

# Microbial Source Tracking



## Sampling Requirements:

- Sterile 600mL PET bottle, Thiosulphate dosed
- Air gap essential
- Transport & Store at 4°C
- Process within 6 hrs of collection up to max 24hrs (AZ/NZS 2031)

For fingerprinting only it is possible to send purified colonies on plates.



## Overview

It is possible to distinguish microorganisms from one another using molecular biological techniques. At AWQC we have implemented several new tests based on patented rep-PCR technology that allows us to quickly and accurately discriminate between closely related bacterial species to the strain level and to determine whether or not they are toxin producing pathogens.

## Value of these tests

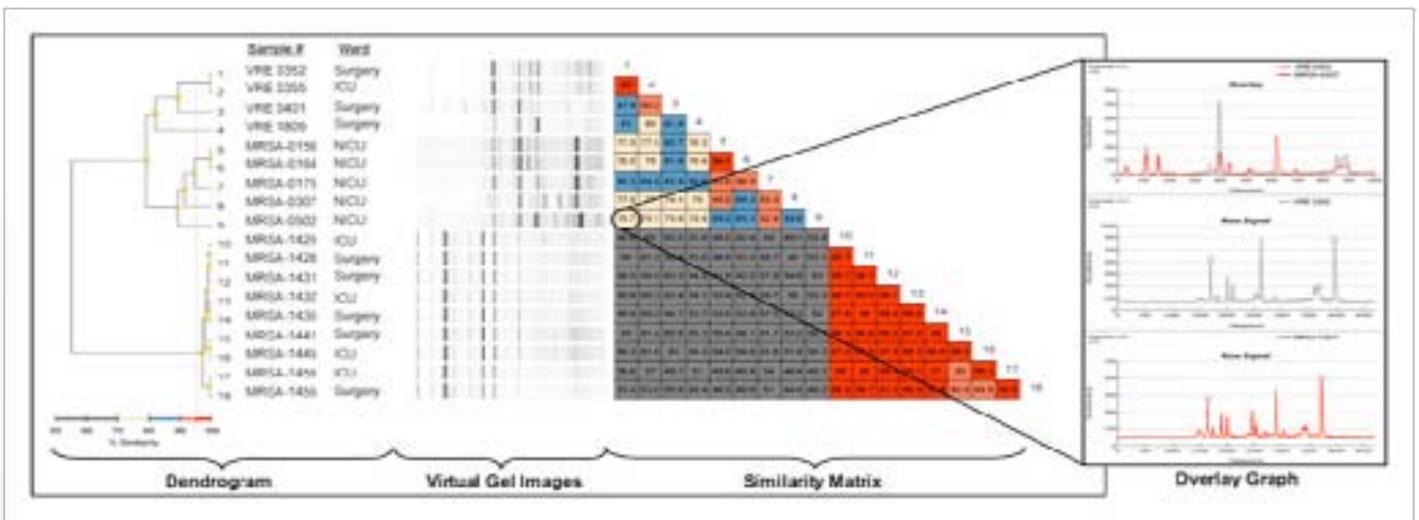
These tests can be conducted on all water types (mains and non-mains) with the results enabling problematic strains to be tracked in a system.

Using the example of *E. coli*, an indicator of faecal contamination in a system, we are able to

1. Isolate, identify, and enumerate *Escherichia coli* in a water sample using Defined Substrate Technologies, namely Colilert® or specialised agar within 24 hours of sample receipt.

This timely information allows informed decisions on the planning and remedial actions for the safe and effective management of a water system.

2. Confirm the identification and further determine whether the *E. coli* is a shiga toxin producer (STEC) eg. O157:H7 strain within 8 hours of the original result.



This information would be invaluable during an outbreak providing evidence on which to evaluate the public health risk from water usage.

3. Provide a fingerprint of the detected organism within 2-4 days depending on the starting material i.e. pure isolated organism or type of water sample. The fingerprint is then compared against databases to identify the probable source of the contamination.

This information is extremely powerful

- In the short term for source tracking of problems and determination of probable cause eg. we can determine if the contamination is due to bird, human or animal and by clever sampling can assist you to track down the probable location of the problem eg. geese on a lake, dairy farm effluent in a catchment area, a cracked sewage pipe etc.
- In the long term by building a specific database for each system we are able to identify to you persistent or recurring problems, new events and seasonal fluctuations allowing a more targeted approach to the safe and effective management of a water system.

Fingerprinting is currently available for several of the organisms identified in the table and can easily and swiftly be set up for the others upon request.

<i>Acinetobacter</i>	<i>Candida</i>	<i>Klebsiella</i>	<i>Propionibacterium</i>
<i>Archaea</i>	<i>Clostridium</i>	<i>Lactobacillus</i>	<i>Pseudomonas</i>
<i>Aspergillus</i>	<i>Clostridium perfringens</i>	<i>Legionella</i>	<i>Salmonella</i>
<i>Bacillus</i>	<i>Enterobacter</i>	<i>Listeria</i>	<i>Serratia</i>
<i>Bifidobacterium</i>	<i>Enterococcus</i>	<i>Mycobacterium</i>	<i>Shigella</i>
<i>Bordetella</i>	<i>Escherichia</i>	<i>Mycobacterium tuberculosis</i>	<i>Staphylococcus</i>
<i>Burkholderia</i>	<i>Francisella</i>	<i>Mycoplasma</i>	<i>Stenotrophomonas</i>
<i>Campylobacter</i>	<i>Haemophilus</i>	<i>Neisseria</i>	<i>Streptococcus</i>

These tests can be run singly or in any combination depending on the information required and the starting material provided i.e. water (as per the sample requirements section) or an agar plate with an already isolated colony.

## Methodology

The DiversiLab System employs the following simple steps to generate unique, reproducible fingerprints for each of your microbial samples.

- Extraction of DNA from isolated cultures.
- Amplifying samples using rep-PCR and the appropriate DiversiLab DNA Fingerprinting Kits.
- Separating fragments in a microfluidics DNA LabChip.
- Analyze data in real time with reports.