was as economical as corn at 47 cents per bushel.

BREWERS' RICE FOR FATTENING HOGS

In 1932 brewers' rice was compared to corn for fattening hogs both in dry lot and on pasture. A standard protein supplement of shrimp meal, cottonseed meal and ground alfalfa was fed in selffeeders, free choice.

Brewers' rice was equal to corn in feeding value for hogs. The pigs on brewers' rice gained faster and ate less protein supplement, but ate more of the rice than the corn lot ate of corn. The total feed eaten per 100 lbs. gain was slightly greater for the corn-fed hogs than for those on brewers' rice.

The relative values of corn and brewers' rice were approximately as follows:
Corn price per bushel | Brewers' rice per ton
---|---
40c | $14.89
50c | 18.61
60c | 22.33
70c | 26.12

**RICE BRAN FOR SWINE**

About 40,000 tons of rice bran are produced annually in the United States, of which Louisiana produces about 17,000 tons. Rice bran is a bulky feed, containing more protein than corn, with a high per cent of fat (14.8%), but less carbohydrates. When fed in quantities greater than 40% of the ration it produces soft pork. A great deal of rice bran is shipped to Germany. During the milling season it is usually sold at low prices. The following experiments are the first of a series to find out the proportions of rice bran in a ration that will give the most economical results in fattening hogs.

**WINTER FEEDING EXPERIMENTS, 1931-1932**

Rice bran and corn was fed in comparison to corn alone to pigs weighing 54 lbs. at the beginning of the experiment. All lots received a protein supplement of shrimp meal and alfalfa meal, or shrimp meal, cottonseed meal and ground alfalfa. One lot received 35% rice bran to 65% corn and other lots received 25% rice bran. One lot had the run of one-half acre winter oats and rape.

The best gains per day in the dry lots were made by the lot receiving 25% rice bran and 75% corn, with a complete supplement; but the most economical gains in the dry lot were made by the lot receiving 35% rice bran. The hogs ate more feed per day, however, when they had both rice bran and corn, so that the feed per pound of gain was somewhat larger.

With corn valued at 42 cents per bushel (farm price), rice bran was worth $16.35 per ton in one comparison and $13.25 in another, an average of $14.80, as compared to $15.00 per ton for corn. With corn at $20.00 per ton, rice bran would have a value of $19.72 per ton, or 98.6% the value of corn when fed in these proportions.

**SUMMER FEEDING EXPERIMENTS, 1933**

In the summer of 1933, rice bran was compared with wheat shorts for fattening hogs, both feeds being combined with corn and with a protein supplement. The proportion used was 35% rice bran or wheat shorts and 65% corn, with the protein supplement fed free choice. In comparing the two rations on sudan grass pasture, the lot receiving rice bran made the largest and most economical gains. In the dry lot comparison, the wheat shorts made slightly larger and cheaper gains. With wheat shorts valued at $18.00 per ton, rice bran showed an average value of $17.30, or 96% the value of wheat shorts. The rice bran was bought at $8.00 per ton at the mill, a price much below its real value.
When properly combined with other feeds, rice bran is a satisfactory concentrate to use, and in these proportions does not produce any objectionable oiliness in pork.

RICE BY-PRODUCTS IN POULTRY RATIONS

A goodly portion of the feedstuffs used in poultry rations in Louisiana is imported. An urgent need exists, therefore, that locally produced feedstuffs be utilized to the best advantage. This is especially true right at present when feed prices and prices of poultry products are "out of line". With this fact in mind, experimental work in which rice by-products were used in rations for chicks and for laying hens was conducted over a period of five years, from the fall of 1927 through the summer of 1932.

RICE BY-PRODUCTS FOR LAYING HENS

Five trials, involving 32 different lots of laying hens, were used. The rice products tested include untreated rice bran (heat), treated rice bran, rice polish, brewers' rice and rough rice. These products were used separately and in various combinations to replace one or more of the following feeds: wheat bran, wheat shorts, ground oats and corn meal in laying mash and rough rice and brewers' rice were used in the scratch grain to replace whole oats, whole wheat or cracked yellow corn. In the different rations used, the percentage of the total feed composed of rice products varied from 0.0% in four lots to 74.4% in one lot. In a majority of the lots, however, from 10% to 35% of the total ration was composed of rice by-products.

To give the detailed results here would be unduly burdensome and since these will soon appear in bulletin form only a few summarizing statements are listed below:

1. Rice-fed hens produced as well as hens on standard rations when rice by-products comprised up to 25% to 35% of the total ration.
2. Rice bran (of good quality) or rice polish, or the two together, may be used to replace wheat by-products, ground oats, or not to exceed half of the yellow corn meal, in laying mash.
3. When cheaper in price, rough rice or brewers' rice may replace wheat or corn to the extent of one-third to one-half of the scratch grain. Because of the small size of the particles it is advisable to trough or hopper feed scratch grain which contains brewers' rice.
4. The eggs from rice-fed hens are excellent for market and they keep well in storage.
5. The eggs from rice-fed hens are as large as eggs from hens fed standard rations.
6. The use of rice by-products in the rations of breeding birds does not impair in any way the fertility nor the hatching quality of the eggs produced.
7. Mortality is no greater in lots fed rice rations than in other lots kept under similar conditions but with no rice by-products in the ration.
8. The body weight of laying hens receiving rice by-products in the ration compares favorably with that of hens receiving no rice by-products.

**RICE BY-PRODUCTS FOR YOUNG CHICKS**

Rice by-products were tested in rations for chicks in fifty-four different lots, involving more than 3,000 chicks. Rice bran, rice polish and brewers' rice were used in various combinations in amounts ranging from 10% to 44% of the total ration. In eleven tests with rice bran the average weight of the chicks in lots receiving rice bran was 97% as great as that for the respective check lots which were fed no rice products. In twelve tests with rice polish the chicks were 95% as heavy as chicks in the check lots. In other words, rice bran or rice polish rations yielded results practically equal to standard rations containing no rice by-products. Entirely satisfactory results were obtained in cases in which rice bran and rice polish both were used to substitute for wheat, oat or corn products, and tests in which brewers' rice replaced some of the other products. In two tests, in which 44.3% of the total ration was composed of rice bran, rice polish and brewers' rice, the results were not equal (weight about 70% as great) to those obtained with standard rations.

Mortality was not increased when rice by-products were used.

We conclude on the basis of our results that rice bran as 10% to 20% of the chick ration, rice polish as 10% to 20% of the ration, or brewers' rice as 10% to 25% of the ration, or combinations of rice polish or brewers' rice with rice bran in amounts not exceeding 30% of the total ration, will yield results equal to those obtained with similar rations, except that wheat, oat or corn products are substituted for rice products.

We are confident that in the rice-producing section of Louisiana, especially, and in other sections in which the price of rice products is no greater than that of similar wheat, oat or corn products, rice by-products can be used with entire satisfaction in rations for growing chicks and for laying hens.

We believe that these products can be and should be used much more extensively in chick rations and in laying rations than they are used at present.

Here at the experiment station, we believe in rice by-products as poultry feed. We use 24% rice products in our all-mash laying ration, 10% to 20% rice products in our all-mash chick ration, and 30% rice by-products in our growing mash (with which scratch grain is also fed). We also use brewers' rice or rough rice in the scratch grain when prices justify it.

Suggested formulas in which rice by-products are used will be sent upon request to the Louisiana Experiment Station, Baton Rouge.
RICE PRODUCTS FOR DAIRY CATTLE

Rice bran, when making up not more than one-third of the grain ration, is equal to wheat bran and worth about 80% as much as ground corn. The addition of rice hulls lowers its feeding value. Rice bran and molasses feed, commonly called sweet bran, is more palatable but of about the same feeding value. Because of its high fat content, rice bran may cause soft butter but will not affect milk flavor. It is most advantageously fed in fall and winter and with other feeds.

Rice polish appears to be equal or slightly superior to ground corn for milk production. Rice polish, like rice bran, has a tendency to make the butter soft if used in too large quantities. It makes an excellent feed with cottonseed meal and bulky feeds.

Brewers' rice and rough rice, fed ground, have about the same feeding value as ground corn. The price of these products is usually too high for use as dairy feed.

Rice straw has some value for milk production, especially when a high protein grain and some succulent feed is fed. It is better for wintering dry stock and heifers than for milk cows.

Rice hulls have no value for dairy cattle.

The following rations are suggested to make use of rice products (other feeds of similar value may be substituted when prices are lower):

16% ration with pasture and limited legume hay:
- 100 lbs. brewers' rice
- 100 lbs. rice polish
- 100 lbs. rice bran
- 100 lbs. corn and cob meal
- 100 lbs. choice cottonseed meal
- 5 lbs. salt
- 5 lbs. oyster shell flour

20% ration with pasture and no legume hay:
- 100 lbs. brewers' rice
- 100 lbs. rice polish
- 150 lbs. rice bran
- 50 lbs. ground oats
- 150 lbs. choice cottonseed meal
- 7 lbs. salt
- 10 lbs. oyster shell flour

24% ration with no pasture and rice straw:
- 200 lbs. rice polish
- 100 lbs. rice bran
- 200 lbs. corn and cob meal
- 400 lbs. choice cottonseed meal
- 9 lbs. salt
- 18 lbs. oyster shell flour