Energy recovery from a high strength wastewater.

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Introduction
Activated sludge (AS), the current wastewater treatment, is an energy intensive process. Although effective, it does not harness the energy contained within wastewater. Bioelectrochemical systems are an alternative technology to AS, as they simultaneously recover energy while treating the wastewater.

Aims:
- Identify how far away the current systems are from industry
- Maximise energy recovery
- Run a pilot-scale bioelectrochemical system on site

How far from reality?
Bioelectrochemical systems are far from ready for industry. A review of the four published pilot-scale MECs has been done by comparison with an “Ideal” system which could replace activated sludge (AS).

Two types of bioelectrochemical systems:
- Microbial electrolysis cells (MECs)
  - Energy recovery in the form of hydrogen
- Microbial fuel cells (MFCs)
  - Energy recovery in the form of electricity

Maximising energy recovery
- 28 MFCs ran simultaneously
- 14 with acetate as the substrate, at 7 different COD values, ran in duplicates
- The equivalent done with high strength wastewater
- Aims to find the rate limiting step underway by improving hydrolysis and fermentation

Continuous fed pilot-scale MEC
- 36L continuous flow MEC
- Using return liquor for high COD
- Hydrogen recovery
- High COD increases energy recovery
- Any reduction in COD is financially beneficial
- Does not have to meet discharge standards (internal loop)

References


Wastewater”. 356500 – 509.