The BEACON Biorefining Centre of Excellence

A partnership between Aberystwyth, Bangor and Swansea Universities.

BEACON Biorefining Analytical Support Facilities at Aberystwyth University

Analytical support available to the BEACON Pilot facility is based within the main research unit on the IBERS Gogerddan campus at Aberystwyth University (AU). The laboratories host an extensive range of analytical equipment to support BEACON activities and are available to commercial partners.

These include:

**Bioconversion/fermentation:**
- Infors bench-top jacketed bioreactors 4 x 1 l and 2 x 10 l units (two with redox probes)
- Molecular capabilities for microbial strain selection and manipulation
- Design of experiments optimisation of fermentation systems for high value products
- On-line monitoring of live biomass using Aber Instruments biomass probes
- Multiple shaking incubators

**Processing:**
- Labman high-throughput robotic sample preparation for small scale biomass preparation and dispensing
- Cryomill for grinding biomass in liquid nitrogen
- GreenStar juicers for crude wet feedstock processing
- Rotary evaporators (1-5 l units)

**Analytical:**
- Analytical support from a variety of both standard and hyphenated techniques including:
  - GC/GC-MS, GC-MS, GC-FID
  - HPLC-MS, HPLC-RI, HPAEC
  - TGA, TGA-GC-MS, TGA-FTIR
  - YSI 2700 biochemistry analyser (sugars)
  - FTIR and NIR
  - Raman microscopy and electron microscopy
  - Enzyme assay systems

**Centrifugation:**
- CEPA LE bench top continuous clarifier for microbial harvesting
- Conventional centrifugation from 1ml to 1000ml
Cross-flow filtration:
• Sartoflow alpha bench-top UF system with cooled 10 l reservoir
• Sterlitech flat plate test rig for MF to RO development (3 plates in series or parallel), also with cooled 10 l reservoir
• Pall minimate TFF system

Applications
A wide variety of opportunities are available to develop commercial activities, including:
• Process development and scale-up
• Waste-stream valorisation
• Isolation of natural products and bioactives from plant biomass
• Development of novel enzyme systems
• Production of transport fuels from plant biomass
• Production and isolation of fine chemicals from plant biomass
• Production of precursors for bio-packaging
• Life cycle assessment, economic analysis and system optimisation associated with biorefining and the production of bio-products
• Cross-flow filtration to fractionate liquid feedstocks
• Analysis of plant biomass components