

# Water Quality For Dairy Cattle

## Test Water Source

Your water source should be tested at least every three years according to the Pasteurized Milk Ordinance (PMO). Be sure to check with your state's regulations to make sure you are following proper protocol as some states have a yearly water quality test required. Should there be any problems with your livestock water source, it should be tested more frequently. Be sure a reputable laboratory is used for testing your water quality.

## Programs

There are many programs available to help determine if there are problems in your water source. Make sure you look at ration components when working with such programs.

## Water Test Interpretation

- ppm = parts per million
  - 1 pound per million pounds of water
- ppm = mg/l = mg/kg
- pH = 6.5 to 8.5
- Salinity or Total Dissolved Solids
- Coliforms
- Nitrates
- Hardness (CaCO<sub>3</sub>)

Total Dissolved Solids (TDS) or Salinity	
TDS Level (ppm)	Comment
< 1,000	Low salinity level; no health problems
1,000 - 2,999	Generally no problems; possible temporary diarrhea to animals not accustomed to this water
3,000 - 4,999	Water intake maximized; initial refusal; temporary mild diarrhea
5,000 - 6,999	Avoid for pregnant and lactating cattle
> 7,000	Saline water; should not be fed to cattle; poor production and/or health problems

## Coliforms

Bacterial contamination of water is measured in a laboratory using microbiological techniques to permit any bacteria present in a water sample to grow. Results are then counted and reported as bacterial counts per 100 mL of water. A coliform count over 1/100 mL can cause scours in calves. In adult cows, a count of 15–20/100 mL can cause diarrhea and cows

may go off-feed. Positive results for fecal coliform (more than 0 counts/100 mL) indicate a pollution problem that should be investigated and corrected.

Nitrates		
Nitrate (NO <sub>3</sub> ) (ppm)	Nitrate-Nitrogen (NO <sub>3</sub> -N) (ppm)	Comment
0 - 44	0 - 10	Safe for dairy cattle
45 - 132	10 - 20	Safe with balanced diets, low nitrate feeds
133 - 220	20 - 40	Potentially harmful over long-term
221 - 660	40 - 100	Cattle at risk, potential death
>660	>100	Unsafe for cattle

## Water Hardness

Water hardness comes mostly from calcium and magnesium residue and has not been documented to limit water intake. The different levels of hard water can range from soft water to very hard water as shown below.

- Soft water: 0–60 mg/L
- Moderately hard water: 61–120 mg/L
- Hard water: 121–180 mg/L
- Very hard water: >180 mg/L

## Resources

Solving Bad Water Problems for Thirsty Cows (Michigan State University)

<http://www.wdmc.org/2009/Solving%20Bad%20Water%20Problems%20for%20Thirsty%20Cows.pdf>

Livestock Drinking Water Quality (Colorado State University)  
<http://water.okstate.edu/programs/documents/external/LivestockWaterQlty-CSU4.908.pdf>

Drinking Water Quality Guidelines for Cattle (University of Kentucky Cooperative Extension)  
<http://www2.ca.uky.edu/agc/pubs/id/id170/id170.pdf>

Evaluation of Water Quality and Nutrition for Dairy Cattle (David Beede, Michigan State University)  
<https://www.msu.edu/~beede/dairycattlewaterandnutrition.pdf>

