

Feeding Raw Whole Soybeans to Beef Cattle

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Recent weather conditions across Mississippi have disrupted soybean harvests and resulted in increased quantities of damaged soybeans in the state. Although these soybeans may not be readily accepted at grain elevators, the potential does exist for incorporation into beef cattle rations. Nonetheless, there are several important points to consider with regard to use of these damaged beans.

Nutrient Quality

Raw whole soybeans contain 40% crude protein and 20% fat on a dry matter basis. However, damage to soybeans may decrease their nutrient content. While it may be tempting to use these damaged soybeans due to the attractiveness of a discounted price, a feed analysis should be conducted to determine the exact quality of the nutrients available. Additionally, in designing supplement programs it is important to know the nutrient content of feeds used. Therefore, a nutrient analysis (feed test) is of the utmost importance.

Chemical Considerations

Unprocessed (uncooked) soybeans have several enzymes that can make them particularly challenging to incorporate them into cattle rations. The first is a trypsin-inhibiting enzyme, which is of importance to non-ruminants/monogastrics (horses, swine) or pre-ruminants (young calves). This enzyme can inhibit protein digestion. Therefore, it is not recommended to feed raw soybeans to monogastrics or young pre-ruminant calves (nursing calves or calves less than 300 pounds). If raw soybeans are offered to cows with calves, there is a risk that the calves may consume these soybeans.

Another concern is that raw soybeans contain urease. Urease breaks urea down into ammonia. This is of importance if cattle are receiving a supplement or feed that contains urea (non-protein nitrogen, NPN). The increased activity of urease in raw soybeans can result in a more rapid breakdown of urea into ammonia within the rumen, potentially leading to ammonia toxicity and cattle death. Be aware of all ingredients in feeds provided to cattle. Many commercially available protein tubs and blocks contain urea, which can potentially be fatal to cattle when fed in conjunction with raw soybeans. Range cubes may also contain urea. Do not feed any combination of urea-containing products and raw soybeans to cattle.

Feeding Whole Soybeans

Despite the previous considerations, whole soybeans can be used successfully in beef cattle feeding programs if managed correctly. Whole soybeans can be effectively used as protein supplements for beef cattle. Nonetheless, feeding guidelines must be followed.

Due to the high fat content (20%), whole soybeans should be limit fed at a level so that the total dietary fat level does not exceed 6% for mature cattle or 4% for growing cattle. High fat levels can lead to reduced digestibility of forages and other feedstuffs; interfere with calcium, magnesium, and vitamin A absorption; cause fluctuations in feed intake; and result in scours (diarrhea). Because of fat intake concerns, do not feed whole soybeans free-choice or at levels that exceed total dietary fat recommendations. Grazing soybean stubble containing whole beans can result in overconsumption and is not recommended.

Grinding raw soybeans can increase their digestibility. However, grinding soybeans decreases their shelf life, because the fat inside the beans becomes exposed to the elements and can become rancid. Feed ground soybeans within 3 weeks following processing and sooner during humid conditions.

With current harvest conditions, soybeans may have high quantities of mold. Additionally, with the hot dry climate experienced early in the growing season, the potential for aflatoxin is high. Mold does not have to be visible for mycotoxins such as aflatoxin to be present. In addition to obtaining a feed nutrient analysis, conduct an aflatoxin-screening test on raw soybeans prior to feeding. Calves are more susceptible to aflatoxicosis than mature cattle. For young calves, aflatoxin levels exceeding 20 parts per billion can disrupt normal rumen function, suppress immune function, inhibit protein building, and lead to cancer. Proper soybean drying and storage can reduce the potential for mold growth and mycotoxin presence.

Conclusions

With the increase in damaged soybeans due to poor harvesting conditions, many cattle producers have the opportunity to acquire raw whole soybeans at discounted prices. Raw whole soybeans can be successfully used in beef cattle diets only if feeding guidelines are followed. Do not allow young calves to consume raw soybeans, and limit feeding quantities of whole soybeans to all cattle. Feed ground soybeans within 3 weeks of processing. Obtain a nutrient analysis and an aflatoxin test prior to purchasing or feeding any damaged soybeans. The nutrient analysis will help determine feeding quality and allow for appropriate diet formulation.

Literature Cited

- National Research Council, Nutrient Requirements of Beef Cattle 7th Rev. Ed. 2000. National Academies Press, Washington DC.
- Lalman, D., D. Gill, and J. Steele. Feeding whole soybeans or drought or frost damaged soybeans to beef cattle. Oklahoma Cooperative Extension Service, Publication F-3030. Division of Agriculture and Natural Resources, Oklahoma State University, Stillwater