

**Extension Notes – Angie Johnson, NDSU Extension Agent Intern**  
**Feeding Corn to Beef Cattle**

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Currently, the price of corn is favorable for beef producers who have access to it and can use it as a source of affordable feed. When a feed source, such as corn, becomes reasonably priced, producers have the opportunity to buy the feed in high quantities or in bulk in order to take advantage of the reduced price. If producers have the flexibility within their budget to buy a feed in large quantities, he or she must understand how to properly manage the feed and how to include it within a ration to make a complete and balanced diet. Let's take a closer look at the dietary factors associated with feeding corn to cattle.

Compared with other feed grains, corn is lower in protein and slightly higher in energy. Corn contains approximately 70 percent starch on a dry-matter basis. Other important fractions in the corn kernel include protein, fiber and minerals. The protein in corn is approximately 55 to 60 percent escape or bypass protein. Escape protein is protein that is not fermented or degraded by the ruminal microorganisms, but is digested and absorbed by the animal in the small intestine. The remaining 40 to 45 percent of the protein in corn is rumen-degradable protein- or protein that can be broken down and used by the microorganisms within the animal's gut. Ruminal microorganisms require rumen-degradable protein for use in growth and protein synthesis.

Most research with corn indicates a substantial benefit to providing rumen-degradable protein in diets containing corn. Backgrounding or finishing diets containing high levels of corn require supplemental rumen-degradable protein in the form of non-protein nitrogen (urea), natural protein sources such as sunflower meal, canola meal or soybean meal, or a combination of non-protein nitrogen and natural protein.

Like all cereal grains, corn is low in calcium and relatively high in phosphorus. Diets containing high levels of corn should include a supplemental calcium source, such as limestone, to prevent urinary calculi in bulls and steers. Urinary calculi is a hard aggregation of mineral salts and tissue cells that form either in the kidney or the bladder and produce a mechanical irritation and a chronic bladder inflammation. The recommended calcium-to-phosphorus ratio in backgrounding and feedlot diets is a minimum of 2-to-1 (two parts calcium to one part phosphorus).

Corn can be used in many different types of backgrounding and finishing diets, and it can serve as a supplement in forage-based diets for beef cows. However, corn is relatively low in protein and high in starch, which can negatively affect forage utilization, especially in diets based on lower-quality forages. Consequently, corn grain should be used in forage-based diets at relatively low levels (less than 0.4 percent of body weight), in forage-based diets that have adequate crude protein (greater than 9 percent crude protein) or in combination with protein supplements.

Corn can serve as the sole grain source in backgrounding and finishing diets. Depending on desired cattle performance, the level of corn can be varied to supply additional energy in the diet of growing and finishing cattle. However, supplemental protein is needed in most corn-based backgrounding and finishing diets because of the low crude protein content of corn.

Even though corn can be fed whole with satisfactory results, cracking or rolling prior to feeding will increase digestibility by 5 to 10 percent. In most instances, grinding or rolling corn will not markedly improve average daily gain, but proper processing will improve feed conversion efficiency. As the proportion of corn in the diet and the cost of corn increase, the benefits of processing also increase because corn is supplying a greater portion of the energy. When corn is fed whole, the animal must process the corn by mastication or chewing. Rolling or cracking corn for use in a mixed ration may facilitate better mixing. Fine grinding corn should be avoided in beef cattle diets because fine-ground corn ferments quickly in the rumen. High fermentation levels can lead to digestive disturbances, such as acidosis. Acidosis is when the pH of the rumen falls to less than 5.5 (normal rumen pH is 6.5 to 7).

Always introduce grains slowly to newly weaned calves. A calf's digestive system has not adapted to a grain diet yet, and it takes time for their body to adjust to a new feed source. Allow newly weaned calves access to long stemmed hays. The feeding of long stemmed hays simulates the grasses that the calves had been grazing on out on pasture, because they

are acclimated to the palatability of grasses. Always make sure that fresh water is available at all times for calves to drink.

Newly weaned calves are extremely vulnerable to diseases because of the stress that weaning places on an animal's body. Weaned calves tend to stop eating, resulting in poor nutrition to fight off infections which then increases the risk for developing respiratory diseases, as well as other illnesses. At this stage of a calf's life, their intake of feed is low, and they become highly susceptible to disease due to the stresses of weaning. It is important to increase the nutrient concentration of the ration, but limit the amount to be fed so the calf does not consume too much of a highly concentrated diet. By increasing the nutrient concentration of a diet, we are implying that the calves need a high source of energy, which would be a grain. Calves also need a source of crude protein, such as soybean meal, and vitamins and minerals to allow bodily functions to take place. Remember, with this high concentrated diet, it must be limit fed to the calves because their rumen is not adapted to a grain ration and it takes time for the rumen to adapt to a new feed source. The goal is to minimize ruminal acidosis and digestive upsets and to get them started on feed so that their bodies can handle gradual feed increases with time.

Overall, corn is a useful feed ingredient. It is high in energy but relatively low in protein compared with other feed grains. For optimum dietary utilization, corn should be processed by rolling, cracking or coarsely grinding prior to feeding. The decision to process corn should be based on efficiencies gained from processing compared with the cost of processing.

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