FACTSHEET

Case study: water sampling and cleaning

Action points

- **Shock dosing (i.e. a deep clean) can reduce a high total viable count (TVC) and total coliform levels to acceptable levels**
- **Following the product supplier's instructions for use is important for any treatment to be effective. This applies to both individual cleaning events and continuous dosing**
- **Regular reviews and testing of water are important to establish whether cleaning methods are working**
- **Sampling at various, crucial points in the water supply will provide an indication of where contamination is occurring**
- **Consider all parts of the system when cleaning. Correctly cleaning the header tank and pipes after each batch improves control of bacterial regrowth**

The importance of water sampling

Poor pig health may be a consequence of poor water quality. Microbiological contamination of water can occur at any point in the supply within a pig unit. Contamination can be controlled by regular testing, cleaning and appropriate treatment.

Testing the microbiological and mineral content of water, along with flow rate and temperature are essential steps to assess water quality and quantity of a new supply, e.g. borehole, or as part of problem-solving activity to investigate issues, such as poor water intake by pigs, or pipes and filters getting blocked.

When testing water, it is recommended that a minimum of three samples are taken at each point, as variation between sample results is likely. This allows a mean result to be calculated, reducing the risk of an abnormal result causing inappropriate action with cost and time implications.

During 2018, AHDB studied water quality on a farm in England.

Organic acids had frequently been included in the water to improve pig health, but no formal cleaning procedure was being followed.

Nipple drinkers were positioned on the internal pen divisions and were fed by two header tanks in each room.

Microbiological and mineral samples were collected, following our standard operating procedure (SOP), from the controlled-environment, weaner building, housing pigs from 7 kg to 40 kg.

Refer to *Standard operating procedures: Water sampling for microbiology, minerals, flow rate and water temperature and Water sampling for microbiology factsheets.* Also, the *Shock water treatment guide. .*

Background

The water supply to the farm was provided by borehole. For weaner pigs, an organic acid was added to the drinking water for a period of eight weeks to improve health.

After a period of time, green slime was observed, blocking drinkers and causing a reduced flow rate. This is a common occurrence on farms using acids and where no cleaning procedure or regime is implemented. Biofilm uses the acid as a form of energy, causing further build-up and green slime, referred to as an algal bloom.

Biofilm (slime)

Bacterial contamination builds up on the internal pipe surfaces forming a biofilm (slime).

Biofilms block water systems, and are difficult to eliminate unless the correct treatment is applied. Growth can be prevented through correct sanitisation and cleaning methods.

Treatment 1: Deep clean

As part of this study, a deep clean (shock treatment) was conducted at the beginning of each new batch. This regime used a high dose of a silver-stabilised hydrogen peroxide solution to disinfect the water, as per the manufacturer's guidance.

AHDB carried out water sampling just before the shock treatment was carried out, immediately after and at various periods throughout the batch.

Samples were taken from the borehole, tank and line. The line sample was taken from just before the nipple. Taking a sample directly from the nipple can skew results as they are often contaminated and challenging to clean.

Results (treatment 1)

- All minerals tested were within acceptable ranges
- TVC and total coliforms were higher than recommended levels in drinking water for pigs before the deep clean
- pH of water entering the farm was 7.5, once acidified pH was 3.7 (as per supplier's recommendation)

The results demonstrate that a deep clean (shock treatment) was effective at reducing TVC and coliform levels in the water. Although the severity of green slime did decrease, the TVC and coliform levels started to increase over time as shown in Figure 1 and Figure 2.

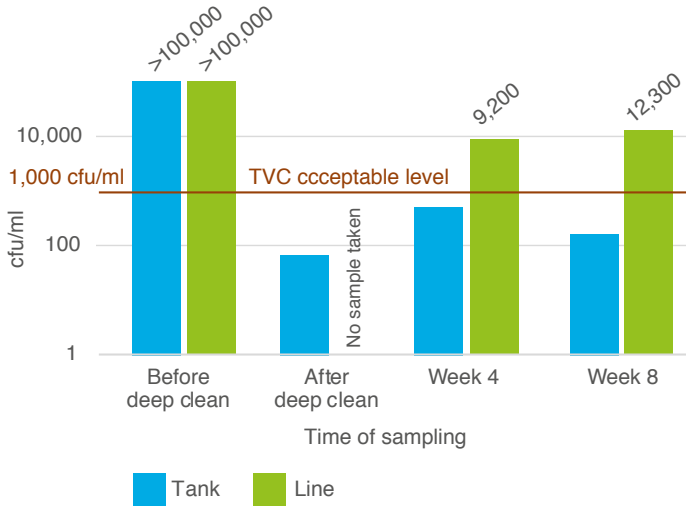

Figure 1. TVC (at 22^{0}C) 72 hours

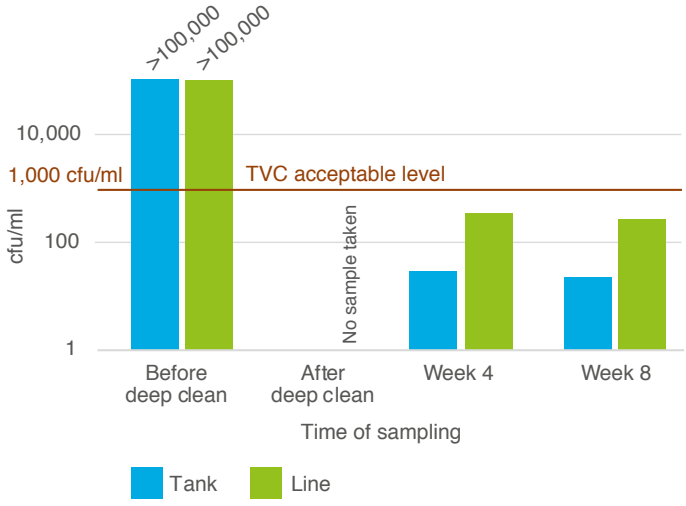

Figure 2. TVC (at 37^{0}C) 48 hours

Biofilm in a drinker

Treatment 2: Continuous dosing

The next step was to trial a deep clean (shock treatment) at the beginning of the batch, followed by continuous dosing of the sliver-stablised hydrogen peroxide solution (at a lower dose rate) throughout. This is designed to keep microbiology levels under control at all times.

Results (treatment 2)

Figure 3 demonstrates that this procedure was effective on farm and kept coliform levels lower than a deep clean alone.

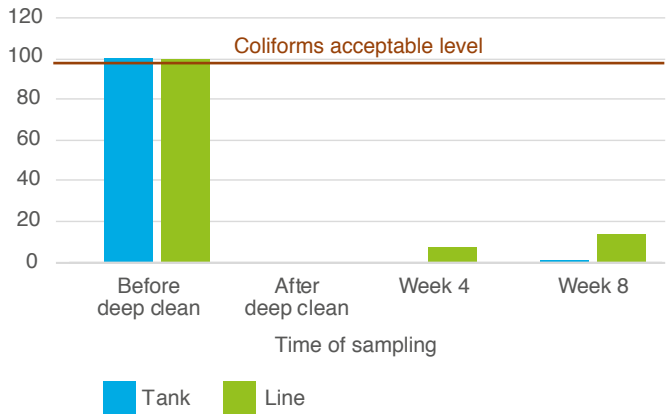

Figure 3. Coliform levels

Summary

- Shock dosing effectively reduced TVC and total coliforms
- TVC and total coliform levels began to rise after shock treatment in both the tank and line samples
- The tank proved to be an environment where bacteria thrived. Physically cleaning out the tanks as well as using chemicals to shock treat may further improve the results
- Continuous dosing was an effective method of keeping the TVC and total coliforms low throughout the batch
- The manufacturer's guidance should always be followed accurately when it comes to shock treatment and continuous dosing to ensure correct dosing and good results

Health and safety statement

Before carrying out any water sampling, conduct a health and safety risk assessment; this will cover, for example, working with water under pressure, chemicals and proximity to electrical equipment and supplies. A Control of Substances Hazardous to Health (COSHH) assessment will be needed where any chemicals are involved.

Legislation

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.

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

For farms relying on private water supplies to ensure an adequate supply of good quality drinking water, further information can be found in *Private Water Supplies: Technical Manual*.

pork.ahdb.org.uk/media/272117/private-water-supplies-tech-manual.pdf

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