

Biomass Processing Core Equipment

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award amount: \$41,600

Biomass Processing Core Equipment

Situation: bioproduct/biomaterial/biofuel research is commonly dependent on sample processing approaches that require specialized equipment that is not typically a part of individual investigator laboratories.

Proposal: to obtain widely applicable “main-stream” sample processing equipment to enable bioproduct/biomaterial/biofuel research efforts.

PIs: Penner, Kelly, Murthy (OSU)

Biomass Processing Core Equipment

Biomass Processing Visions:

- Biomass components as source of carbon
- Biomass components as source of macromolecules
- Biomass components as source of macromolecular “building blocks”

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Biomass Processing Core Equipment

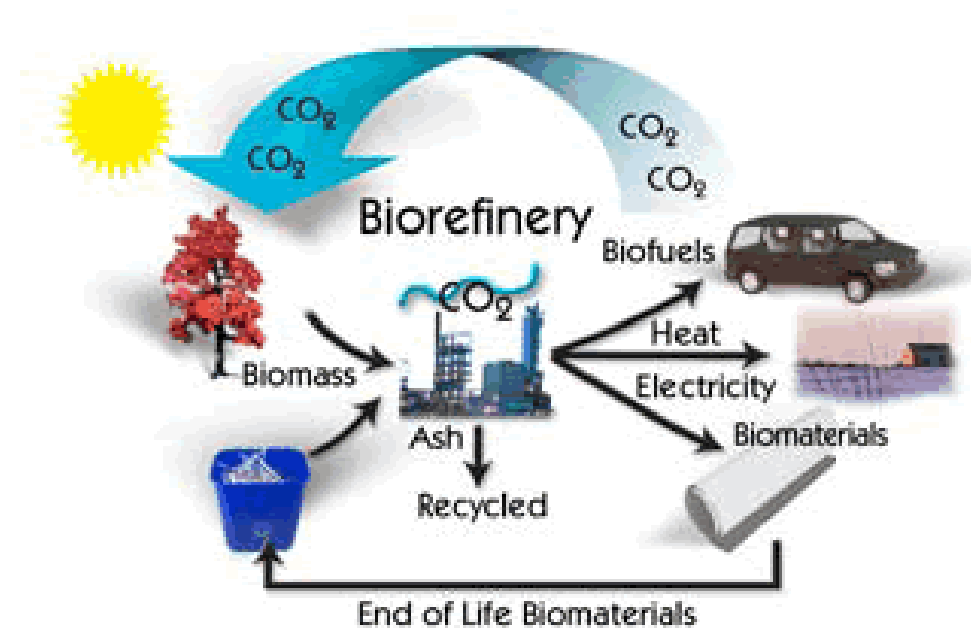


image from Oak Ridge National Laboratory web site: <http://www.ornl.gov/sci/besd/images/biorefinery.gif>

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Biomass Processing Core Equipment

Particle Size Reduction 1:

Knife Mill (Retsch SM100)

- soft, medium-hard, fibrous materials
- 1500 W motor, rotor speed 1390 rpm
- 5 liter receptacle
- Stainless steel cutting plates
- 0.25 – 8.00 mm bottom sieves



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Particle Size Reduction 2:

Ball Mill, Planetary (Retsch PM100)

- benchtop (single grinding station)
- 1250 W (high pulverization energies)
- 250 ml grinding jar (12-500 ml suitable)
- St. steel balls (5 mm – 30 mm)
- solvent & inert atm. compatible



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Particle Size Reduction 3:

Ultrasonic Liquid Processor (Sonics VCX-750)

- benchtop, 10 – 1000 ml volumes
- 750 watts at 20 kHz
- tips from 0.25 to 1.00 inch
- solvent & inert atm. compatible
- temperature controller



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Particle Size Distribution Determination:

Sieve Shaking System (Retsch AS200 digital)

- throw action sieve shaker (3D-sieving)
- as is for dry sieving (capable of wet)
- sample volume to 3 kg
- holds eight 2" H x 8" W sieves
- sample range <math><25 \mu\text{m}</math> to $>6.3 \text{ mm}$



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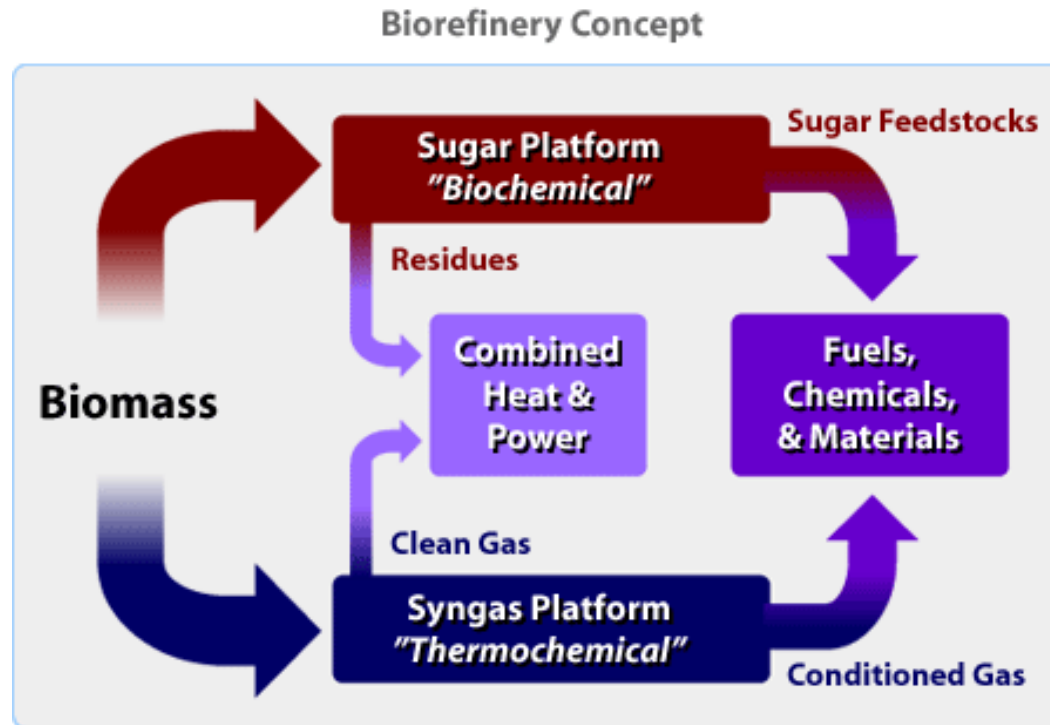


image from National Renewable Energy Laboratory web site: <http://www.nrel.gov/biomass/biorefinery.html>

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Pretreatment Accessories:

- Tubular reactor system components (~ 60 ml)
- Thermocouples
- Horizontal air flow oven



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Analytical Accessories:

- Soxhlet-extraction heating system (6 station)
- Filtration vacuum pump



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Relevant Research Projects:

- Biomass component analyses
- Biomass component fractionation
- Biomass conversion processing
- Mechanisms in biomass chemistry

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