

Whole Cottonseed for Beef Cattle Rations ¹

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High availability in the southern USA has generated much interest in the use of whole cottonseed as a feed ingredient for beef cattle rations. Whole cottonseed is high in energy (TDN), protein, phosphorus, and fiber. The high TDN is mainly due to the high oil/fat content of the whole cottonseed. Composition of whole cottonseed is presented in table 1. Be aware that the nutrient concentrations given in the table are average values and it is strongly suggested that the available source of cottonseed be analyzed.

Pertinent Points on the Feeding of Whole Cottonseed to Beef Cattle

1. Because of the high oil content of whole cottonseed, the maximum amount to be fed should not exceed 0.5% of body weight per day for mature cows and 0.33% of body weight for weaned calves. For example, a 600-lb stocker should not receive more than 2 lbs per day ($0.33 \times 600 \div 100 = 2$) and a 1000-lb cow, 5 lbs ($0.5 \times 1000 \div 100 = 5$). In mixed rations, whole cottonseed should not exceed 15% of the total ration dry matter, including dry matter from hay and/or pasture. The high fat/oil content of whole cottonseed could result in diarrhea if fed at high levels.
2. As with any new feed, cattle may have to be enticed to eat cottonseed, which can be done by top dressing it with molasses or other palatable feed.
3. Cottonseed can be fed without feed processing.

A Few Cautions

1. Cottonseed can combust spontaneously if stored too wet and stacked high. Moisture level should not exceed 14% for safe storage.
2. Mold mycotoxins such as aflatoxins can be a problem, especially if whole cottonseed is stored too wet.
3. Whole cottonseed contains some free gossypol, which can be toxic to some livestock species. However, gossypol toxicity is usually not a concern with beef cattle except for young calves under four months of age and for breeding bulls. Gossypol is known to interfere with male fertility. Gossypol-induced infertility in bulls should not be of concern if recommended feeding levels are not exceeded. However, to err on the side of caution, do not feed whole cottonseed to bulls 60 to 90 days before the start of the breeding season or to young growing bulls

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to be sold for breeding. For more information, refer to edis.ifas.ufl.edu/AN130.

4. Cottonseed can overheat if stored improperly. Heat-damaged cottonseed has reduced feeding value and palatability.
5. Prolonged wet, humid conditions just before cotton harvest can result in mold growth and/or seed sprouting, which reduces the feeding value of whole cottonseed.
6. A check of seed soundness should be done before purchase (i.e. cut some seeds open with a pocket knife). Avoid lots with many lightweight/hollow seeds.

Further Information

Further information can be obtained from local county extension service and the animal science extension websites of North Carolina State University (www.cals.ncsu.edu/ansci/extension/animal/nutr/ahnutr.html) and the University of Florida (edis.ifas.ufl.edu/TOPIC_Beef_Cattle_Nutrition).

Table 1. Composition of whole cottonseed in comparison to other feedstuffs.^{a,b}

| Item | Whole Cottonseed | Cottonseed Meal | Corn |
|--|------------------|-----------------|------|
| Crude protein, % | 28 | 46 | 9.8 |
| TDN, ^c % | 90 | 75 | 90 |
| Crude fat, % | 22 | 3 | 4 |
| Crude fiber, % | 20 | 13 | 2 |
| NDF, ^d % | 52 | 29 | 11 |
| ADF, ^e % | 30 | 18 | 3 |
| Calcium, % | 0.2 | 0.2 | <0.1 |
| Phosphorus, % | 0.8 | 1.2 | 0.3 |
| NE _m , ^f Mcal/kg | 2.24 | 1.79 | 2.44 |
| NE _g , ^g Mcal/kg | 1.55 | 1.16 | 1.55 |

^a Dry matter basis; typical dry matter concentrations - 92%, 90%, and 90% for whole cottonseed, cottonseed meal, and corn, respectively

^b Source: NRC (2000), Nutrient Requirements of Beef Cattle, National Research Council, Washington DC, USA.

^c Total digestible nutrients

^d Neutral detergent fiber

^e Acid detergent fiber

^f Net energy for maintenance

^g Net energy for weight gain