



Cattle Producer's Handbook

Nutrition Section

312

Limiting Feed Intake

Revised by¹

Michael J. Mehren, Livestock Nutritionist
William A. Zollinger, Extension Beef Specialist
Oregon State University

Cattle producers are aware of the impact that high-cost labor has on profit. Management procedures frequently used to reduce labor requirements are to limit amounts of feed available or regulate feed intake with use of self-fed supplements.

Limiting feed intake can be an effective way to control labor cost and the amount of a daily supplement consumed by livestock. Use of self-feeding supplements permit timid, slow-eating cattle to get their share, and it is an easy method to provide Vitamin A, phosphorus, and other feed additives on a consistent basis.

One means of limiting intake is to *control the amount of supplement provided*. Simply stated the amount of supplement intended to be eaten in one day or several days is provided to the cattle and no further supplement is fed until the next scheduled feeding. This feeding schedule is maintained whether the cattle consume all of the supplement during the first few hours or during the entire day (Table 1). Cattle may need to be sorted by Body Condition Scores (see 720) to ensure consumption relative to individual animal need.

Feeding by the schedule in Table 1 will provide enough protein supplement for a 100-cow herd for one week. This type of schedule is not appropriate if the source of protein in the supplement is primarily from non-protein

nitrogen (NPN). Supplements containing high levels of NPN should be fed daily.

Protein supplement types that would work with the above plan would include block, pellet, cake, meal, cube, or hay. An *energy* supplement should be provided daily; not in an interval feeding system.

Use of *physical barriers* can also limit intake of a feed or supplement in some circumstances. If a self-feeder is used, you may place a board or sheet of plywood over the feeding tray to prevent cattle from reaching the feed. The boards may be put in place at a certain time each day, which will restrict feeding to only those hours desired. Another physical barrier is fences placed around hay stacks or feeders to prevent access to the feed until it is pitched out of the enclosure or animals are allowed inside to eat. Also, you can control the feed intake from a liquid supplement tank equipped with a "wheel" from which livestock lick by inserting a board in the spoke of the wheel to prevent it from turning.

At times you can use *certain feed ingredients* to limit intake. Salt is the normal ingredient used. If salt is unacceptable as an agent to limit intake, ingredients such as magnesium oxide, ammonium chloride, calcium sulfate (gypsum), and ammonium sulfate are quite unpalatable to cattle and may be added to a feed or supplement to assist in controlling the intake of a product offered free choice.

The feed additive Rumensin® quite effectively limits feed intake. Normally an ionophore is added to a feed to prevent coccidiosis, improve feed efficiency, and increase rate of weight gain. Addition of Rumensin® will also aid control of feed intake of a free choice supplement.

Salt is not a precise regulator of intake since certain animals will tolerate more salt than others, and having available abundant water is essential. Daily salt requirement for mature cattle is less than 1 oz/head/day, however, voluntary intake often exceeds minimum needs.

¹Original authors were T. D. Rich, Steve Armbruster, and D. R. Gill, extension beef cattle specialists, Oklahoma State University.

Table 1. Protein supplement feeding schedule for 100 cows when 1 pound daily supplement intake is desired.

Mon	Tues	Wed	Thur	Fri	Sat	Sun
250 lb		250 lb		250 lb		

Because there are practical limits to the amount of salt cattle will eat, salt can be used to restrict the consumption of highly palatable feeds such as grain and supplement. In such instances, daily voluntary intake of salt will approximate 0.1 pound salt/100 pounds body weight for most classes of cattle. This fact sheet is a guide for formulating salt-limited supplements.

Effects of High Salt Intake

Salt toxicity is seldom seen in cattle because of their high tolerance for salt. An exception would be when “salt hungry” cattle are offered salt without water in the immediate vicinity. The one-feeding lethal dose for mature cattle is 4 to 5 pounds salt. Salt is rapidly absorbed from the intestinal tract into the bloodstream and subsequently excreted by the kidney through urine. Thus, an animal is able to eliminate excess salt only when adequate clean water is available.

As a guide, cattle on salt mixtures drink 50 to 75 percent more water than normal. If only salty water is available, cattle will often refuse the supplement or may be forced into a toxicity situation. Salt content of water is usually measured by total dissolved solids (TDS), which includes calcium, magnesium, sodium chlorides, sulfates, and bicarbonates (see 307).

Caution is necessary in using salt-limited supplements when water TDS is above 5,000 ppm. You may need to have a water analysis. Your county extension office has a list of these laboratories. Research in several states has shown that proper use of salt-concentrate mixes is not harmful to cattle production.

Adjusting Salt Levels

Several factors influence the concentration of salt required in a mix to achieve a producer-controlled feed intake. Where large amounts of salt are naturally present in drinking water or forage, the amount of salt in the mix must be reduced in order to get satisfactory feed intake. Also usually necessary is to increase the salt content of the mix over time as cattle become accustomed to the high salt level. Cattle tend to consume more of a salt-limited supplement when forage is scarce or unpalatable. 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 2. Actual salt intake occasionally varies from the indicated values. Forage intake, palatability of supplement ingredients, salt content of the water, and animal adaptation all influence salt intake.

Feeding Salt-Limited Supplements

When cattle are accustomed to eating supplements but 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 salt level to

obtain the desired level of intake. If cattle have not eaten concentrates before, you may need a training period of a week or more of daily hand feeding of meal without added salt, particularly with young cattle.

If grain is included in a self-fed supplement, it should be cracked or coarsely ground and mixed with salt of similar particle size such as coarsely ground salt. This prevents separation of the salt from the grain and aids in prevention of overeating and its accompanying problems. Adequate grass or hay must be available so that the cattle are not forced to eat a salt-limited supplement to survive.

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

Refer to Tables 2 and 3 when formulating salt-limited protein or energy supplements for cattle. For example, let’s assume a desire 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 1,100-pound cows. From Table 2, the daily salt consumption of 1,100-pound cattle averages 1.1 pounds when salt is used to limit supplement intake. In the left column of Table 3, locate 1.1 pounds of daily salt intake and look across the row labeled “nonsalt feed” for the value nearest 2 pounds. Exactly 2 pounds is found. Then look directly above that figure to the “% salt in supplement” figure. In this example, a self-fed supplement composed of 35 percent salt, 65 percent protein supplement would, on the average, regulate total protein intake to 2.0 pounds protein supplement and 1.1 pounds salt.

Adjust these percentages to achieve the desired intake of the mixture. A note of caution: cattle fed a salt limiting supplement may not consume trace minerals provided as free choice salt supplements. Other means of providing trace minerals such as magnesium, phosphorus, calcium, and selenium may need to be defined.

Assume that in addition to 2 pounds protein supplement, you desire that the cow also consumes 3 pounds of

Table 2. 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
1,100	0.8	1.1	1.3
1,300	0.9	1.3	1.5
1,500	1.0	1.5	1.6

Assumes drinking water is low in total dissolved solids (TDS).

grain (corn, barley, etc.) for a total non-salt consumption of 5 pounds. In that case, the self-fed supplement should be only 18 percent salt.

Salt used in self-fed supplements should be coarse, plain, and white. Cost alone prohibits the use of trace-mineralized salt, however, it is conceivable that someone could attempt to use trace-mineralized salt. This should be avoided since forced feeding high levels of trace-mineralized salt could result in toxicity or mineral imbalances due to excessive intake of certain trace elements. If trace-mineralized salt is needed by cattle, the amount of trace-mineralized salt should not exceed 0.02 percent of the animal's body weight.

Other Forms of Supplement

Intake of different kinds of supplements is controlled in various ways (e.g., block, liquid, cube, cake, pellet, meal, granular) depending on the form of supplement.

Block intake is controlled by hardness as well as other factors such as salt, ionophore content, and palatability of the ingredients used. Control is also achieved by place-

ment of the blocks in proximity to water and other areas where cattle congregate. Number of blocks fed relative to number of cattle also helps control consumption.

Liquid supplement intake is controlled in several different ways. One manufacturer has developed computerized technology that controls the amount of product that can be consumed from an individual tank over a set period of time. Another variation is the use of phosphoric acid to assist in regulating intake.

Some manufacturers use a covered tank that has wheels mounted in the cover which pick up supplement from inside the tank when an animal licks the wheel. This action, along with the formulation of the product, serves as a means of control. Tank placement and number of tanks relative to number of cattle also serve as means of intake control.

Range cubes, cake, or pellets traditionally use salt as the primary source of intake control. However, you also may use Rumensin® and unpalatable ingredients for this purpose.

Table 3. Estimated salt level to include in mixture for desired intake of non-salt feed.

Salt intake (lb/day)		% salt in supplement												
		6	8	10	12	14	16	18	20	25	30	35	40	45
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	1.7	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	12.8	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	7.1	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	4.2	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

Meal or granular products also use salt as the most common form of intake limiter. Formulations without salt that include Rumensin® or magnesium oxide and/or calcium sulfate can achieve intake control quite successfully.

Table 4 shows a simple way to calculate intake of a product. Determine the pounds consumed. Do this by using a scale, or delivery receipt, or net weight listed for the product. Divide this figure by the number of head of livestock that have access to the product. Finally, divide that figure by the number of days that it took the livestock to consume the product.

Table 4. Estimating intake of a supplement for cattle.

2,000 lb	Supplement purchased
100	Cows and calves
20 days	Length of time supplement lasted
Daily Intake = 2,000 lb divided by 100 divided by 20	
Daily Intake = 1 lb/head/day	

Limiting intake of products that are offered continuously to livestock is an art as much as a science. No single formula or form of control will be completely effective in all circumstances. Cattle will adapt to flavor and odor, so that a product that was being consumed in the desired amount for a period of time will change dramatically for reasons known only to the livestock.

The amount of forage available, the maturity of the forage, and species of plants also has an effect on intake of the supplement provided. Constantly monitoring intake and being prepared to change are the best means of assuring the desired level of intake.

Reference

Byers, F. M. Nutritional Management of the Beef Cow Herd. *In: Livestock Feeds and Feeding*. Second edition. O&B Books, Inc., Corvallis, OR.



©2016

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, by the Cooperative Extension Systems at the University of Arizona, University of California, Colorado State University, University of Hawaii, University of Idaho, Montana State University, University of Nevada/Reno, New Mexico State University, Oregon State University, Utah State University, Washington State University and University of Wyoming, and the U.S. Department of Agriculture cooperating. The Cooperative Extension System provides equal opportunity in education and employment on the basis of race, color, religion, national origin, gender, age, disability, or status as a Vietnam-era veteran, as required by state and federal laws. Fourth edition; December 2016 Reprint