

## **Achieving Lean Quality for Food & Beverage Manufacturing Efficiency**

Adoption of rapid microbial methods (RMMs) among manufacturers of packaged dairy, food and beverage products is on the rise. By implementing RMMs, they are able to get their products to market faster, keep inventory levels leaner, ensure product quality and increase profitability. When choosing an RMM for your company, there are many factors to consider. It is critical to understand exactly what your company needs in order to perform most efficiently and effectively. When these factors drive the purchase decision, you will be able to implement the best system for your company and quickly realize a return on your investment.

Smart science for smart business™

## Shortening the Production Cycle with Lean Quality

Over the past two decades, “lean manufacturing” initiatives have made their way through most industries. By stripping waste and other non-value-add steps from the production process, lean manufacturing has saved companies billions. But why stop there? “Lean quality” extends the same principles to microbial testing.

The cost of quality is extremely high for companies that use traditional monitoring methods for Ultra Heat Treated (UHT) products, whether aseptic or extended shelf life (ESL) fill. Methods such as post-production tear-downs or pH monitoring are unreliable and inadequate in ensuring against microbial contamination. The traditional agar plating method is slow, requiring multiple days to deliver results depending on product specifications and expected shelf life. This slow and unreliable testing not only ties up millions of dollars each year in working capital and excess inventory requirements, but it also causes a delayed and, therefore, more expensive response to contamination events when they do occur.

Fortunately, RMMs offer an alternative. Over the past few years, ATP bioluminescence technology has become the industry standard for the rapid microbial screening of UHT aseptic and ESL dairy and beverage products. Celsis rapid detection systems have been implemented at top dairy and beverage companies around the world and the company’s rapid detection technology is increasingly being used to test a wide variety of dairy, foods and beverage products including syrups, soups and broths, brewed tea, sports and nutritional drinks, pudding, infant formula, condiments and sauces, nut milks and fruit and vegetable juices.

Companies that implement the rapid microbial screening technology offered by the Celsis rapid detection system—Pepsi, Unilever Foods, Saputo, Abbott Laboratories, Danone, Arla Foods and FrieslandCampina—are able to release product days faster than with traditional methods. Even in response to a contamination event, the total time products must be held in micro-hold to identify a contamination and then to clear the replacement product is significantly shortened when using Celsis, which means companies can keep their safety standards high and their cost of quality low.

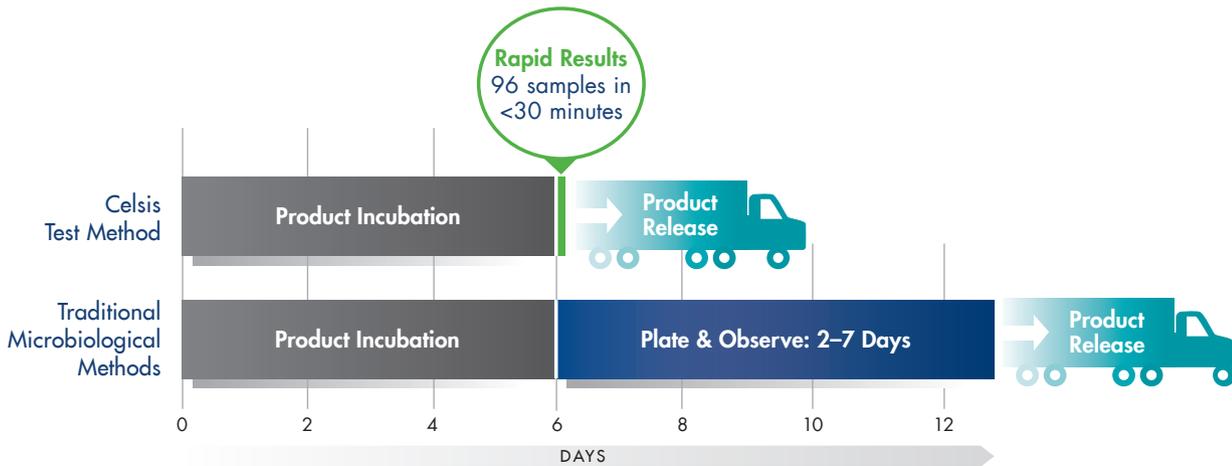
## The Value of RMMs

While the time savings achieved by implementing RMMs are significant, the financial savings are even more outstanding. Companies using Celsis generate an average 5-year Net Present Value (NPV) of \$500K at a single plant. Celsis is able to quantify these savings using its Financial Impact Assessment. This assessment is a proprietary financial modeling tool that was co-developed with international management consulting firm, Arthur D. Little, on behalf of a global Celsis customer. It uses readily available company information—such as the cost of capital, the average value of daily finished goods and the current number of days products are held for microtesting—to calculate a customized projection of that company’s 5-year NPV and time to ROI. The Financial Impact Assessment is available at no charge to any companies that are interested in learning about the savings they can achieve with Celsis.

## How Rapid Methods Work

To ensure quality and safety, products that are susceptible to microbial contamination but expected to be shipped contamination-free are screened before being released into distribution. However, as mentioned above, the traditional agar plating method used for this screening is slow and other methods are unreliable.

In contrast, Celsis rapid detection systems eliminate the need for plate incubation, allowing you to release product days faster than with traditional methods.



This method is possible because all living organisms contain the compound ATP (adenosine triphosphate) as a vital part of their energy metabolism. The Celsis rapid detection system begins by treating samples with a proprietary reagent that reduces non-microbial sources of ‘background’ ATP to ensure sensitive, accurate and reproducible results. The standard ATP bioluminescence assay uses the enzyme luciferase to catalyze the consumption of microbial ATP. The luciferase causes a reaction that generates a photon of yellow-green light (similar to that of a firefly) when microbial ATP is detected. The samples are then screened by an instrument called a luminometer. If there is microbial ATP present, the instrument will detect the light and indicate to the user that the sample is contaminated.

ATP bioluminescence is applicable to a wide range of sample types and Celsis provides customers with kits that are specific to the products they are testing. A rapid screening of these products quickly and accurately identifies the few batches that carry bioburden, allowing the majority of your production run to be released to market rapidly and efficiently.

## Selecting the Right Rapid Method

Achieving these results is only possible when the right rapid method is implemented. To aid in this important decision Celsis recommends the five criteria packaged food and beverage manufacturers should consider when selecting the right rapid method for their facility:

### 1. Critical Information

The more quickly a rapid microbial screening method can help you make an important business decision, the greater the financial value you will realize. A simple, rapid test that provides a positive or negative result is what is needed for the vast majority of today’s functionally sterile production runs. Testing all of your products via time-consuming, complex methods is a significant waste when a rapid presence/absence primary screen will reveal which products can be quickly moved to distribution and which require further evaluation.

### 2. Lab Efficiency

A rapid microbial method should process samples efficiently with minimal input. The ideal rapid method is easy to use, processes samples in a resource-efficient manner and allows for ‘walk-away’ automation. Look for a rugged, robust, accurate instrument with high sample throughput that is also small enough to conserve valuable lab space.

### 3. Technical Expertise

To obtain maximum efficiencies from a rapid screening system, a provider must offer comprehensive service, scientific and technical support. Critical items to consider when evaluating the support offered by a provider are its ability to implement and maintain the rapid method throughout a facility, expertise with similar product types in the food and beverage industry, application development facilities and capabilities, global customer and technical service availability, rapid response times, minimal downtime, regulatory compliance assistance, data integration for track and trace reporting and a clear process for estimating ROI.

### 4. Compliance

The full economic benefits of rapid microbial screening methods cannot be realized if the software does not track, trace and provide controlled access to data. Be sure the system provides a database that is customizable to a company's unique requirements and is able to track samples in a way that meets USDA/FDA or local regulatory requirements. The database should be designed to integrate with existing LIM and ERP systems and to export valuable reporting information to common spreadsheet and database programs, such as Excel or Access.

### 5. Continuous Improvement

To be successful, companies in the food and beverage industry and their suppliers must adapt to ever-changing products and market requirements. For this reason, it is important that the rapid method provider is committed to continuous improvement. Key activities to look for include investments in instrumentation, and software, increased reagent stability, optimization to reduce downtime, ISO certification and in-house laboratories that assist in application development.

## The Opportunity of Rapid Methods

With a solid understanding of the key considerations in selecting a rapid method, dairy, food and beverage manufacturers can capitalize on the full benefits of rapid microbial screening: faster, more reliable microbial results; improved manufacturing efficiencies; reduced inventory requirements; increased customer responsiveness; and faster time-to-market. The benefits add up to ongoing quality assurance with significant, bottom-line savings for today's progressive companies.



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