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# Water quality and concerns for beef cattle

# By: Josh Stroh, beef nutritionist, Hubbard Feeds

Water is the most critical nutrient but often overlooked for its importance and contribution to animal nutrition. Cattle require an adequate, available supply of fresh water to enable metabolic processes of the body. Understanding issues influencing water quality and intake are vital to beef herd nutrition and management. An important task is to have water tested to make informed nutrition decisions for the cattle under your care.

Sample water for laboratory analysis using a clean plastic container. The container then needs to be rinsed repeatedly with the water to be tested. Samples must come from the site of discharge into the tank or trough and not be taken by dipping into the tank directly. This helps to avoid contamination by feed, saliva or other pollutants. Exceptions to this procedure would be if sampling a stock dam, stream or pond.

#### Water quality and consumption

Water quality can affect how much is consumed and the overall health of the herd. Odors or tastes can influence water intake, impacting feed intake, weight gain, reproduction and health. Many tastes and odors come from characteristics that can be evaluated in a simple water test. The amount of water consumed varies from one animal to the next. Age, stage of production, type of ration and weather all contribute to how much water is needed and consumed.

Components typically evaluated in a water quality analysis include:

- Physical and chemical properties
- The concentration of macro- and micro-minerals
- The presence of toxic compounds
- Microbial contamination

These factors can affect the palatability of drinking water and even the animal's digestive and physiological functions.

Is the water provided clean? This might be an elementary question, but it is as essential for water quality as anything else. The common adage comes to mind, "If you wouldn't drink it, why make your animals drink it?" This concept reinforces the importance of supplying cattle with a clean source of water. Cleaning water troughs and tanks at regular intervals to avoid the build-up of impurities or growth of organisms will encourage consumption and keep issues associated with unclean water at bay.

Excessive amounts of minerals dissolved in water can be detrimental and create an opportunity for mineral antagonism. Antagonists bind with free trace elements, preventing their absorption and creating secondary deficiencies. Trace minerals provided in an organic form are more bioavailable to the animal and less apt to interact with antagonists.

# Salinity

Salinity, often referred to as total dissolved solids (TDS), is a measure of total salts suspended in the water. High TDS levels are an indicator of poor-quality water. According to Gadberry (2016), cattle prefer water containing some salt. At TDS levels above 5,000 ppm, intake and average daily gain are reduced. Levels from 7,000–10,000 ppm are safe for dry cows under low levels of environmental stress, and TDS levels over 10,000 ppm should not be used. Diarrhea and weight loss are possible at extremely high TDS. Cattle can adapt to saline water over time, but sudden change to high-saline water can be fatal.

# **BEEF SOLUTIONS**

# pH & Hardness

The acidity or alkalinity of an aqueous solution is represented by its pH. Solutions with a pH of less than 7 are acidic, while solutions with a pH over 7 are basic. The acceptable pH range for water consumed by beef cattle is 6–8.5 (Herring, 2014). Alkalinity is caused by carbonates, bicarbonates and hydroxide ions and rarely harms cattle unless extremely high.

Hardness is caused by cations calcium, magnesium, ferrous iron and manganous ions. If the topsoil is thick or limestone is present, water is generally hard. If rock formations are absent and topsoil is thin, water is soft. Hardness does not usually affect the palatability or safety of water but can cause an accumulation of scale on water delivery systems. Clogging can potentially reduce water availability and intake.

# Sulfates

Sodium sulfate is a common sulfate salt found in water, along with calcium sulfate and magnesium sulfate to a lesser extent. All these sulfates act as a laxative while causing water to taste bitter. Sulfur can have a detrimental impact on cattle performance and health. The maximum threshold for water sulfate is 500 ppm for calves and 1,000 ppm for mature cattle (Rasby and Walz, 2011). Sulfates bind to beneficial minerals and cause issues for absorption due to these antagonistic interactions. High levels of sulfates are often the source of secondary copper deficiencies in beef cattle.

Sulfur that is present in feedstuffs will have a cumulative effect with sulfates in water. High levels of dietary sulfur from feed and/or water can result in excessive hydrogen sulfide production in the rumen contributing to the incidence of sulfur toxicity and thiamine deficiency. This can result in polioencephalomalacia (PEM), a brain disorder found in cattle.

# **Nitrates & Other Factors**

Nitrates in drinking water can be a toxicity concern for cattle. Total nitrates are the sum of all nitrates in feed and water. Nitrates are converted into nitrites in the rumen, which cause reduced oxygen-carrying capacity in the blood and can result in death. Symptoms of nitrate poisoning include labored breathing, trembling, lack of coordination and the inability to stand.

There are concerns to be mindful of when assessing water quality. Some of these involve other salts, minerals, blue-green algae, pesticides, temperature or even stray voltage. Many of these can impart undesirable odors or flavors that will discourage adequate water intake. For further reading on potentially toxic substances in drinking water and their tolerable limits, <u>click</u> <u>here</u>.

Reproduction, health and growth are highly influenced by mineral nutrition. Water quality issues play a role in how the animal utilizes minerals. If trace mineral supplementation is a concern due to high sulfates, iron, etc., keep in mind that high-quality organic trace minerals are more easily absorbed and used by the animal and are much less affected by antagonists. Hubbard Feeds' <u>Blueprint</u><sup>®</sup> line of products is a great tool to help deal with antagonist problems and trace mineral deficiencies. This line does not add inorganic trace minerals but contains only <u>Bioplex</u><sup>®</sup> organic trace minerals as the source of copper, zinc, manganese and cobalt, along with <u>Sel-Plex</u><sup>®</sup> as a source of organic selenium.

In conclusion, it cannot be stressed enough just how crucial water is to cattle's health, performance and well-being to ensure production goals are met. Cattle producers are often focused on finding the next tool to get a competitive edge. While it is good to seek out new and potentially better products and technology, water is a fundamental component to successful nutrition that should not be marginalized. Determining water quality issues in your operation is the first step to implementing nutritional solutions to address them. Water testing is an inexpensive way to understand the potential risks that may exist and a great start for laying the groundwork for animal success.

# References

Gadberry Shane., 2016. Water for Beef Cattle - FSA3021. University of Arkansas. <u>https://www.uaex.edu/publications/pdf/FSA-3021.pdf</u>

Herring, A. 2014. Beef cattle production systems: Wallingford, Oxfordshire; Boston, MA: CABI.

Rasby R.J., T.M. Walz. 2011. Water Requirements for Beef Cattle. University of Nebraska-Lincoln Extension Publications. <u>https://beef.unl.edu/water-requirements-for-beef-cattle</u>

