Portable Elemental Analysis

- Food safety and agriculture solutions
Safe and nutritious food is of primary concern to everyone, from the farm to the table. The recent prevalence of contaminants and adulterated, counterfeit or fraudulent food has led to an increase in public awareness and government regulations.

Simple, routine and sophisticated science-based methods enable a reliable, precise, accurate, transparent and harmonious decision making process for safe and nutritious food the world over.

Bruker’s portable XRF solutions offer multi-element analysis with off-the-shelf or customized methods to provide actionable results at any stage of the food production process – from the presence of required elemental nutrients to threats from elemental and metal contaminants.

Bruker provides science-based portable XRF solutions for rapid, routine testing and in-depth research analysis for food and agriculture applications in the lab, factory or in the field.

Healthy soil, crops and food maximize farm-to-table safety, quality & profitability

Portable elemental analysis solutions for farm-to-table safety, quality & profitability

Sustainable and healthy soil, crops & food
- Elemental content, characterization & profiling

Food control management & inspection
- Quality analysis at critical control points for raw materials, during process and finished products
- Hazardous analysis at critical control points for intentional & incidental adulterants and metallic contaminants

Characterize fields quickly and non-destructively for optimized planting
- Analyze elemental composition of soil to confirm healthy and sustainable fields
- Determine elemental properties of area soil, irrigation source and fertilizer for optimized crop quality and yield
- Compare quality and yield of various seed brands or fertilizer mixes
- Analyze elemental nutrient content in plants and leaves
Generate elemental maps in 2D or 3D with portable XRF data

Examine fertilizer and treatment effectiveness
- Research elemental properties of soil and fertilizer placement to determine maximum yield mixes in support of regional farming
- Optimize surface treatments such as Ca, Cl, S on produce for preservation of product from farm to market to minimize financial loss
- Analyze elemental nutrient content of solid, powdered or liquid organic and manufactured fertilizers before field distribution

Screen for toxic metals in water, soil & plants
- Monitor heavy metals (Pb, As, Hg and more) in-situ and in real time
- Determine toxic metal concentrations in water, soil, sediments and crops with matrix-matched standards
- Profile phytoremediation effectiveness by characterizing toxic metal uptake in soil remediation plants such as Indian Mustard (for Cd, Pb, Se, Zn, Hg, Cu, 137Cs), White Willow (for Cd, Ni, Pb), Sunflower (for Pb, Zn), Hemp (Cd, Pb, Ni 137Cs) or Ladder Brake (for As)

QC/QA incoming material as well as in-process and finished products
- Determine elemental nutrient content in products such as Se or Mo in dietary supplements or Fe in animal feed
- Analyze elemental food content for fortificants such as Fe and Ca in milk liquid and powder or I in salt
- Screen raw materials and finished products for metals such as Pb, Hg or As
- Identify intentional or incidental adulterants such as Pb or Cr colorants or As and Br from pesticides

Positive Material Identification (PMI) of incoming stock, in-process materials and finished products
- Check for hazardous elements in food packaging such as plastics, polymer films, tins, cans, and cardboard packs
- Confirm metal and alloy grades of incoming and in-service piping, tubing, components, parts and welds
- Monitor blending, grinding and mixing operations for metal contamination
- Check heavy planting, harvesting and transportation equipment & machinery components to ensure safe and durable alloy grades

Screen all Food Contact Materials (FCMs)

Pass/Fail results for incoming, in-process or end products

Generate elemental maps in 2D or 3D with portable XRF data

2D relative abundance plot of sulfur on a tomato
Portable elemental analysis for food & its production

Elemental analysis provides key information to help assure the presence of essential and beneficial nutrients and the absence of toxic metals in food, plants, soil, and water.

When you can’t bring samples to the analyzer, you can take Bruker’s Handheld XRF Analyzers (HHXRF) to them. These multi-element analyzers are ideal for in-situ research, screening heavy metals and elemental nutrients, or fast ID of alloys & metals in parts & processing equipment. They can even be pre-calibrated for customized applications.

Bruker portable XRF analyzer benefits

- Non-destructive measurement of sample material as-is or with minimal sample preparation
- Battery operated and ruggedized analyzers, ideal for remote locations, at-line and in-situ tests
- Off-the-shelf pre-installed calibrations for point-and-shoot testing with no user adjustments necessary
- Advanced data analysis software for qualitative and custom or user generated quantitative analysis
- Low operation and maintenance costs with no hazardous waste disposal requirements
- Powerful, green alternative to traditional ICP and AAS atomic spectroscopy methods

Point-and-shoot handheld XRF

Our S1 TITAN point-and-shoot HHXRF provides fast results in composition, pass/fail or Y/N for Mg to U in soil, dry plant matter, incoming biomaterial, and final food products for well-defined and standard materials and methods. Options for off-the-shelf or custom calibrations are available. The S1 TITAN is a workhorse for fast metal and alloy ID of incoming and in-service piping, tubing, components, parts, and welds.

Field portable elemental analysis

Our portable Tracer Analyzer with air, helium or vacuum beam paths and customizable filters provides lab-like qualitative and quantitative analysis of elements from sodium to uranium. The advanced Tracer XRF enables detection limits of the lightest elements at detection limits lower than standard HHXRFs. Its versatility enables research and methods development for multi-element analyses with custom SRMs for soil, fertilizers, seeds, plants, crops & treatments, liquids and more.
Health & safety, quality & yield, profitability & sustainability
Bruker portable XRF analyzers can help reach your objectives

**Farming**
- Soil
- Seeds
- Irrigation
- Fertilizers
- Treatments
- Plants & feed

**Processing**
- Raw materials
- Mixes/blends
- Stored goods
- Equipment
- Waste

**End products**
- Beverages
- Snacks & condiments
- Grains
- Supplements
- Packaging

**Materials**
- Liquids, slurries & powders
- Soil, sediment & sludge
- Cellulose, polymers & paper
- Solids, metals & alloys

**Measurements**
- Nutrient content
- Nutrient profiling
- Elemental composition
- Elemental mapping
- Fortificant content
- Adulterant content
- Heavy metal content
- Metallic contaminants
- Alloy grade ID

**Nutrients & fortificants**
- Manganese (Mn)
- Iron (Fe)
- Copper (Cu)
- Zinc (Zn)
- Selenium (Se)
- Molybdenum (Mo) & more

**Fertilizers & treatments**
- Sodium (Na)
- Phosphorus (P)
- Sulfur (S)
- Potassium (K)
- Calcium (Ca) & more

**Heavy & toxic metals**
- Arsenic (As)
- Mercury (Hg)
- Thallium (Tl)
- Lead (Pb)
- Uranium (U) & more

**Time to measure**
- Minimal to no sample prep
- Screen content in seconds
- Measure content in minutes
- Analyze for actionable results

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