<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Specs</th>
<th>Purpose</th>
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<tbody>
<tr>
<td>Parr Reactor</td>
<td>Parr</td>
<td>4557</td>
<td>- 5 Gallon/20L capacity (3.33 Gallon / 13.33L usable)</td>
<td>A versatile pre-pilot scale piece of equipment designed specifically for cell wall deconstruction of various kinds of biomass (e.g. Miscanthus, switchgrass, corn stover, etc.) using different combinations of temperature, acid or base or other physical or chemical treatments.</td>
</tr>
<tr>
<td>Fermenters, Advanced (3)</td>
<td>New Brunswick</td>
<td>BioFlo®/CelliGen® 115</td>
<td>- 1.3-14.0L autoclavable systems</td>
<td>These bench-scale fermenters/bioreactors are well-suited for a wide range of fermentation and cell cultures.</td>
</tr>
</tbody>
</table>
Fermenter

Manufacturer – New Brunswick
Model – BF-5000

Specs:
- 80L capacity (20-60L working capacity)
- Aerobic or anaerobic microorganism
- 316L stainless steel
- DO, pH, foam, level, temperature RTD sensors

Purpose: This pilot-scale fermenter is designed for culturing both aerobic and anaerobic organisms for a small-scale production of bacterial, yeast, plant, fungal, and algal cells. The unit is also able to be sterilized in-place.

Hammer Mill

Manufacturer – Schutte-Buffalo
Model – W-8-H

Specs:
- 10HP adjustable speed motor
- Suitable for multiple biomass grinding applications
- Integrated dust collection system
- Available screen sizes
  - 0.020” – 0.51mm
  - 1/32” – 0.79mm
  - 1/16” – 1.59mm
  - 3/32” – 2.38mm
  - 1/8” – 3.175mm

Purpose: Used for grinding and size reduction of various types of biomass samples.
Accelerated Solvent Extractor

Manufacturer – Dionex
Model – ASE 350

Specs:
- Automatically extract up to 24 samples (1-100mL each)
- Mixing and delivery of up to 3 solvents
- Temperature up to 200°C
- Pressure up to 1500 psi
- 250mL collection vials

Purpose: Extraction of solid and semi-solid samples using common solvents at elevated temperature and pressure.

Nitrogen Analyzer

Manufacturer – Elementar Americas
Model – rapidN Cube

Specs:
- Nitrogen (Protein) analysis using Dumas Method
- 60 Position auto-sampler
- Organic sample sizes up to 1 gram (liquid = 1mL)
- 4-5 minute analysis time per sample
- CO2 carrier gas
- 0.1 – 200 mg N absolute dynamic working range
- <0.5% rel. reproducibility (300 mg test substances)

Purpose: Used for the determination and quantitative assessment of protein and non-protein nitrogen in various biological samples.

Spectrophotometer

Manufacturer – Thermo-Scientific
Model – Evolution Array UV-VIS

Specs:
- UV and Visual Spectrum
- 8 cell auto sampler

Purpose: Used for microbial growth measurements, and quantitative measurements of various types.
Wet and Dry Corn Milling Equipment also available

3L bench top Fermenters

300L New Brunswick Fermenter