Water – the forgotten nutrient?

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In pig production water is normally the cheapest and most readily available nutrient. In addition, water is also the most critical nutrient for maintaining performance and indeed life. However, in spite of its importance, water is often referred to as the forgotten nutrient as it is frequently the nutrient that receives least attention. Water is intimately involved in virtually all metabolic functions as well as comprising almost 70% of the adult animal's body mass.

To put the importance of water into perspective an animal can lose practically all of its body fat and over half of its body protein and yet live, however, a loss of just one tenth of its body water will result in death.

The role of water in maintaining performance is not just a question of water supply but also, and equally importantly, of water quality. Recent work carried out on commercial farms by Devenish Nutrition indicates that the quality of ground and surface water is highly variable.

The minimum standard that should be applied on farms is that water that is being offered to pigs should be clean, fresh, cool and free of contaminants – essentially farmers should be willing to drink the same water that the pigs are drinking.

Water quality

Pigs might frequently give the impression that they are not overly choosy in their eating and drinking habits, however, on closer examination this illusion is dispelled.

Table 1. Water quality guidelines (ppm).

Total dissolved solids	<5000
Calcium	<1000
Nitrates	<100
Nitrites	<10
Sulphates	<1000
Magnesium	<400
Iron	<0.5
Manganese	<0.1
Sodium	<150
Chloride	<400
Aerobic bacteria (per ml at 37°C)	20
Coliforms (per ml)	0

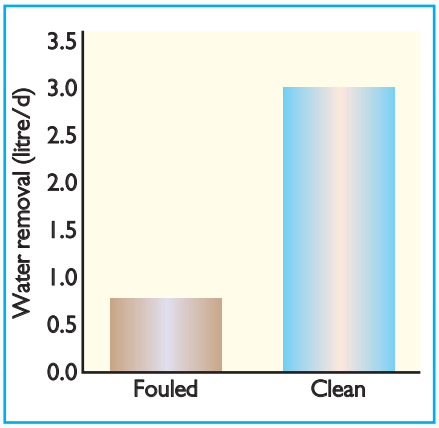

Fig. 1. Effect on consumption of fouling of water bowl.

Research has shown that when given the choice between drinking uncontaminated water from a clean water bowl or a nipple drinker, pigs preferred to drink from a bowl.

However, as soon as the water bowl became contaminated with faecal material and stale food, the pigs reduced their consumption from the bowl opting instead for a supply of clean uncontaminated water from the nipple drinker (Fig. 1).

This clearly demonstrates that pigs have a definite preference for clean fresh water. Given this depression in water intake due to simple contaminants, it soon becomes clear that if water is of an unacceptable quality at source, then intake may be affected.

It has been well established that where water has a high mineral content or when it contains toxic substances of either mineral, chemical or biological (for example, algae) origin, pig performance will be depressed.

The manner in which water quality affects intake is not, however, quite as simple as poor quality equals reduced intake.

In the case of heavily contaminated water, a vicious circle is set up. This is because if the pig initially ingests contaminated water, it will then consume more water to try to detoxify itself eventually leading to the offensive substance building up to a toxic level in the body.

Thus, it becomes clear that contaminants, depending on what they are may either depress or increase water consumption.

Pig producers should have the water on their farm tested routinely to ensure that it is of an acceptable standard for consumption. Suggested water quality guidelines are outlined in Table 1.

Water delivery

Apart from water quality, the rate at which water is delivered to the pig will affect consumption. In the past it had been assumed that a pig ate food and then drank as much water as was needed to metabolise the nutrients ingested.

However, recent work has shown that the opposite is in fact the case. Research shows that the availability of water influences the amount of water the pig consumes, which in turn influences the amount of food it consumes.

An interesting feature of pig behaviour is that pigs do not seem to be prepared to extend the time spent drinking in order to compensate for poor water flow rate.

Thus a correlation between water flow rate (availability), water consumption and feed intake is established.

Table 2 demonstrates clearly the relationship between water flow rate and growth. Suggested water flow rates for different classes of pig are as follows:

- Suckling piglet – 0.5 litre/min.
- Stage one weaner – 0.5 litre/min.
- Grower – 0.75 litre/min.
- Finishers – 1.2 litre/min.
- Sows and boars – 3.0 litre/min. ■

Table 2. Water flow rate and stage one performance.

Water flow rate (ml/min)	175	350	450	700
Water intake (litre/d)	0.78	1.04	1.32	1.63
Feed intake (g/d)	303	323	341	347
ADG (g/d)	210	235	250	247
FCR	1.48	1.39	1.37	1.42