

CORE FACILITY FOR ECOLOGICAL ANALYSES

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- Services
- Rates
- Sample Submission
- Equipment
- Staff



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The Core Facility for Ecological Analyses is located in the Department of Plant Biology in Life Science II 417. The Facility owns and operates several instruments to support basic research efforts throughout Southern Illinois University. The Facility offers sample analysis by facility personnel and offers training to students who wish to gain experience operating the instruments. The Facility's services are also open to external research.





OI Analytical Flow Solution IV



Shimadzu GC-8A



Shimadzu GC-2014



Varian Spectra AA 220FS



Thermo Scientific Flash 2000 Elemental Analyzer



Triology 7200 Fluorometer



Shimadzu Total Organic Carbon/Total Nitrogen Analyzer

Samples

Procedure

Inorganic N and P

This instrument is for filtered liquid samples only: water, soil extracts, or digests. This instrument can analyze: ammonium (NH₄⁺), nitrite + nitrate (NO₂⁻/NO₃⁻), nitrite only (NO₂⁻), orthophosphate (PO₄³⁻), and total N and/or P following persulfate digestion. Inorganic N and P concentrations are calculated as elemental concentrations and should be reported as NO₃-N, NH₄-N, and/or PO₄-P.

OI Analytical Flow Solution IV (OI Analytical Corp., College Station, TX, USA).

Preparation requirements: Samples must be filtered through a 0.4 µm membrane prior to analysis. We recommend using polycarbonate membranes to filter samples as Whatman filters can contain ammonium.

Submission requirements: Each sample must be labeled with a date, investigator name, project name, ID system, and background solution (e.g. 2 N KCl or H₂O).

TOC, TC and/or TN

This instrument is for filtered liquid samples only: water or extracts. This instrument can analyze: Total Organic Carbon (TOC), Total Carbon (TC), and Total Nitrogen (TN). The primary configuration uses a high salt combustion tube, for samples such as 0.5 M K₂SO₄ soil extracts. The instrument must be reconfigured with a standard combustion tube for water samples.

Shimadzu TOC-L/TNM-L (Shimadzu Corp., Kyoto, Japan).

Preparation requirements: Samples must be filtered through a 0.4 µm membrane prior to analysis. We recommend using polycarbonate membranes to filter samples as Whatman filters can contain ammonium.

Submission requirements: Each sample must be labeled with a date, investigator name, project name, ID system, and background solution (e.g. 0.5 M K₂SO₄ or H₂O).

Gas Analyses: CO₂ and N₂O

These instruments are for gas samples only.

Shimadzu GC-8A and GC-2014 (Shimadzu Corp., Kyoto, Japan).

These instruments can analyze nitrous oxide (N₂O) and high concentrations of carbon dioxide (CO₂). The GC-2014 contains an electron capture detector (ECD) and the GC-8 contains a thermo-conductivity detector (TCD). Both instruments require manual injection and there is a 7 minute sample run time. Contact the facility if you wish to analyze samples for these gases.

Samples

Procedure

Total CN, CHN, CHNS and/or O

Thermo Flash 2000 CHNS/O Elemental Analyzer (CE Elantech Corp., New Brunswick, NJ, USA).

This instrument can analyze solid or liquid samples (requiring special preparation) for percent carbon (C), nitrogen (N), hydrogen (H), sulfur (S), or oxygen (O) using dry combustion followed by gas chromatography. The primary configuration of the instrument is for CN. The instrument must be reconfigured to analyze samples for H, S, and O. Separate samples must be submitted for each of the desired configurations: CN, CHN, CHNS, or O.

Preparation requirements: Solid samples must be dried and ground to a fine powder. We recommend using a mixer mill ("ball-grinder") or mortar and pestle to achieve a powder-like consistency (spice/coffee grinders and Wiley mills are not adequate for sample homogenization). Samples must be weighed on a microbalance (00.000 mg) into a tin capsule. Capsules should be condensed to a "square-like" package to prohibit sample rolling, spilling and to remove excess air from the sample. It is recommended that tin capsules are purchased directly from CE Elantech. Samples should be housed in well-plates or individual vials.

Contact the facility for appropriate weights to use. The following are general guidelines for plant tissues and soil:

- Percent CN in solid samples: Appropriate sample weights are determined by the percent of the element in the sample (e.g., soil with %C < 10% use 40.000-80.000 mg; organic soils like peat use ~10.000 mg; plant tissue use 5.000-10.000 mg).
- Percent CHN/CHNS in solid samples: Approximately 2.000 mg
- Percent O in solid samples: Approximately 2.000 mg

Other types of solid samples include filter papers and animal tissues, please contact us for more information.

Liquid samples can be analyzed by placing absorbent in the foil cup and pipetting in a small amount of liquid sample. The tin cup must then be sealed. Please contact us for more information.

Submission requirements: Each sample plate must be labeled with a date, investigator name, project name, ID system, and type of sample. Corresponding weights for each sample must be submitted. The facility will prepare standards and checks.

Samples

Procedure

Fatty Acids

Shimadzu GC-2010 (Shimadzu Corp., Kyoto, Japan).

This instrument is used for the analysis of Fatty Acid Methyl Esters (FAME) in hexane.

This instrument is equipped with a Flame Ionization Detector (FID) and an Omegawax 250 Column (30m x 0.25mm i.d. x 0.25 μ m film). Current analyses have focused on soil microbial Phospholipid Fatty Acids (PLFA). Contact the facility for more information.

Flame Atomic Absorption Spectroscopy

Varian Spectra AA 220FS (Varian Inc., Palo Alto, CA, USA).

This instrument is used for the analysis of chemical elements, typically metals, in a solution. Contact the facility for more information

Chlorophyll a, Rhodamine Water Tracing, or Chromophoric Dissolved Organic Matter

Trilogy 7200 Fluorometer (Turner Designs, San Jose, CA, USA).

This instrument is for liquid samples only, either water or extract solutions. Contact the facility for more information.