charles river

MICROBIAL SOLUTIONS

Releasing Safe Clean Products to Your Customers

Why Perform Environmental Monitoring?

The real value of a microbiological monitoring program lies in the ability to create a baseline understanding of your manufacturing environmental conditions. Environmental monitoring gives you the power to easily identify areas for quality improvement, respond quickly and proactively to changes in the microflora of your environment, and maintain an overall contamination control strategy. Regulators recommend routine environmental monitoring and data trending as best practices. EM is a fundamental aspect of current good manufacturing practice (cGMP) compliance and is a proven strategy for contamination risk mitigation for cosmetic and home care product manufacturers. For each monitored location and material source, alert and action levels can be created from the established microflora baseline. An alert level of microorganisms indicates a potential drift in microflora growth from normal operating conditions. An action level is the second tier of notification where if reached indicates a significant drift from normal operating conditions and an investigation should be done to understand the cause of the change. By routinely sampling and identifying organisms, you can detect possible contaminants and identify sites where there is risk of contaminating the product.

Releasing contaminated products pose an enormous risk to consumer safety and your brand's reputation. Manufacturers are beginning to be held accountable for the quality of their products. With many personal care products being classified as over the counter drugs, increased regulatory oversight requires companies to adopt cGMP quality control standards aligning with current regulatory demands on the pharma industry. Cosmetic manufacturers must be concerned about the safety of personal care product ingredients, inspection of facilities and records, and developing good manufacturing practices.

Is It Your Formula or the Environment?

To adopt cGMP in a production environment, most manufacturers must undertake a series of upgrades to improve their quality system, production process, and product release testing. In the past, these improvements were frequently dismissed as too expensive and resource-dependent to implement. Though the upfront cost of implementation may be relatively high, the risks and long-term costs of using outdated quality testing methods is much higher.

The historical methods of manufacturing are no longer acceptable in today's competitive market. In order to move away from a manufacturing philosophy that inherently carries a certain level of risk, quality must be preserved from start to finish. Raw materials, in-process samples, and final product testing should be implemented as part of a good manufacturing process, addressing contamination earlier and faster.

For years, the world's leading consumer care and cosmetic manufacturers have been using a "clean-by-design" process, meeting the demands of consumer trends, ultra-short production cycles, and brand protection. When production schedules are so tight that products are manufactured and delivered to a store shelf within the same day, there is no room for error. While conventional

microbial limits testing is a tried-and-true method, it has its limitations.

For maximal regulatory compliance, the standards and principles applied to cosmetic products can be based on those applied in the pharmaceutical industry for non-sterile products. In addition to known objectionable organisms for a particular product, the significance of any microorganism that is recovered from microbial testing should be evaluated to determine whether they are objectionable. In other words, regulators recommend routine environmental monitoring and data trending as a best practice. Bring your manufacturing into today's age by evaluating the microbial environment of your manufacturing with EM; your facility will switch from reactive to a proactive.

Improved test methods, records management, and data integrity all play a powerful role in meeting regulatory requirements. However, companies often view records management by merely capturing results in any convenient manner and incorrectly assuming the data is sufficient. What they fail to realize is that regulators are increasingly concerned about data integrity and measures need to be taken to ensure data is attributable, legible, real-time, original, and accurate.

The Importance of Accurate Microbial IDs

Detecting contamination in your facility is only the first step in contamination control. Accurate identifications are required to understand the manufacturing microflora, direct appropriate cleaning and disinfecting strategies, and determine contamination risk areas and points of entry. Risk assessments are an important part of qualifications, and an appropriate risk assessment cannot be made without an accurate microbial ID.

Moreover, assessment of manufacturing qualification cleanliness is not a one-time event. A clean facility should be requalified periodically, especially after any changes to equipment, facility, personnel, and/or processes. Requalification provides the opportunity to critically evaluate the microbiological data. Identifications made during this process are just as important as checking the final product to assess and maintain quality in your manufacturing for your products.

Being able to review a database of previous results allows users to determine how the contaminant may have gotten into a critical area. For example, an organism found in the contaminated product may have also been found in an air vent within your manufacturing facility and updating air filtration could be a way to remove and prevent future contamination event. Having the ability to link isolates with contamination events will aid investigations when out-of-specification (OOS) results are detected, and in ideal cases prevent them from happening. Tracking and trending microorganisms with accurate identification methods in place are key to making proactive decisions in your manufacturing facility. Without tracking and trending, it is difficult to show that procedures put in place for preventing contamination are truly effective.

There are many elements to a successful approach in quality risk management and microbiological control that should be based on scientific knowledge. Having a good understanding of the microflora present is vital. Contamination can come from a variety of sources (e.g., personnel, materials, equipment, air, and the surrounding environment). When there is a risk of product or process contamination from particular types of organisms, these are considered microorganisms of interest (objectionable organisms). It is important to be able to accurately identify these organisms of interest to assess either the possibility of their viability or if they are likely to be pathogenic, producing hazardous toxins and or causing disease that can adversely affect consumers.

The Consequences of Using Outdated Methods

Error-prone methods or processes that lack sound science can yield inaccurate data, cause investigations to go in circles, and result in inconclusive or incorrect decisions. All of these situations not only waste time and money but also increase the risk to consumer safety. Accurate microbial identifications are dependent on the method, how that method is executed, how the data is analyzed, and the quality of the reference library. There are many technologies utilized to characterize or identify microorganisms isolated from manufacturing environments (e.g., phenotypic methods like gram staining, genotypic, etc.), and being

aware of the limitations of these technologies are vital. Basic characterization, such as a Gram reaction, gives general information about the likely source of the contaminant, but more detail may be required to fully understand the risks to your products.

It is also recognized that the Gram-stain procedure is one of the most frequent causes of incorrect identification of bacteria. The Gram-staining reaction observed from a bacterial strain does not always correspond to its Gram type, and the multiple steps and controlled times required for each step mean there is potential for analyst error, as well as a subjective interpretation of results. Each of these steps in the Gram-stain process has the potential to provide incorrect findings. Maintenance of data integrity and quality is difficult when the data is subjective. Gram staining is often the first step in microbial identification in consumer care product manufacturing, and an inaccurate gram ID can lead to erroneous results with lost time and lost profits.

Different methods of identification have varying levels of accuracy. For example, it has long been recognized that genotypic methods are the gold standard for microbial identifications, providing the highest confidence in accuracy and precision versus commercial phenotypic methods. However, this method can be costly and work intensive. An alternative to genotypic methods is the The MALDI-TOF (Matrix-Assisted Laser Desorption Ionization – Time of Flight) mass spectrometry technology, the MALDI Biotyper®, which has become widely accepted across industry segments as the next generation of microbial identification with fast sample prep and testing time. The MALDI-TOF system for microbial identification is accurate, rapid, and cost-effective. Both genotypic and proteotypic methods provide higher accuracy from the conventional phenotypic methods like gram-staining. You can reduce risk to your products when you rely on a more accurate identification method.

However, an identification system is only as powerful as the library database coverage that supports it. When an identification system does not have sufficient database coverage, it will either yield “no match” or “no identification”, and even an inaccurate identification can be reported. Inaccurate data causes faulty risk assessments which are potentially worse than no identification determined. Many commercially available systems were developed to address clinical applications and have a focus on clinically relevant species in their libraries and are not comprehensive enough to generate accurate identifications. It is pertinent that the identification system’s database contains a robust library of microorganisms relevant to the products you are manufacturing in your industry.

How Can Charles River Laboratories Help You?

Our long-standing industry experience and quality technology define our products and services we provide to keep your manufacturing running at the highest quality. For 30 years, Celsis® Rapid Microbial Detection methods have been able to detect microorganisms to confirm quality products in as a little as 24 hours, significantly reducing your production time. Depending on the instrument used, Celsis can run 30 to 120 assays per hour, cutting days off your production cycle to get your products on the market quickly, safely, and with the quality that your customers demand. Celsis can revolutionize how you get your product to market.

As for microbial identifications, our Accugenix® microbial identification and strain typing services are highly regarded in the industry. PhD-level scientists are behind the creation of robust and validated assays. Our library database is constantly being updated and contains the most comprehensive bacterial and fungal species found in today’s industrial production and research environments, ensuring your sample’s ID accuracy. We have the services to meet your manufacturing needs with genotypic and proteotypic analyses and turnaround times needed for the speed of your industry.

By using these two technologies, your facility can benefit from fast microbial detection with a harmonized identification program to help you get safe products in the hands of consumers quickly. Explore our portfolio of integrated services at www.criver.com/personal-care-and-cosmetics.