

# Limiting Feed Intake with Salt in Beef Cattle Diets

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Using salt to limit feed intake in cattle can increase profits in beef enterprises. This NebGuide provides guidelines to successfully use this management practice in beef cattle operations.

Cattlemen continue to investigate ways to reduce cow costs. Standardized Production Analysis and Integrated Resource Management records indicate that labor cost impacts annual cow costs. Management strategies to reduce cow costs — in particular, labor costs — can increase profit potential of the cow/calf enterprise. One management tool frequently used is regulating feed intake with salt. Research suggests that regulating feed intake with salt is not precise, meaning that the salt content may need to be adjusted throughout the feeding period to achieve the desired feed intake. Cattle have different levels of tolerance for salt. However, guidelines that are included in this NebGuide can give producers a starting place, and then they can fine-tune the inclusion of salt to get the desired intake. As a management practice, self-feeding supplements tend to allow timid, slow-eating cows to get their share, and it is an easy method of providing vitamin A, phosphorus, and other feed additives.

When using this management strategy, abundant clean water is essential. Water intake can easily increase 50 percent when using this strategy to deliver feed. Total salt intake is the amount in the feeds that are eaten and the amount in the water. Salt toxicity is seldom seen in cattle because of their high tolerance for salt. Salt is rapidly absorbed from the intestinal tract into the bloodstream. It is then excreted by the kidneys through urine. However, the animal is able to eliminate excess salt only when adequate clean water is available.

The daily salt requirement for mature cattle is less than 1 ounce/head/day. Voluntary salt intake often exceeds minimum needs. Because there are practical limits to the amount of salt cattle eat, salt can be used to restrict the consumption of highly palatable feeds. In such instances, daily voluntary intake of salt will approximate 0.1 pound salt/100 pounds body weight for most classes of cattle.

## Effects of High Salt Intake

As a rule of thumb, cattle on salt mixtures drink 50 to 75 percent more water than normal, or approximately 5 gallons of additional water for each pound of salt. If only salty water is available, cattle often will refuse the supplement or may be forced into a toxicity situation. Water's salt content is usually measured by total dissolved solids (TDS), which includes calcium, magnesium, sodium chlorides, sulfates, and bicarbonates. Caution is necessary in using salt-limited supplements when water contains above 5,000 ppm TDS. This analysis usually can be obtained through an analytical laboratory. Check with your extension educator to find the laboratory closest to you.

Controlled experiments in several states have failed to show any harmful effects upon cattle production from proper use of salt-concentrate mixes. Cows fed salt at a rate of 1 pound per head per day the last two to three months of pregnancy did not experience any production problems as long as they had access to plenty of water. Excess salt consumed during lactation had no effect on milk composition and no harmful effect on the calf. High salt diets had no effect on the digestibility of nutrients in the ration.

Make sure there is plenty of clean, fresh water. If salt is used in the winter to limit feed intake, make sure the water source is not frozen.

## Adjusting Salt Levels

Several factors influence the concentration of salt required in a mix to achieve a desired feed intake. It is usually necessary to increase the salt content of the mix over a period of time as cattle become accustomed to the high salt level. Self-feeders should protect the feed/salt mixtures from wind and rain and be portable. Usually, it is desirable for at least 20 percent of the cattle to be able to eat from the feeder at one time. By knowing the initial volume and weight of the salt mixture put into the feeder, and by measuring the change in the level of the feed every few days, the amount eaten per day can be

calculated. Keeping intakes at constant levels is desirable. As cattle become more accustomed to the feed salt mixture and as forage conditions change, it is not uncommon to need to adjust salt concentrations four to seven times over the course of the grazing season to keep feed intake at desired levels. Extra precautions should be taken under these and other emergency conditions to ensure that water supplies are adequate.

Estimates of salt needed to limit feed intake are shown in *Table I*. Actual salt intake occasionally varies from the indicated values. Forage intake, palatability of supplement ingredients, the water's salt content, and animal adaption all influence salt intake.

### Feeding Salt-Limited Supplements

When cattle are accustomed to eating supplements but are unaccustomed to self-feeding, overeating can be prevented by starting with a high salt level (50:50 or even 60:40 salt to meal) and then reducing the salt level to obtain the desired level of intake. If cattle have not eaten concentrates before, a training period of a week or more of daily hand feeding of meal without added salt may be necessary, particularly with young cattle.

**Table I. Estimated Salt Intake of Cattle Fed Salt-limited Supplements**

Body Weight lb	Salt Consumption lb/day		
	Low	Avg	High
300	0.3	0.5	0.6
500	0.5	0.6	0.7
700	0.6	0.7	0.9
900	0.7	0.9	1.1
1100	0.8	1.1	1.3
1300	0.9	1.3	1.5
1500	1.0	1.5	1.6

*Table I.* Limiting feed intake with salt. (From Regional Cooperative Extension Project GPE-8). Assumes drinking water is low in TDS.

If grain is included in a self-fed supplement, it should be cracked or coarsely ground and mixed with salt of similar particle size. This prevents separation of the salt from the grain and reduces the incidence of overeating and its accompanying problems. If the salt-limited feedstuff is only a portion of the total diet, make sure other feedstuff(s) is available for cattle consumption. Adequate amounts of additional feedstuffs, such as grass or hay, must be available so that the cattle are not forced to eat a salt-limited supplement as their total daily intake.

The amount of salt to mix in the concentrate depends upon the intake of concentrate desired. To increase concentrate intake, decrease the salt in the mixture; to decrease intake, increase the salt. Coarsely ground salt is more effective in limiting meal intake than finely ground salt. Pelleting a salt-concentrate mixture before feeding reduces separation of the salt and concentrate but is normally an unnecessary expense.

*Tables I and II* can be used to formulate salt-limited supplements for cattle. For example, assume it is desired to self-feed a protein supplement (soybean meal, cottonseed meal, etc.) at the rate of 2 pounds per head per day to a group of 1100-pound cows. *Table I* indicates that the daily salt consumption of 1100 pound cattle averages 1.1 pounds when salt is used to limit supplement intake. In the left-hand column of *Table II*, locate 1.1 pounds daily salt intake and look across the row labeled nonsalt feed for a value nearest 2 pounds. In this example, a self-fed supplement composed of 35 percent salt as 65 percent protein supplement would, on average, regulate total intake to 2.0 pounds protein supplement and 1.1 pounds salt. The percentages will likely need adjusting to achieve the desired feed intake.

Assume that in addition to 2 pounds protein supplement, it is desired that the cow also consume 3 pounds of grain (corn, milo, etc.) for a total nonsalt consumption of 5 pounds; then the self-fed supplement should be only 18 percent salt.

Salt used in self-fed supplements should be coarse, plain white salt. Cost alone prohibits the use of trace-mineralized salt; however, someone could attempt to use trace-mineralized salt. This should be avoided since forced feeding of high levels of trace-mineralized salt could result in toxicity or mineral imbalances due to excessive intake of certain trace elements.

When using salt to limit intake of feeds or supplements, consider the following:

- The proportion of salt to limit intake in self-fed mixtures will vary from 5 to 60 percent.
- The amount of salt needed will be determined by the desired feed or supplement intake.
- Use plain, white salt. Coarsely ground salt is better than finely ground salt.
- Logically, to increase supplement intake, decrease salt in the supplement. To decrease supplement intake, increase salt in the supplement.
- As the weight of the animal increases, the amount of salt needed to limit intake of the supplement to the desired level must increase.
- Age seems to impact salt intake. If cattle weigh the same, less salt will be needed to limit supplement intake to the desired level in the younger animal, compared to the older one.
- As animals become more accustomed to the salt in the supplement, more will need to be added to limit the intake to the desired intake level.
- To assure that calves do not overeat, set the levels high the first two to three days and consider hand-feeding the feed or supplement.
- To prevent separation of feeds in the supplement, particle size needs to be similar. That's the reason for the recommendation to use coarsely ground salt.

**Table II. Estimated Salt Level to Include in Mixture for Desired Intake of Nonsalt Feed**

		<i>% Salt in Supplement</i>												
<i>Salt Intake, lb/day</i>		6	8	10	12	14	16	18	20	25	30	35	40	50
0.3	Total Feed	5.0	3.7	3.0	2.5	2.1	1.9	1.7	1.5	1.2	1.0	0.9	0.7	0.6
	Nonsalt Feed	4.7	3.4	2.7	2.2	1.8	1.6	1.4	1.2	0.9	0.7	0.6	0.4	0.3
0.4	Total Feed	6.7	5.0	4.0	3.3	2.9	2.5	2.2	2.0	1.6	1.3	1.1	1.0	0.8
	Nonsalt Feed	6.3	4.6	3.6	2.9	2.5	2.1	1.8	1.6	1.2	0.9	0.7	0.6	0.4
0.5	Total Feed	8.3	6.2	5.0	4.2	3.6	3.1	2.8	2.5	2.0	1.7	1.4	1.2	1.0
	Nonsalt Feed	7.8	5.7	4.5	3.7	3.1	2.6	2.3	2.0	1.5	1.2	0.9	0.7	0.5
0.6	Total Feed	10.0	7.5	6.0	5.0	4.3	3.8	3.3	3.0	2.4	2.0	1.7	1.5	1.2
	Nonsalt Feed	9.4	6.9	5.4	4.4	3.7	3.2	2.7	2.4	1.8	1.4	1.1	0.9	0.6
0.7	Total Feed	11.7	8.7	7.0	5.8	5.0	4.4	3.9	3.5	2.8	2.3	2.0	1.8	1.4
	Nonsalt Feed	11.0	8.0	6.3	5.1	4.3	3.7	3.2	2.8	2.1	1.6	1.3	1.1	0.7
0.8	Total Feed	13.3	10.0	8.0	6.7	5.7	5.0	4.4	4.0	3.2	2.7	2.3	2.0	1.6
	Nonsalt Feed	12.5	9.2	7.2	5.9	4.9	4.2	3.6	3.2	2.4	1.9	1.5	1.2	0.8
0.9	Total Feed	15.0	11.2	9.0	7.5	6.4	5.6	5.0	4.5	3.6	3.0	2.6	2.2	1.8
	Nonsalt Feed	14.1	10.3	8.1	6.6	5.5	4.7	4.1	3.6	2.7	2.1	1.7	1.3	0.9
1.0	Total Feed	16.7	12.5	10.0	8.3	7.1	6.2	5.5	5.0	4.0	3.3	2.9	2.5	2.0
	Nonsalt Feed	15.7	11.5	9.0	7.3	6.1	5.2	4.5	4.0	3.0	2.3	1.9	1.5	1.0
1.1	Total Feed	18.3	13.7	11.0	9.2	7.9	6.9	6.1	5.5	4.4	3.7	3.1	2.7	2.2
	Nonsalt Feed	17.2	12.6	9.9	8.1	6.8	5.8	5.0	4.4	3.3	2.6	2.0	1.6	1.1
1.2	Total Feed	20.0	15.0	12.0	10.0	8.6	7.5	6.7	6.0	4.8	4.0	3.4	3.0	2.4
	Nonsalt Feed	18.8	13.8	10.8	8.8	7.4	6.3	5.5	4.8	3.6	2.8	2.2	1.8	1.2
1.3	Total Feed	21.7	16.2	13.0	10.8	9.3	8.1	7.2	6.5	5.2	4.3	3.7	3.2	2.6
	Nonsalt Feed	20.4	14.9	11.7	9.5	8.0	6.8	5.9	5.2	3.9	3.0	2.4	1.9	1.3
1.4	Total Feed	23.3	17.5	14.0	11.7	10.0	8.7	7.8	7.0	5.6	4.6	4.0	3.5	2.8
	Nonsalt Feed	21.9	16.1	12.6	10.3	8.6	7.3	6.4	5.6	4.2	3.2	2.6	2.1	1.4
1.5	Total Feed	25.0	18.7	15.0	12.5	10.7	9.4	8.3	7.5	6.0	5.0	4.3	3.7	3.0
	Nonsalt Feed	23.5	17.2	13.5	11.0	9.2	7.9	6.8	6.0	4.5	3.5	2.8	2.2	1.5

*Table II. Limiting feed intake with salt. (From Regional Cooperative Extension Project GPE-8)*

- If grains are included, they should be cracked or coarsely ground.
- Including an ionophore in the feed or supplement that is being limited will reduce the amount of salt needed to limit the intake to the desired level. Read label directions for use of ionophores when feeding beef cattle.
- If the water that is available for the cattle to drink when salt is used as a feed limiter is above 5,000 ppm TDS, caution is necessary.
- Feeders should be portable and feed protected from wind and rain.
- Strategic placement of feeders can impact grazing distribution.
- Do not place feeders next to the water source in a pasture as it will affect grazing distribution.

- To monitor supplement consumption, know the initial amount of supplement in a feeder. Every day for the first three to four days, check the feeder to get an estimate of the amount of feed being consumed.

### Resources

*Limiting Feed Intake with Salt.* Prepared by the Regional Cooperative Extension Project GPE-8 serving Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Texas, and Wyoming.

*Salt and Trace Minerals for Livestock, Poultry, and Other Animals.* Berger, Larry, L. 2006. Published by the Salt Institute.

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