RMIT UNIVERSITY

WATER: EFFECTIVE TECHNOLOGIES AND TOOLS (WETT) CENTRE

RMIT's WETT centre combines engineering and scientific approaches in a unique multidisciplinary way addressing three key research areas:

1. Water and wastewater treatment
2. Water resources and management
3. Biosolids and bioenergy

The WETT centre develops technologies and methodologies for managing the quality and quantity of water for our needs. They are actively engaged with the community, government and industry and conduct research to increase the availability of clean, safe water for public consumption and the environment.

Research expertise is supported by the enabling disciplines of engineering, environmental chemistry, ecotoxicology, biology, modelling, and renewable energy.

Water and wastewater treatment

Research in this area covers the treatment of drinking water and industrial and municipal wastewater, and water recycling.

Current projects

- Membrane technology for the treatment of wastewater
- Advanced oxidative and biological methods for the treatment of reverse osmosis concentrate
- Identification and prevention of formation of taste and odour in drinking water.
- Development of dual geothermal technology for the desalination of water sources
- Evaluation of biogas production potential of wastes.

Water resources and management

Research in this area covers the design of systems to manage the quantity, quality and distribution of water, whether potable, ground, waste or stormwater. Environmental impacts are also covered.

Current projects

- Reducing and monitoring blue-green algal blooms in wastewater treatment lagoons
- Development of a portable instrument for the rapid detection of pesticide residues in water
- Sustainable management of water in urban systems
- Development of appropriate microstructures to control biofouling of immersed surfaces.

Biosolids and bioenergy

Research in this area includes public health safety and plant nutrient value of biosolids, sustainable production of energy through the application of bioenergy systems

Current projects

- Mobility of organic contaminants in biosolids when applied to land
- Informing regulatory authorities about the microbial safety of biosolids during sewage treatment
- Novel and cost effective mixing technique for anaerobic digesters
- Application of biological systems for generation of bioenergy by anaerobic digestion
- Use of microalgae for generation of biofuels.

Further information

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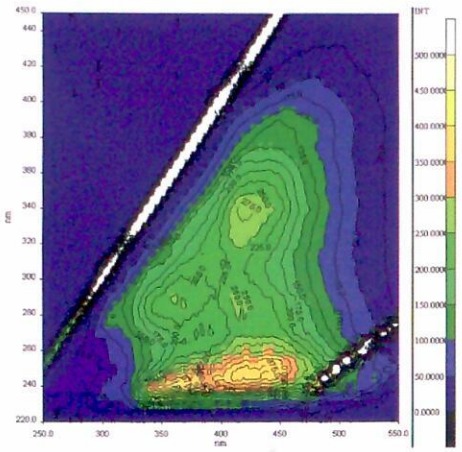
RMIT University was a Founding Member of the Cooperative Research Centre for Water Quality and Treatment, and also of its successor, Water Quality Research Australia.

WETT



Characterisation of organic membrane foulants.

Water treatment plant.

Desalination processes powered by renewable energy.

Testing nutrient uptake from biosolids in crops.

Recycling municipal effluent and wastewater

RMIT University has undertaken projects aimed at upgrading biologically treated wastewater as well as other wastewaters through removal of the organic content (which may also give undesirable colour), and where necessary, salt reduction. These projects draw on expertise in the characterisation of the organic components and their removal via various means including: coagulation, advanced oxidation processes (e.g. UV/H_2O_2, ozonation, electrochemical oxidation) and membrane-mediated processes (microfiltration and ultrafiltration).

A Smart Water Fund-supported project monitored the potential of microfiltration and ultrafiltration membrane fouling of treated water over a two-year period. The treated water from the activated sludge-lagoon system at Western Treatment Plant has a salt level that limits its long-term sustainable use. The effectiveness of the fouling control strategies combined with membrane treatment prior to reverse osmosis performance was measured. Results indicated prediction accuracy of 85% for microfiltration, and 86% for ultrafiltration. Further research on the characterisation of the effluent organic matter using various pre-treatments and low pressure membrane filtration processes is currently underway.

Desalination technology powered by solar thermal energy

Research into solar thermal desalination by the Energy CARE group is tackling major problems of fresh water shortage and rising salinity. By developing technologies and systems powered by a sustainable energy source, saline ground water or sea water can be treated using solar thermal energy.

The group is developing and evaluating the most promising desalination technologies such as evacuated tubular collectors and solar ponds. The use of renewable energy inputs overcomes one of the major hurdles facing conventional desalination technologies powered by fossil fuels: namely that fresh water is extracted from salt water at the expense of increased greenhouse gas emissions.

Salinity mitigation schemes in inland Australia could improve their overall economic viability using solar technology to produce fresh water together with concentrated salt solution for production of commercial salt.

Measuring the effectiveness of nutrient uptake from biosolids in crops

RMIT is investigating the reliability of current assumptions in managing nutrients in biosolids applied to land. The project is evaluating mineralisation rates of the organic nitrogen component. Mineralisation rates depend significantly the types of biosolids used, as well as climate. The project will also test assumptions that if the nutrient is applied in excess, the remainder (particularly nitrogen) is likely to leach into the subsoil. The field trials are also being compared to a controlled laboratory test.

Working with Western Water, Barwon Water and local farmers, field trials will examine very different soil types (a sandy loam and a clay loam) with two types of biosolids. To test the assumption that excess nutrient application will necessarily lead to leaching, a third field trial will be conducted in which biosolids are added to a wheat crop, at a rate considered to be in excess of nutrient requirement.