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**Water Quantity**

Drinking water for poultry is an important dietary requirement. Under normal conditions, poultry will consume by weight, approximately twice as much water as food. Water is not only a nutrient; it also softens food and carries it through the body, aids in digestion and absorption, and cools the body as it evaporates through

the bird's lungs and air sacs. Water helps remove waste, lubricates joints, is a major component of blood, and a necessary medium for many chemical reactions that help form meat and eggs. The following table indicates the typical quantities of water required for various poultry enterprises.

**Table 1 Approximate Water Consumption for Poultry (litres/day)**

Type of Poultry	Normal Temperature (20°C)		Hot Weather (32°C)*
	Average (growing)	Mature Birds	Mature Birds
Layer pullets	0.10	0.13	0.20
Breeder pullets	0.12	0.16	0.25
Layer hens		0.21	0.40
Broiler breeders		0.30	0.60
Broiler chickens	0.16	0.25	0.50
Roaster chickens	0.20	0.30	0.60
Broiler turkeys	0.29	0.54	1.00
Heavy female turkeys	0.38	0.64	1.20
Heavy male turkeys	0.55	1.00	1.80

\* These are the water consumption volumes recorded in most literature. However, recent research would suggest that during high temperature conditions, birds will reduce feed intake and consequently consume about the same amount of water as normal.

**Water Quality**

Poor water quality, can retard growth, curtail egg production, or produce lower egg quality. Feed conversion, for example, has been positively correlated to the presence of sulfate and copper concentrations in the water, and livability with potassium, chloride, and calcium. Body weight is positively influenced by water hardness

and dissolved oxygen, and negatively influenced by total bacteria and a pH less than 6.0. While several elements can cause poor water quality, the interaction between elements is more significant in water quality problems than the simple fact of their presence. Table 2 lists the standards for water quality for poultry use.



**Table 2 Drinking Water Quality Standards for Poultry**

Contaminants or Parameters	Maximum Acceptable	Remarks
<b>Bacteria</b> Total bacteria Coliform bacteria	100/mL 50/mL	- 0/mL desirable - 0/mL desirable
pH	6.0 - 8.0	- < 6.0 is undesirable; < 6.3 may degrade performance
Hardness	180 ppm	- < 60 is unusually soft; > 180 is very hard; interferes with effectiveness of soap, disinfectants, medications.
Total Dissolved Solids	< 4000 < 3000 < 1500	- mature poultry - young poultry - young turkey poults
<b>Nitrogen Compounds</b> Nitrate (NO <sub>3</sub> ) Nitrite (NO <sub>2</sub> )	25 mg/L 4 mg/L	- Levels of nitrate from 3 to 20 mg/L, may affect performance.
<b>Natural Chemicals</b> Calcium (Ca) Chloride (Cl) Copper (Cu) Iron (Fe) Lead (Pb) Magnesium (Mg) Sodium (Na) Sulfate (SO <sub>4</sub> ) Zinc (Zn)	600 mg/L 250 mg/L 0.6 mg/L 0.3 mg/L 0.02 mg/L 125 mg/L 50 mg/L 250 mg/L 1.5 mg/L	- Excessive deposit sand scale formation at > 600 mg/L. - Even 14 mg/L may be detrimental if sodium level is higher than 50 mg/L. - Higher levels of copper produce a bitter flavor. - Higher levels of iron produce bad odour and taste; encourages growth of iron bacteria which plugs the water system. - Higher levels of lead can be toxic. - Higher levels of magnesium have laxative effects. Levels > 50 mg/L may affect performance if sulfate levels are high. - > 50 mg/L of sodium may affect performance if sulfate or chloride is high. - Higher levels of sulfate have laxative effects. Levels > 50 mg/L may affect performance if magnesium and chloride are high. - Higher levels of zinc are toxic

Source: Adapted from Carter and Sneed, 1987; AAFRD

### Water Treatment

Routine water analysis is required to determine if water treatment procedures are necessary. Some basic treatment techniques are:

- 1. Filtration:** May be required for some surface water sources to remove organic matter and/or turbidity.
- 2. Chlorination:** May be required to remove bacteria; prevent slime and algae build-up in water lines; precipitate out nitrites, iron, manganese and sulphur. Continual use of chlorine may cause corrosion of steel fixtures, residue build-up, and reduce effectiveness of any medications applied through the water system.

- 3. Ozone Treatment:** May be used to remove bacteria, taste, and odour. Ozone may also be corrosive to steel fixtures.

### Water Temperature

Drinking water temperatures should be between 10°C to 15°C for the most comfortable consumption by mature birds, but some studies have indicated that water temperatures of about 25°C reduce mortality in chicks and poults. Temperatures over 30°C will reduce consumption and birds **will refuse** to drink if water temperatures are over 44°C.