What have cows got to do with waste water quality?

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Industry partnership leads to research breakthrough

Dr **Cynthia Carliell-Marquet (mailto:c.m.carliell@bham.ac.uk)** , lecturer and water researcher in the School of Civil Engineering, has been working with Severn Trent Water to better understand their anaerobic digesters and bioenergy output.

Anaerobic digesters play an essential role in wastewater treatment. They transform the sludge produced in other parts of the treatment process into methane (a highly useful end product) that can be used to generate electricity (bioenergy) or upgraded and injected directly into the gas grid (biomethane). The rate at which methane, and hence energy, is produced from the system can be limited by trace nutrient availability. An anaerobic digester is a living system, working in much the same way as a cow's gut. Both need the correct mix of bioavailable nutrients to perform effectively and to produce their end products!

An early success story, illustrating the industrial impact of this research, took place when the team identified a digestion site performing below its energy target. They concluded this was likely to be deficient in these valuable trace nutrients.

After 50 days of supplementing very small amounts of trace elements to that digestion site, the electricity production rose from 23% below target to 28% above target: the highest electricity output recorded from that site. The Renewable Energy Team at Severn Trent Water is so pleased with the results that they are reluctant to stick to the original plan of switching off the dosing system to test the effect of washing out the trace nutrients.

The research that led to this success story was carried out as part of an EPSRC CASE studentship, led by Dr Carliell-Marquet, in partnership with Severn Trent Water. The full impact of this research will shortly be transferred to the water industry, with secondment of the student, Farryad Ishaq, to Severn Trent Water in November 2011. The secondment has been funded through an EPSRC KTS (Knowledge Transfer Secondment) award that was won by Dr Carliell-Marquet earlier this year.

To find out about KTS opportunities and for more information on this project, please contact Dr David Boardman, KT Manager for the School of Civil Engineering.