



Providing Complete Solutions for Food Safety, Quality, and Authenticity

AGILENT SUPPLIES INSTRUMENTS, SOFTWARE, CHEMISTRIES, AND MORE

The stakes are high in the food industry. When bad things happen to food, people die. Companies go bankrupt. Brands disappear. What's more, the globalization of the food supply has expanded the range of contaminants that may be present in foods, whether chemical, viral, bacterial, or microbiological.

According to the World Health Organization, the most common food borne illnesses include norovirus, salmonella, listeria, and sickness caused by unpasteurized dairy products, tainted beef, fish, and poultry. While many of these illnesses are somewhat transitory, causing severe but temporary gastrointestinal symptoms, they can also cause chronic, life-threatening symptoms including neurological, gynecological, or immunological disorders, organ failure, cancer, and death.

As a result, governments, trade organizations, and health-care agencies around the world are implementing more stringent standards on food testing and analysis.

Agilent answers the call

Agilent has a long history of developing solutions to validate the quality, safety, and authenticity of food and agricultural products. The company provides sophisticated screening and analysis technologies to government agencies, industry, and private laboratories around the world. It also collaborates with leading institutions to develop next-generation tools and methods to help safeguard the global food chain.

Agilent solutions cover sample preparation, testing, and analysis—the whole start-to-finish process—and can identify contaminants in measurements as small as one part per trillion. How small is that? If you were to take the distance from earth to the moon, a part per trillion would be roughly one inch.

Agilent solutions are also used to answer difficult questions about the nature and origins of various products: Is this pure fish oil or has it been adulterated with canola oil? Is this olive oil truly extra-virgin? Is it truly Italian? Does this package contain whitefish from the North Atlantic, or is it really catfish from Louisiana? (Once the head, tail, and skin have been removed, it's hard to tell without the help of exacting scientific instruments.) What is its nutritional value?

FOOD-TESTING TECHNOLOGIES

GC, GC/MS - GAS CHROMATOGRAPHY and GAS CHROMATOGRAPHY/MASS SPECTROMETRY technologies are used to identify and separate contaminants from food products.

LC, LC/MS - LIQUID CHROMATOGRAPHY and LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY technologies are used to identify and separate contaminants from different types of food products.

ICP MS - INDUCTIVELY-COUPLED PLASMA MASS SPECTROMETRY technologies are used to identify elemental contaminants such as trace metals and non-metals.

PCR | LAB-ON-A-CHIP ANALYZERS - Used to obtain DNA “fingerprints” enabling identification/confirmation of species of fish, meats, and other products, as well as bacterial pathogens.

ICP OES – INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROSCOPY is widely used to analyze the quality of soils for the agricultural industry.

TOF-MS – TIME OF FLIGHT MASS SPECTROMETRY is used to evaluate the safety of can coatings in the food industry.

4100 HANDHELD | PORTABLE FTIR – MOBILE FOURIER TRANSFORM INFRARED SPECTROSCOPY is now being used in the field to measure samples and achieve near-instantaneous identification of contaminants in liquid and solid food.

Common contaminants

Pesticides

Most fruits and vegetables are protected from insects during growth by chemical pesticides. Agilent gas and liquid chromatographs, often used in tandem with mass spectrometers, are widely employed to screen produce and verify that banned pesticides are not present and Maximum Residue Levels are not exceeded.

Mycotoxins

Produced by fungi that can grow on food products such as peanuts, spices and corn, mycotoxins are widely regarded as some of the most serious naturally occurring toxins that can contaminate the food supply. Agilent LC and LC/MS systems are used to detect and measure this important class of contaminant to ensure that stringent regulatory limits are enforced.

Melamine

When added to dairy products, this industrial chemical can establish an illusion of higher protein content. It can also trigger kidney stone formation and kidney failure in humans and animals. Agilent has developed methods to quickly detect and measure melamine in dairy products, wheat, rice, and corn products.

Metals

Trace metals like arsenic are contained in many foods, either naturally or as a result of pollution. While trace amounts of some metals are important nutrients, higher concentrations can be extraordinarily toxic. Methylmercury, for example, is a naturally occurring element found in fish and shellfish, but is harmful when present in elevated quantities.

Additives

A wide variety of additives are used to enhance the shelf life, color, texture, and flavor of various food products. Fatty acids, for example, occur naturally in the body, but are harmful when consumed in large quantities. Agilent’s GC/MS methods for analyzing various compounds, along with other more complex samples such as fish oils and hydrogenated fats, are commonly used in the food-processing industry.

Food processing and packaging

While packaging is intended to protect food and enhance freshness, compounds such as plastic linings in cans may migrate to the food contained inside. Many of these compounds are suspected carcinogens and associated

with other health problems. Agilent provides sensitive analytical technologies to monitor foods for these contaminants.

Fish species identification

Agilent has developed a unique method for identifying fish fillets even after the species' usual identifiers (the head, tail, and skin) have been removed. The method incorporates lab-on-a-chip technology to minimize expense, and speed-up/simplify DNA testing for routine fish species testing.

Veterinary drugs

Drugs commonly administered to livestock and poultry to prevent or treat illness and enhance growth are strictly regulated in the commercial production of milk, eggs, fish, meat, and other products. Various configurations of Agilent LC/MS systems are used to detect and measure these compounds, even in very minimal quantities.

Soil

Proponents of sustainable farming are placing considerable emphasis on fast, accurate, and precise testing of agricultural soil to detect harmful elements. As a result, instruments such as Agilent's ICP-OES systems have become widely used for reporting the health of soils in the agricultural industry.

Consumer products

Phthalates, commonly used plasticizers, can increase the flexibility of children's toys and baby products. However, studies have shown that phthalate exposure may disrupt hormonal development and can lead to early puberty, reproductive defects, and other health problems. As a result, government agencies in the United States, China, and the European Union have enacted bans on six restricted phthalate esters commonly used in children's toys and other items. Agilent's advanced detection instruments deliver excellent levels of sensitivity for impurity analysis and allow manufacturers to quickly and easily validate methods and results to ensure global compliance.

Mobile food-testing solutions

To further expedite the routine testing and analysis of food, Agilent has launched a collection of mobile solutions. Now, scientists, technicians, and food-safety regulators can bring the accuracy, precision, and sensitivity of large-scale laboratory instruments into the field for immediate results. They can identify and measure contaminants in food and food ingredients, verify and authenticate ingredients, and eliminate counterfeit or out-of-spec materials on-site—before they are ever released to the public.

To learn more, visit Agilent's [Food Testing & Agriculture](#) website.

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