

Water quantity is a given, but what about the quality?

Does yours pass the test?

The availability of water is variable across the UK but one thing stays the same – three litres are required for every litre of milk produced. Water quantity cannot be questioned, but the same can't be said for quality. That can have a considerable impact on cow consumption and milk output.

text Allison Matthews



Boreholes provide 32% of the water used in agriculture, which crude estimates suggest is between 210 million and 360 million litres per year. With high yielding cows, on drier forages, capable of consuming up to 200 litres of water every day, a large herd of cows has a considerable water requirement.

But it's not just about quantity – quality is important too. Zinpro's Michael Bain believes that producers should be sampling their water annually.

"As more producers have switched to the cost-saving benefits of borehole water, they have also started to ask questions. What are the potential contaminants to my water supply and how can I deal with them?"

"Taste, smell and colour can all give an indication of the presence of bacteria, but ultimately to be sure, laboratory tests are available that check water for anything from £37 to £150 a time," he says.

Boreholes provide a cost effective option for many producers. The water act of 2003 states that you can extract up to 20,000 litres of water a day without any licence, so with the financial gains stacking in favour of boreholes, what's the problem?

Water pH

Recent survey work, carried out by Zinpro in the UK and by Thompsons in Northern Ireland, has highlighted some interesting data on both the pH of water and dietary cation-anion difference (DCAD).

Thompsons' Richard Moore explains how any water samples, with results outside the normal range of data, could impact on the performance of the herd. "It is widely accepted higher yielding, more intensively fed cows are under greater rumen acidotic pressure and as a

result more likely to be on the verge of going into SARA (Sub Acute Rumen Acidosis). Diets will be formulated and presented in a manner to minimise this risk, however in some cases the addition of large volumes of water into diet at lower pH figures could very possibly and unknowingly tip the balance," explains Mr Moore.

Optimum DCAD levels are based on the milking status of the cow with transition cows becoming more dependent on its negativity in order to minimise milk fever.

Where producers need to control milk fever, the overall DCAD of the diet should be at or below 0mEq/kg. In lactating cows this DCAD level is better positioned at 50-100mEq/kg.

Borehole water

"To put this into the perspective of borehole water, the survey carried out by Zinpro found that the DCAD levels of water around the UK varied from -9 mEq/kg to +503 mEq/kg," adds Mr Bain.

"Where a negative DCAD is desirable, possibly in dry cows three weeks prior to calving, appropriate anionic salts should be added to the diet. "As the cow's blood calcium increases, milk fever is prevented and retained placentas and displaced abomasums become less frequent."

While showing less significant variation, a recent survey carried out in Northern Ireland on borehole water has highlighted results, which Mr Moore warns could still have a bearing on cow performance.

"Water was collected from 12 producers in different areas. The pH in these samples ranged from 6.04 to 7.94 and the higher values were driven by greater levels of calcium in the water.

"Even with moderate intakes of water,

in some cases the calcium levels would have the potential to increase the risk of sub-clinical milk fever in dry cows and other associated problems in early lactation.

"Iron levels in some samples were also at higher levels. Depending on how extreme the level of iron is it can interfere with the transport mechanisms for some of the other key minerals such as zinc, copper and particularly manganese.

"Other samples also highlighted increased levels of sodium, which can encourage water intakes but also has an effect on the DCAD of water," says Mr Moore.

Action plan

When the water has been sampled and the results are in Mr Moore explains what action can be taken to ensure that water does not add itself to the list of things to worry about.

"The re-formulation of transition diets to adjust DCAD levels – perhaps with the inclusion of whole-crop cereals as a forage or extra straw or the inclusion of magnesium chloride – can be a simple yet effective means of taking into account water sources with higher DCAD levels.

"For lactating cows the only solution may be to have an alternative supply of water, but where this is impractical mineral specifications could be adjusted accordingly."

The results from both surveys show that producers and advisors can expect widespread variation in water samples across the UK.

So while access to water, flow returns, cleanliness of troughs and adequate drinking space are all important issues, how valid are they if the water being drunk is not up to scratch?!

Figure 1: DCAD variability in Northern Ireland was tested in a cross-section of water samples



Figure 2: Variation in pH value from 30 water samples (source: Zinpro)

