



# Salt: An Essential Element

Severe restriction of salt over a long period of time could result in permanent central nervous system damage, lower weight gain, poor feed conversion and lower quality grade.

Story & photos by Troy Smith

**C**attle producers hear it time after time: The lion's share of production costs is related to nutrition. Producers who keep a close account of feed expenditures often wince at the final tally. The smart ones keep looking for ways to shave the cost, while still providing adequate nutrition for their herds. A few producers might be willing to cut corners on things like ... well, like salt and mineral, for instance.

What about salt, plain ol' sodium chloride (NaCl)? After all, cattle seem to be able to get along without it, for a little while at least. Even if it was unintentional, plenty of producers have allowed their cattle to go without salt for a day or two, or maybe longer.

But there is a reason why all good feed suppliers keep salt blocks and bagged loose salt on hand. Cattle need it. You don't often hear about cattle dying from salt deprivation,

but it can happen. Letting cattle go without this common but essential nutrient source is not advisable. Doing so purposefully is a bad idea.

"I'm surprised at how many people neglect to provide enough salt for their cattle. There are producers that just put some out every two or three months. A few provide it less frequently, and some not at all," says Johnny Rossi, University of Georgia Extension specialist. "Then they wonder why their cattle are eating up the fences or chewing on buildings."

## Salt craving

Rossi says salt, or the sodium it contains, is the only mineral for which animals exhibit

**Salt, or the sodium it contains, is the only mineral for which animals exhibit "nutritional wisdom."**

"nutritional wisdom." Animals have a more well-defined appetite for salt than any other compound in nature, except water.

Instinctively, cattle know they need salt. If their diet is salt-deficient, they will seek alternative sources.

"The most commonly seen symptom of salt deficiency in cattle is when they eat things they wouldn't normally eat," Rossi explains. "They eat wood or plants they might otherwise avoid. They lick dirt and may lick each other."

Rossi says these signs aren't always symptoms of a salt deficiency, but a salt-deficient diet almost always prompts these kinds of behavior as cattle try to satisfy their appetite for salt. However, there are other more subtle and costly effects that result from salt deficiency.

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►**Above:** If cattle have been without salt for a while, it may be wise to start them out again with plain white salt blocks. They can't be consumed as quickly as loose salt, affording a measure of control over consumption.

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“Salt really is the stuff of life for every cell in an animal’s body,” offers Kansas State University (K-State) cow-calf nutrition specialist KC Olson. “Sodium is critical to maintaining osmotic balance and pH in every living cell. It is required in relatively large amounts, compared to other minerals.”

Sodium plays a key role in the mechanism by which cells move nutrients back and forth across their borders. It’s necessary for transmission of nerve impulses — those “signals” responsible for contraction of skeletal, heart and digestive tract muscles. Sodium is a major component of saliva, too,

and helps buffer acid during ruminal fermentation.

Because salt affects how the body functions at a cellular level, the most common and most costly result of salt deficiency might be reduced performance.

“Every aspect of performance is affected. Growth, fertility and reproduction, and milk production decline. Cattle simply don’t perform to their genetic potential,” Olson states.

David Lalman, Oklahoma State University Extension beef specialist, concurs, noting that numerous studies of growing

cattle have demonstrated a decline in feed intake and reduced feed efficiency when diets were deficient in sodium and/or chloride. Research suggests rumen fermentation is hindered to some degree, but the effects of salt restriction on post-ruminal digestion and animal health appear to be greater.

It follows that carcass quality grade might also be jeopardized if salt is deficient in finishing diets, though supporting data is scarce. Lalman speculates that if the finishing period growth rate is compromised due to salt restriction, body fat composition (and presumably marbling) would be substantially lower than for cattle gaining at a faster rate and harvested at the same number of days on feed. However, if salt restriction occurred during a grazing period prior to entering the feedlot, cattle should compensate while on a well-balanced diet. Still, severe restriction for a long period of time could result in permanent central nervous system damage, lower weight gain, poor feed conversion and lower quality grade.

### Sodium content of feedstuffs

Complete feedlot rations generally are formulated to contain salt and other minerals, as a fixed proportion of the diet, according to animal requirements. The requirement for sodium, for example, is 0.06% to 0.08% of diet dry matter (DM). For animals consuming diets consisting primarily of forages, however, salt is most often provided as a free-choice supplement. That’s important, Lalman says, because most grazed and harvested forages are low in sodium.

Fig. 1 shows the typical sodium content of some popular forages, relative to the animal requirement.

“Many grass species contain one-half to one-sixth the amount required, but legume species are a relatively good source of sodium. As with any nutrient concentration in forage, considerable variation in these values should be expected,” Lalman says.

The fact that the saliva of healthy beef cattle contains a sodium-to-potassium ratio of 20:1 illustrates how the balance of sodium relative to other minerals may influence animal requirements and salt consumption. Some soils, and therefore the forages grown in them, are high in potassium (K). Therefore, cattle consuming high-forage, high-potassium diets generally need and consume more salt.

Animals grazing intensively managed



► Studies have shown that diets containing as much as 10% salt have not hampered digestion, as long as ample drinking water was available. However, salt toxicity can be a real danger if cattle do not have access to ample water or if the water contains minerals that inhibit consumption.

pastures that are heavily fertilized with nitrogen (N) and potassium may also have an increased salt requirement, says Larry Berger, University of Illinois beef cattle nutritionist. Here again, higher levels of potassium in the diet need to be balanced with an increased consumption of sodium. In some situations, fertilizing pastures with salt may even be advisable.

Berger says the sodium-potassium balance is also related to an animal's ability to absorb magnesium (Mg). Producers typically counter the threat of magnesium deficiency (tetany) through supplementation with mineral products containing high levels of magnesium. But high dietary potassium may inhibit magnesium absorption, so a higher sodium-potassium ratio may be needed.

### Supplementation a no-brainer

So, the need to provide free-choice supplemental salt to cattle on forage diets should be a no-brainer. But what is the best delivery method — blocks or loose salt? And should supplemental salt be provided in a mixture containing other minerals, or should they be offered separately?

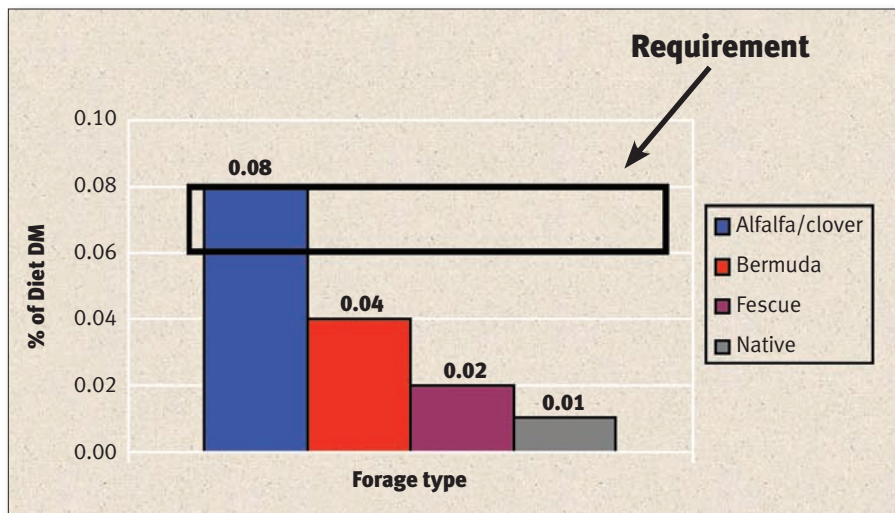
Rossi and Lalman advise against feeding salt and commercial mineral separately. For one thing, Rossi says, many small feed stores carry one so-called all-purpose bagged mineral product. There really is no such thing. Many areas produce forages deficient in certain trace minerals, copper (Cu) and selenium (Se) for example. Therefore, a producer should find an appropriate commercial mineral or, if it's economically feasible, have one custom-made to meet specific requirements. Then, loose salt can be mixed with the mineral in proportions that allow some control over intake.

"Cattle don't crave other minerals like they do salt," Rossi explains. "Mixing with salt ensures mineral consumption, but you have to mix it in proper amounts to have control."

Olson says mixing salt and mineral together may not always be the best way.

"Cattle may crave more salt than they really need. They can eat too much mineral while trying to satisfy their appetite for salt. In those cases, it's more cost-

**Fig. 1: Sodium content of different forages**



Source: David Lalman, Oklahoma State University.

effective for producers to provide a salt block separately, beside the mineral."

Berger usually recommends mixing salt and mineral together, particularly to ensure consumption of trace minerals. In regions where there are needs for specific trace minerals, producers usually can buy appropriate trace-mineral packages to mix with salt.

"Some calcium and phosphorus supplements have been developed that are palatable on their own, but not all are. If a product is recommended to feed alone, that is a safe approach. If there are no such recommendations, then I would mix it with the trace-mineral-salt mix," Berger advises. "At our farm, cows are fed a mixture that is two parts trace-mineral-salt to one part calcium/phosphorus (Ca/P) source."

Allowing your cattle to run out of salt for a few days isn't likely to do irreparable damage. Just don't make a habit of it. And remember that once it's put in front of them again, salt-deprived cattle are likely to eat more than the 3 or 4 ounces considered average daily consumption.

If cattle have been without salt for a while, it may be wise to start them out again with plain white salt blocks. They can't be consumed as quickly as loose salt, affording a measure of control over consumption. Neither will it allow them to overconsume minerals in a mixture. Once the animals' heightened salt craving is satisfied, loose salt mixed with mineral can be provided again.

Actually, cattle will seldom eat more plain salt than they can handle. Studies have shown that diets containing as much as 10% salt have not hampered digestion, as long as ample drinking water was available. However, salt toxicity can be a real danger if cattle do not have access to ample water or if the water contains minerals that inhibit consumption.

It's also important to remember that cattle on forage diets may display a varying appetite for salt due to the type of forage or the maturity of grazed forages. Cost-wise producers will monitor intake and adjust levels of salt in their salt-mineral mixtures. If cattle consistently consume high levels of salt, it might be due to a mineral imbalance.

Salt is relatively cheap; however, in the long run it can have a significant effect on a producer's bottom line.

