

Advanced Monitoring Techniques

Gold Coast Water is continuously evaluating and implementing ways to improve how water-related services are provided to the community. The development of efficient and sensitive tools for monitoring water quality improves confidence in product quality and enables a rapid response to potential problems.

Fluorescence as a tool for sensitive detection of failures in recycled water treatment plants and distribution systems

With the increasing use of recycled water there is a need for rapid and inexpensive monitoring tools to ensure water quality is maintained.

A fluorescence “fingerprint” can be used to characterise dissolved organic matter in treated wastewater and detect the presence of contaminants.

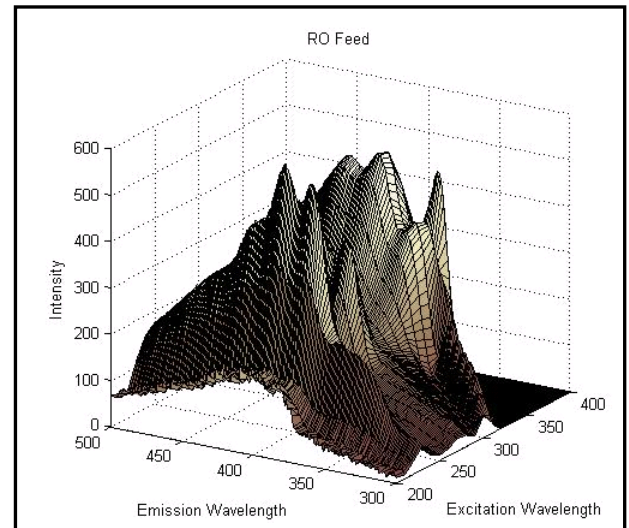
This project aims to develop techniques for online underperformance monitoring of treatment processes such as microfiltration and for identification of cross-connections between potable and recycled water supplies. The project will:

- Characterise fluorescence spectra for water samples from a range of sources including blended samples;
- Determine a fluorescence ‘fingerprint’ for the Pimpama Coomera dual reticulation system; and
- Transition developed technology from laboratory bench top equipment to a portable spectrometer.

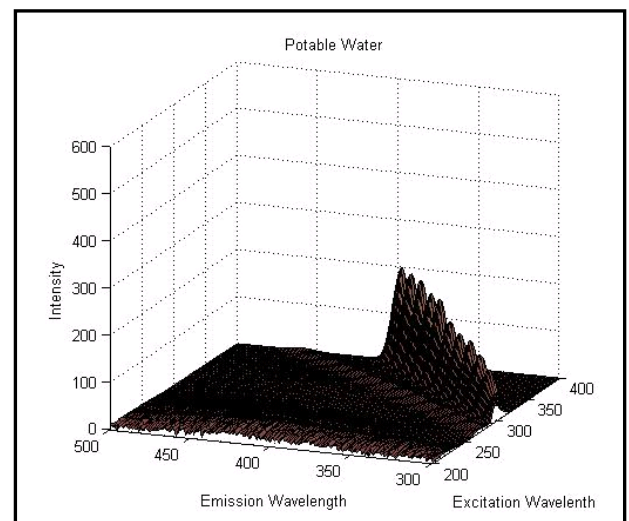
Gold Coast Water will host major field trials for this collaborative research work, to be conducted under an Australian Research Council Linkage Grant obtained by the University of NSW and 10 additional partner organisations.

This research is expected have significant benefits for public health, environmental protection and public confidence in the integrity of recycled water practices.

Fluorescence “Fingerprints” Characteristics



Above: Fluorescence ‘fingerprints’ characteristic for recycled water (pre-reverse osmosis) samples. (Figure: University of New South Wales).



Above: Fluorescence ‘fingerprints’ characteristics for potable water. (Figure: University of New South Wales).

Stability Sensor Development for Anaerobic Digestion

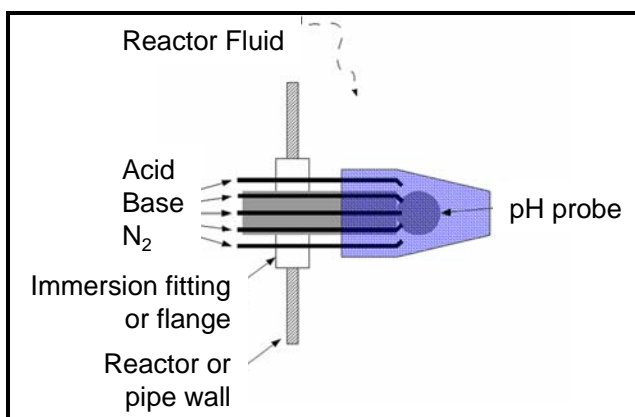
One of the biggest disadvantages of anaerobic digestion is a lack of an on-line stability sensor. Failure of the anaerobic digester can cause cessation of upstream operations and place the solid and liquid stream treatment in doubt.

Causes of failure are well understood. It is known that monitoring of volatile fatty acids concentrations can provide an early warning measure. However, off-line measurement is slow and expensive, and no online sensors are as yet available.

This project is run by the University of Queensland with funding collaborators including the Australian Research Council, Gold Coast Water and Brisbane Water. The project aims to:

- Develop a flexible and robust sensor for both volatile fatty acids and other potential stability indicators based on their acidity characteristics; and
- Apply the developed sensor to implement an overall stability indicator for digester operation.

Field trials will be carried out by researchers from University Queensland at the Elanora Wastewater Treatment Plant as well as Oxley Creek Treatment Plant (Brisbane).



Above: A conceptual design for an immersed sensor to be developed during the project. This sensor functions by titration in a thin film around the bulb of a pH probe. (Figure: University of Queensland).

Rapid Toxicity and Biological Oxygen Demand Measurement

This project focuses on the development of novel approaches for measuring toxicity and Biological Oxygen Demand (BOD).

In a collaborative project, co-funded by the Australian Research Council and Griffith University, researchers are establishing a redox-mediated test which will measure microbial respiration to indicate organism health.

The approach is being optimised for:

- Toxicity testing of trade waste and variable influent using organisms obtained from the activated sludge of the relevant wastewater treatment plant;
- A rapid BOD test using activated sludge; and
- A rapid early warning test for recycled and potable water.

Gold Coast Water employee Dr Kylie Catterall recently won the 2008 International Riversymposium Young Water Scientist Award for postgraduate research work on this project.

Further Information

For more information please visit www.goldcoastwater.com.au or alternatively contact the following research project officers:

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Project: Stability sensor development for anaerobic digestion.

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