

Battelle Analytical Sciences

FOOD AND BEVERAGE CHEMICAL CHARACTERIZATION AND ANALYSIS



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Characterizing Food Additives

Rising consumer and regulatory concerns are putting pressure on food and beverage makers and their natural ingredient suppliers to produce safer food products. Chemically, many natural ingredients are highly complex formulations with thousands of individual components that are challenging to characterize. Battelle has conducted the complete characterization of processed commodity food additives with a suite of contemporary chemical analysis methods combined with innovative statistical data evaluation techniques to determine whether a modified additive significantly changes the final product. Our methods allow suppliers to demonstrate that their new, safer products are substantially equivalent to their original formulations—except for the intended change.



BECAUSE YOUR BRAND IS BUILT ON YOUR INGREDIENTS

Sometimes, protecting the integrity of your brand requires an in-depth analysis of your ingredients and formulations. At Battelle, we conduct complex mixture analysis of food and beverage products to answer critical questions for manufacturers and suppliers, like:

- Have counterfeit, contaminated or inferior-quality ingredients made their way into my supply chain?
- Will changing one ingredient in my formulation produce unanticipated effects?
- What change in my product chemistry is suddenly causing problems such as off-flavors, off-odors or shortened shelf life?

Whether you are seeking a solution for an emerging problem with a product, considering a change to your formulation or production process, or verifying the authenticity of raw ingredients from a new supplier, our analytical chemists can give you the accurate, objective and confidential answers you need.

CLEAR ANSWERS FOR COMPLEX QUESTIONS

Our complex mixture analysis services are backed by extensive experience, state-of-the-art instrumentation and advanced statistical methods that go far beyond the capabilities of most commercial labs. This means we provide not only data but also the information you need to draw conclusions and make informed decisions.



We apply the sophisticated analytical and statistical methods developed for forensic science and national security to the science of foodomics. When characterizing food and beverage samples, we use multiple analytical methods to generate thousands of data points. Combined, these multiple methods of analysis create a unique characteristic pattern that defines sample properties down to the molecular level. Then we apply Statistical Equivalency Testing to compare the fingerprints of different samples and determine whether they can be considered equivalent. By comparing the established patterns of different samples, we can identify changes that result from the introduction of new production methods or raw material sources.

- Get a complete chemical characterization of your product using multiple, integrated analytical technologies
- Quantitatively assess flavor and odor profiles using objective, scientific methods
- Identify unknown changes or contaminants in your formulation—even if you're not sure what you're looking for
- Demonstrate statistical equivalence of ingredients or formulations for regulatory purposes



OUR METHODS

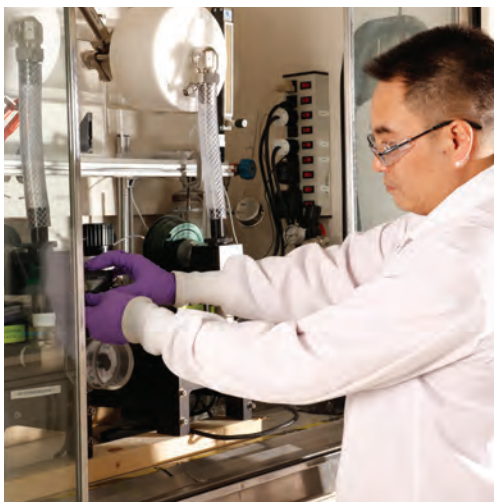
We use highly sensitive instrumentation to provide a more accurate, complete and reproducible chemical profile. These methods can be applied to a wide variety of complex natural products or food additives. Each array of methods is specifically chosen to exploit the chemical profile of the product matrix to be characterized.

Analytical methods include:

- Two-Dimensional Gas Chromatography coupled with Time of Flight Mass Spectrometry (GCxGC-TOFMS) for extractable volatile and semi-volatile small molecules, lipids, essential oils, flavonoids and other related compounds
- Two-Dimensional Gas Chromatography coupled with High Resolution Mass Spectrometry (GCxGC-HRMS) characterization for volatile and semi-volatile small molecules
- Liquid Chromatography coupled with High Resolution Mass Spectrometry (LC-HRMS) for polysaccharides, proteins and other larger molecules
- Solid Phase Micro Extraction (SPME) GCxGC-TOFMS for volatile molecules including odor constituents
- Gas Chromatography-Pulsed Flame Photometric Detection Analysis (GC PFPD) for nitrogen and sulfur compound profiles
- Nuclear Magnetic Resonance Spectroscopy (multinuclear NMR) for complete bulk characterization
- Gel Permeation Chromatography (GPC) characterization for larger molecule and macromolecular weight distributions
- Gas-Chromatography/Mass Spectrometry (GC-MS) and Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) for trace-level targeted analysis for compounds of regulatory or toxicological interest
- Ion Chromatography (IC) for various ionic species
- Ion Chromatography for salts and inorganic acids
- Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for trace metals
- Ultraviolet-Visible Absorbance Analysis (UV-Vis Spectroscopy) for matrix absorption profiles
- ICP-MS for heavier elemental analysis
- Physical parameters including percent solids, water content, pH, color and viscosity

Analysis for Public Safety: French Fries

A police officer and his wife purchased French fries from a fast food restaurant. The officer recognized the person preparing the fries as someone he had arrested previously. The wife later noted that the French fries “smelled and tasted funny.” The police department impounded cooked and uncooked french fries, used and unused cooking oil and a cleaning agent located near the deep fryer and sent them to Battelle for analysis. Data generated for the suspect cooking oil and french fries were identical to the corresponding data generated for the control matrices. There was no evidence that the suspect samples had been adulterated with the cleaning agent. Battelle was able to detect trace quantities of a different chemical in the cooked potatoes. This turned out to be a harmless chemical commonly used to inhibit potato eye development.



Ready to find out more?

Contact us to find out how we can help you answer your product formulation questions.

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