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PSIW Banff October 2022
Interpreting Water Analysis

Water Quality Parameters

Water Quality Parameters					
Date:					
Results	**Parameters**	**Acceptable**		**Optimal**	**Negative Effects**
		Minimum	**Maximum**		
	pH	5.5	7.5	6.5	low pH (acidic, under 6) could be corrosive for equipment, could reduce water consumption high pH (basic, over 7.5) allows bacterial growth in piping, could reduce water consumption
	ORP	650	800	725	Contact time to kill *E. coli* bacteria: – infinite at 450 mV – 1 hour at 500 mV – 100 seconds at 550 mV – 10 seconds at 600 mV – instant at 650 mV – should be around 725 mV for *Salmonella*
	Chlorine	0.02	5 ppm	1-3 ppm	
	Hydrogen Peroxide			25-50 ppm	
	Temperature		< 15° C		Animals prefer to drink fresh water rather than stagnant or hot water
	Manganese		< 0.05 mg/L		Cause black spots, giving unpleasant metallic taste, promotes bacterial growth and causes bad odors in hot water
	Calcium		<1000 ppm		Mineral deposits in pipes, water restriction
	Magnesium		< 125 ppm		Can have a laxative effect
	Hardness	60 mg/L	120 mg / L	80-100 mg/L	Water spots, high usage of soap required, dry skin, alter the taste of food, scaling of piping, wear on equipment
	MTD or TDS (total dissolved solids)			< 500 mg/L	Doesn't affect the taste of water, but may stain equipment, make limestone deposits & corrode pipe
	Total salt		< 5 mS/cm		Can reduce productivity and cause diarrhea
	Iron	0 ppm	0.3 ppm	< 0.3 ppm	Can: affect taste, cause unpleasant water coloration, produce spots (yellow, brown, red), and also be found in bacterial form (black or brown silt), promote pathogen such as E.Coli
	Alkalinity		30-500 mg $CaCO_3$		
	Boron		< 5 ppm		
	Chloride		< 200 ppm		From 200 to 1500 ppm can cause metabolic problems
	Conductivity		775 µS/cm		Unpleasant taste

Water Quality Parameters

Water Quality Parameters					
Results	Parameters	Acceptable		Optimal	Negative Effects
		Minimum	Maximum		
	Copper		<1 ppm		Can change the taste and stain equipment
	Nitrate		<50 mg/L	<5 mg/L	The rate may increase in spring, can come from fertilizers, manure,and sanitary discharges. Can affect the overall health of the animal
	Nitrite		<0.1 mg/L		Promotes development of biofilm, can tie up hemoglobin
	Phosphorus		<1 ppm		May indicate contamination from manure
	Potassium		500 ppm		
	Silicone		ppm		
	Sodium		<250 ppm		The total amount of Sodium incorporated in the diet must be considered
	Sulfur (hydrogen sulfide)			<0.05 mg/L	Can alter the taste, smell and color of water. Can cause nausea, vomiting and abdominal pain. Can reduce daily consumption
	Sulphate		<250 ppm		Can have a laxative effect
	Tannin		<0.05mg/L		Can alter the taste, color (yellow to brownish), and smell of dinking water
	Zinc		<5 ppm		Can change the taste and make a greasy film

Bacteria Parameters					
Results	Parameters	Acceptable		Optimal	Negative Effects
		Minimum	Maximum		
	Total Coliforms		<10 UFC/100 ml		May cause gastric disorders, weight loss
	Atypical Colonies		<200 UFC/100 ml		Non-drinkable water
	Fecal Coliforms		0 UFC/100 ml		Non-drinkable water
	Escherichia Coli		0 UFC/100 ml		Non-drinkable water
	Enterococci		0 UFC/100 ml		Non-drinkable water

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Bacteria

- Total Coliforms : < 10 CFU / 100 ml
- Atypical Colonies : < 200 CFU / 100 ml
- Fecal Coliforms : 0 CFU / 100 ml
- E. Coli : 0 CFU / 100 ml
- Enterococci : 0 CFU / 100 ml

- May cause gastric disorders and weight loss
- Non drinkable water

Bacteria : Option Solution

- Know where water contamination is ;
  - > Well
  - > Water lines
  - > Reservoir

- Add disinfectant :
- Chlorine
  - > Pucks or liquid

Water acidification + disinfectant
  - > Chlorine
  - > Chlorine Dioxide
  - > Hydrogen Peroxide

Parameters : pH level

- Acceptable levels ;
  - > Minimum : 5.5
  - > Maximum : 7.5
  - > Optimal : 6 – 6.5

- > Low water pH (acidic, under 5.5)
  - Corrosive for equipment
  - Reduce daily water intake
- > High water pH (basic, over 7.5)
  - Allows bacterial growth in piping
  - Reduce daily water intake

- Delay bacteria growth
- Economical
- Optimal disinfectant efficacy

Parameters : pH level Option solution

- Water acidification;
  - Add acidifier with a proper dosing pump
  - Link that dosing pump with a water meter
  - Use a water reservoir to mix water well and acidifier before it’s used at the farm
  - Chose the adapted acidifier for the water quality

Parameters : Mineral concentration ; Calcium

- Acceptable level ;
  - > Maximum :
    - < 1 000 ppm
  - > Mineral deposits in pipes, water restriction
  - > Reaction with acidifiers

Parameters : Mineral concentration ; Manganese

- Acceptable level ;
  - > Maximum :
    - < 0.05 mg /L or ppm

- > Causes black spots
- > Gives unpleasant metallic taste
- > Promotes bacterial growth
- > Causes bad odors in hot water
- > Reaction with acidifiers
- > White gummy stuff can appear and clog the water lines

Parameters : Mineral concentration ; Magnesium

- Acceptable level ;
  - > Maximum :
    - < 125 ppm
  - > Can have a laxative effect
  - > Reaction with acidifiers
    - Gummy stuff can appear and clog the water lines

Parameters : Mineral concentration ; Iron

- Acceptable level ;
  - > Maximum :
    - < 0.3 ppm
  - > Can affect taste
  - > Causes unpleasant water coloration, produces spots (yellow, brown, red)
  - > Can also be found in bacterial form (black or brown silt)
  - > Promotes pathogen such as E.Coli
  - > Reaction with acidifiers
    - Orange gummy stuff can appear and clog the water lines

Parameters : Mineral concentration ; Hardness

- Acceptable levels ;
  - > Minimum : 60 mg / L
  - > Maximum : 120 mg / L
  - > Optimal :
    - > 80 mg / L < 100 mg / L

- > Water spots
- > High usage of soap required
- > Dry skin
- > Alters the taste of feed
- > Scaling of piping
- > Wear on equipment

Parameters : Mineral concentration ; Chloride

- Acceptable level ;
  - > Maximum :
    - < 200 ppm
  - > Can cause metabolic problems

Parameters : Mineral concentration ; Copper

- Acceptable level ;
  - > Maximum :
    - < 1 ppm
  - > Can change the taste
  - > Stains equipment

Parameters : Mineral concentration ; Nitrate

- Acceptable level ;
  - > Maximum :
    - < 50 mg / L
  - > The rate may increase in spring, can come from fertilizers, manure and sanitary discharges.
  - > Can affect the overall health of the animal.

Parameters : Mineral concentration ; Nitrite

- Acceptable level ;
  - > Maximum :
    - < 0.1 mg / L
  - > Promotes development of biofilm
  - > Can tie up hemoglobin

Parameters : Mineral concentration ; Phosphorus

- Acceptable level ;
  - > Maximum :
    - < 1 ppm
  - > May indicate contamination from manure

Parameters : Mineral concentration ; Sodium

- Acceptable level ;
  - > Maximum :
    - < 250 ppm
  - > The total amount of Sodium incorporated into the diet must be considered

Parameters : Mineral concentration ; Sulfur

- Acceptable level ;
  - > Maximum :
    - < 0.05 mg / L

- > Can alter the taste, the smell and the color of water.
- > Can cause nausea, vomiting and abdominal pain.
- > Can reduce daily water consumption

Parameters : Mineral concentration ; Sulfate

- Acceptable level ;
  - > Maximum :
    - < 250 ppm
  - > Can have a laxative effect

Parameters : Mineral concentration ; Zinc

- Acceptable level ;
  - > Maximum :
    - < 5 ppm
  - > Can change the taste
  - > Can make a greasy film

Parameters : Mineral concentration ; Option solutions

- Install filters at the source
- Install a water softener
- Chose the adapted water additives for the water quality
- Find another source of water ($$$)
  - No guarantee it will be better

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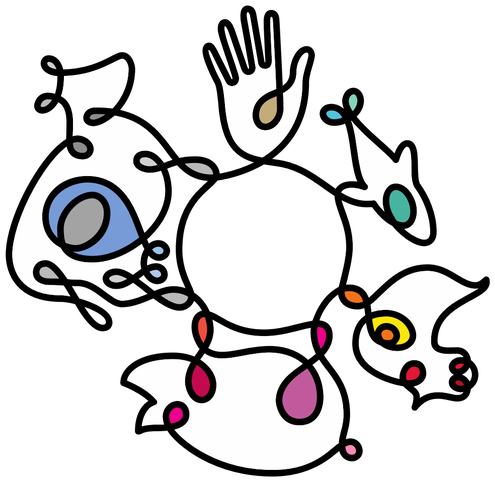

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