# Do all ATP systems rise to the challenge?

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The use of adenosine triphosphate (ATP) as an indicator of cleanliness is a widely recognised practice in the global food and beverage industry. ATP rapid hygiene monitoring has been available to the UK market for decades and during this time, manufacturers of ATP tests have been advancing their solutions to meet their customers' requirements.

Today the market has a number of ATP systems on offer varying in sensitivity, repeatability and, of course, price. All food and beverage processors using ATP to monitor hygiene will want to ensure they are using the most reliable and efficient system available to them to help avoid any costly food contamination incidents. It is therefore important to understand that not all systems are the same.


***The Clean-Trace ATP system from 3M.***

Much has already been written about the criteria to be assessed when choosing an ATP system, including a recent International Food Hygiene article titled 'Choosing the correct luminometer' by Professor Chris Griffith.

Areas such as repeatability, sensitivity, use of extractants to break microbial cell walls and aid detection of biofilms, and even the type of device used to detect the light reaction are all critical factors which require consideration.

## What is ATP monitoring?

For readers that are new to the concept of ATP it is the energy molecule found in all living cells, and it can be found on a surface in the organic residues of food or other cellular material, which may or may not include pathogenic bacteria. Even if there are no pathogens present at the moment of testing the presence of the organic residues creates a breeding ground for microbes that can contaminate food products during the manufacturing process.

ATP based rapid hygiene tests seek to measure the amount of ATP present at the critical points of a production line, thereby giving, in less than a minute, an indication of the hygienic status.

The technology typically involves a sample being taken using a surface swab or water sampling device. The test is activated to release the ATP which is then stimulated to emit light. This bioluminescence reaction is measured in a luminometer and converted into Relative Light Units (RLU) for easy interpretation.

The greater the RLU the more ATP present and therefore potential contamination risk. By setting Pass, Caution and Fail limits for each critical control point, the user can then immediately determine if the point tested is clean or if further re-cleaning is needed prior to production commencing.

Such rapid technology offers many benefits; ATP tests deliver results in seconds, giving real-time hygiene information that a manufacturer can act on by re-cleaning the 'at risk' area.

Tests are simple to use and provide clear results, allowing all operatives to perform the testing with no specialist personnel or laboratory required.

Records can be kept to show due diligence and to demonstrate that an effective cleaning regime is in place as part of the company's HACCP system.

It enables companies to not only quickly identify a hygiene trouble spot but also to take immediate corrective action to ensure the critical area is within the required hygienic status and ready for production again.

Rapid hygiene testing is also an excellent training tool – enabling personnel to see a clear and immediate link between good hygiene practice and the hygiene test result.

## Data trending software

Some ATP systems allow regular analysis of hygiene monitoring results through the use of data trending software. This enables food processors to monitor the hygiene status of their operations at all times by providing information on performance over time.

This continuing benefit of ATP hygiene monitoring helps to identify problem areas and measures the effectiveness of remedial action, whilst allowing managers to keep a close eye on the standards of cleaning by all operatives.

It also helps manufacturers refocus and refine their cleaning regimes, concentrating their time and effort on the areas which

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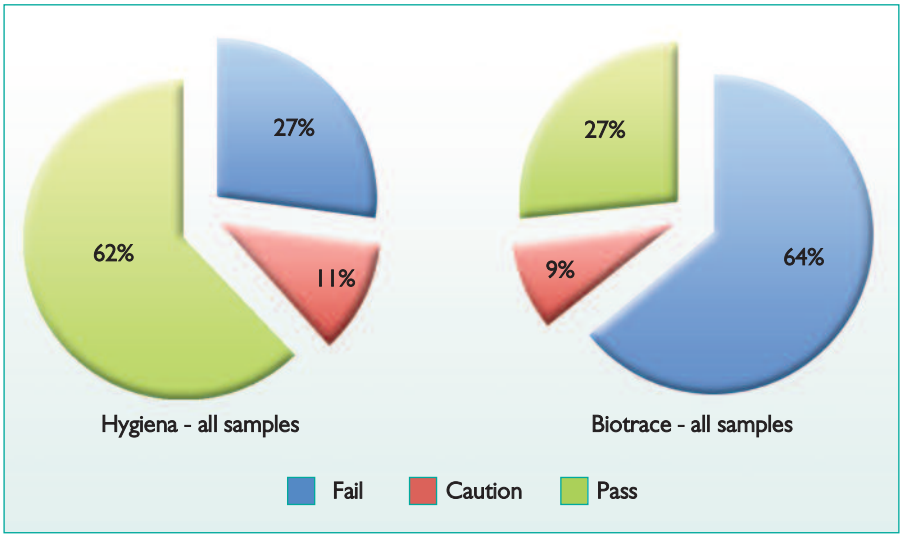


***Fig. 1. From Cara report by W. J. Simpson et al, 2006.***

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really count. Some companies have even used the technology to modify their production lines, by identifying production areas which are difficult to clean and feeding that information back to their production line equipment suppliers.

## Audit requirements

The value of a good ATP rapid hygiene monitoring system is no more apparent than when meeting audit requirements, whether internal or external.

Hygiene data can quickly be presented to the auditor through the use of sophisticated data filtering. In the case of a retest following re-cleaning, clear audit trails allow easy identification of the steps taken, by whom and when.

Data trending also allows the production of hygiene reports without spending valuable time manipulating data, with graphical representations generated easily for reporting needs.

ATP hygiene monitoring systems should be simple and easy to use, with minimal operative training required. Tests should be reliable and repeatable to ensure consistency of results. The system should be portable and robust, with swabs being easily identified by colour or metal detectable properties in case of loss in the production area.

## Maximum return

To get the maximum return on your ATP investment, the system should include an advanced data trending software to allow easy, yet thorough analysis of hygiene data.

Ultimately, the use of an effective ATP hygiene monitoring system can help reduce product reject and recall levels, in turn protecting the consumer, the brand and retail relationships.

Studies by independent companies such as Cara Technology Ltd and Hygiene Assured have highlighted marked differences between systems currently available on the market. In order to be sure which system will be the most effective for your facilities, valuable independent information can be built upon by conducting your own in-house system comparison study.

This route of in-house evaluation is becoming increasingly popular and some manufacturers of ATP test systems are actively promoting these studies.

3M Microbiology for example is currently running an ATP challenge, encouraging users of ATP systems to compare the Clean-Trace ATP system with the user's current system in place. The scheme demonstrates the high level of confidence 3M Microbiology has in the performance of the Clean-Trace system when compared to others.

When conducting such a study, the two key performance measurements are sensitivity and repeatability. It is important to understand that sensitivity and repeatability are very much inter-related.

Sensitivity is a measure of the smallest amount of ATP that can be detected by an ATP system and is a function of how much the test signal is greater than the background signal.

Repeatability has been described as the ability of the system to provide the same result when presented with the same sample repeatedly.

In practice it is the ability of the system to measure the highest or lowest level of contamination with equal and comparable accuracy time and time again. In this regard, repeatability is more important than absolute sensitivity – if you have no confidence that the reading is repeatable, any sensitivity claims are irrelevant.

Confidence in test results can only really be achieved when an ATP system provides both these factors.

## The 3M ATP challenge

The 3M ATP challenge focuses on these two parameters and those who have already taken up the challenge have found that the Clean-Trace ATP system has produced favourable results.

An in-house comparison study can be conducted at little cost to the user as most manufacturers/suppliers of ATP systems would offer a free system trial.

Time and resource allocated to the study can also be as minimal or as great as the user determines, although the ideal study would at a minimum compare systems in the real testing environment and also a laboratory/ bench top based comparison.

Test points in the production environment should include samples from areas that could be susceptible to both low and high levels of contamination and areas that have a high potential for biofilm development; giving an indication of the tests sensitivity in your specific setting.

A result from a system that is sensitive and repeatable will accurately reflect the level of contamination in a food manufacturing environment so that good hygiene decisions can be made time after time. ■

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## References


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