Potential for Gossypol Toxicity When Feeding Whole Cottonseed to Beef Cattle[1]

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The feeding of whole cottonseed to beef cattle has increased over the last decade due to increased local cotton production. Whole cottonseed is a good source of both protein and energy for beef cattle rations. However, one should be aware of potential gossypol toxicity when feeding cottonseed.

What Is Gossypol?

Gossypol is a natural toxin present in the cotton plant that protects it from insects. Its name is derived from the scientific name of cotton (*Gossypium* spp.) and phenol, its main chemical structure.

Non-ruminant animals, such as pigs and poultry, can't tolerate much gossypol before toxicity signs develop. Cattle, however, have the ability to detoxicify gossypol because the microorganisms within the rumen bind it so it can't be absorbed. This ability, however, can be compromised at very high levels of cottonseed feeding. With young calves, the feeding of whole cottonseed is not recommended until they have a well-developed rumen (usually at over four months of age). Young calves will not eat enough cottonseed from the cow's ration to present a problem when lactating cows are supplemented at or below the recommended level.

Feeding Guidelines

Typical maximum recommended ration levels of whole cottonseed are 0.5% of body weight per day for mature cows and 0.33% of body weight for weaned calves. This would be about 5 lbs/day for a mature cow and 1.5 lbs/day for a weaned calf (450 lbs). The maximum amount should not be exceeded, not only because of the gossypol content but also because of the high fat/oil content of whole cottonseed. If the recommended level is exceeded, diarrhea may result due to the high level of fat. In addition, care should be taken to ensure that individual animals do not over-consume cottonseed when group- fed.

Gossypol and Bull Fertility

In regards to bulls, gossypol can cause a temporary reduction in fertility when cottonseed is fed above the recommended level. Because of the importance of bull fertility to profitable beef production, the general recommendation is that bulls should not be fed whole cottonseed 60 to 90 days before the start of the breeding season. The feeding of whole cottonseed to the cow herd when the bulls are present is okay as any decrease in fertility will take several months to develop. By the time fertility begins to decline (if at all), the breeding season should be over.

Summary

Overall, whole cottonseed is an excellent supplemental feed for beef cattle. If fed properly, it should not cause any problems. Whole cottonseed offers the potential for cattle producers to save money, but the level of management will be slightly higher than with traditional supplements.