Dairy Products Microbiology Testing

Proven solutions and services for every step of your microbial testing workflow.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

Millipore®

Preparation, Separation, Filtration & Monitoring Products

We are setting standards in the food industry

We provide products and services to support every step of your dairy product microbiology testing process. Our microbial testing products and kits comply with international standards; our portfolio includes dehydrated and granulated culture media, ready to-use agar plates, liquid media, as well as molecular (PCR) or immunological solutions for the specific detection of pathogens such as *Listeria, Salmonella, Campylobacter* or *E. coli* or the detection of quality indicator organisms. We also have a comprehensive range of services and high-quality environmental monitoring solutions to help keep your facilities safe for convenient checking of surfaces, equipment, and air quality for contaminants – for rapid, reliable results and international standard compliance.

Our expertise in the food industry

As a worldwide leading provider of life science solutions, we address the needs of customers in industries where consumer safety is a major concern. Our experts are dedicated to ensuring reliable safety testing results.

Bringing wholesome and safe products to market fast

We provide dependable, connected and rapid solutions specifically tailored to the needs of the food and beverage industry.

What makes us different?

We offer a complete portfolio with proven solutions & technologies that are compliant to international standards throughout the entire safety testing workflow.

Dairy Safety & Testing Solutions

The Importance of Dairy Testing

Throughout your dairy production process, specific tests should be carried out to ensure the quality and safety of your final dairy products from milk, yogurt, cheese, ice cream and dried milk to infant formula.

Milk and dairy products provide a favorable environment for a large range of bacteria, yeasts and molds; it is therefore important to monitor these organisms to help prevent spoilage or potential pathogenic contamination.

Our range of solutions cover the entire production process through to the QA/QC analysis of your final products while ensuring compliance with regulatory standards.

How We Test

Dairy processing, manufacturing and quality control requires testing of specific microorganisms. Common pathogenic contaminants in dairy include *Salmonella, Campylobacter, Listeria, E. coli, S. aureus,* and *Cronobacter* amongst other spoilage organisms.

Your microbiological testing program needs to take a number of points into consideration, such as the frequency of testing, which stages in the production process to carry out testing, the matrix or product composition, which target organisms to test for, and which test methods to use.

How We Can Support Your Testing Program

Our comprehensive range of QA/QC microbiological solutions:

- Environmental monitoring for microbiological analysis of air, surfaces and personnel
- Bioburden testing
- Pathogen testing
- Indicator organism testing
- Spoilage organism testing
- Allergen testing
- HACCP management and ATP testing
- Services - from method development to maintenance

Tests range from quantitative and qualitative depending on your needs. If you are following specific regulatory methods, we can provide the right solutions for your protocol, along with a selection of rapid methods.

SigmaAldrich.com/Food-Microbiology

Focus: Infant Formula

Infant formula and their ingredients are foods that have specific testing needs. It is critical to verify the absence of *Cronobacter* spp. and *Salmonella* in powdered infant formula (PIF). While *Salmonella* has the capability to infect all humans, *Cronobacter* spp., formerly *Enterobacter sakazakii*, is a pathogenic bacterium that can cause severe disease, primarily in infants under 6 months old and immunocompromised adults. This organism can survive in low moisture foods, such as PIF, for up to two years.

In the EU, Commission Regulation (EC) No. 2073/2005 requires the absence of *Cronobacter*, *Enterobacteriaceae*, and *Salmonella* in dried infant formula and dried dietary foods for special medical purposes intended for infants below six months of age. This food must also be tested for presumptive presence of *Bacillus cereus*. In the US, all finished dried product infant formula samples (domestic or import) designated for microbiological analysis, need to be tested for *Salmonella* and *Cronobacter*. For *Salmonella* analysis, each sample should consist of 25 grams or larger, for *Cronobacter* analysis it is 10 grams or larger.

Most countries have standards for quality control (QC) of PIFs and their ingredients. QC labs of food companies exporting PIF need to be aware of the food testing regulations in the countries of destination. Culture media-based methods are described in all countries, but a careful check of the compliance of culture media products used in quality control is important. The culture media should be of high quality and should be accompanied by clear documentation about the compliance to the given standards. This compliance information should be visible in both the product and batch documentation provided by the media supplier. Such documentation also supports QC managers in audit situations and lab inspections.

As described above, a rapid method can only be applied if permitted in the country of destination. These methods are only acceptable if validated according to ISO 16140, AOAC International standards or a specific local standard if needed. Molecular methods for detection of *Cronobacter* and *Salmonella* are preferred as they can detect these organisms in low numbers. A molecular system needs to provide excellent performance data of the individual system with PIF as food matrix. A sample preparation procedure that efficiently extracts the target nucleic acid is important, e.g. by magnetic separation which leads to higher test reliability.

Read page 18 for more information.

Which are the most important microorganisms in dairy products?

Milk and dairy products need to be examined for diverse set of organisms depending on the product type and the country. The typical testing specifications per product type are listed below.

Product	Raw milk & derivatives	Pasteurized milk	Dairy products	Powder milk	Infant formula
Total count (aerobic mesophilic bacteria)	✔	✔	✔	✔	✔
Somatic cells	✔				
E. coli	✔		✔		
Coliforms		✔	✔	✔	✔
Clostridium perfringens		✔	✔		
Enterobacteriaceae		✔	✔	✔	✔
Cronobacter				✔	✔
Salmonella	✔	✔	✔	✔	✔
Listeria monocytogenes	✔	✔	✔	✔	✔
Thermotolerant *Campylobacter* spp.		✔	✔		
Bacillus cereus		✔	✔	✔	
Coagulase positive Staphylococci	✔			✔	✔
Staphylococcal enterotoxin				✔	✔
Molds		✔	✔		
Probiotics			✔		✔

Total aerobic, mesophilic and somatic cell counts give information about the quality and freshness of milk along with hygiene and animal health. *E. coli,* coliforms, *C. perfringens* and *Enterobacteriaceae* are important indicators for fecal contamination. *Cronobacter, Salmonella, Listeria monocytogenes, thermotolerant Campylobacter, Bacillus cereus,* and coagulase-positive staphylococci are possible pathogens in milk and dairy products. Most of them can produce toxins like staphylococci and *Bacillus cereus.* Molds can also produce dangerous toxins, but the regulations often only state that there should be no molds visible by eye. Probiotics are beneficial organisms for the human body and are commonly used in dairy products and infant formula.

Enterobacteriaceae

Enterobacteriaceae are intestinal bacteria which can be found in dairy products from contamination of food, insufficient pasteurization and sterilization or recontamination due to inadequate hygiene standards. We offer diverse media and tests, like oxidase tests, for the detection and enumeration of *Enterobacteriaceae*.

Cronobacter (Enterobacter sakazakii)

Cronobacter is a Gram-negative, facultative anaerobic rod-shaped and motile bacterium that belongs to the *Enterobacteriaceae* family. The microorganism can cause severe neonatal infections: necrotizing enterocolitis, septicaemia and meningitis. The fatality rate following meningitis and other infections is 50%, with the survivors being neurologically damaged for life. Fortunately, infections are rare in infants, but they can occur in all age groups, admittedly with less severe clinical outcomes. *Cronobacter* spp. can grow over a wide temperature range, between 5.5 °C and 8 °C the multiplication begins. Average generation times of Cronobacter is about five hours at 10 °C and only 40 minutes at 23 °C. The organism is very tolerant of drying steps and can survive for two years desiccated in infant formula and then rapidly grow on reconstitution.

Escherichia coli & Coliforms

Coliforms are intestinal bacteria that are often present as a result of contamination by feces. They are defined as rod-shaped Gram-negative facultative anaerobic non-spore forming organisms that ferment lactose with the production of acid and gas when incubated at 35–37 °C. In most cases coliforms do not cause illness, but they are used as indicators for other pathogenic organisms of fecal origin that may be present in foods and water. *Escherichia coli (E. coli)*: Is the most famous member of the coliform group bacteria and is an important indicator for fecal contamination, as it is almost exclusively of fecal origin.

We offer a broad range of tests and culture media, also chromogenic and fluorogenic media, for detection of *E. coli* and coliforms.

SigmaAldrich.com/Ecoli

Clostridium perfringens

C. perfringens is also a fecal indicator organism but is much more resistant than *E. coli* and, due to the ability to produce spores, can be found even after treatments like pasteurization. We offer our unique chromogenic CP ChromoSelect agar but also diverse other media and tests to detect this organism.

SigmaAldrich.com/Clostridium-Article

Salmonella

Salmonella contamination is the second leading cause of foodborne illness worldwide. Controlling outbreaks of *Salmonella* is an important task for the food industry. The *Salmonella* family includes over 2,300 serotypes of bacteria, but two types, *Salmonella* Enteritidis and *Salmonella* Typhimurium, are responsible for about half of all human infections. Most outbreaks of *Salmonella* are traced back to dairy, poultry and meat products. *Salmonella* have the necessary tools and mechanisms to spread in the body.

Microbiological control in the food industry plays a critical role in preventing *Salmonella* outbreaks and is probably an important reason for decreasing incidences in recent years. Tests and media used for identification of *Salmonella* take advantage of unique aspects of *Salmonella* physiology or biochemistry relative to other genera within the *Enterobacteriaceae* family. For example, bacteria from the genus *Salmonella* are mostly facultative anaerobes, oxidase-negative, catalase-positive and Gram-negative rods. Most strains are motile and ferment glucose with production of both acid and gas.

Learn more about *Salmonella* contamination:
SigmaAldrich.com/Salmonella-Article

Listeria monocytogenes

In recent years, it has been recognized that *Listeria monocytogenes* is an important public health problem. Listeriosis primarily affects people of advanced age, pregnant women, newborns, and adults with weakened immune systems. The infection increased over the last few years, most likely because of an increasing variety of food products, the trend for “ready-to-eat” and “ready-to-cook” products plus the demand for longer shelf life. Therefore, it is even more important that the risk foods, like dairy products, are thoroughly checked for contamination.

Read our article about *Listeria monocytogenes*:
SigmaAldrich.com/Listeria-survivor

Thermotolerant *Campylobacter*

Campylobacteriosis is currently one of the most common bacterial infections in humans and is often a foodborne illness. The two species, *Campylobacter jejuni* and *C. coli,* are responsible for the majority of human foodborne campylobacteriosis. There are other pathogenic species—*C. lari, C. fetus* (infect reproductive tract), *C. upsaliensis* and very seldom *C. helveticus*—which can also cause diarrheal illness. *Campylobacter* can occasionally be found in raw milk. They are microaerophilic organisms that require oxygen levels between 2 and 10% for growth. These two species are classed as thermophilic campylobacters as they have an optimum temperature for growth of 42 °C. The current method used for detection of campylobacters from foodstuffs is the EN/ISO 10272-1:2017 method.

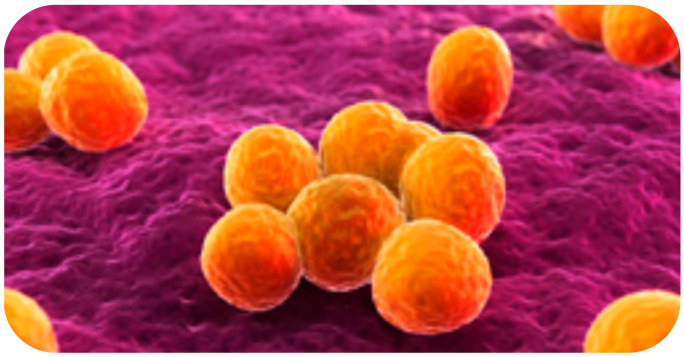
SigmaAldrich.com/Campylobacter-Testing

Bacillus cereus

Bacillus cereus is a typically motile soil bacterium which is able to build resistant centrally located endospores. The colonies that grow on most media types are dull and frosted. It is a Gram-positive and a facultative anaerobic organism, but older cells may become Gram-negative as they age. The *Bacillus cereus* group comprises *Bacillus anthracis, Bacillus thuringiensis, Bacillus cytotoxicus* and some other species, which share about 3100 genes. Some strains can cause foodborne illness similar to those caused by *Clostridium perfringens* or *Staphylococcus aureus.* The minimum infective dose is about 10^6-10^7 bacteria/g, at that range of cell concentration they start to build different toxins which cause both diarrheal and emetic human gastrointestinal syndromes. One of the infection sources for the diarrhea type of *B. cereus* infection are UHT milk products. Contamination of raw milk occurs by simple transfer during milking when hygiene conditions are not fully observed. If present in raw milk, spores can survive the pasteurization process and contaminate the finished milk product.

In milk products, *B. cereus* and other bacilli can degrade the casein to peptides which may be further degraded to amino acids which are responsible for alkaline reaction and a bitter taste in milk. The ISO recommends a colony count technique ISO 7932:2004 and an MPN method ISO 21871:2006 to detect and enumerate *B. cereus.*

Coagulase-positive Staphylococci



Coagulase-positive staphylococci comprise *Staphylococcus aureus, Staphylococcus hyicus* and *Staphylococcus intermedius. S. aureus* is reported to be the most pathogenic species and is responsible for food poisoning due to the production of several relatively heat stable exotoxins. Enterotoxins are produced if the colony forming units per g sample exceeds 10^5 cfu/g. While in most cases for dairy products for *S. aureus* cells, a concentration of up to 100 cfu/g is acceptable, the toxin should not be detectable.

Read more: **SigmaAldrich.com/Staph-Aureus**

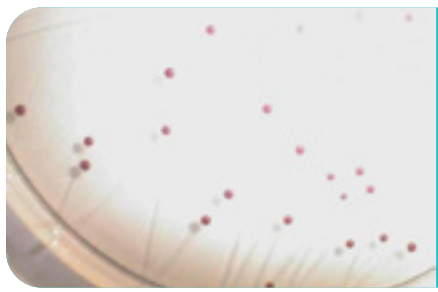
Probiotics

Probiotics are defined as live bacteria with beneficial effects to the health of the host organism. Probiotics take on a key role in the functional food industry. Today, lactic acid bacteria (LAB) and Bifidobacteria are primarily used as probiotics, however certain yeasts and bacilli are also known to have positive effects. In most cases, probiotics are produced directly by fermentation in foods such as yogurt or are supplied through dietary supplements.

Probiotic Species	Product Name	Company
Bifidobacterium breve Yakult	Bifiene	Yakult
Lactobacillus casei DN114-001	Actimel/ DanActive	Danone
Lactobacillus casei Shirota	Yakult	Yakult
Lactobacillus johnsonii La1	LC1	Nestlé

Table 1: Some famous probiotic products

Bifidobacterium is one of the most important probiotic bacteria used in the dairy industry. Bifidobacteria have a positive effect on the immune system and control intestinal pH. Additionally, they produce bacteriocins and bacteriocin-like inhibitory compounds which inhibit the growth of other bacteria. ISO 22981:2010 describes the enumeration of presumptive Bifidobacteria by the TOS-MUP agar. Our 100043 TOS-MUP agar is in accordance with this ISO standard and is highly selective for Bifidobacteria as it suppresses the growth of Lactobacilli. Our chromogenic Bifidobacteria Selective Media allows for easy and fast quality control of yogurt: **SigmaAldrich.com/Bifidobacteria-Media**



Yogurt sample cultured on BSM Agar. Bifidobacteria appears as purple-brown colonies.

Lactobacilli belong to the lactic acid bacteria and comprise the major part of this group. As their name implies, they produce lactic acid. The acid-producing mechanism inhibits growth of other organisms and favors the growth of Lactobacilli that thrive in low pH environments. Some strains of Lactobacilli were shown to produce, like Bifidobacteria, a bacteriocin-like substance and can inhibit a broad range of pathogens.

Food Sample Preparation

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

Sample Dilution

Our 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. Our 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

Enrichment and Cultivation

Watch our video

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

Our 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. Our GranuCult® media are released through an ISO 17025 QC lab. Regulatory compliance is clearly visible on the product label and all test strains are listed in the certificate of analysis.

SigmaAldrich.com/DCM

Ready-to-Use Culture Media

Our 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 the dairy industry. Whether you need carry out pathogen testing or indicator organism testing in food or beverage 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/RTU-Media

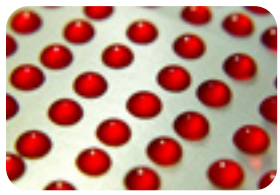
Certified Reference Microorganisms

Vitroids™ and LENTICULE® Discs

Take the hassle out of your culture media performance testing and quality control. Our range of Vitroids™ and LENTICULE® Discs are certified reference materials that can help 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.

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.

SigmaAldrich.com/MiBi-CRM

Sample Analysis

Pathogen detection

Traditional Methods

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

ReadyBag® Ready-to-Use Media

Our pre-weighed and gamma-irradiated Readybag® granulated media pouches speed up and simplify your food pathogen testing routines. With our 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.

SigmaAldrich.com/DCM

Rapid Methods

Rapid methods, if not described in specific USDA, FDA, ISO, or any other standard are considered as alternative methods that are preferred if short time to result is needed to release food samples for human consumption. Alternative methods are applicable if validated according ISO 16140 and/or AOAC International guidelines. The acceptance of which can be dependent on your geographical region.

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.

Our newest assay, Assurance® GDS *Cronobacter* Tq II has been developed to meet the needs of laboratories testing for *Cronobacter* spp. in infant formula, infant cereals and environmental samples. The system uses the targeted isolation capabilities of PickPen™ Immunomagnetic Separation (IMS) together with the specificity of DNA-based detection, to provide reliable results in as little as 22 hours.

In addition, the Assurance® GDS pathogen detection system includes validated assays (AOAC / MicroVal / Health Canada / AFNOR) for *Salmonella, E. coli* O157:H7, Non-O157 Top STEC, Shiga Toxin Genes, *Listeria* spp., and *Listeria monocytogenes.*

SigmaAldrich.com/GDS

Enzyme-linked Immunosorbent Assay (ELISA) Method

TRANSIA® AG and TRANSIA® PLATE incorporate proven antibody-antigen "sandwich" assay technology for the detection of food borne pathogens in both product and environmental samples. The TRANSIA® PLATE *Salmonella* Gold and TRANSIA® PLATE *Listeria* are fully ISO 16140-2 validated.

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. The Gemini® instrument offers the option of a complete automation, from pipetting, washing and incubating to reading and interpretation.

SigmaAldrich.com/Transia

Lateral Flow Tests

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

SigmaAldrich.com/Lateral-Flow

Singlepath® & Duopath® Lateral Flow Tests
Covering the major pathogens, these 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.

Microbiological Identification and Confirmation

ID Membranes for Rapid Identification or Confirmation

Agar plates are often used for the detection or enumeration of microorganisms. Our smart, inexpensive and simple ID membranes can help to identify or confirm organisms within 1 to 4 hours, directly from your plates. After routine inoculation and isolation, these membranes enable the direct identification based on chromogenic and fluorogenic substrates. Simply place the membrane on the colonies grown on the plate, then after a short incubation time, the colors or fluorescence develop in the presence of specific microorganisms.

We offer a broad range of different ID membranes to identify diverse organisms from water, food, environmental and clinical samples.

SigmaAldrich.com/IDMembranes

Indicator organism testing

Contamination prevention is the key to keeping our food supply safe. It is therefore necessary to continuously monitor food production facilities and final products for 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 indicators and / or index organisms, including traditional methods using our gold standard GranuCult® dehydrated media, or our ready-to-use solutions, for example ReadyPlate™ agar plates or ReadyTube® liquid media.

ReadyPlate™ Agar Plates

For isolation and enumeration of indicator organisms, our ReadyPlate™ 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. Our ReadyTube® bottles and tubes are fully compliant with EN ISO 11133:2014 and as well as with individual standards, and are quality controlled by ISO/IEC 17025:2005 accredited laboratories to ensure compliance.

Our clear naming convention where the number indicates the volume in mL of media contained in each bottle or tube (e.g. ReadyTube® 200 media where 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

SigmaAldrich.com/RTU-Media

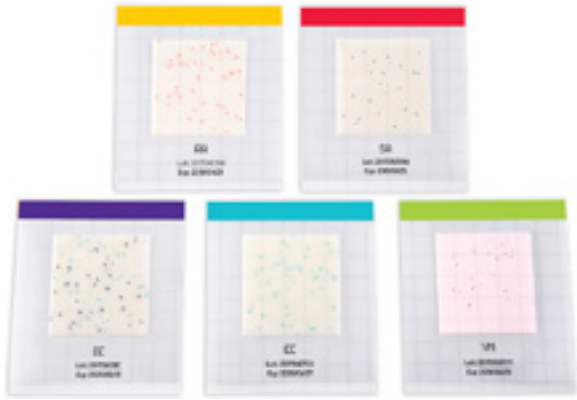
Alternative methods

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 also suitable for testing of difficult matrices.

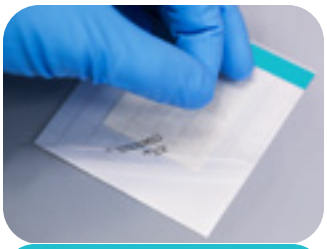
SigmaAldrich.com/Alternative-Media

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), and it can be used for convenient microbiological testing of coliforms 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!



Accurate results in four steps



1.
Open the cover film diagonally

2.
Inoculate your sample, it will diffuse automatically

3.
Close the cover film and incubate

4.
Count your results

SimPlate® Tests

When working with complex matrices, our SimPlate® device can help make testing simple. This ISO and AOAC validated assays 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.

Hygiene Monitoring

Effective cleaning and disinfection, the foundations for good hygiene, have been a product focus and passion of ours for many years. Whether it is the environment, the equipment, the surfaces, air, water or wastewater, we have the solutions.

Our hygiene monitoring range has been developed and optimized in close cooperation with industrial users and operators, as well as with opinion leaders of supervising authorities.

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.

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
- Easy yes/no button operation
- Built-in airflow compensation and fully automatic calibration
- Robust and designed to operate in food manufacturing environments

Passive Air Monitoring: LI (Long Incubation) Settle Plates

LI Settle Plates are single-bagged prepared media ideal for use as settling plates. 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.

- Higher than standard filling volume of 30 mL to compensate for water loss
- Barcoded to enable full traceability

SigmaAldrich.com/Microbial-Air-Monitoring

Traditional Surface and Liquid Monitoring

We provide a wide range of solutions for surface, personnel and liquid testing, which are critical to ensure that your production plants are clean, and the contamination risk of products and processes is minimized. For monitoring the efficiency of disinfection routines, proven methods and easy-to-use testing solutions are available for standard flat and curved surfaces as well as difficult to access areas. We offer a wide range of traditional agar media solutions such as ready-to-use contact plates, contact slides as well as swabs, each being suited to different surface types.

SigmaAldrich.com/Surface-Monitoring

Contact Slides, Dip & Swabs

Our Dip and Swab testers are designed for convenient 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 convenient and easy to use, suitable for liquid and swab samples.

Rapid Surface Monitoring

We offer a range of solutions for rapid environmental monitoring disinfection control and HACCP management including convenient media, ATP testing and allergen and protein detection.

SigmaAldrich.com/Rapid-Surface-Monitoring

MVP ICON® Hygiene Monitoring and HACCP Management System

The MVP ICON® instrument and software platform 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. Available measurements include:

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

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® instrument provides 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.

FLASH® Rapid Allergen Indicator 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. The FLASH® total protein test gives a visual readout with 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.

- 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)

Microbiology Services

Are you ready to start testing?

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

- On-site product installation
- Instrument qualification protocols
- Operator qualification training & annual re-certification training
- Instrument service and preventative maintenance plans (Total Coverage, Total Service, Verification Service)

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

SigmaAldrich.com/Food-Services

what if safety were an open book?

Let's create regulatory compliance. Together.

In the food industry, where consumer safety is a major concern, stringent standards regulate the production environments. The quality control of food products and their ingredients is regulated by international standards. Countries that don't follow ISO, FDA, or USDA methods may have developed their own methods that are different, making it challenging to stay updated.

Visit our website to find regulatory resources that help you to stay compliant. We offer articles, whitepapers and webinars about international regulatory standards for free.

SigmaAldrich.com/Food-Regulatory

To find out more, visit
SigmaAldrich.com/Food-Methods

Regulatory Compliance

FDA-BAM and AOAC standards

The Bacteriological Analytical Manual Chapter 29 *Cronobacter* published by the FDA-BAM specifies both a real-time PCR method for rapid screening and a cultural method for the detection/isolation of *Cronobacter* spp. ([3]). Chromogenic agars are used to isolate the culture for confirmation. A pre-enrichment step is used to grow the bacteria to an amount (≥ 10^3 CFU/ mL) detectable by PCR and chromogenic agars. The cultural portion of this method is a complete detection/isolation method, it can be used as a stand-alone method if PCR technology is unavailable. The cultural method is completely different from the ISO method. The PCR portion of the method is a screening method, whose positive results should always be confirmed with the cultural method. The PCR method may be used to confirm pure cultures as *Cronobacter* spp.

Our dairy testing products are AOAC-OMA, AOAC-PTM, and Health Canada approved.

Product	AOAC-PTM	AOAC-OMA	MicroVal, AFNOR acc. ISO 16140-2	Health Canada
Assurance® GDS molecular detection system	✔	✔	✔	✔
VIP® Gold lateral flow devices	✔	✔		✔
Singlepath® lateral flow devices	✔			
Duopath® lateral flow devices	✔			✔
TRANSIA® Plate ELISA system	✔	✔	✔	✔
SimPlate® Plates	✔	✔	✔	
MC-Media Pad® Y&M	✔	✔	✔	
MC-Media Pad® RAC	✔	✔	✔	
MC-Media Pad® SA	✔		✔	
MC-Media Pad® CC	✔			
MC-Media Pad® EC/CC	✔			

What if safe dairy was all we had?

Accurate results with a comprehensive portfolio for chemical analysis and as microbiological testing from one safe source.

Whether you are processing milk or producing milk products like powders, cheese, yogurt, or ice cream you need the most consistent, convenient, reliable and compliant chemical analysis and microbiological testing available to ensure dairy product safety and quality.

We are committed to advancing global dairy product safety and quality today, through lab testing efficiency & regulatory expertise for food and beverage manufacturers who care about tomorrow.

Visit our webpage dedicated to dairy testing and analysis to discover the full portfolio from Supelco® Analytical Products, Milli-Q® Lab Water Solutions and Millipore® Preparation, Separation, Filtration & Monitoring Product in one click.

SigmaAldrich.com/Dairy

Milking & dairy lines

From dairy cow health, to dairy line hygiene and worker environmental exposure, you need reliable reagents and detection tools to ensure milk safety and regulatory compliance.

Milk processing & pathogen detection

Milk product quality and safety during on-farm collection, processing, and post pasteurization relies on key microbial and analytical testing stages based on reliable, established reagents and approved methodologies.

Dairy product quality and nutrition

Given the diverse foods, beverages, and powders that can be produced from milk and other additives, there are many potential steps that can introduce nonmicrobial contamination or otherwise decrease the safety, quality, or nutritional value of the resultant product.

Millipore®

Preparation, Separation,
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Discover all our products and services at
SigmaAldrich.com/Dairy

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