

Joe Walter, Agriculture Agent

FS# 7102AG

Water Quality for Livestock

Water is the most important nutrient for livestock. Water consumption is influenced by temperature, humidity, dry matter intake, production, and stage of life. The higher the moisture level in the feed/grass, the lower the amount of other water the animal needs to consume.

A Safe supply of quality water is essential for optimal livestock production and health. Water sources should be tested periodically for quality and potential contaminants particularly if a significant change in well water level, lake level, or potential contamination occurs. Water pH should be between 6.5 and 8.0. Salinity refers to total dissolved solids or total dissolved salts (TDS). Although this is primarily a measurement of the sodium chloride, it also includes carbonates, nitrates, sulfates, calcium, magnesium and potassium.

The following charts can be used to determine if your water is safe for livestock:

Drinking Water Salinity Levels and Their Effects on Livestock

| Total Dissolved Salts (mg/L or ppm) | Comment |
|--|--|
| Less than 1,000 | Presents no serious burden to livestock. |
| 1,000 – 2,999 | Slightly saline. Should be satisfactory. May cause temporary and mild diarrhea to unaccustomed livestock, but should not affect health or performance. |
| 3,000 – 4,999 | Moderately saline. Generally satisfactory. May cause temporary diarrhea or be initially refused by unaccustomed livestock. |
| 5,000 – 6, 999 | Very saline. Reasonable safety for adult livestock. Avoid consumption by high producing, pregnant, lactating, or young livestock. |
| 7,000 – 10,000 | Approaching brine. Avoid if possible. Considerable risk for pregnant, lactating, stressed, or young livestock. |
| Greater than 10,000 | Brine. Unsafe. Do not use under any conditions. |
| Adapted from Nutrients and Toxic Substances in Water for Livestock and Poultry (1974). | |

Levels of nitrate in water and expected response

| Nitrate in Water (ppm) | | |
|--|-------------------------|--|
| NO₃ | NO₃-N | Comment |
| 0 – 44 | 0 – 10 | Not harmful to livestock. |
| 45 – 132 | 10 – 19 | Safe, if diet is low in nitrates and nutritionally balanced. |
| 133 – 220 | 20 – 39 | Could be harmful if consumed over long periods of time. |
| 220 – 660 | 40 – 99 | Cattle at risk. Potential death losses. |
| 660 – 800 | 100 – 199 | Unsafe. High potential for death losses. |
| Over 800 | Over 200 | Unsafe. Do not use. |
| Adapted from Nutrients and Toxic Substances in Water for Livestock and Poultry (1974). | | |

Recommended limits of concentration of potentially toxic substances in livestock drinking water

| Item | Upper Limit, mg/L or ppm | Item | Upper Limit, mg/L or ppm |
|--|-------------------------------------|-------------|-------------------------------------|
| Aluminum | 5.00 | Lead | 0.10 |
| Arsenic | 0.20 | Mercury | 0.01 |
| Cadmium | 0.05 | Molybdenum | 0.50 |
| Chromium | 1.00 | Nitrate-N | 100.00 |
| Cobalt | 1.00 | Nitrite-N | 10.00 |
| Copper | 0.50 | Selenium | 0.05 |
| Fluoride | 2.00 | Zinc | 25.00 |
| Adapted from Nutrients and Toxic Substances in Water for Livestock and Poultry (1974). | | | |

National Research Council. 1974. Nutrients and toxic substances in water for livestock and poultry. Washington D. C. National Academy of Sciences.

National Research Council. 1996. 7th ed. Nutrient requirements of beef cattle. Washington D. C. National Academy of Sciences.