



# MANAGEMENT

## High Grain Rations for Cattle

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### Quick Facts...

A rapid increase in ration grain content can lead to acid production by rumen bacteria that can overwhelm a beef animal's buffering ability. This may result in reduced performance or death.

A gradual series of ration changes from high roughage to high concentrate is recommended to avoid excess acid production.

Conscientious bunk management will ensure successful feeding of high grain rations.

Physical appearance of feces has been a better predictor of starch digestibility to the trained eye than fecal starch or pH.

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Cattle feeding economics have dictated that some grain be fed to cattle prior to slaughter for best production efficiency. The amount of grain and the length of time that grain has been fed varies depending on cattle price, cattle breeding, the price spread between good and choice quality carcass grade and the price of grain.

Regardless of these factors, grains have been more economical than roughages to feed during a finishing period. If this economic situation continues, cattle producers will continue to finish cattle with high grain rations. Ensuring that cattle make the transition from a high roughage to a high concentrate ration without suffering any metabolic repercussions remains an important management priority.

### The Symbiotic Relationship

The beef animal is unique in that a major part of digestion takes place in the rumen where bacteria break down feedstuffs into usable compounds for maintenance and growth. This depends on what the animal eats and on the conditions in the rumen. Most of the bacteria live in an environment that is close to a neutral pH. The acid or alkaline nature of a liquid is measured by pH. A pH of 7 is neutral. Anything below 7 is classified as acidic everything above is "basic" or alkaline.

The ruminant or beef animal consumes mostly roughages in its lifetime. Bacteria break down this roughage into three main energy compounds, called volatile fatty acids, from which the animal gets its energy. These three main acids — acetic, propionic and butyric — are fairly mild and do not lower the pH from neutral to a great extent. When roughage is the main diet ingredient, the pH of the rumen ranges from 6.5 to 6.8, or just slightly acid. Seldom, then, does an animal fed a high-roughage ration eat less due to acid indigestion.

The main condition that can trigger acid indigestion or "acidosis" is too rapid a change from roughage to concentrate rations. Roughages are made up of fiber, lignin, cellulose and other hard-to-digest carbohydrates. Grain is composed mostly of starches and sugars. These starches are broken down very rapidly into glucose, and the glucose is converted to lactic acid. Lactic acid is not harmful in itself, as there are enough "bugs" to convert it into usable compounds. However, with an abrupt change to high grain rations, the bacteria cannot adapt fast enough to handle the lactic acid. This leads to an acid condition, with a pH as low as 4 to 4.5.

This acid condition also kills bacteria that were doing the job of digestion. Thus, there is not only too much acid, but also reduced rumen function. Therefore, when starting cattle on feed, that is, changing from a high roughage to a high grain ration, make ration changes gradually, usually over a

**Table 1: Typical composition of rations.**

	Starter	Ration II	Ration III
% Roughage	50-90	50-18	5-18
% Concentrate (includes supplement)	10-50	50-82	82-95
Supplement	5-10	5-10	5-10
Minimum days ration fed prior to change	5	5	—

three-week period. At least three ration changes are suggested for the transition to high grain rations. Some feeders use as many as eight to 10 ration changes to get cattle onto a high concentrate ration.

## Ration Suggestions

Typical composition of rations (% dry matter basis) are shown in Table 1.

## Buffering Capabilities

The ruminant or beef animal has its own built-in buffering system called saliva. Saliva is alkaline in nature (pH 8.4-8.7) and contains several buffering agents that help keep the rumen neutralized. Eating large amounts of roughage stimulates increased saliva secretion in order to mix with and liquefy the large amount of dry material. However, when cattle eat grain, they consume less total material, and grain does not trigger the salivary glands to the same extent as roughage. Thus the animal's buffering system is not at capacity.

Saliva contributes more than 70 percent of the liquid in the rumen. During a 24-hour period, an animal can secrete from 20 to 30 gallons of saliva. Thus, reduced saliva production can create an imbalance in the rumen. Wet feeds, such as silage and green chop, also can reduce saliva and create a shortage of buffering compounds. Silage is acid in nature, which adds a larger burden on the beef animal's built-in buffering system.

## Bunk Management

Rations and health programs are important but may fail unless the operator practices good bunk management. With processed grain rations, it is vitally important to have fresh feed in front of the cattle at all times. Feed left in bunks more than 12 hours usually becomes stale and moldy. Stale feed reduces intake and subsequent performance. For every 1 percent reduction in intake, expect reduced gains of 1.5 to 2.0 percent.

In order to make sure the ration in the bunk is always fresh, most feedlots feed at least twice a day. With high-moisture rations, some yards feed three times a day. Between feedings, allow cattle to clean up all the ration from the previous feeding. Ideally, feed cattle no later than one-half hour after they have cleaned up.

In order to keep this kind of schedule, most feedlots have at least one person assigned to reading bunks. If consumption problems arise, check ration formulation, quality control of ingredients and bunk management. It may be advisable to increase the number of times cattle are fed daily -- up to three or four times per day.

Be especially careful how cattle are brought up on feed before and during winter storms. Cattle are sensitive to weather changes and will increase their consumption as much as 20 percent just before storms. It would be wise to delay the feeding of a hotter ration prior to a change in weather. Feed a greater amount of a lower concentrate ration prior to a weather change to avoid problems caused by greater intake. Then reduce the amount when the storm hits. As the storm eases, build up the volume fed according to their intake. In the summer, feed early in the morning and late at night, with only a sprinkling of feed in the heat of the day.

The bottom of the bunk should be clean every morning. Not slick, but with just a little feed left. Never increase feed more than 2 pounds a day per head on high concentrate or 4 to 6 pounds on a high roughage ration. Keep accurate intake records and monitor them closely to understand how cattle are performing. Cattle shouldn't have intakes that vary more than 4 pounds per head per day.

Intake variation is difficult to accurately estimate, since moisture in rations may vary 200 pounds per load without our knowledge. At the same time, we have the technology to weigh a load of feed accurately to four decimal places. Routinely analyze feed ingredients for moisture content. Report intake on a dry matter basis. Read bunks early in the morning, so feed tickets are ready when the feeding crew begins at noon, and they can correct early morning mistakes. Read again at 5 p.m. Distribute the feed in the bunk evenly all the way down the bunk. This should reduce the occurrence of spoiled or moldy feed and give all animals equal access to the feed.

## Bunk Space Requirements

Bunk space requirements depend upon the size of the cattle. For feeder weight animals, 500 to 1,000 pounds, provide a minimum of 8 inches of bunk space per head. Ten to 12 inches is better. Limiting bunk space causes cattle to eat less often but more at each feeding. This reduces performance, compared to eating the same amount over a longer period of time.

The digestive system does not function as efficiently when feed is ingested in large batches vs. smaller, more evenly spaced batches. In addition, more acidosis and founder will result from less frequent feedings. These recommendations assume ad libitum (all cattle can eat) feeding. If limit feeding is practiced, as in a stockyard situation, bunk space must be increased to 14 to 18 inches. Otherwise, the bigger more aggressive animals will eat a disproportionate share.

## Reading Stools

Many successful managers use manure consistency as an appraisal of the general condition of animal performance. The stools should look a little loose — somewhere between one that is stacked or formed and loose — with a little bit of grain passing through. A bubbling loose stool or one with white caps indicates acidosis.

Fecal sampling, starch or pH do not give an accurate estimation of the extent of energy digestibility occurring in the beef animal. Physical appearance of the feces is probably as good an indicator to the trained eye as use of starch analysis or pH.