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## BioEnergy 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>

(Note: Please fill up last page of this fee schedules for all analytical requests needed.)

|                                                                                                    | Price (per run or test) |
|----------------------------------------------------------------------------------------------------|-------------------------|
| <b>Biomass Feedstock Analysis</b>                                                                  |                         |
| <input type="checkbox"/> Sample Preparation/Grinding                                               | \$25                    |
| <input type="checkbox"/> Ultimate Analysis (C, H, N, S and O by difference)                        | \$110                   |
| <input type="checkbox"/> Proximate Analysis (Moisture, Volatile Matter, Fixed Carbon and Ash)      | \$100                   |
| <input type="checkbox"/> Moisture Analysis (ASTM E 871 - 82- Standards)                            | \$20                    |
| <input type="checkbox"/> Fixed Carbon (by difference after ASTM E871, E872 and D 1102)             | \$20                    |
| <input type="checkbox"/> Ash Analysis (ASTM D1102-84 Reapproved 2007)                              | \$20                    |
| <input type="checkbox"/> Volatile Matter (ASTM E872-82 Reapproved 2006)                            | \$40                    |
| <input type="checkbox"/> Eutectic Point Analysis (by compressive strength)                         | \$320                   |
| <input type="checkbox"/> Acid Soluble Lignin Concentration (NREL Procedure)                        | \$320                   |
| <input type="checkbox"/> Structural Carbohydrates and Lignin in Biomass (NREL Procedure)           | \$320                   |
| <input type="checkbox"/> Gross Calorific Value via Bomb Calorimeter (ASTM E711-87)                 | \$50                    |
| <b>Seed Oil Extraction Tests</b>                                                                   |                         |
| <input type="checkbox"/> Mechanical Oil Seed Press (5 kg/hr)                                       | \$350/day               |
| <input type="checkbox"/> Solvent Extraction (8-hour runs)                                          | \$250/day               |
| <input type="checkbox"/> Ultra-sonication/Cell Lysis Algae Oil Extraction/Solvent Extraction       | \$350/day               |
| <b>Vegetable &amp; Animal Fats Oil Refining Tests</b>                                              |                         |
| <input type="checkbox"/> Degumming                                                                 | \$100/day               |
| <input type="checkbox"/> Neutralization                                                            | \$100/day               |
| <input type="checkbox"/> Dewaxing                                                                  | \$100/day               |
| <input type="checkbox"/> Bleaching                                                                 | \$100/day               |
| <input type="checkbox"/> Deodorization                                                             | \$100/day               |
| <input type="checkbox"/> Phosphorus                                                                | \$50/day                |
| <b>Biodiesel ASTM D6751 Tests</b>                                                                  |                         |
| <input type="checkbox"/> Kinematic Viscosity of Transparent and Opaque Liquids (ASTM D445)         | \$50                    |
| <input type="checkbox"/> Acid Number of Petroleum Product by Potentiometric Titration (ASTM D 664) | \$30                    |
| <input type="checkbox"/> Sulfur in Petroleum Product by Potentiometric Titration (ASTM D644)       | \$55                    |
| <input type="checkbox"/> Distillation of Petroleum Products (ASTM D 1266)                          | \$55                    |
| <input type="checkbox"/> Flash Point by Pensky-Martens Closed Cup Tester (ASTM D93)                | \$40                    |
| <input type="checkbox"/> Sulfate Ash from Lubricated Oils Additives (ASTM D 874)                   | \$55                    |
| <input type="checkbox"/> Cloud Point of Petroleum Products (ASTM D 5773)                           | \$30                    |
| <input type="checkbox"/> Water and Sediment (ASTM D 2709)                                          | \$30                    |
| <b>Biodiesel Transesterification Experiments</b>                                                   |                         |
| <input type="checkbox"/> 30-gallon Batch Reactor (maximum)                                         | \$1000                  |
| <b>Engine Dynamometer Testing</b>                                                                  |                         |
| <input type="checkbox"/> Engine Performance Testing                                                | \$1000/day              |
| <input type="checkbox"/> Engine Exhaust Emissions Testing                                          | \$1000/day              |

**Fluidized Bed Gasification/Pyrolysis Testing**

|                                   |       |            |
|-----------------------------------|-------|------------|
| □ Fluidized bed gasification runs | ..... | \$2500/day |
| □ Fluidized bed pyrolysis runs    | ..... | \$2500/day |

**Fluidized Bed Gasification Demonstration (Mobile System)**

|                                                     |       |            |
|-----------------------------------------------------|-------|------------|
| □ Full-day fluidized bed gasification demonstration | ..... | \$5000/day |
|-----------------------------------------------------|-------|------------|

**Synthesis Gas/Greenhouse Gas Analysis**

|                                                                                             |       |       |
|---------------------------------------------------------------------------------------------|-------|-------|
| □ Complete syngas analysis using gas chromatograph                                          | ..... | \$250 |
| □ Complete greenhouse gas analysis (CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O) | ..... | \$250 |

**Biooil Analysis**

|                                                                                         |       |       |
|-----------------------------------------------------------------------------------------|-------|-------|
| □ Biooil Sample Preparation (depending upon extent of dissolution/ solvent extraction)  | ..... | \$250 |
| □ GC/MS Analysis (for sample injection-ready solvent extracted compounds only, per run) | ..... | \$350 |
| □ Hydrogenation Experiments (moderate pressure and temperature, per run)                | ..... | \$350 |
| □ Hydrogenation Experiments (high pressure and high temperature, per run)               | ..... | \$550 |
| □ Deoxygenation Experiments (using Micro-Berty Catalytic Reactor, per run)              | ..... | \$550 |

**Biochar Analysis**

|                                              |       |       |
|----------------------------------------------|-------|-------|
| □ BET Surface Area/Pore Volume Analysis      | ..... | \$250 |
| □ Adsorption/Absorption Isotherm Experiments | ..... | \$250 |

**Fermentation Tests**

|                                                               |       |            |
|---------------------------------------------------------------|-------|------------|
| □ Complete Sugar Analysis (Using HPLC)                        | ..... | \$60       |
| □ Complete Fermentation Experiments (5-day experimental runs) | ..... | \$2500/run |

**Air Quality PM Measurements**

|                                                |       |       |
|------------------------------------------------|-------|-------|
| □ FRM PM <sub>10</sub> Measurements (per day)  | ..... | \$500 |
| □ FRM PM <sub>2.5</sub> Measurements (per day) | ..... | \$500 |

**Animal Manure Management Analysis**

|                                                                                 |       |           |
|---------------------------------------------------------------------------------|-------|-----------|
| □ 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     |
| □ Onsite gas detection and measurement (bundle*)                                | ..... | \$275     |
| □ Onsite gas detection and measurement (selected item*)                         | ..... | \$25-\$75 |

(\*One of the hydrogen sulfide, ammonia, carbon dioxide, hydrogen sulfide, sulfur dioxide, nitrous gases, and ozone measurement. Please contact for specific sample analysis information.

Beta Lab can help develop new test requests not available above in consultation with the Lab Coordinator and Dr. Capareda:  
Lab Coordinator: Eunice Arzadon: Email: [elarzadon@tamu.edu](mailto:elarzadon@tamu.edu)

Please use the other form (BETA-LAB-Test-Request-Form-01) for Specific Requests and Billings.