



A pilot scale facility for extracting, analysing and optimising chemicals from biomass and waste stream materials with integral industrial biotechnology and a food grade environment.



Pilot plant:

- **Primary Processing Unit (PPU)** – Juicing fresh feedstocks (100kg to 1 tonne/hr) and producing pressed material for further processing using bespoke continuous countercurrent extraction and belt drying systems (25-150kg/hr). Ambient stirred digestion of bulk materials in IBCs (250-1000 litres). Milling and densification of dried feedstock for fuel production including production of pellets for trials.
- **Downstream Processing Unit (DSPU)** – Food grade facilities for size fractionation of suspended and dissolved solids using pilot scale MF/UF/NF and Reverse Osmosis cross-flow filtration systems fitted with industrial sized spiral wound, ceramic and tubular membranes. Continuous solid-liquid and liquid-liquid separation capability using decanter, auto desludging disc-stack and separator centrifuges (50 to 2000 litres/hr). Preparation of food-grade quality extracts and concentrates.
- **Spray Drying** – Finished powder products (approx. 7 litres/hr). Steam explosion for pressurised hydrothermal pre-treatment of a range of different feedstocks (batch processing up to 20kg dry biomass per day).
- **Pilot Fermentation Unit (PFU)** – Food grade facilities for conventional fermentative and novel biotech products at an industrially relevant scale. Fermentation in 1 litre, 10 litre, 30 litre, 70 litre and 300 litre bioreactors.

Automated methane potential systems for assessing biogas potential of feedstock. Design of experiment (DoE) guided bioprocesses, capable of scale-up.

- **Clean Room** (including Product Finishing Area) – An ISO 7 level (high hygiene) area for finishing (purifying/crystallising/drying) and bagging small scale products (mg to kg) in a controlled atmosphere environment.

Industrial biotechnology suites:

- **The Industrial Biotechnology Acceleration Suite (IBAS)** – State-of-the-art microbial phenotyping and fermentation platforms for both aerobic and anaerobic microbiological applications. Phenotypic microarrays to identify novel microbes and characterise the metabolism of new production strains developed using synthetic biology approaches. Exploration of **Synthetic Biology** development routes and full analytical support.
- **Bio-Prospecting Suite (BPS)** – Extraction of samples at a range of scales (mg to kg). Laboratory scale fractionation (mg to kg) of semi-purified natural products and liquors. Accelerated solvent extraction for rapid extraction of natural product components and solvent evaporators for concentration and subsequent purification of natural products. High performance counter current chromatography system for rapid liquid-liquid separations.
- **Low Carbon Laboratory** – Eighteen LED-based illumination controlled growth chambers for controlled environment study such as modification of chemical composition.

Compositional Analysis facilities:

- Access to excellent facilities in the **Advanced Analysis Centre** for compositional testing at all stages of biorefining, bioprocessing and fermentation activities.

