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Soybean Oil Meal as a Protein Supplement

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The utilization of the products of the soybean plant during the past twenty years has been one of the outstanding achievements of science. In this paper it is our desire to emphasize the value of the soybean and its main product, soybean oil meal.

There are, at present two general methods by which the oil is removed from the soybean. The expeller method removes the oil by extreme pressure and heat. This reduces the oil content from about 18 per cent to 5 per cent. The meal is of a light brown color and has a pleasant nut-like flavor. Its protein content runs 41 to 43 per cent. The extraction method removes the oil by the use of fat solvents. Less than 1 per cent of the oil remains in the meal. The protein content is 43 to 45 per cent. This meal does not have the toasted flavor of the expeller meal. Most authorities agree that the expeller processed meal has a slightly higher feeding value than does extracted meal.

Of the quality of the protein of soybean oil meal Morrison in his "Feeds and Feeding" states, "Soybean oil meal is especially rich in protein, and the protein is also of excellent quality."

Low in Fiber

"Soybean oil meal, "says Morrison, "is lower in fiber than cottonseed meal or linseed meal, containing an average of only 5.6 per cent. On account of its high digestibility, it supplies 82.2 pounds of total digestible nutrients per 100 pounds, which is somewhat more than is furnished by linseed meal or cottonseed meal."  

Like other seeds, soybeans and soybean meal are very deficient in vitamins A and D. They are also low in calcium and phosphorus. Therefore when soybean oil meal is fed to livestock it is essential that an adequate supply of vitamins and minerals be furnished.

The value of soybean meal in comparison to other protein rich feeds has received considerable attention from investigators.

At the North Platte Sub-station of the University of Nebraska tests were conducted to determine the relative value of different protein supplements for the wintering of steer calves fed on alfalfa and silage. The results are given in Nebraska Circular No. 7. These supplements included cottonseed meal, linseed meal, soybean oil meal (both expeller and solvent process), digester tankage, and dry rendered tankage. The bulletin states, “The three lots of calves fed soybean oil meal made faster and more economical gains than the calves fed any other supplements used in this test.”

In feeding dairy cattle it has been found that soybeans and soybean oil meal provide a protein of excellent quality and make good the deficiencies in the proteins of grains.

Morrison states that whole soybeans can be used to supply part of the protein requirement for fattening cattle, but that the cattle often tire of the ration. Soybean oil meal can be used exclusively, however. In three experiments with fattening calves soybean oil meal was compared with soybeans. The results showed that soybean oil meal was worth considerably more than whole soybeans.

Supplements for Sheep

"Both soybeans and soybean oil meal are excellent protein rich supplements for sheep feeding", states Morrison.

Soybean oil meal is an excellent protein supplement to cereal grains for
swine feeding. If sufficient mineral is added soybean oil meal is very satisfactory as the only protein supplement for all hogs, except those weighing less than 50 to 75 pounds. Soybeans fed to hogs in excess of 5 per cent of the ration produce a soft fat which is very objectionable. For this reason soybean oil meal should be fed to pigs and not whole soybeans.

When soybean oil meal is mixed with tankage, meat scraps, or fish meal particularly good results are obtained. Soybean oil meal makes an excellent substitute for linseed meal in the trio mixture (which consists of 50 pounds tankage; 25 pounds linseed meal, and 25 pounds chopped or ground alfalfa hay.)

In eight experiments at three stations it was found that pigs on pasture when fed soybean oil meal and a mineral mixture as a supplement to corn gained as rapidly as those fed tankage, and the gains were very economical.

**Produced in Corn Belt**

The soybean is the only protein supplement produced in the cornbelt. Almost all of our other crops are starchy foods which must have protein added in order to make a balanced ration. Freight accounts for approximately $6 per ton on the retail price of cottonseed meal in Iowa. The consumer saves this in soybean oil meal since he is near the source of supply.

Last year considerably less than 6,000,000 bushels of soybeans were raised in Iowa. It is estimated that 35,000,000 bushels of soybeans will be required to produce enough soybean oil meal to supply a sufficient amount of protein for all animals on Iowa farms.

The soybean plant is an annual legume and will thrive in almost any locality where corn can be grown. It will grow on soil too acid for alfalfa. If the seed is properly inoculated, soybeans add nitrogen to the soil.

With the gradual change from horse to tractor farming the demand for oats has greatly decreased. As a result many farmers have started to raise soybeans in place of oats.

**Crop Rotation Systems**

Soybeans can be made to fit into the crop rotation system of almost any farm. They can be planted immediately following corn in the spring and cultivated with the same machinery. In the latter part of the summer any amount of the crop may be cut for hay, which compares in value to alfalfa, or after frost the remainder may be harvested for the beans with a combine.

The desire of this article is to acquaint veterinarians with the possibilities of soybeans. Soybeans are a cash crop, planted and harvested in the same year. The excellent feeding value of the oil meal and the fact that a farmer can raise his own protein supplement at a good saving are important. This will relieve the necessity of buying costly commercial supplements and at the same time enable him to use a more balanced feed for his livestock.

**References**

2. Ibid, pp. 372.
5. Ibid., pp. 672-674.
6. Ibid., p. 674.
8. Ibid., pp. 886-890.
9. Ibid., p. 890.
10. Ibid., p. 889.

Doctor W. R. Anderson, formerly of the Iowa State ambulatory clinic, has established a practice in Slater, Iowa. Dr. Anderson received his degree in Veterinary Medicine at Iowa State College in 1930. After graduation he practiced for two years at McCook, Nebraska. From there he entered state work in Minnesota for one year. In 1934 he was in the B. A. I. and worked in several states. From 1935 until 1939 he served as ambulatory clinician at Ames.

Dr. Warren H. Smeltzer, of Chicago, has accepted his reserve officer's commission and is now working for the B. A. I. at Little Rock, Arkansas.