

Bacteriophage in Water

Bacteriophages are a common group of viruses, which are infectious particles and are capable of infecting and replicating within living cells and organisms.

ALS Environmental can provide analytical testing for Bacteriophage (Coliphage) in water. The method of analysis applied can be used within all types of water, sediments and sludges, where necessary after dilution.

The presence of F+ bacteriophage in a water sample generally indicates pollution by wastewater contaminated by human or animal faeces. Their survival in the environment, removal by widely used water treatment processes and concentration/retention by shellfish resembles that of foodborne and waterborne human enteric viruses, for example, hepatitis A, Norovirus and Rotaviruses. Thus they are a potential indicator organism for the presence of such viruses.

BACTERIOPHAGE BACKGROUND

Bacteriophages were first discovered in the early 20th century. True to their name, they are a class of viruses that infect bacteria.

Bacteriophages infect bacterial cells by binding to cell surface receptors and then entering the cell. These viruses then start the process of replication within the host cell where they multiply many times. Viral enzymes then help the breakdown of the cell membranes, ready to start the infection process again.

The type of bacteriophages most commonly used as indicators of faecal contamination are male-specific coliphages with RNA genomes (or F+ RNA coliphages). The name coliphage comes from the fact that these phages infect *Escherichia coli* bacteria. The two main classes of coliphages, somatic and male-specific (F+ coliphages). Somatic coliphages infect through receptors on the *E. coli* host cell wall, whereas F+ coliphages infect through the F pilli on *E. coli* hosts.

BACTERIOPHAGE BACKGROUND

Bacteriophages can be used as faecal indicators of microbial water quality, food and shellfish quality, sewage contamination, and efficiency of water and wastewater treatment. The analysis is compiled by measuring the removal rates through the sewage treatment process including efficacy of UV disinfection. They can also be used as indicators for pathogenic viruses such as Noraviruses and Rotaviruses.

METHOD

The test sample is mixed with a small volume of semi-solid nutrient medium to which a culture of host strain is also added. This is mixed and poured on to a solid plating medium which when set, is incubated under specified conditions. After incubation, the F-specific bacteriophage will infect the host strain to produce visible plaques (zones of clearance) which can be counted.

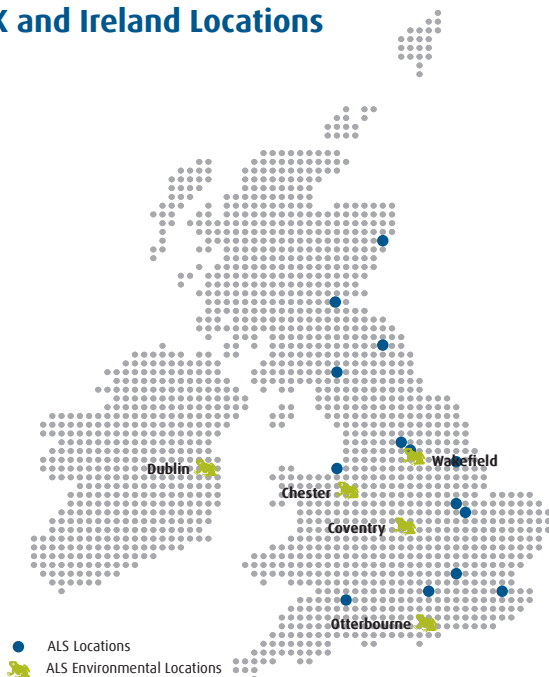
Once started, the speed of analysis is critical. If the sample and host bacteria remain in contact for too long prior to agar pouring, then the number of plaque forming units may be over-estimated. The entire plating process should be carried out in less than 20 minutes.

REFERENCES:

- Environment Agency - The Microbiology of Recreational and Environmental Waters (2000).
- United States Environmental Protection Agency. Method 1602: Malespecific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure. 2001.
- Wyn-Jones, A. P., Sellwood, J. A Review: Enteric viruses in the aquatic environment. *Journal of Applied Microbiology* 2001, 91, 945-962.

Service overview

UK and Ireland Locations



Quality

Providing customers with UKAS ISO 17025:2005, MCERTS and DWTS accredited data from our laboratories across the UK. We participate in a broad range of Proficiency Testing schemes and hold a DEFRA import licence for soils.

Did you know that?

We are able to provide a broad range of additional services to help with your sampling including:

- Internal refrigerated and tracked courier network
- National portfolio of drop-off locations
- Pre-Registration of samples via our "Pre-Reg" system
- Dedicated customer service advisor
- Online reporting via our WebTrieve system

Contaminated Land

We understand the time pressures of large scale Remediation and Brownfield projects and are a member of the AGS. Our Coventry laboratory utilises state of the art analytical equipment with the back-up of our sister laboratories across Europe to ensure that we deliver your projects on time every time.

Waste Management

By working closely with some of the largest companies in this sector we are able to offer unrivalled analytical and administration services to ensure that your samples are processed swiftly and in line with the UKAS Deviating Sample Guidance.

Legionella and Microbiology

Being members of the Legionella Control Association (LCA) we understand the emphasis placed on laboratory analysis for the Control of Legionella. With 3 methods for testing Legionella (including rapid PCR) and an understanding and appreciation the implications of ACoP L8, HSG 274 and HTM04-01 we are your ideal analytical partner for all of your water hygiene monitoring requirements.

Drinking Water

We are one of only a handful of commercial laboratories to have a dedicated Drinking Water Testing Specification (DWTS) accredited laboratory, based in Wakefield, Yorkshire. We are able to supply analysis to the Public and Private Drinking Water Regulations.