YOUR FOOD TESTING CHALLENGES SOLVED

With a broad, trusted microbial and chemical analysis portfolio used by food testing heroes everywhere.

Merck has brought together the world's leading Life Science brands, so whatever your life science problem, you can benefit from our expert products and services.

Millipore®

Preparation, Separation,
Filtration & Monitoring Products

The Millipore® portfolio of Merck offers an ecosystem of industry-leading products and services, spanning preparation, separation, filtration and monitoring – all of which are deeply rooted in quality, reliability and time-tested processes. Our proven products, regulatory and application expertise are a strong foundation you can rely on to consistently perform at the highest level.

Milli-Q®

Lab Water Solutions

The Milli-Q® portfolio of lab water solutions of Merck takes care of all your water quality and purity needs. Our solutions are backed by consistent quality and full compliance and work seamlessly together, letting you focus on your vital work.

Sigma-Aldrich®

Lab & Production Materials

The Sigma-Aldrich® portfolio of Merck offers a strong and ever-expanding offering of lab and production materials. Through our technical support and scientific partnerships, we help connect our customers with a whole world of progress.

Supelco®

Analytical Products

The Supelco® portfolio of analytical solutions of Merck is developed by analytical chemists for analytical chemists to ensure your results are accurate, precise and reproducible. Every product is meticulously quality-controlled to maintain the integrity of your testing protocols and, with our dedicated scientists, the expertise you need is always on hand.

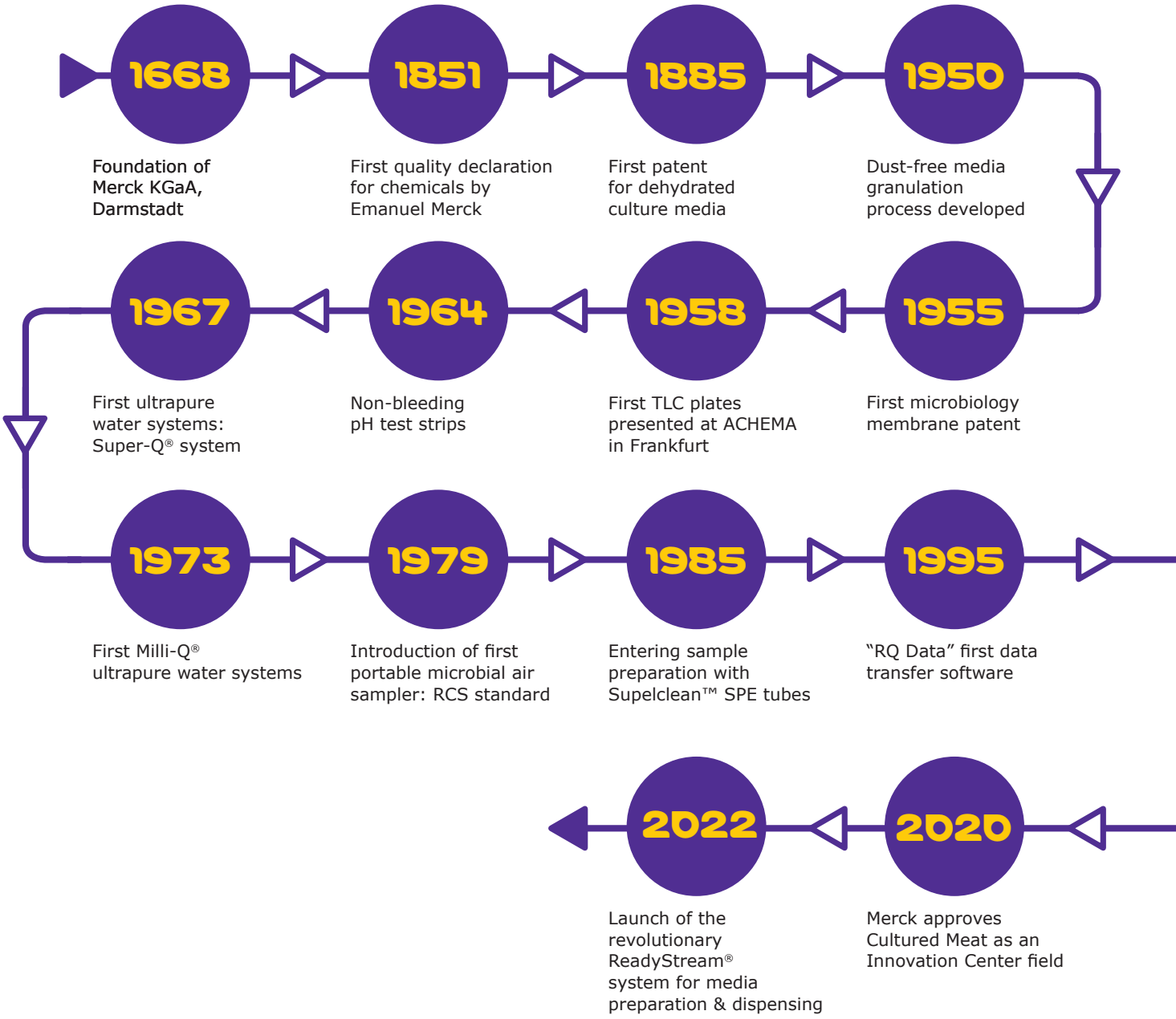
Consumer safety is your top priority and as a leading provider of life science solutions, it’s ours too.

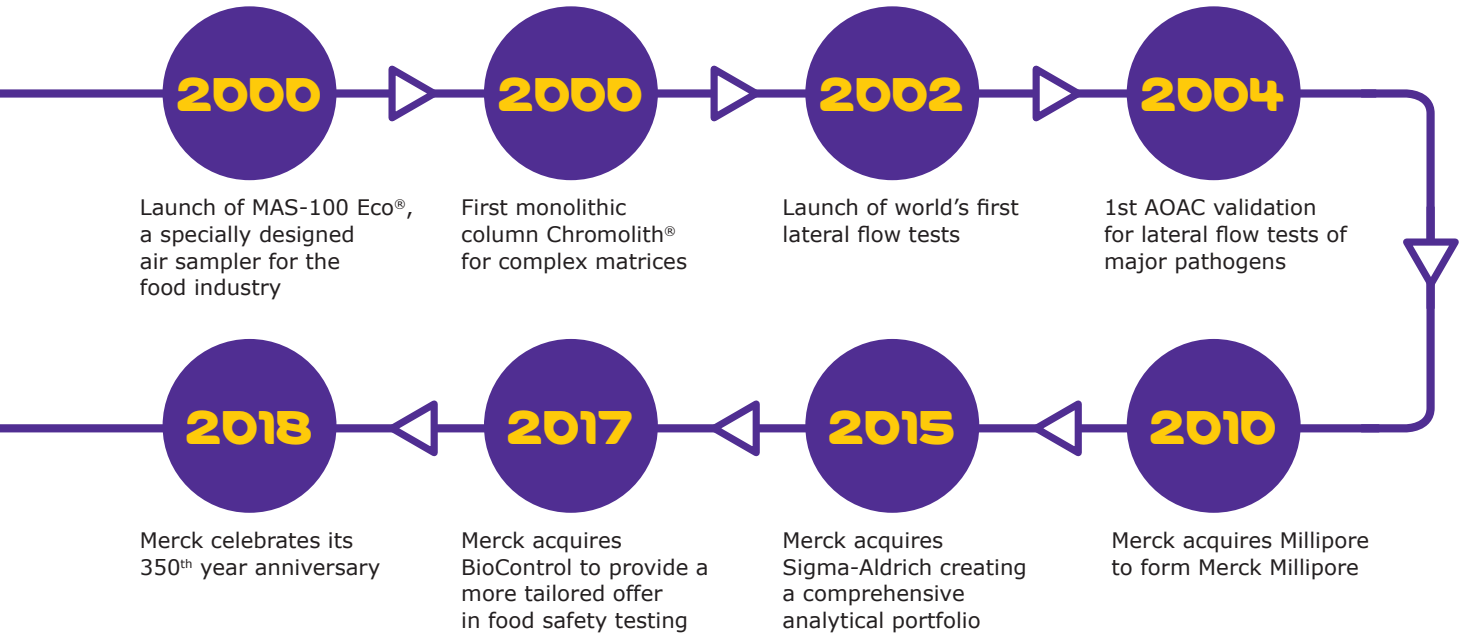
You require speed and reliability in food and beverage testing, so we provide dependable, connected and rapid solutions specifically tailored for the industry.

You need solid solutions for challenges anywhere in your safety testing workflow, so we offer broad and complete portfolio solutions for your specific processes.

SigmaAldrich.com/FoodTestingHero

A LONG HISTORY OF INNOVATIONS AND MILESTONES




2000
Launch of MAS-100 Eco®, a specially designed air sampler for the food industry
2000
First monolithic column Chromolith® for complex matrices
2002
Launch of world's first lateral flow tests
2004
1st AOAC validation for lateral flow tests of major pathogens
2010
Merck acquires Millipore to form Merck Millipore
2015
Merck acquires Sigma-Aldrich creating a comprehensive analytical portfolio
2017
Merck acquires BioControl to provide a more tailored offer in food safety testing
2018
Merck celebrates its 350th year anniversary

UNLOCKING REGULATORY COMPLEXITIES

In the food industry, where consumer safety is a major concern, stringent standards regulate the production environments. These regulations see many changes making it challenging to stay up-to-date.

Regulatory resources

On a regular basis, we provide webinars, whitepapers and articles about the latest regulatory changes for major regulations, such as ISO and FDA-BAM standards.

Visit our website to find regulatory resources that help you to stay compliant
SigmaAldrich.com/FoodRegulations

ENSURING FOOD SAFETY

Solutions to meet global needs

Driven by purpose-built solutions that combine world-class access, accuracy and expertise, we help you to streamline by providing reliable, efficient delivery of premium-grade consumables and testing components at the velocity essential for success. Microbial testing solutions, high-purity reagents, and chromatography systems that allow your work to be optimized to its full potential while being supported with compliance to very stringent international food regulations enable concerted efforts towards a safer and healthier world.

Microbial testing solutions

We provide products and services to support every step of your microbial testing workflow. Our microbial testing products and kits comply with international standards. Innovative products for rapid and reliable results like dehydrated and granulated culture media, ready-to-use agar plates, liquid media, molecular (PCR) or immunological solutions for the specific detection of pathogens such as *Listeria, Salmonella, Campylobacter, E. coli*. or quality indicator organisms can enhance the effectiveness of your environmental monitoring practices.

Learn more at
SigmaAldrich.com/FoodMicro

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Chemical testing solutions

Products for analytical chemists under the Supelco® brand continue to offer a high-quality, comprehensive portfolio for food analysis. With new features developed for digitalization like smart bottles and a test strip App for mobile phones we make your daily work easier, faster and safer. Our proficiency testing rounds, reference materials, and regulatory expertise help keep you in compliance now and as quality requirements evolve. Our portfolio includes chemicals and reagents, as well as products for chemical air monitoring, sample preparation, inorganic analysis and various chromatographic separations. We also offer you a mobile and photometric analysis portfolio for better control of water, soil or food testing. With us you can be sure your results are going to be accurate, precise, and consistent.

Learn more at
SigmaAldrich.com/FoodSafety

Supelco®
Analytical Products

WORKFLOW SOLUTIONS
for food testing heroes

STEP 1
Sample log in

STEP 2
Food sample preparation

Page 11

ANALYTICAL
SAMPLE PREPARATION

Sample prep.
- Samplicity®, Millex® filters
- SPE tubes and manifolds
- QuEChERS tubes, adsorbents and shakers
- SPME fibers and holders

Solvents and reagents
- LiChrosolv® HPLC solvents
- EMSURE® acids, bases, salts

Water purification
- Milli-Q® IQ 7003/05/10/15 pure and ultrapure water systems

Test strips and StripScan app
- MQuant® pH tests
- MQuant® test strips
- MQuant® StripScan app

MICROBIOLOGY
SAMPLE PREPARATION

Sample dilution
- DiluCult™ system
- Sample Homogenizer (ESH)

Microbiology enrichment and cultivation
- GranuCult® granulated culture media
- ReadyTube® Media
- ReadyStream® media preparation & dispensing system

Media performance testing
- Vitroids™ and Lenticule® Disc CRMs

Water purification
- Milli-Q® IX 7003/05/10/15 pure and ultrapure water systems

STEP 3
Sample analysis

Page 20

CHEMICAL SAMPLE ANALYSIS

Chromatography
- TLC, GC, HPLC, UHPLC plates, columns and accessories

General titration
- Titripur®, Titripac®

Karl Fischer titration
- Aquastar®

Spectrophotometry
- Spectroquant® test kits
- PROVE and NOVA spectrophotometer

Solvents and reagents
- LiChrosolv® HPLC solvents
- EMSURE® acids, bases, salts
- Ultrapur, Suprapur® high purity reagents for AAS/ICP
- Certipur® buffers
- Milli-Q® Lab Water Solutions

Disinfection residue checking
- MQuant® test strips
- Reflectoquant® strips and RQflex® 20 instrument
- Move colorimeter and Spectroquant® test kits

MICROBIOLOGY SAMPLE ANALYSIS

Pathogen detection
- Readybag® pre-weighed media pouches
- Assurance® GDS PCR detection system
- Lateral flow tests

Indicator organism testing
- MC-Media Pad® tests
- Dehydrated and ready-to-use culture media

Hygiene monitoring
- MVP ICON® ATP test
- MAS-100® air samplers
- LI settle plates
- Contact slides, dip & swabs
- RCS® High Flow Touch with Compressed Gas Adapter

Water purification
- Milli-Q® Lab Water Solutions

Standards and certified reference materials
- Vitroids™, Lenticule®
- TraceCERT®, Cerilliant®
- Matrix standards

STEP 4
Services

Page 33

Supporting documentation
- Certificates of analysis, Safety data sheets and Validation Guides, Milli-Q® System Validation

Proficiency testing

key ingredients

✓ Carrots
✓ Mushrooms
✓ Your Dedication to Safety

Your work is essential to bringing the world's food to the table.

We support you at every stage of the workflow with trusted, intuitive products and services for lab efficiency and regulatory compliance, backed by technical expertise and quality systems.

Unlock your solutions.

SigmaAldrich.com/FoodTestingHero

STEP 2

FOOD SAMPLE PREPARATION

Analytical sample preparation

When it comes to determining food quality and ensuring food safety, sample preparation is key to obtaining accurate chemical analyses such as HPLC, LC-MS or GC/MS.

Samplicity® G2 filtration system & Millex® filters

Many chromatography samples, especially in food and beverage, are viscous and/or contain high levels of particulates. If manual filtration is used, these samples can require excessive manual force, greater time per sample, and lower recovery — all reducing laboratory efficiency. In contrast, the Samplicity® G2 filtration system filters even highly viscous samples in seconds, with minimal manual force. Our 33 mm Millex® filters, compatible with the Samplicity® G2 filtration system provide a trusted quality for HPLC Sample preparation. Millex® filters are available in a variety of membranes, offer minimal hold-up volume, low extractables and low binding.

See our demonstration video at SigmaAldrich.com/Samplicity

Millipore®
Preparation, Separation, Filtration & Monitoring Products

Test strips and StripScan app

In sample preparation you often have to check the pH value of your sample. Now you can read out your MQuant® pH test strips in seconds with the StripScan app with higher precision and automatic documentation! Additionally, a broad variety of applications for various workstreams are available such as checking the quality of frying oils, ensuring the safety of your production line after disinfection, or testing the glucose content of your food.

Learn more at SigmaAldrich.com/mquant-stripscan

Supelco®
Analytical Products

Solid Phase Extraction (SPE) and QuEChERS

Depending on your matrix and analyte characteristics, we have a full range of SPE cartridges for rapid, selective sample preparation and purification prior to chromatographic analysis. For example, Supelclean™ EZ-POP NP cartridges offer superior cleanup for the extraction of heavy and light polynuclear aromatic hydrocarbons (PAHs) from edible oil matrices such as olive and corn oil while Supelclean™ Ultra 2400 was designed for the cleanup of extracts of dry commodities (tea, spices, coffee, etc.) prior to pesticide residue analysis.

In addition, we also offer a large portfolio of QuEChERS (Quick, Easy, Cheap, Effective, Rugged, and Safe) solutions e.g. Supel™ QuE Verde for analyzing challenging compounds in green matrices or Supel™ QuE Z-Sep for fat removal in difficult matrices.

Learn more at
SigmaAldrich.com/SPE

SPME

Solid phase microextraction is a fast, solventless alternative to conventional sample extraction techniques. In SPME, analytes establish equilibria among the sample matrix, the headspace above the sample, and a polymer-coated fused fiber, then are desorbed from the fiber to a chromatography column. Because analytes are concentrated on the fiber, and are rapidly delivered to the column, minimum detection limits are improved, and resolution is maintained. SPME is compatible with gas chromatography or HPLC and provides linear results for wide concentrations of analytes.

Overcoated polydimethylsiloxane–divinylbenzene (PDMS–DVB) SPME fibers are ideal for immersion extraction from food matrices. The over-coating offers protection to the SPME fiber, making it more resistant to physical and chemical damage. Also, it increases fiber selectivity for the smaller analyte molecules over macromolecules present in sample matrix.

Learn more at
SigmaAldrich.com/SPME

Solvents and reagents

Even simple dilution is a form of sample preparation. Use the best solvents and reagents to ensure your downstream results are as accurate as possible. Impurities in reagents used for trace metal analysis can compromise measurement accuracy. That's why all Ultrapur™, OmniTrace Ultra™, Suprapur®, and OmniTrace® inorganic reagents for wet digestion are carefully tested for purity.

Learn more at
SigmaAldrich.com/solvents

Supelco®
Analytical Products

Water purification systems

Milli-Q® Lab Water Solutions – Delivering quality to meet all your water purity needs

Purified water is a ubiquitous reagent in most of the analyses performed in the lab, and its consistent purity is of paramount importance for correct and reliable results. Because you need to focus on releasing accurate and reproducible results, we ensure you have the water at the quality you need.

The Milli-Q® portfolio offers a broad range of pure and ultrapure water systems for your food safety applications. The highest-quality ultrapure (Type 1) water is recommended for HPLC and LC-MS, as well as for ICP-MS and AAS, while pure (Type 2) water is required to prepare reagents and solutions.

Discover the Milli-Q® IQ 7003/7005/7010/7015 ultrapure and pure water system, designed to improve your productivity, reduce environmental impact, and provide unparalleled convenience and versatility in the lab.

- An optimized combination of purification technologies reliably delivers ultrapure and pure water quality, ascertained by state-of-the-art TOC and resistivity monitors
- Select pure water for your basic work and high-quality ultrapure water for your most sensitive analyses. Application Paks provide targeted removal of contaminants at the point of dispense: LC-Pak® polisher for LC-MS grade water, VOC-Pak® polisher for water free of volatile organics
- Completely mercury-free system with patented ech2o® UV lamps for both photo-oxidation of organic contaminants and bacterial control
- Milli-Q® IQ 7003 and 7010 systems awarded our Greener Alternative Product label as they are certified to consume less electricity, decrease plastic waste, and eliminate mercury handling

Learn more at SigmaAldrich.com/ milli-q-iq7003-05-10-15

Milli-Q®
Lab Water Solutions

Microbial sample preparation

Accurate microbiology results are highly reliant upon the quality of your sample preparation.

Learn more at
SigmaAldrich.com/Dilucult

Sample dilution

DiluCult™ automated gravimetric dilutor instruments with two integrated pumps, are designed to facilitate work in a microbiological safety cabinet for samples of up to 5 kg. They are low in height and have a removable drip tray. Three modes of dispensing are available: a fast flow with minimum accuracy, a standard flow with standard accuracy, and a slow flow with optimal accuracy. DiluCult™ and DiluCult™ 2 instruments can be easily calibrated with a certified weight.

Food sample homogenizer (blender)

The **Enrichment Sample Homogenizer** (ESH) is used for the automated homogenization of food samples with enrichment media. The ESH has two removable and autoclavable massaging paddles for straightforward cleaning.

- Multi-function digital display & control panel
- Variable speed and time
- Adjustable blending power
- Side-by-side paddle stop
- Silent, brushless motor
- Security drip tray
- Removable autoclavable paddles

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Microbiology enrichment and cultivation

Dehydrated culture media

The superior granulation technology of our traditional dehydrated culture media meets the highest industry performance standards, while guaranteeing that our products provide maximum convenience and safety.

GranuCult® ISO 11133: 2014 compliant granulated culture media

GranuCult® low-dust dehydrated culture media granules are compliant with EN ISO 11133:2014 standards, as well as other ISO standards and FDA-BAM and USDA-FSIS methods for food and water sample testing. GranuCult® media are released through an ISO 17025 QC lab. Compliance is clearly visible on the product label and all test strains are listed in the certificate of analysis.

SigmaAldrich.com/granucult

Ready-to-use culture media

Prepared and ready-to-use culture media products can save you time and resources, while ensuring that your media is fully compliant with the regulations relevant to your industry. Whether you need to carry out pathogen testing or indicator organism testing in food, beverage or water samples, we have a full range of liquid media and pre-filled agar plates suitable for your needs.

ReadyTube® liquid media

Compliant with EN ISO 11133:2014, our ready-to-use media in tubes and bottles for isolation, enumeration or enrichment of microorganisms. The clear naming convention where the number indicates the volume in mL of media contained in each bottle or tube makes it simple (e.g. ReadyTube® 200 — each bottle in the pack contains 200 mL of media).

SigmaAldrich.com/readytube

Refer to page 13
for information on our water purification systems and solutions suitable for culture media preparation.

Cultivation of anaerobic bacteria

Many microorganisms involved in food and beverage contamination are anaerobes, microaerophiles or capnophiles such as *Clostridium*, *Campylobacter* or *Lactobacillus*.

Anaerocult® systems produce the anaerobic, microaerobic and capneic growth conditions that are required for cultivation of these microorganisms.

SigmaAldrich.com/anaerocult

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Certified reference microorganisms

Vitroids™ and LENTICULE® discs

Take the hassle out of your culture media performance testing and quality control.

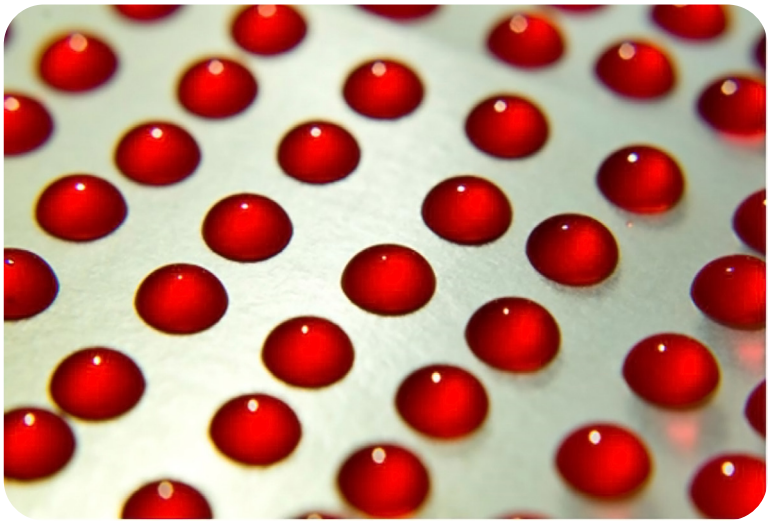
Certified reference materials make your quality control tests quick, convenient and consistent. Provided as ready-to-use discs in convenient CFU levels, there is virtually no prep needed: simply place the disc onto or into the media of your choice, rehydrate for 10 minutes, and process as normal. It's as easy as that!

Learn more at
SigmaAldrich.com/MiBi-CRM

Streamline your media performance testing and daily quality control:

- Ready-to-use at convenient CFU ranges
- No dilution required
- Quick rehydration in 10 minutes
- 1+ year shelf life in standard -20 °C freezer
- Complete with comprehensive certificate of analysis

Use for media performance testing, method development and validation, process quality control and for employee training and proficiency testing.



Supelco®
Analytical Products

ReadyStream® media preparation & dispensing system

Culture media at the push of a button—the ReadyStream® system has revolutionized media preparation and dispensing. Up to 100 liters of pre-heated media can be conveniently prepared when and where needed. In an initial 20-minute step gamma-irradiated dehydrated media is rehydrated by adding sterile filtered water in a semi-automated way. This creates 10x concentrated media stock which consequently provides the 10-fold volume when dispensed by the ReadyStream® system. Thanks to this true workflow innovation you can benefit from the following advantages:

Time savings

- Less than 20 min to prepare up to 100 L of media
- No autoclaving as dehydrated media has been gamma-irradiated in its bag
- Pre-heated media is instantly delivered at the temperature you specify

Streamlined workflow

- ISO compliant GranuCult® culture media (buffered peptone water)
- Easy to handle 10x concentrated media (3 L bag for 30 L media; 10 L bag for 100 L)
- 5-day shelf life of concentrated media once rehydrated
- Seamless connection to Milli-Q® pure water system for water intake

Improved ergonomics and minimal space requirements

- Easy to carry and store dehydrated media bags
- Small footprint for easy integration into lab (also suitable for laminar flow hood)
- No need for a media kitchen

Learn more at
SigmaAldrich.com/ReadyStream

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Water purification systems

Milli-Q® IX Pure Water System

Pure water is the predominant component of microbiology media formulations. Special care must be taken to select the correct water quality as contaminants, such as heavy metals, chlorine, ammonia and bacteria, may impact the growth of your microorganisms of interest.

Learn more at SigmaAldrich.com/milli-q-ix

The Milli-Q® IX pure water system can reliably and reproducibly feed your Type 2 pure water needs thanks to:

- Constant, reliable pure water quality that meets Pharmacopeia and ISO requirements, including EN ISO 11133:2014, and is optimal for culture media preparation and ELISA tests.
- Simple and intuitive dispensing at the touch of a finger. Obtain water at the flow rate you need, or program your desired volume and walk away.
- Easy data management and traceability. View water quality and system data onscreen, download individual reports, or access a complete history in the system's memory.
- Effortless maintenance. The system notifies you when it requires attention, and onscreen graphic instructions provide step-by-step guidance.

Milli-Q®
Lab Water Solutions

Key Ingredients

- ✓ Fat Analysis
- ✓ Allergen Testing
- ✓ Your Dedication to Safety

Your work is essential to bringing the world's food to the table.

We support you at every stage of the workflow with trusted, intuitive products and services for lab efficiency and regulatory compliance, backed by technical expertise and quality systems.

Unlock your solutions.

SigmaAldrich.com/FoodTestingHero

STEP 3

SAMPLE ANALYSIS

Chemical sample analysis

A rapid analysis for a number of parameters can be done by reflectometry. More precise are the HPLC and UHPLC methods presented for toxin and pesticide screening (MS-detection); Karl Fischer (KF) methods for water determination; Atomic Absorption Spectroscopy (AAS), Inductively Coupled Plasma (ICP) methods for metal content determination; GC methods for fatty acid methyl esters (FAME); and different examples of classical titration analysis.

Reflectoquant® system for rapid and precise analysis

Take your lab to the sample with the compact and easy-to-use RQflex® 20 reflectometer for fast quantitative results. Monitor parameters at any stage of your incoming quality control or production process, and rapidly verify disinfection, directly on-site. The Reflectoquant® system consists of test strips and a reflectometer; this mobile laboratory gives you all the tools you need for high quality, low cost analyses for your food samples. With over 20 test parameters, find the test strips that you need to test for example ascorbic acid, nitrate, peracetic acid, glucose, hydroxymethylfurfural, or pH.

Learn more at SigmaAldrich.com/reflectoquant

Supelco®
Analytical Products

Chromatographic Analysis

To select the optimal technique, you have to look at your analyte, at your matrix and decide what are the most important factors (regulations, time, precision or others).

HPLC

HPLC, UHPLC and LC-MS methods are ideal for mycotoxin testing, veterinary drug residue analysis, or for detecting pesticide contamination or adulterants such as melamine in milk. To provide accurate analysis for your specific application a comprehensive portfolio of columns is available to you under the Supelco® portfolio.

Learn more at
SigmaAldrich.com/LCMS
SigmaAldrich.com/HPLC

Gas Chromatography

Whether you are testing for pesticides or packaging contaminants, we offer the most complete line of GC columns and accessories for your food safety analyses. To maximize performance, check out our comprehensive line of GC accessories, including molded GC septa, deactivated inlet liners, syringes, and vials, calibration standards, extraction solvents, and gas purification or management products, including purifiers, traps, gas generators, tubing, fittings, and pressure regulators.

Learn more at
SigmaAldrich.com/GC

Thin-Layer Chromatography

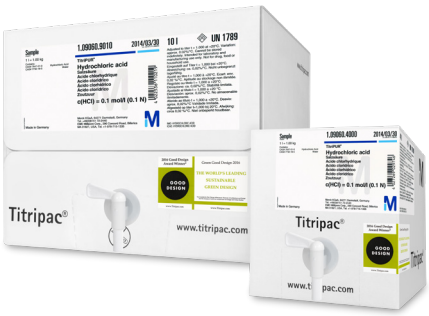
Thin-layer chromatography (TLC) is a fast, easy-to-use, and highly versatile separation technique for qualitative and quantitative analysis, it is ideal for rapid identification of ingredients, screening and reaction monitoring. Its high matrix tolerance and the possibility to separate many samples in parallel makes TLC highly cost-efficient. In addition, multiple detection methods including visualization (derivatizations) and hyphenation to Mass Spectrometry (MS) enable a safe and precise identification of known and unknown compounds.

- Rapid analysis of ingredients in matrix-rich samples (e.g. food QC)
- Fast screening of very complex samples (e.g. phytochemicals)
- Rapid and high throughput pre-screening prior to HPLC

Our extensive range of quality, reliable TLC & HPTLC plates and accessories can be used for a full range of food safety analyses including mycotoxin, antibiotic residue or pesticide testing and more.

Learn more at
SigmaAldrich.com/TLC

Refer to page 13 for information on our water purification systems and solutions for chemical analysis.



General Titration

Titration methods are often used for fast and precise determination of salt e.g. chloride or sugar content, or the concentration of vitamin C or vitamin E, or simple measurement of acidity or alkalinity. The **Titripur® ready to use volumetric solutions**, especially in the **Titripac® packaging system** offer an optimized work process. You not only save time and money, but also protect the environment!

Learn more at
SigmaAldrich.com/titration

Water Content Determination

Karl Fischer titration is an established method for the accurate determination of water content in raw materials, intermediates and finished products. Water has great influence on many substance properties, such as shelf life, stability, and agglomeration. Using Karl Fischer titration, together with our **Aquastar® reagents and standards** the water content of your food samples can be determined easily with a high degree of accuracy.

View our volumetric titration tutorial videos
SigmaAldrich.com/video/analytical/karl-fischer-titration.html

Photometry

For swift and secure photometric water analysis, there's no better choice than **Spectroquant® test kits**. Consisting of validated, standard compliant reagents, the test kits are pre-programmed for use with **Spectroquant® spectrophotometers** to ensure rapid reliable results for parameters like COD, nitrate or total nitrogen.

Learn more at
SigmaAldrich.com/photometry

Supelco®
Analytical Products

Disinfection Analysis

We have a range of solutions to help you ensure that your disinfection processes are effective.

MQuant® and Reflectoquant® test strips

Ensure safety after disinfection. Residues from disinfectants used in food production environments can cause serious problems, but our **MQuant® and Reflectoquant® test strips** can help monitor the cleaning process by checking effective concentrations of disinfectants.

Learn more at
SigmaAldrich.com/test-strips

Spectroquant® Move $Cl_2/O_3/ClO_2/CyA/pH$ colorimeter

The **Spectroquant® Move instrument** is built for easy disinfection control in process monitoring. This small device can measure chlorine, ozone and chlorine dioxide. This colorimeter is dust and waterproof according to IP 68 and the **Spectroquant® Data Transfer Unit** allows you to transfer, print & store all your measurements.

Learn more at
SigmaAldrich.com/photometry

Reference Materials

The accuracy of your analytical results are only as reliable the reference material you use for calibration. We offer more than 7000 high quality reference materials for testing food quality and to help ensure food safety, including many certified reference materials (CRMs) that we manufacture in-house under ISO/IEC 17025 and ISO 17034 accreditation. This portfolio comprises microbiological CRMs, as well as pesticides, mycotoxins, veterinary drugs, and many others. Our reference materials are also available in the food matrices that you require.

Discover our comprehensive portfolio at
SigmaAldrich.com/food-crm

Microbiology sample analysis

Pathogen Detection

Traditional methods

We provide a broad selection of high-quality culture media to detect pathogenic bacteria in your sample. From dehydrated culture media to ready-to-use media, we have the solution matching your needs.

On-demand culture media

Culture media for the enrichment step can be made available on demand, at the push of a button, with the revolutionary ReadyStream® system, which prepares and dispenses pre-heated media when and where needed. Culture media is 10x concentrated allowing you to dispense up to 100 L of media with a 10 L bag. Refer to page 17 for more information.

Readybag® Ready-to-Use Media

Pre-weighed and gamma-irradiated Readybag® pouches speed up and simplify your food pathogen testing routines. With single-use Readybag® Buffered Peptone Water and Half FRASER broth pouches, there is no weighing and no autoclaving. Readybag® Half FRASER Broth even eliminates the need to prepare and sterile filter the supplements because they are already incorporated into the medium, saving you even more time and expense.

Learn more at
SigmaAldrich.com/DCM

Refer to page 13 for information on our water purification systems and solutions for microbiology sample analysis.

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Rapid methods

Rapid methods, if not described in specific USDA, FDA, ISO, or any other standard are considered alternative methods. These methods are often preferred if a short time to result is needed to release food samples, especially meat and other foods with short shelf life. Alternative methods are applicable if validated according to ISO 16140 and/or AOAC International guidelines and accepted by specific regional governance.

PCR detection

Assurance® GDS combines the latest advancements in molecular detection technology and food microbiology to provide faster results with the increased accuracy required to meet today's food and environmental testing challenges. Assurance® GDS utilizes multiple layers of specificity, including immunomagnetic separation (IMS), highly specific primers, and a patented probe system to ensure highly accurate results. Designed for optimum flexibility, various portions of the sample preparation can now be automated with the PickPen™ PIPETMAX® allowing industrial and plant laboratories to customize their testing to better fit their changing needs.

Assurance® GDS assays have been validated by international standards (AOAC / MicroVal / Health Canada / AFNOR) and are available for the detection of *Salmonella, Listeria* spp., *Listeria monocytogenes*, *E. coli* O157:H7, Shiga Toxin Genes, Top STEC, and *Cronobacter*.

Learn more at SigmaAldrich.com/GDS

Enzyme-linked Immunosorbent Assay (ELISA) method

Our TRANSIA™ AG (Enzyme ImmunoAssay) and TRANSIA™ PLATE assays incorporate proven antibody-antigen "sandwich" technology for the detection of foodborne pathogens in both products and environmental samples. How it works: microtiter plate wells coated with highly specific antibodies capture and bind the target antigen if present. A detection antibody linked to a conjugate enzyme is then introduced to form an antibody/antigen/antibody sandwich and finally, a substrate is added and converted by the conjugate enzyme to produce a color change indicating the presence of the target pathogen. A combination of the extensive AOAC OMA validation along with built-in positive controls ensures confidence in results.

Learn more at SigmaAldrich.com/Transia

Lateral flow tests

Lateral Flow Tests are immunoassays for detecting food pathogens with the ultimate convenience.

Learn more at
SigmaAldrich.com/lateral-flow-test

Singlepath® lateral flow tests

Covering the major pathogens, the tests act as mini-laboratories and include a built-in control reaction for optimized pathogen testing. Definitive results are delivered in as little as 20 minutes. Use in combination with our GranuCult® dehydrated media to ensure optimal test performance.

Benefits:

- **Reliable:** same accuracy standards as classical detection methods
- **Comprehensive:** cover the most relevant pathogens in food – *Campylobacter, E. coli 0157,* STEC, *Salmonella* (all AOAC-RI approved), *Listeria* monocytogenes and *Bacillus cereus Enterotoxins*.
- **Fast:** Definitive results within 20 - 30 minutes
- **Easy-to-use:** Clear yes/no results after simple sample application
- **Safe:** Additional positive control and specially adapted enrichment media for reliable results

VIP® Gold lateral flow tests

VIP® Gold (Visual Immuno Precipitate) is a lateral flow immunoassay for the detection of pathogens in food and environmental surfaces. Each VIP® Gold device is a self-contained test that requires only the addition of sample, making it an extremely simple and user-friendly method ideal for low to medium volume labs.

VIP® Gold tests are AOAC and Health Canada approved and available for testing:

- *Salmonella*
- *E. coli O157:H7*
- *Listeria spp.*

Learn more at
SigmaAldrich.com/lateral-flow-test

ID membranes for rapid identification or confirmation

Agar plates are often used for the detection or enumeration of microorganisms. Smart, inexpensive and simple ID membrane can help to identify or confirm organisms within 1 to 4 hours, directly from the plate. After the routine inoculation and isolation technique the membranes enable the direct identification based on chromogenic and fluorogenic substrates. The membrane is just placed on the colonies grown on the plate. After a short incubation the colors or fluorescence are developed in case of the presence of the tested microorganisms. A broad range of different ID membranes exists to identify diverse organisms from water, food, and environmental samples.

Learn more at
SigmaAldrich.com/microbial-id

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Indicator Organism Testing

A food scandal or product recall is highly damaging to the food industry and brands, with the potential impacts they have on consumer health and perception, so prevention is key. It is therefore necessary to continuously improve the test parameters in food production facilities and final products. One parameter that exemplifies this commitment is quality indicator organisms. These organisms indicate potential hazards in the finished products, which can lead to costly product recall.

Traditional methods

There are different ways to test for quality indicator and / or index organisms, including traditional methods using gold standard GranuCult® dehydrated media, or ready-to-use solutions, for example ReadyPlate™ agar plates or ReadyTube® liquid media.

ReadyPlate™ agar plates

For isolation and enumeration of indicator organisms, ReadyPlate™ pre-prepared agar plates are certified to be fully compliant with EN ISO 11133:2014, as well as with individual standards, and are quality controlled by ISO/IEC 17025:2005 accredited laboratories. Each plate is provided with a label including a data matrix code for paperless plate identification.

Our range includes:

- ReadyPlate™ (90 mm plates) e.g. XLD agar, MYP, BPA, PEMBA etc.
- ReadyPlate™ CHROM (90 mm plates) Chromogenic media e.g. CCA, TBX and Listeria Agar

Ready-to-use Liquid Media: ReadyTube® Media

Discover ready-to-use media in tubes and bottles for isolation, enumeration or enrichment of microorganisms in food. ReadyTube® bottles and tubes are fully compliant with EN ISO 11133:2014 and with individual standards. Additionally, they are quality controlled by ISO/IEC 17025:2005 accredited laboratories to ensure compliance. A clear naming convention where the number indicates the volume in mL of media contained in each bottle or tube (e.g. ReadyTube® 200 media for each bottle in the pack contains 200 mL of media) makes it simple.

- Easy visibility of compliance on product label and certificate of analysis
- Safe testing with maximum convenience
- No time-consuming preparation
- High reproducibility with a low error rate
- Long shelf life of 6-12 months
- Released through ISO 17025 accredited QC lab for reduced incoming quality control tests

Learn more at
SigmaAldrich.com/Microbial-SamplePrep

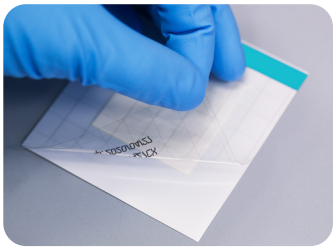
Alternative methods

Our range of rapid culture media plates are an efficient method for the detection and enumeration of microorganisms including quality indicators, pathogens and spoilage organisms. They are even suitable for testing of difficult matrices.

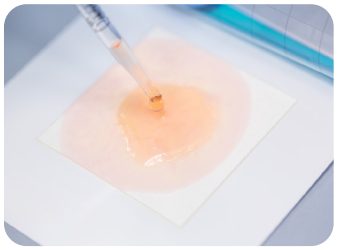
Learn more at
SigmaAldrich.com/quality-indicators

MC-Media Pad®

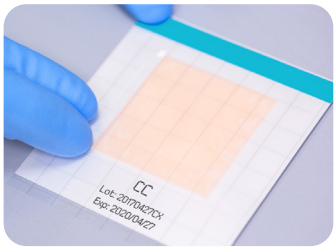
Use fewer handling steps for your indicator organism testing, with our **MC-Media Pad®** ready to use method. This convenient method complies with international food and beverage standards (AOAC-PTM & MicroVal, ISO 16140), it can be used for convenient microbiological testing of coliform and *E. coli*, yeast and mold, or aerobic microbial contamination. The clear color coding means that you will always pick the right one at a glance. The MC-Media Pad® improves your workflow and reduces required storage, incubation and waste capacity. Simply inoculate your sample, incubate, and count your results!



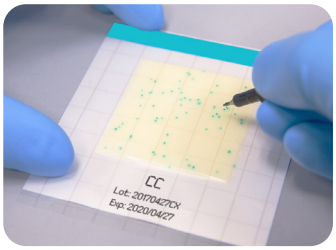
Open the cover film diagonally.



Inoculate your sample, it will diffuse automatically.



Close the cover film and incubate.



Count your results.

SimPlate® Tests

When working with complex matrices, our **SimPlate® device** can help make testing simple. This ISO and AOAC validated assay provides rapid, easy to interpret results even with food matrices that are challenging for other rapid methods. The SimPlate® system with **Binary Detection Technology™** represents the latest technological advancement in counting techniques for the food industry. Results are presented as a clear visual positive or negative readout without the need for subjective interpretation, which provides consistency across users, generating more reproducible results.

Learn more at
SigmaAldrich.com/Simplate

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Hygiene Monitoring

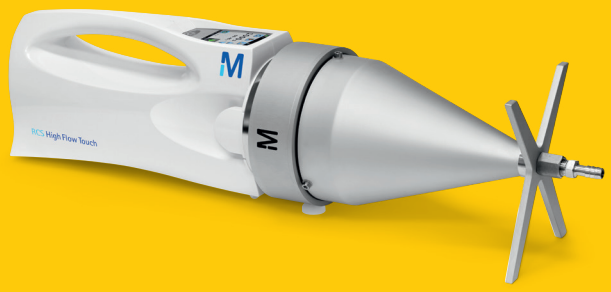
To help you easily verify effectiveness of your sanitation program and reduce the risk of contamination in products and processes, throughout your production environment. Whether you need to routinely monitor conventional surfaces, limited access areas, or even process liquids, we can help.

Active and Passive Air Monitoring

Hygiene standards in a production environment are directly linked to the microbiological safety of the finished products; we therefore make sure that our active microbial air sampling solutions generate highly precise, reliable and reproducible results.

We offer a comprehensive range of active and passive microbial air monitoring solutions for effective use in the food and beverage industry where regulations are on the rise, and standards become increasingly stringent. Our air samplers are based on different principles, enabling selection of the technology to suit your needs. Our range includes MAS-100® air samplers which are based on the Anderson impaction principle that use settle plates or contact plates, as well as RCS® (Reuter Centrifugal Sampler) that use dedicated agar strips. There are product variants specifically designed for economical use in the food and beverage industries, for explosion hazard areas and for monitoring of compressed gases.

Learn more at
SigmaAldrich.com/microbial-air-samplers



MAS-100® ECO Air Sampler

The **MAS-100® ECO microbial air** sampling system is designed for reliable and easy microbial monitoring of ambient air in food and beverage manufacturing facilities.

- Accurate, reproducible measurements and outstanding user flexibility
- Excellent collection efficiency
- Built-in airflow compensation and fully automatic calibration
- Hardware and software validated for HACCP

Passive Air Monitoring: LI (Long Incubation) Settle Plates

LI Settle Plates are single-bagged and non-irradiated and are ideal for air monitoring in less critical areas. These plates contain either Tryptic Soy agar (TSA) general purpose media, or Sabouraud Dextrose agar (SDA), which is ideally suited for the growth of yeast and molds.

- Supplemented with disinfectant neutralizers such as lecithin (L), Tween® 80 (T), histidine (H) and sodium thiosulfate (Th)
- Higher than standard filling volume of 30 mL to compensate for water loss
- Barcoded to enable full traceability

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Traditional Surface and Liquid Monitoring

Minimizing the contamination risk of products and processes with monitoring and testing of surfaces, personnel, and liquids is a critical aspect of any production facility. Curved surfaces or difficult to access areas propose risk and can lead to a decrease in operational efficiencies. It is important to have a selection of easy-to-use testing solutions with proven methods to maintain or increase the effectiveness of disinfection routines.

Learn more at
SigmaAldrich.com/Surface-Monitoring

Contact Slides, Dip & Swabs

Dip and Swab testers are designed for convenient easy-to-use microbial counting in a broad range of applications. Using the swab, you can reach even difficult to access areas. These ready-to-use dehydrated dip testers are available for heterotrophic plate count (HPC), yeast & mold, and coliforms. They are suitable for evaluation of liquid and swab samples.

Our Envirocheck® Dip Slides for semi-quantitative detection of microorganisms on surfaces and in liquids are flexible paddles that are coated with different nutrient media. After sampling and incubation, two parameters can be determined in one step.
Envirocheck® Dip Slides are available for the following parameters: Disinfection control, Total Colony Count, Detection of yeasts and molds, Detection of Enterobacteriaceae and Detection of total coliforms / *E. coli*.

Rapid Surface Monitoring

Solutions for rapid environmental monitoring disinfection control and HACCP management including convenient media, ATP testing, and allergen and protein detection.

Learn more at
SigmaAldrich.com/Rapid-Surface-Monitoring

MVP ICON® ATP hygiene monitoring and HACCP management system

The MVP ICON® is an instrument and software platform that combines HACCP and hygiene monitoring with powerful program management capabilities. The MVP ICON® system allows you to monitor key HACCP parameters, reducing the need for multiple instruments. Rapid results allow for real-time decision making and corrective action. The patented design of the sampling device ensures a high degree of accuracy – even in the presence of sanitizers. The MVP ICON® is the most complete HACCP and hygiene monitoring system with dashboard software that displays key performance metrics, so you can effectively manage your quality assurance program.

Available measurements include:

- ATP (Adenosine Triphosphate)
- Chemical Concentration [ppm]
- Conductivity [µS]
- pH
- Temperature

FLASH® rapid allergen indicator total protein detection test

Protein swab tests are used to help quickly verify cleaning effectiveness by detecting protein residues, including allergens left on food contact surfaces after cleaning. FLASH® is a visually read total protein test that produces results within 10 minutes, allowing corrective action to be taken immediately. No instrumentation is required, and the test can be used by all personnel without the need for extensive training.

- Easy-to-interpret color change results within 10 minutes
- Single swab providing flexible test method based on desired level of sensitivity:
  - Room temperature readings detect down to 20 µg
  - Achieve higher sensitivity detection down to 3 µg when incubated at 70 °C
- Detects total protein, including samples comprising the "Big 8" food allergens: gluten flour, soy flour, egg powder, milk powder, roasted almonds, peanut butter, raw shrimp, and raw fish (cod)

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Key Ingredients

✓ Cultured Meat
✓ Sustainability
✓ Your Dedication to Safety

Your work is essential to bringing the world's food to the table.

We support you at every stage of the workflow with trusted, intuitive products and services for lab efficiency and regulatory compliance, backed by technical expertise and quality systems.

Unlock your solutions.

SigmaAldrich.com/
FoodTestingHero

STEP 4
SERVICES

Microbiology Services

Are you ready to start testing?

We provide an **extensive service offering*** for our customers in the food industry:

- Feasibility study and method optimization
- Installation at customer site
- Qualification protocols
- PQ consultancy
- Operator training and annual re-certification
- Maintenance services: calibration, preventative maintenance, repair coverage

* Individual service offerings may vary per product and geography, so ask your local representative for details

Learn more at
SigmaAldrich.com/food-services

Risk Mitigation Services

Partnering with us mitigates supply chain risk

We have developed a full range of e-commerce services designed to enable greater spend control. If you're looking to reduce inventory, automate payments, increase procurement fiscal control and/or reduce costs – we can tailor a convenient and cost saving e-solution to fit your needs. Discover how our website is making it easier for you to stay productive and conduct your daily activities in a more efficient manner.

Regulatory Support

Bookmark our regulatory learning center to stay up-to-date.

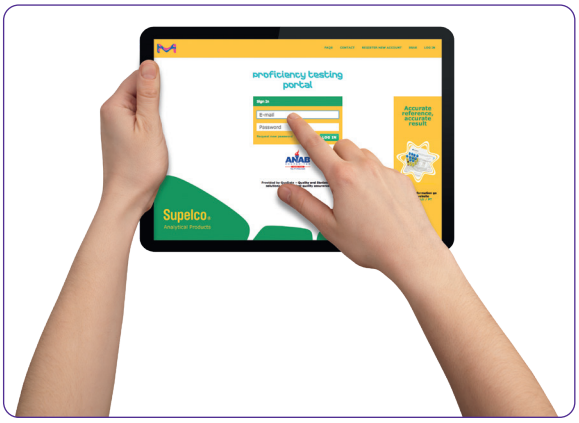
SigmaAldrich.com/FoodRegulations

Proficiency Testing Services

Partnering with us mitigates supply chain risk

Providing you with the essential performance data and premium grade testing components that help you build a valuable quality control asset. Having quality products and services allow you to work smarter, enabling a safer and healthier community and world.

Learn more at
SigmaAldrich.com/pt



Milli-Q® Services

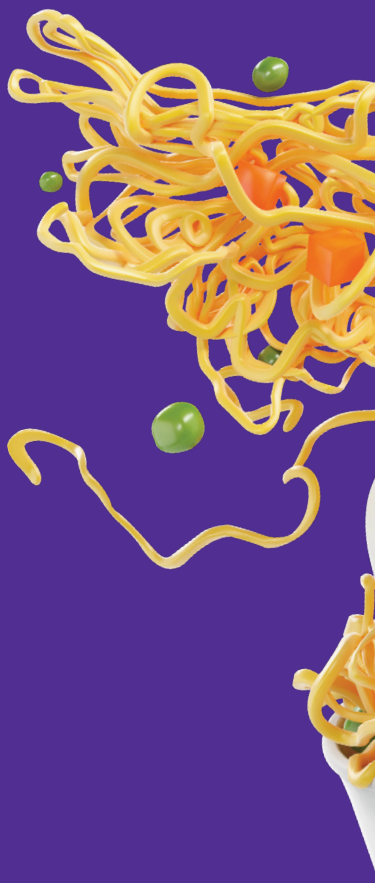
Water Purification Services & Support

Your water purification system is an important part of your work that contains sensitive and complex technologies. Ensuring that your system is operating at optimum efficiency is an essential part of the expertise we provide to our customers. Our certified field service engineers provide expertise on-site with professional support for the installation, validation and maintenance of your individual systems and total water purification solutions.

Learn more at
SigmaAldrich.com/milli-qservices

Notes

Merck KGaA
Frankfurter Strasse 250
64293 Darmstadt, Germany



Contact us at
SigmaAldrich.com/foodbev-contact

To place an order or receive technical assistance

Order/Customer Service: **SigmaAldrich.com/order**
Technical Service: **SigmaAldrich.com/techservice**
Safety-related Information: **SigmaAldrich.com/safetycenter**

The Life Science business of Merck operates as MilliporeSigma in the U.S. and Canada.

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