

Polmerase Chain Reaction (PCR) for the use in legionella testing

There has been a great deal of promotion recently of Polymerase Chain Reaction (PCR). This is the method of testing for legionella that claims to provide results within 24 hours.

Led by the manager of our own inhouse UKAS accredited laboratory, the Elementus team of highly experienced microbiologists have investigated this method of Legionella testing.

Following our initial investigation we would make the following comments regarding use of Polymerase Chain Reaction for legionella management.

The standard method for detection of Legionella in water systems is the culture method. This will typically give results between 6 - 10 days. Polymerase Chain Reaction has existed since the early 1970s, and recent improvements in the method have made its use practicable.

The speed at which results can be determined is the most obvious advantage of the PCR method. This means that using PCR you can quickly determine if your facility or system is safe to re-open and operate or not.

However, there are some aspects to the PCR that require more detailed consideration. Although the improvements reduce detection of non-viable (dead) cells, there is still a chance of detecting dead Legionella. This means you may receive a false reading leading to potential unplanned and unnecessary expenditure.

The current Approved Code of Practice L8 "Legionnaires' disease The control of legionella bacteria in "water systems" sets action limits for legionella quoted in colony forming units per litre (cfu/l). PCR is read in genome units (GU/l). At this moment no direct comparison between the scales has been established. This would make it difficult to act upon action limits and meet and prove compliance. PCR appears to be more sensitive and will pick up non-culturable but viable legionella that the usual legionella testing method would miss. However, PCR will also read fractions of legionella. Hence you could get a false high and in consequence an erroneous positive result.

A French study in 2006 that looked at environmental samples of cooling tower and domestic water samples stated that "PCR offers little information on the relative risk of legionellosis". It also stated that "with cooling tower samples, no correlation was observed between culture and PCR results, which were highly variable". Furthermore, the study stated "a single quantitative PCR assay is of limited value for risk monitoring".

Conclusion

Our current opinion, is that PCR may have a use as an indicator tool. But as there is no 100% guarantee that the system is clear, especially in an outbreak situation it would be unwise to switch a cooling tower back on until being given the all clear by the investigating authority, if such a tower is in an outbreak zone.

For on going regular testing, at present we feel the existing culture method is still more reliable, even if slightly less sensitive, because we will not be reporting positive results for dead Legionella and we can still report in cfu/l to meet the compliance standard.

We will continue to monitor any further development of the Polymerase Chain Reaction method. Should you require a more in-depth analysis of PCR or re-assurance regarding this matter, please contact your Elementus consultant. We will be happy to provide further information or help review your legionella management, call us on tel. 0844 800 7705 or email info@elementus.com