

Salt Toxicity and Water Deprivation

Carla L. Huston, DVM, PhD, ACVPM

Beef Extension and Outreach Coordinator

College of Veterinary Medicine, Mississippi State University

Submitted to: Cattle Business Magazine, Feb 2016

At this time of the year in the southeastern US, a few days and nights of freezing weather isn't too unexpected. At some point, many of us will be busy wrapping pipes and turning off water sources in order to prevent damage from freezing. Water quality and quantity should be carefully monitored at all times, but especially when we encounter situations when water quantity can be potentially limited.

Water is the most important element that livestock require. It is required for livestock metabolism and thermoregulation – essential for growth, reproduction, lactation, digestion, and all other bodily functions.

Water requirements in cattle vary by many factors including temperature, stage of production, and weight of the animal. Water intake or consumption will be influenced by additional factors such as breed, humidity, feed intake, and moisture levels in feeds. Water requirements will increase with diets high in protein, salts, minerals, or other diuretic substances due to increased urine excretion. While many nutritional guidelines are available (Table 1), as a general rule, water consumption in cattle will range from 1 gal/100 lbs in colder temperatures up to 2 gal/100 lbs during hotter weather conditions.

Salt toxicity most commonly results from management factors such as a high salt concentrations in the diet or water deprivation. Animals can tolerate higher levels of salt in the diet provided they are given time to acclimate to the diets and have access to fresh drinking water. Reduced water consumption, or water deprivation, results in reduced urine excretion of sodium, leading to a build-up in the central nervous system (CNS) of the animal. The most common time we see acute salt toxicity is when something prevents animals from drinking, such as penning cattle for extended periods of time without water or turning of water sources to work on lines or prevent freezing. Other times we encounter salt toxicity is following natural disasters, when the only water sources displaced cattle may have access to is salt or brackish waters.

Acute salt toxicity causes gastrointestinal (GI) and CNS signs in livestock, such as diarrhea, depression, blindness, aggressiveness, hyperexcitability, ataxia, head pressing, extreme thirst and constant chewing motions (Figure 1). Advanced signs are seizures, coma, and death. In the case of water deprivation, sudden access to water can exacerbate the signs due to increased fluid accumulation in the CNS.

Once clinical signs are observed, treatment of animals for salt toxicity is rarely successful. Ingestion of water at this point could be detrimental, as fluid absorbed from the GI tract will diffuse into the CNS and worsen the clinical signs. Your veterinarian should be consulted immediately if salt toxicity is suspected. Intravenous fluids may be given to help reduce sodium and fluids in the CNS and prevent brain swelling. Medications can also be given to reduce brain

swelling and other CNS signs. In severe cases, euthanasia of affected animals may be the most humane option.

Given the poor prognosis in animals experiencing salt toxicity, prevention of conditions that cause salt toxicity is critical. Ensure that animals always have access to clean water, and pay special attention to dietary factors. Be sure you turn water sources back on if you turned them off to prevent freezing, or for any other reason. Use tank heaters, or bust up ice formations frequently to ensure cattle have a constant source of water in the winter. Furthermore, never leave cattle penned up for extended periods of time without water. Try to avoid moving and working cattle during extreme hot weather. If animals have been restricted from water intake for short periods of time due to processing, sorting, or other reasons, gradually provide them with small amounts in order to let their bodies metabolically adjust. As always, consult your veterinarian or extension livestock specialist if you have questions on water requirements in your herd.

Temp	Growing beef cattle			Lactating Cows	Bred Cows	Mature Bulls (1400#)
	400 lb	600 lb	800 lb			
Estimated water intake, gallons per day						
40° F	4	5	6	11	6	8
50° F	4	6	7	13	7	9
60° F	5	7	8	15	7	10
70° F	6	8	9	17	9	12
80° F	7	9	11	18	*11	13
90° F	10	13	15	16	*15	19

Table 1: Estimated Water Intake of Beef Cattle

*Adapted from Nutritional Requirements of Beef Cattle, 7th Edition (2000), National Academy of Sciences Press. *from additional sources where NRC estimates not available.*



Figure 1: Signs of salt toxicity can include depression, ataxia, head pressing, and constant chewing motions.