

Acceptable drinking water parameters for pigs



Figure 1. Regular testing provides confidence of good water quality

Assessment of the quality of water can be split into three categories:

- **Physical appearance:** odour, cloudiness or turbidity, gross contamination
- **Chemical and mineral contamination:** calcium, magnesium, sulphate, iron, manganese
- **Microbiological contamination:** bacterial, fungal or parasitic agents

Introduction

Microbiological contamination of water is highly likely within a pig unit and can occur at any point in the supply, from primary source to individual drinking points. Contamination can be managed and controlled by regular testing, cleaning and appropriate treatment.

Different minerals have varying effects in terms of challenge, either to the pig's health or chemical or physical reactions to the unit infrastructure.

Pigs often have a higher tolerance to minerals found in water, such as sodium and chloride, than other animals. It is important, however, that water does not have an unpleasant taste or odour as a result of residual chemicals.

Refer to *Survival time of pathogens in water* factsheet.

Testing for total dissolved solids (TDS) gives a measure of all dissolved minerals in the water. Assessing TDS can be a useful first step to check whether any minerals are

present in excessive amounts. Table 1 provides an indication of the impact of varying levels of TDS on pig health and performance.

Table 1. Evaluation of the water quality for pigs, based on TDS

Total dissolved solid (TDS) (mg/l)	Comments
<1,000	No risk to pigs
1,000– 2,999	Satisfactory for pigs. Mild diarrhoea may occur in pigs not adapted to it
3,000–4,999	Satisfactory for pigs. May cause temporary refusal of water and temporary diarrhoea
5,000–6,999	Reasonably safe for pigs. Higher levels should be avoided for pregnant/lactating pigs
7,000–10,000	Unfit for pigs. Risky for pregnant, lactating or young pigs, or those exposed to health stress/ water loss
>10,000	Not recommended for use

Source: RAFT Solutions. Optimising the Use of Antimicrobials, 2017

High sulphate levels can cause diarrhoea in pigs. Nitrates can be converted to more toxic nitrites in the pig's body, resulting in detrimental effects on the ability of the blood to carry oxygen.

Water systems carrying a high load of biofilm are likely to harbour many bacteria, leading to bacterial contamination of water.

For details, refer to the *Shock water treatment guide*.

Where water quality is poor, or the supply is at risk of contamination, frequent testing should be carried out to determine the nature and degree of treatment necessary to bring the supply up to an acceptable standard.

Table 2. Accepted limits for livestock drinking water

Microbiological measure	Acceptable level
TVC (at 22°C)	<1000 CFU per ml
TVC (at 37°C)	<1000 CFU per ml
Total coliforms	<100 CFU per 100 ml
E. coli	None detected in 100 ml

Source: RAFT Solutions. *Optimising the Use of Antimicrobials*, 2017

1,000 UG (microgram) is equivalent to 1 mg (milligram). It is important to check individual laboratory reports for varying units.

Table 3. Standard AHDB Pork panel for mineral analysis

Mineral measure	Acceptable level
Manganese (Mn)	<1000 UG per l
Magnesium (Mg)	<1000 UG per l
Calcium (Ca)	<1000 UG per l
E. coli	None detected in 100 ml
Copper (Cu)	<5000 UG per l
Sodium (Na)	<1000 UG per l
Iron (Fe)	<2000 UG per l
Hardness	<500 mg per l
pH	5–8
Nitrates	<25 mg per l
Nitrites	<0.1 mg per l
Total dissolved solids (TDS)	<1000 mg per l

Source: RAFT Solutions. *Optimising the Use of Antimicrobials*, 2017

How to avoid water contamination

Water supplied by mains should be of good quality upon entry to the farm; often contamination occurs as the water travels through the system to the drinkers. English farmers supplied by mains water must comply with the Water Supply (Water Fittings) Regulations 1999. For details, see Water Regulations Advisory Scheme (WRAS) guidance. For agricultural premises, further information can be found in the Water Supply Systems: Prevention of Contamination and Waste of Drinking Water Supplies publication, produced by WRAS and available from:

wras.co.uk/downloads/public_area/publications/general/wras_agricultural_premises_2017.pdf

These requirements protect the water from contamination, prevent waste of water, and ensure farmers have reliable and robust systems.

For farms relying on private water supplies to ensure an adequate supply of good quality drinking water, regular testing provides confidence of good water quality. To be compliant with farm assurance schemes, users on non-mains water must test for bacterial contaminants every year, as close to the source as possible. Analysis must be carried out, for:

- Coliforms
- Total viable count (TVC)

Two days at 37.5°C

Three days at 22°C

Refer to the *Standard Operating Procedures: Water sampling for microbiology, minerals, flow rate and water temperature* and *Water sampling for microbiology (Farm assurance requirement)* factsheets.

Further information can be found in *Private Water Supplies: Technical Manual*, available from: www.privatewatersupplies.gov.uk

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