



Livestock Water Quality

Overview

Water as with feed provides critical nutrients for Livestock. To ensure total animal health, water that is consumed by animals should meet its nutritional needs and be free of toxic materials. Farm contaminants and pollutants can enter surface water and cause adverse affects to livestock including disease or death. Protection of water supplies and wells with good surface drainage away from the well is essential to prevent contaminants from entering the water supply. Stagnant water can act as a reservoir for disease microbes and algae, which can poison livestock. Care should be taken when algae is present which might be an indicator of manure /nutrient contamination.

When water is suspected of causing heath problems, laboratory examination of the water can help to identify the problem and veterinary assistance should be sought for accurate and complete diagnosis.

Common Water Contaminants

1. Salinity: The “saltiness” of water is measured by total dissolved salts (TDS), which is approximated by the electrical conductance of the water. Chlorides and sulphates are major contributors in the form of calcium and sodium chloride (table salt). Sulphates may include calcium and magnesium. Other salts present include carbonate/bicarbonate, nitrates, phosphates, and fluorides.

These specific ions may cause objectionable effects if consumed in high levels.

Chloride: Change electrolyte balance causing dehydration

Sulphate: Reducing copper availability in the diet, laxative effect

Fluoride: Degeneration of teeth

“Salinity effect”: Changes of water from a low salinity to a high salinity causes an increase in water consumption. Animals may refuse to drink for a few days followed by periods they consume large quantities.

Cations such as calcium, magnesium, sodium and potassium contribute to “salinity” and may cause toxic effects because of the “salinity effect” or interfere with other elements. Otherwise they are not considered toxic.

FACT SHEET

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Table 1. Guidelines for potential problems associated with Conductivity/TDS

Parameter(s)	Comments
<0.15 ms/cm < 1000 ppm	Water has very low conductivity (TDS) and should have no objectionable effects to any livestock or poultry
0.16-0.50 ms/cm 1,000-2,999 ppm	Water is satisfactory for all livestock and poultry. Animals not accustomed to these levels may have mild diarrhoea until they become accustomed to the water. Health and performance should not be affected.
0.51-0.83 ms/cm 3,000-4,999 ppm	Water should be satisfactory for livestock but may cause temporary diarrhoea or be refused at first by animals not accustomed to it. Poor water for poultry causing water feces, decreased growth and increased mortality.
0.84-1.16 ms/cm 5,000-6,999 ppm	Avoid use with lactating animals. Not acceptable for poultry. May be used for other livestock with reasonable safety.
1.17-1.67 ms/cm 7,000-10,000 ppm	Water unfit for poultry and swine. High risk for lactating and pregnant cows, horses and sheep. High risk to young animals, and heat stressed animals.
1.7 ms/cm > 10,000	High saline water great risk and should not be used

2. Alkalinity and pH: The pH is a measure of acidity or alkalinity. A neutral pH is 7.0, >7.0 is alkaline and < 7.0 Acidic. The preferred pH for livestock water is between 6.0 and 8.0, which is mildly alkaline.

Alkalinity may be expressed as bicarbonate/carbonate or titratable alkalinity. Water that is in the desirable range will only have bicarbonates. As the pH increases the water will become more alkaline and the water will contain carbonates. Excessive alkalinity can cause digestive upset, but the threshold level has not been determined and so guidelines for suitability is difficult.

3. Nitrate: Clinical signs of Nitrate poisoning in animals may include lack of coordination, blue colourations of mucus membranes, vomiting and breathing problems. The nitrate ion is reduced to nitrite in the animal's gut, which can be then absorbed. Nitrate toxicity when it occurs may not be caused entirely by water contamination. Feed sources should be checked for nitrate levels.

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Table 2. Guidelines for potential problems associated with Nitrate-n (NO3-N)

	Comments
< 100 ppm	Considered safe
100-300 ppm	Caution, Feed source should be considered
Over 300 ppm	Potentially toxic

Table 3 Potentially toxic compounds in Livestock water

Parameter	Safe upper levels ppm
Alkalinity (carbonate + bicarbonate)	2,000
Aluminium	5.0
Arsenic	0.2
Blue-Green Algae	Avoid water with heavy growth
Barium	0.2
Boron	5.0
Cadmium	0.05
Calcium	1000
Chromium	1.0
Cobalt	1.0
Copper	1.0 (cattle)
	5.0 (swine/poultry)
	0.5 sheep
Fluoride	2.0
Iron	2.0
Lead	0.05
Mercury	0.01
Nickel	1.0
Nitrate-N	100.0
Selenium	0.05
Sulphate	1000
TDS	3000
Conductivity	< 0.51
Vanadium	0.1
Zinc	25.0

Suggested Testing Packages

1. *Livestock Monitoring* – Used to monitor basic water quality.

TDS, Conductivity, pH, NO3, Ca, Mg, Na, K, P.....\$25.00

2. *Livestock Diagnostic- Used to assist in water diagnosis of unsafe water*

TDS, Conductivity, pH, NO3, SO4, Cl, Alkalinity (carbonate + bicarbonate), Al, Ba, B, Cd, Ca, Cr, Co, Cu, Fe, K, Mg, Mn, Na, Ni, P, Pb, S, Va, Zn...\$40.00

Additional Tests

Arsenic	\$25.00
Mercury	\$25.00
Selenium	\$25.00
Silicon	\$2.00
Fluoride	\$15.00

Bacteria/Algae

Total Bacteria	\$20.00
E.coli	\$20.00
Fecal Coliform	\$20.00
Salmonella	\$30.00
Blue green Algae	Inquire