

The Wastewater Treatment Research Unit deals with all kinds of effluent and contaminated waters, such as plastic sludges, dye liquors, food processing wastes and contaminated soils and groundwater, and has specialist knowledge of anaerobic digestion. Our long experience of operating biological treatment plants at laboratory, pilot and full scale means that the Unit is ideally placed to investigate these areas.

The team also develops instruments for use in the wastewater field, for example for the on-line measurement of bicarbonate alkalinity, oxygen demand, active aerobic biomass and very low flow rates of gas.

**WWTRU offers expertise in;**

- **Anaerobic digestion**
- **Aerobic treatment technologies**
- **Advance Oxidation Processes**
- **On-line monitoring and control**
- **Instrumentation**
- **Analytical wastewater and water analysis**
- **Process selection and optimisation**



The Unit carries out research into advanced methods for the control of aerobic/anaerobic biotreatment processes using on-line instrumentation. Most of the work of the Unit involves industrial collaboration allowing research assistants and students to benefit from exposure to the commercial constraints felt by companies. The Unit runs the Waste Treatment Technology Network funded by the WDA to transfer this expertise to industry ([www.wastetech.net](http://www.wastetech.net)).

Funded by the Welsh Assembly Government in collaboration with Rhondda Cynon Taff County Council the Unit is reviewing the use of anaerobic digestion as a treatment solution for biodegradable municipal waste (BMW). The project aims to transfer industrial experience from continental Europe to UK, enabling Wales and the UK to gain from the advantages anaerobic digestion offers for the treatment of BMW.



The Unit has received significant funding from external bodies such as EPSRC, DTI, and European Union. With an EU grant we developed a remote

monitoring /control package for the management of small to medium size wastewater treatment plants in collaboration with United Utilities plc. and two SME's, Water Development Services (WDS) Ltd. and Camplas Ltd. In collaboration with WDS, the Unit was also funded through WRAP to investigate the performance of recycled glass for use in wastewater filtration.

We have recently completed an EPSRC funded project to investigate the use of two patented online biosensors, to monitor and control a pilot scale advanced oxidation (AOP) system treating textile wastewater. The instruments measure incoming oxidisable load and peroxide in an AOP using a Fe II membrane and UV/peroxide, giving a more effective process for treating a variety of recalcitrant products independent of composition. The Unit was also involved in the design and implementation of a full-scale upflow anaerobic sludge blanket (UASB) system to treat textile effluent. This demonstration project uses the on-line peroxide monitor to safeguard the anaerobic bacteria in the digester against H<sub>2</sub>O<sub>2</sub> present in the

textile wastewater. The project was funded under the DTI-BioWise programme, in collaboration with a local SME and textile manufacturer.



With the recent funding of three EU FP6 Marie Curie Fellowships and state-of-the-art LC MS/MS and molecular biology equipment, we are investigating the

composition of the biological consortia within waste bioreactors and their complex biochemical intermediates and pathways.

The Unit has investigated the use of the patented Bio Activity Assessment monitor (TerraBAM) in collaboration with several potential users. This work led on to a number of other projects including the measurement of biomass in soils and ground water for which we have gained EU/WDA funding. We are investigating the mechanisms of increasing the degradability and dewaterability of waste activated sludge and the production of hydrogen from sewage biosolids; both projects are funded by EPSRC in collaboration with Thames Water.

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