

Microbial Source Tracking Workshop – Belfast 19-11-19

Following a short introductory talk by Dr Jonathan Porter, the workshop took the form of a discussion on points raised led by Jonathan.

1. MST measures different things to culture - DNA vs dividing cells (and the effects of flocs)

Measuring two different things; relationship between the two is not expected to be ideal.

DNA - filter, extract, and mix.

Colony Forming Units (CFU) - filter and grow, therefore flocs not necessarily dispersed. DNA also multiple genes per cell (this shouldn't affect linear relationships between the two parameters, but is a factor when comparing several different markers with CFU).

2. Beach and catchment-specific

A detailed knowledge and understanding of the specific variables affecting each site is needed to help interpret all water quality (bacti and MST) data. This (lack of context) is often missing, which can limit interpretation of the MST data.

3. Confidence in some markers

A wide range of markers is available to indicate (mark) different sources of pollution. Some markers have been tested more extensively than others. The human and ruminant-specific *Bacteroides* markers were agreed to be the best validated. Others (e.g. dog-specific *Bacteroides*) have had different degrees of success in different testing labs. The avian marker used by SEPA for instance works well with gulls, but poorly with (say) geese.

4. Communication/expectation

Any MST testing service could likely be improved by providing more background information to end-users of the data, for example on strengths and limitations of the data. (Subsequent to the workshop, the 3 labs undertaking MST testing for the UK regulatory agencies arranged to discuss this in more detail.)

5. High concentrations vs low concentrations of CFU

It was felt there was a difference when using MST testing between sites/samples with high and low concentrations of FIO. The use of MST for samples with high FIO was felt to be better explored/better understood than when FIO were low (cleaner samples). This latter area is worthy of more work.

6. Communication again - spikes in FIO - what do they mean

Linked to point 5 – what is happening at sites which show “spikes” in FIO counts against a (predominantly) low background? Is it real, or is it an artefact of the sampling/monitoring regime? Some datasets were discussed at the workshop; further context was given by the 3 presentations from CREH staff during the main conference. Although no consensus explanation was reached, it is clear this is a common situation and end-users of (MST and FIO) data would like to understand this better.

7. Avian markers?

Agreement from the room that markers for pollution from birds is an area for improvement – also what can be done to tackle the problem, if birds are suspected/proven to be a major source of faecal pollution.

8. MST = FIOs MST ≠ risk

The idea of providing more context for different (microbiological) health risks from different sources of faecal pollution was explored at some length. For example, there is (some, but limited) evidence that water dominated by human pollution may be more likely to contain detectable human GI viruses (norovirus, enterovirus) whereas water dominated by ruminant animal pollution may be more likely to contain bacterial pathogens. This could be of interest in preparing a bathing beach profile. It was acknowledged that this type of information would not be available in time for in-season information updates. Overall, the workshop participants did not feel this was information that could be used. Information from MST was very much focused on explaining FIO in water; not on assessing risk to water users.

9. Future - pathogens and public health?

Future development work could include direct measurements of pathogens in addition to (instead of?) indicators. The use of *Campylobacter* to monitor water quality in Australia was discussed (though this may be for drinking water, rather than bathing water). It was noted that assessing FIO as indicators still had considerable merit as general indicators of all pathogens; and that specific methods may be required for each pathogen, which could limit widespread adoption of this within recreational waters.

Overall, there was agreement that improving communication/information, based on the factors above, could help users of MST testing services decide upon sample analysis requirements and on data interpretation. Specifically, improving MST analysis for avian pollution was a priority for UK waters.