

# Cottonseed Meal, Cold-Pressed Cake and Linseed-Oil Meal in Rations for Fattening Cattle

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Cottonseed meal and linseed-oil meal are high in protein and both have been used by successful feeders to supplement rations for fattening and maintaining cattle. There is much experimental data which shows that the addition of either of these supplements to corn belt rations usually increases the rate of gain and reduces the amount of feed required to produce 100 pounds of gain.

A study of experimental results obtained in twenty-nine trials conducted at the Missouri, Iowa, Kansas, Nebraska and Pennsylvania stations in which cottonseed meal and linseed-oil meal were compared as supplements to rations for fattening cattle shows that in six tests the lots fed cottonseed meal made larger daily gains and in twenty-three trials the ones that received linseed-oil meal made larger gains. In one of the three trials in which cold-pressed cottonseed cake was compared with linseed-oil meal the lot fed cold-pressed cottonseed cake made a larger daily gain. The fact that in some trials cattle receiving cottonseed products as a supplement made larger daily gains than ones fed linseed-oil meal, and in other trials the lots fed linseed-oil meal made larger daily gains than those receiving cottonseed meal or cold pressed cake would indicate a considerable variation in the quality and palatability of these supplements. When an average of the above trials was taken it was found that cattle fed linseed-oil meal gained about 8 to 10% faster than similar ones that received cottonseed meal.

Linseed-oil meal was apparently more palatable to the cattle in twelve of the trials studied, as there was a greater consumption of feed in these cases. A greater quantity of feed was consumed by steers receiving cottonseed meal in six trials.

More pork was produced by hogs following steers receiving linseed-oil meal as a supplement to corn in seven of the ten trials in which this item was reported, while in the other three trials more pork was produced by hogs following the steers fed cottonseed meal.

The selling price of the cattle was reported in twenty-three of the trials studied. In fifteen cases the lots fed linseed-oil meal sold for 10c to 75c a cwt. more than similar lots that received cottonseed meal. In four trials the lots fed cottonseed meal sold for 5c to 50c a cwt. more than similar lots that received linseed-oil meal and in four cases the selling price was equal.

The answer to the question, "Should a feeder buy cottonseed meal or linseed-oil meal to supplement the fattening ration?", will depend upon the relative price and quality of these supplements. The following gives the feeder some information as to how these supplements compare under various conditions.

### LINSEED-OIL MEAL AND COTTONSEED MEAL

Three trials were conducted in which 2-year-old steers were fed shelled corn, corn silage, legume hay and supplement. The steers weighed about 1,000 pounds when started on feed and were fed for 120 to 133 days. An average of the three trials shows that the steers fed linseed-oil meal gained 6.6% faster than similar ones receiving cottonseed meal. However, in one of the trials the steers that received cottonseed meal gained 0.27 pounds per head daily, (11.02%) more than those fed linseed-oil meal. In each experiment only slight differences were observed in the amounts of feed consumed, but the steers receiving linseed-oil meal made more efficient use of their feed and on an average more pork was produced by hogs following these lots.

In two trials conducted at the Missouri Station in which cottonseed meal and linseed-oil meal were compared as supplements to a ration of corn silage and legume hay, the linseed-oil meal was somewhat superior. The steers averaged about 925 pounds and were fed for 130 days. In one trial the steers receiving linseed-oil meal gained 0.41 pounds per head daily (20.8%) more than those fed cottonseed meal as a supplement, while in the other trial both lots made practically the same gain. An average of the two trials shows that the lots receiving linseed-oil meal made a 9.9% faster gain.

There was practically no difference in the efficiency of these supplements when fed in conjunction with a basal ration of corn silage and corn stover to 2-year-old steers in three trials at the Pennsylvania Station. The steers averaged about 880 pounds when started on feed and were fed for 140 days. In the first two trials the steers receiving linseed-oil meal made slightly greater daily gains. In these two trials more linseed-oil meal was fed as the amounts of supplements were based on their protein content. Equal amounts of supplements were fed in the other trial and in this case the steers receiving cottonseed meal gained 0.20 pounds per head daily more than those fed linseed-oil meal. An average of the three years' work shows the gains in both lots to be identical. Tomhave and Bentley of the Pennsylvania Station report, "There is very little choice between cottonseed meal and linseed-oil meal as protein supplements in the fattening ration."

Linseed-oil meal produced a larger daily gain than cottonseed meal when fed with corn silage, and a corn stover; and shelled corn added during the later part of the feeding period to two-year-old steers. Two trials were conducted at the Pennsylvania Station in which steers that averaged 925 pounds were fed for 140 days. Corn was added to the ration during the last 69 days of the period. An average of the two trials shows that the steers receiving linseed-oil meal gained 12.5% faster and showed more finish than those fed cottonseed meal. The extra finish increased the average sale value \$0.37 a cwt.

Calves in the feeding demonstrations conducted by the St. Joseph Stock Yards Company that received linseed-oil meal in conjunction with a basal ration of corn and alfalfa hay gained 2.24 pounds per head daily as compared with 2.05 pounds per head daily for similar calves receiving cottonseed meal as a supplement. The calves fed linseed-oil meal required 15 pounds more of supplement, 8 pounds less of corn and 33 pounds less of alfalfa hay to produce 100 pounds of gain. The calves receiving linseed-oil meal sold for \$0.50 a cwt. more than ones fed cottonseed meal.

In two trials at the Kansas Station calves were used to determine the efficiency of these supplements when fed in conjunction with a basal ration of corn, silage and legume hay. In one trial the lot receiving linseed-oil meal made a larger daily gain than the one fed cottonseed meal while in the other trial the lot fed cottonseed meal made a larger daily gain. There was practically no

difference in the rate and economy with which the gains were made on the rations but the cattle fed linseed-oil meal sold for \$0.50 and 0.25 a cwt. more respectively than the lots receiving cottonseed meal.

The results of one year's work at the Kansas Station show that a ration made up of 1 pound of cottonseed meal and 1 pound of corn per head daily in addition to silage and straw was slightly more efficient for wintering calves than a ration in which linseed-oil meal was substituted for the cottonseed meal.

The results of five years' work at the Missouri Station comparing linseed-oil meal and cottonseed meal as supplements to corn fed on bluegrass pasture show linseed-oil meal to have been from 0.74% less efficient to 11.5% more efficient for 3-year-olds, 2-year-olds and yearlings. Three-year-old steers weighing 1300 pounds were fed 180 days on bluegrass. Those receiving linseed-oil meal gained on an average 2.68 pounds per head daily as compared with 2.40 for similar steers fed cottonseed meal. More corn and supplement were required to produce 100 pounds of gain on the lot fed cottonseed meal. An average of two trials in which 2-year-old steers averaging 900 pounds were fed corn and supplement on bluegrass for 210 days shows that there was only a slight difference in the rate of gain, those fed linseed-oil meal gained 0.03 pounds more per head daily. The lot receiving cottonseed meal made a larger daily gain in one of the two trials. Yearling steers receiving linseed-oil meal in addition to corn while on bluegrass pasture made larger daily gains than similar steers fed cottonseed meal as a supplement in each of these five trials.

#### **LINSEED OIL MEAL AND COLD-PRESSED COTTONSEED CAKE**

Yearlings at the Nebraska Station fed linseed-oil meal with a basal ration of corn and prairie hay produced 9.43% faster gain than similar cattle receiving the same basal ration supplemented with cold-pressed cottonseed cake. The lot receiving linseed-oil meal also made more efficient use of their feed, fifty pounds more of corn, 9 pounds more of supplement, and 53 pounds more of hay being required to produce 100 pounds gain on the steers fed cold-pressed cottonseed cake. Two-year-old steers that received cold pressed cottonseed cake as a supplement to a ration of corn and corn stover gained 11.1% faster, made more efficient use of their feed and sold for \$0.10 a cwt. more than similar cattle fed linseed-oil meal. Calves fed cold-pressed cottonseed cake as a supplement to a basal ration of corn and corn silage gained 4.1% less per head daily than similar ones receiving linseed-oil meal.

#### **COTTONSEED MEAL AND COLD-PRESSED COTTONSEED CAKE**

One trial conducted recently at the Kansas Stations shows that 130 pounds of 32% cold-pressed cottonseed cake were required to equal the feeding value of 100 pounds of choice 43% cottonseed cake. An average of three other trials shows that 138 pounds of cold-pressed cake were required to equal 100 pounds of choice cottonseed meal.

#### **AMOUNTS TO FEED TO FATTENING CATTLE**

Nitrogenous supplements are essential in many of our corn belt rations for economy of gain. However, some waste occurs through injudicious feeding of these supplements. Experiments at the Indiana Station show that 2.5 pounds of cottonseed meal per head daily per 1000 pounds of live weight is sufficient to supply the necessary protein in a ration of shelled corn, corn silage, and oat straw or clover hay. Trials at the Missouri Station show that 1000-pound steers receiving 2.77 pounds of linseed-oil meal per head daily in addition to a full feed of corn silage and legume hay made as large daily gains as similar steers fed 4.4 pounds of the supplement. An average of two trials at the Kansas Station shows that calves receiving 1 pound per head daily of cottonseed meal

in addition to a ration of corn, corn silage, and alfalfa hay, made a profit of \$7.61 per head as compared with \$5.15 for similar ones fed 2 pounds per head daily of cottonseed meal and \$5.84 per head for those receiving no supplement.

On this basis the addition of 1 pound of cottonseed meal or linseed-oil meal per head daily to a ration of corn, corn silage, and legume hay for 400-pound calves or 2 pounds per head daily for 800-pound steers, would ordinarily give the greatest return for money expended in the purchase of nitrogenous concentrates. Legume hay such as clovers, alfalfa, and soybeans fed as the sole roughage to fattening cattle will supply considerable protein and smaller amounts of nitrogenous concentrates are therefore required to supply the necessary protein.

Since many corn belt feeders are confronted with the problem of providing a supplement high in protein, it is advisable to consider the composition of these nitrogenous concentrates as shown by the label on the bag. While the label gives the total composition and serves as a guide in buying the real value of a feed is dependent upon the digestible nutrients.

TABLE 1.—COMPARISON OF DIGESTIBLE NUTRIENTS IN COTTONSEED MEAL, COLD-PRESSED COTTONSEED CAKE, AND LINSEED-OIL MEAL

	Total dry matter in 100 lbs.	Digestible Nutrients in 100 lbs.				
		Crude Protein	Carbo-hydrates	Fat	Total	Nutritive ratio
		lbs.	lbs.	lbs.	lbs.	lbs.
Choice cottonseed meal .....	92.5	37.0	21.8	8.6	78.2	1.1
Old process linseed oil meal....	90.9	30.2	32.6	6.7	77.9	1.6
Cold-pressed cottonseed cake.	92.1	21.1	33.2	7.4	70.9	2.4

Cottonseed meal is one of the feeds richest in protein and carries more than 8% fat. Linseed-oil meal contains less protein and fat and more carbohydrates than choice cottonseed meal. Cold pressed cottonseed cake contains a larger proportion of hull than normal cake and has a correspondingly lower protein content. Analysis shows cold pressed cake to contain about 21% digestible protein. The protein content is an indication of its feeding value.

There is considerable variation in the quality of linseed and cottonseed products, especially the latter. Usually greater reliance can be placed in the better grades. Unadulterated cottonseed meal of choice quality should have a light yellow color and a sharp nutty odor. The value of the supplement depends on the percentage of protein it contains and it may be bought in accordance with the guaranteed analysis label on the sack. Feed manufacturers and officials have agreed on the following classification of cottonseed products.

**Choice Cottonseed Meal.**—Must be perfectly sound and sweet in odor, yellow, not brown or reddish, free from excess of lint, and must contain at least 41% of crude protein.

**Prime Cottonseed Meal.**—Must be of sweet odor, reasonably bright in color, and must contain at least 38.6% of crude protein.

**Good Cottonseed Meal.**—Must be of sweet odor, reasonably bright in color and must contain at least 36% of crude protein.

### FEEDING VALUE OF PROTEIN RICH SUPPLEMENTS

When cottonseed meal or linseed-oil meal is added to rations deficient in protein in amounts sufficient to supply the deficiency each pound of the supplement has a feeding value equal to 2½ to 3 pounds of shelled corn. In rations that contain excessive amounts of supplement the protein rich concentrate takes the place of the corn or carbohydrates and as a substitute for corn is not so valuable. With ordinary prices cottonseed meal and linseed-oil meal can be used as supplements to corn for fattening cattle but corn is the staple fattening feed in the corn belt and only under very extraordinary conditions will Missouri feeders be justified in feeding linseed meal or cottonseed products as a substitute for corn.