

## Bio-Energy Testing and Analysis Laboratory (BETA Lab)

Biological and Agricultural Engineering Department (BAEN)

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<https://betalab.tamu.edu>

<b>Biomass Feedstock Analysis</b>	<b>Fee</b>
Sample Preparation / Size Reduction	\$32
Bulk Density (ASTM E873)	\$42
Proximate Analysis (Moisture, Volatile Matter, Fixed Carbon, Ash)	\$121
Moisture Analysis (ASTM E871-82)	\$27
Fixed Carbon (by difference after ASTM E871, E872 and D1102)	\$27
Ash Analysis (ASTM D1102-84)	\$27
Volatile Matter (ASTM E872)	\$53
Ultimate Analysis (C, H, N, S, O by difference)	\$137
Slagging and Fouling Determination* (Rs, Rf, Rb/a, BAI, AI) <i>*Requires ash preparation of sample.</i>	\$390
Eutectic Point Analysis* (Compressive Strength) <i>*Requires ash preparation of sample.</i>	\$525
Gross Calorific Value via Bomb Calorimeter (ASTM E711)	\$65

<b>Fuel Testing Analysis</b>	<b>Fee</b>
Acid Number of Petroleum Product by Potentiometric Titration (ASTM D664)	\$37
Cloud Point of Petroleum Products (ASTM D5773)	\$37
Water and Sediment (ASTM D2709)	\$37
Water using Volumetric Karl Fischer Titration (ASTM E203)	\$42
Flash Point by Pensky-Martens Closed Cup Tester (ASTM D93)	\$63
Kinematic Viscosity of Transparent and Opaque Liquids (ASTM D445)	\$63
Distillation of Petroleum Products (ASTM D1266)	\$68
Sulfur in Petroleum Product by Potentiometric Titration (ASTM D664)	\$68

<b>Gasification and Pyrolysis</b>	<b>Fee</b>
Fluidized bed gasification	\$3150/day
Fluidized bed pyrolysis	\$3150/day
Batch pyrolysis (Slow to Medium)	\$1575/day
Full-day fluidized bed gasification demonstration (mobile system)	\$6300/day

<b>Biooil Analysis</b>	<b>Fee</b>
Biooil Sample Preparation (depends on extent of dissolution / solvent extraction)	\$315
GC/MS Analysis (for sample injection-ready solvent extracted compounds only)	\$441/run
Hydrogenation Experiments (moderate pressure and temperature)	\$441/run
Hydrogenation Experiments (high pressure and high temperature)	\$683/run
Deoxygenation Experiments (using Micro-Berty Catalytic Reactor)	\$683/run

<b>Biochar Analysis</b>	<b>Fee</b>
BET Surface Area / Pore Volume Analysis	\$315
Adsorption / Absorption Isotherm Experiments	\$315

<b>Synthesis Gas / Greenhouse Gas Analysis / Anaerobic Digestion / Composting</b>	<b>Fee</b>
Complete syngas / biogas / GHG analysis using GC	\$315
Complete greenhouse gas analysis (CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O)	\$315

<b>Air Quality (Federal Reference Method)</b>	<b>Fee</b>
FRM PM <sub>2.5</sub> Measurement	\$630/day
FRM PM <sub>10</sub> Measurement	\$630/day
FRM Single Event Sampler (equipment rental only)	\$168/day
	\$525/week
	\$1470/month
FRM Continuous Sampler (equipment rental only)	\$189/day
	\$630/week
	\$1680/month
DJI Phantom (equipment rental only)	\$32/day
DJI Matrice 600 Pro (equipment rental only)	\$263/day

<b>Seed Oil Extraction Tests</b>	<b>Fee</b>
Solvent Extraction (8-hour runs)	\$300/day
Mechanical Oil Seed Press (5 kg/hr)	\$410/day
Ultra-sonication / Cell Lysis Algae Oil Extraction / Solvent Extraction	\$410/day

<b>Vegetable &amp; Animal Fat Oil Refining Tests</b>	<b>Fee</b>
Phosphorus	\$70/day
Degumming	\$140/day
Neutralization	\$140/day
Dewaxing	\$140/day
Bleaching	\$140/day
Deodorization	\$140/day

<b>Biodiesel Transesterification Experiments</b>	<b>Fee</b>
30-gallon Batch Reactor (maximum)	\$1380

<b>Fermentation and BMP Tests</b>	<b>Fee</b>
Complete Sugar Analysis (Using HPLC)	\$74
Complete Fermentation / BMP Experiment (5-day experimental runs)	\$3150/run

<b>Animal Manure Management Analysis</b>	<b>Fee</b>
Bacteria indicators Total Coliform Bacteria & E. Coli (water)	\$42
Bacteria indicators Total Coliform Bacteria & E. Coli (Manure Effluent / Slurry)	\$48
Bacteria indicators Total Coliform Bacteria & E. Coli (Manure Solids)	\$53
Manure Nutrient Analysis	\$32
Manure BOD / COD Analysis	\$32
Wastewater BOD / COD Analysis	\$32
Onsite Air Quality General Analysis	\$21
Odor and Total Volatile Organic Compounds	\$420
Complete Onsite Gas Detection and Measurement	\$289
Onsite Gas Detection and Measurement (select an item*) <i>*Hydrogen sulfide, ammonia, carbon dioxide, hydrogen sulfide, sulfur dioxide, nitrous gases, ozone measurement.</i>	\$26-\$79
Manure sampling (under 6 liters) when less than 100 miles**	\$184/trip
Manure sampling (under 6 liters) when greater than 100 miles**	\$289/trip

\*\*Coordinate with lab personnel for specific analysis/trip information.