DNA fingerprinting of sewage bugs

New methods of identifying and understanding micro biology are being studied to shed light on sources of bacterial pollution and improve treatment processes.

Northumbrian Water is working with Newcastle University to investigate the potential for the use of next-generation DNA sequencing – identifying and distinguishing the genetic make-up of life.

NORTHUMBRIAN WATER

It's not only for high value medical research or finding criminals now, DNA, for example, has also been used to find traces of horse meat in ready prepared food!

The water company project is focussed on bathing water quality and the management of the activated sewage sludge treatment process.

It is the first time that next-generation sequencing has been applied in an operational sense.

The 16S gene is being studied using an Ion Torrent Personal Genome Machine which can identify 10 million bacteria in just three hours.

Methods under investigation are whole community analysis, host species indicators and deep sequencing of E. coli.

Many of the global cycles that sustain life on earth could not operate without bacteria recycling and converting one thing to another. They are vital to our survival - and effective sewage treatment also depends on them.

Given how important they are we know surprisingly little about bacteria – what they like to eat, where they like to grow - even what to name them - and so far it is estimated we have studied around only 0.1% of all bacteria.

As tighter standards for the bathing waters around our coastline are being introduced it will be possible, for example, to identify where contaminating bacteria have come from and if they are from a human, animal or bird source.

Knowledge of what and where contaminating bacteria are and come from will help pin-point the most effective place for improvement investment.

Activated sewage sludge treatment can fail for many reasons and understanding which bacteria are active, why they fail and what is needed to nuture them will provide early warning, prevent failure, avoid pollution, create cost-saving efficiencies, lead to more effective operation and management of treatment works and reduce carbon emissions.

Identification of the right bacteria will, for example, enable them to be used to remove the rising levels of oestrogen now being found in rivers and the sea due to the widespread use of the contraceptive pill.