

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

Biological and Agricultural Engineering Department (BAEN)

AgriLife Research, Texas A&M University

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<https://betalab.tamu.edu>

<b>Biomass Feedstock Analysis</b>	<b>Fee</b>
Sample Preparation / Size Reduction	\$30
Bulk Density (ASTM E873)	\$40
Proximate Analysis (Moisture, Volatile Matter, Fixed Carbon, Ash)	\$115
Moisture Analysis (ASTM E871-82)	\$25
Fixed Carbon (by difference after ASTM E871, E872 and D1102)	\$25
Ash Analysis (ASTM D1102-84)	\$25
Volatile Matter (ASTM E872)	\$50
Ultimate Analysis (C, H, N, S, O by difference)	\$130
Slagging and Fouling Determination* (Rs, Rf, Rb/a, BAI, AI) <i>*Requires ash preparation of sample.</i>	\$370
Eutectic Point Analysis* (Compressive Strength) <i>*Requires ash preparation of sample.</i>	\$500
Gross Calorific Value via Bomb Calorimeter (ASTM E711)	\$60

<b>Fuel Testing Analysis</b>	<b>Fee</b>
Acid Number of Petroleum Product by Potentiometric Titration (ASTM D664)	\$35
Cloud Point of Petroleum Products (ASTM D5773)	\$35
Water and Sediment (ASTM D2709)	\$35
Water using Volumetric Karl Fischer Titration (ASTM E203)	\$40
Flash Point by Pensky-Martens Closed Cup Tester (ASTM D93)	\$50
Kinematic Viscosity of Transparent and Opaque Liquids (ASTM D445)	\$60
Distillation of Petroleum Products (ASTM D1266)	\$65
Sulfur in Petroleum Product by Potentiometric Titration (ASTM D664)	\$65

<b>Gasification and Pyrolysis</b>	<b>Fee</b>
Fluidized bed gasification	\$3000/day
Fluidized bed pyrolysis	\$3000/day
Batch pyrolysis (Slow to Medium)	\$1500/day
Full-day fluidized bed gasification demonstration (mobile system)	\$6000/day

<b>Biooil Analysis</b>	<b>Fee</b>
Biooil Sample Preparation (depends on extent of dissolution / solvent extraction)	\$300
GC/MS Analysis (for sample injection-ready solvent extracted compounds only)	\$420/run
Hydrogenation Experiments (moderate pressure and temperature)	\$420/run
Hydrogenation Experiments (high pressure and high temperature)	\$650/run
Deoxygenation Experiments (using Micro-Berty Catalytic Reactor)	\$650/run

<b>Biochar Analysis</b>	<b>Fee</b>
BET Surface Area / Pore Volume Analysis	\$300
Adsorption / Absorption Isotherm Experiments	\$300

<b>Synthesis Gas / Greenhouse Gas Analysis / Anaerobic Digestion / Composting</b>	<b>Fee</b>
Complete syngas / biogas / GHG analysis using GC	\$300
Complete greenhouse gas analysis (CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O)	\$300

<b>Air Quality (Federal Reference Method)</b>	<b>Fee</b>
FRM PM <sub>2.5</sub> Measurement	\$600/day
FRM PM <sub>10</sub> Measurement	\$600/day
FRM Single Event Sampler (equipment rental only)	\$160/day
	\$500/week
	\$1400/month
FRM Continuous Sampler (equipment rental only)	\$180/day
	\$600/week
	\$1600/month
DJI Phantom (equipment rental only)	\$30/day
DJI Matrice 600 Pro (equipment rental only)	\$250/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	\$60/day
Degumming	\$120/day
Neutralization	\$120/day
Dewaxing	\$120/day
Bleaching	\$120/day
Deodorization	\$120/day

<b>Biodiesel Transesterification Experiments</b>	<b>Fee</b>
30-gallon Batch Reactor (maximum)	\$1200

<b>Fermentation and BMP Tests</b>	<b>Fee</b>
Complete Sugar Analysis (Using HPLC)	\$70
Complete Fermentation / BMP Experiment (5-day experimental runs)	\$3000/run

<b>Animal Manure Management Analysis</b>	<b>Fee</b>
Bacteria indicators Total Coliform Bacteria & E. Coli (water)	\$40
Bacteria indicators Total Coliform Bacteria & E. Coli (Manure Effluent / Slurry)	\$45
Bacteria indicators Total Coliform Bacteria & E. Coli (Manure Solids)	\$50
Manure Nutrient Analysis	\$30
Manure BOD / COD Analysis	\$30
Wastewater BOD / COD Analysis	\$30
Onsite Air Quality General Analysis	\$20
Odor and Total Volatile Organic Compounds	\$400
Complete Onsite Gas Detection and Measurement	\$275
Onsite Gas Detection and Measurement (select an item*) <i>*Hydrogen sulfide, ammonia, carbon dioxide, hydrogen sulfide, sulfur dioxide, nitrous gases, ozone measurement.</i>	\$25-\$75
Manure sampling (under 6 liters) when less than 100 miles**	\$175/trip
Manure sampling (under 6 liters) when greater than 100 miles**	\$275/trip

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