

MICRO-ANALYSIS, INC.

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Elemental Analysis Methods

All of our Elemental Analysis methods are based on mass. Samples are weighed on calibrated micro-balances and certified standards are used to calibrate the instruments and standardize methods.

% CHN and %S

CHN and S Elemental Analyzers

The sample is combusted in a pure oxygen environment; the gases are carried through the system by helium, converted and measured as CO₂, H₂O, N₂ and SO₂. The product gases are separated under steady-state conditions and are detected by Thermal Conductivity or IR. The C, H and N methodologies based on the Pregl (CH) and Dumas (N). (CHN: [ASTM D5291](#)).

Precision: +/- 0.30 % LOD: < 0.10%

% Oxygen

Organic Oxygen by Pyrolysis

Material is pyrolyzed, acid gases are filtered and detection is made by IR with an automated analyzer or by gravimetric determination (Unterzaucher method). These methods are for organic materials only: [ASTM D5622](#). Elements that may interfere with oxygen analysis: high fluorine >30%, metals

Precision: +/- 0.30 % LOD: < 0.10%

% Sulfur and Halogens % Br, Cl, F and I

Ion Chromatography

Samples are put into solution by Oxygen Flask Combustion converting the halogen to its ionic form (bromide, chloride, etc.). The solution is diluted, filtered and injected into the instrument; data is collected and then calculated.

Precision: +/- 0.30% LOD: < 0.10% (Iodine LOD <0.25%)

Nitrogen Kjeldahl (micro)

This method is applicable to all compounds where nitrogen is linked to carbon or hydrogen. Compounds containing nitrogen linked to nitrogen or to oxygen or sulfur cannot be determined by this method. The sample is digested in sulfuric acid containing potassium sulfate and catalyst. The digest is distilled into caustic and the ammonia is titrated against standard acid.

Precision and LOD vary based on N concentration and sample weight.

Precision: +/- 0.020% LOD: < 0.020%

Trace Nitrogen and Sulfur

Antek 9000NS Analyzer

The sample is vaporized and combined with oxygen at a temperature in excess of 1200°C. The conversion of chemically bound nitrogen to NO and of sulfur to SO₂ is quantitative.

The combustion gases are routed through a membrane drying system to remove all water and then to the detector modules for quantification.

Nitrogen is detected by way of Chemiluminescence and Sulfur by UV- Fluorescence.

Nitrogen: [ASTM D5762](#) Sulfur: [ASTM D5453](#)

RSD: 10% LOD: < 10 PPM

Inorganic Analysis

ICP

Inductively Coupled Plasma is an emission spectrophotometric technique. An aqueous sample solution is pumped and atomized with argon gas into hot plasma. The sample is excited, emitting light wavelengths characteristic of its elements. A mirror reflects the light through the spectrometer on a grating that separates the element wavelengths onto photomultiplier detectors.

Preparation: Aqueous solutions may only require dilution before introduction into the instrument. Non-aqueous solutions and solid materials require acid or bomb digestion.

RSD: 25% LOD: < 1 PPM

Take 10% off your first Elemental Analysis.

Here is how:

- 1) Call **(302) 994-6531** or click [here](#):
- 2) Mention: **10 PERCENT** to get it right away.

Alternative techniques similar to the listed methods may be employed.