



**The Wales
Centre of Excellence
For Anaerobic Digestion**

The Wales Centre of Excellence for Anaerobic Digestion

Role and Activities

Cardiff City Hall, 11th November 2008

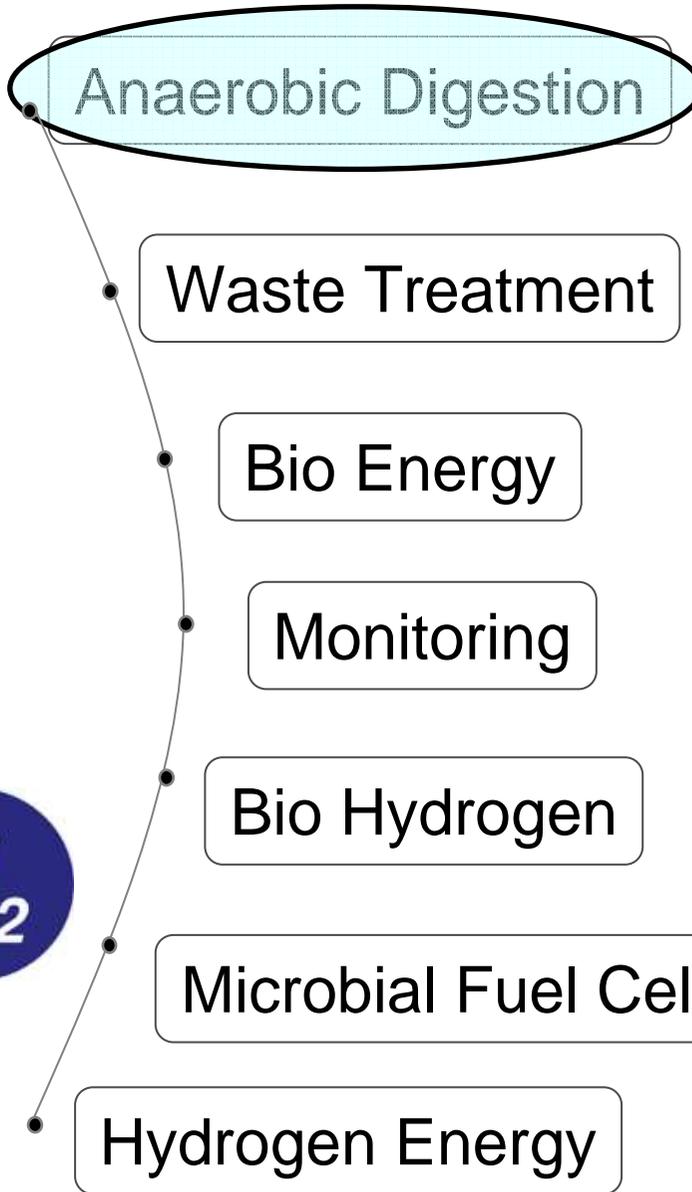


Llywodraeth Cynulliad Cymru
Welsh Assembly Government

S E R C
SUSTAINABLE
ENVIRONMENT
RESEARCH
CENTRE



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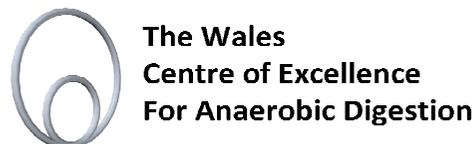
SERC and Anaerobic Digestion

- Over 35 years of R&D related to Anaerobic Digestion
- Agricultural, municipal and industrial wastes and wastewaters
- Reactor design
- Monitoring, modelling and control systems



IWA Specialist Group on Anaerobic Digestion – Western Europe Representative

UK Representative on the IWA-AD Task Group on Harmonisation of Anaerobic Biodegradability/ Activity/ Inhibition Test Methods



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Analytical, Monitoring and Modelling and Facilities

‘State of the art’ Chemical Analysis Suite

- UPLC MS/MS, SPME-GC MSMS, HS-GC, FTNIR, IC

Molecular biology Equipment

- Real-time PCR, DGGE

On-line monitoring/modelling and control facility

- Novel on-line instruments, MatLab, LabView, Simapro and EcoInvent



History of SERC and AD



- **EPSRC AD Research Facility**
(1986-94)
- Ice-cream effluent
(Bird's Eye Wall's)
- Instant coffee wastes
(Nestle)

EPSRC

Engineering and Physical Sciences
Research Council



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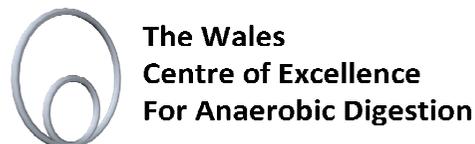


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History of SERC and AD

EU FP(4) Projects

- Development of an integrated process control system for a multi-stage wastewater treatment plant - Bakers Yeast Wastewater (1991-1994)
- Integrated water recycling and emission abatement in the textile industry (1996-1999)



History of SERC and AD

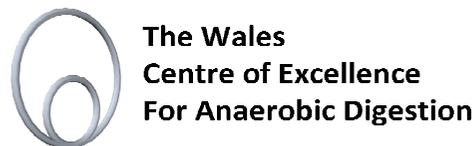


- Anaerobic Digestion of High Solid Content Waste (1994-1996)
 - Novel reactor design tested on market waste
 - Collaboration with ENEA-Italy

History of SERC and AD



Anaerobic Treatment of Textile Wastewater



Improving the Digestibility and Dewaterability of Sewage Sludge



EPSRC

Engineering and Physical Sciences
Research Council



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AD of BMW - Review

- Review published in May 2007
- Partly funded by WAG and RCT
- Includes a Summary of AD Site Visits
- AD Technology Status and Trends
- 20 European case studies
 - source separated BMW + other wastes – 9 plants
 - OFMSW + other wastes - 8 plants
 - industrial and agricultural organic wastes – 3 plants
- Lessons learned



Sustainable H₂ Production from Wheat Starch Based Co-products

- Feasibility of continuous fermentative H₂ production from wheatfeed
- Determine performance envelope including a second methanogenic stage
- Cost-effectiveness
- Contribution to the low carbon economy



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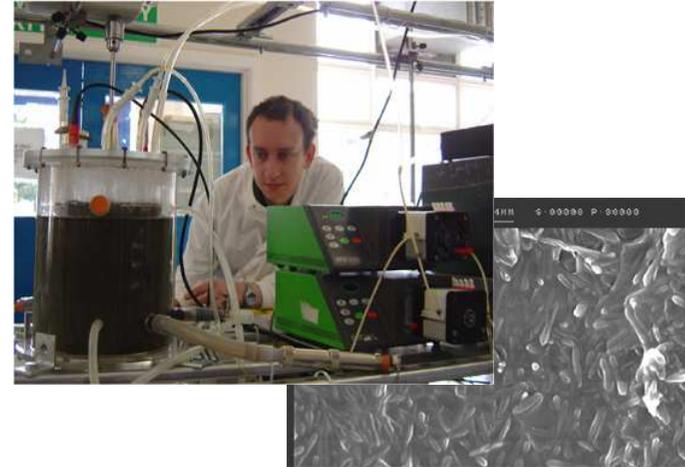


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Hydrogen Production from Sewage Biosolids

This approach uses:

- inoculum from natural sources
- non-sterile operation and mixed microflora
- batch start-up, then continuous operation
- temperature $\sim 35^{\circ}\text{C}$, operational conditions selecting for H_2 production (especially retention time, pH)
- a second methanogenic stage



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Role of the Centre of Excellence for Anaerobic Digestion



The centre will expand knowledge and expertise in AD systems and will help address the barriers for a rapid and successful deployment of AD facilities in Wales



Information, Dissemination and Awareness Raising Services

- Awareness raising and seminars
- Dissemination of best practice for AD
- Collation of information on AD technology suppliers/contractors for dissemination
- Developing AD publicity for general public
- Developing guidance for AD plant developers/procurer/planners and regulators
- Developing best practice for AD operators
- Support policy development
- Life cycle assessment of AD technologies and biogas utilisation

Technical and Analytical Support Services

- **Laboratory and Pilot Scale Testing**
 - Organic waste analysis and characterisation
 - Biodegradability and stability testing facilities
 - Biodegradability of kitchen waste collection bags
 - Digester inhibition
 - Biogas yield and biogas analysis
 - Biogas utilisation options

Technical and Analytical Support Services

- **Design and Commissioning**
 - Advice on reactor design and pre and post-treatment stages integration for optimised performance
 - Independent design reviews
 - Independent support for tender preparation and tender assessment
 - Plant commissioning and start-up
- **Monitoring and Management Support**
 - Process monitoring, optimisation and management
 - Digester 'Health Checks'

Thank you

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