

Third-party study demonstrates not all ATP systems produce stable, consistent results

When you make the high risk decision to start food production, you must trust the data from your ATP testing system. If you make “the go-ahead decision” using results that are unstable or inconsistent, you could start production when an area may not be properly cleaned or lose valuable time re-cleaning when it is not necessary.

You also have to rely on data from your ATP monitoring system to proactively manage risk in your operation, by identifying areas that are most likely to be contaminated, showing results of cleaning over time and preparing for audits.

However, not all ATP systems produce results that are both stable and consistent.

Impacts of Time and Temperature on ATP Test Results

The time it takes to complete an ATP test can differ when testing the same site from day to day or even between shifts, due to time delays or differences in technique. Once a test is activated, time delays can occur when technicians are distracted, have unexpected conversations or need to navigate around equipment in the plant. Also, experienced technicians may work faster than newer personnel.

In addition, food manufacturers operate in a variety of temperatures, depending on the foods they produce. However, some ATP systems perform inconsistently, providing stable results at some temperatures but unstable results when operating temperatures increase or decrease.

Therefore, it is critical for an ATP system to provide stable and consistent results despite time delays taking readings or variations in operating temperature.

Studies Comparing ATP Testing Systems

With the introduction of the new 3M™ Clean-Trace™ Hygiene Monitoring and Management System, 3M commissioned a study by the Zero2Five Food Industry Centre to compare the new system’s performance to that of eight other ATP systems. The study evaluated the impact of time and temperature on the stability and consistency of results produced by the ATP systems.



A Study of Stability and Consistency

Methods

To test the stability of results produced by each system, a known amount of ATP was applied on swabs and read repeatedly over two minutes to determine how much results varied. Tests were conducted at 10°C, 20°C and 35°C. System stability was measured as percent signal decay per minute.

Interpretation of Results

Desired results will be both stable and consistent. In Figure 1, an ATP system that produces stable results over time at different temperatures will show a nearly horizontal line at each of three temperatures. In the targets, an ATP system that provides consistency will have results grouped closely on the target while stability in ATP system will cause the results to hit the center of the bullseye. In Table 1, a signal decay of more than 10% per minute was considered unacceptable.

Results

As shown in Table 1:

- The 3M™ Clean-Trace™ Hygiene Monitoring System was the only ATP system that produced acceptable results at all times and temperatures.
- Three ATP testing systems produced unacceptable results at all temperatures:
 - » Hygiena EnSure SuperSnap
 - » Neogen Accupoint Advanced Access
 - » Neogen Accupoint Advanced Surface
- Five systems produced unstable results, with unacceptable results at some temperatures and acceptable results at other temperatures:
 - » Biocontrol MVP ICON Surface Sampling Device
 - » Charm NovaLUM FieldSwab Plus
 - » Charm NovaLUM PocketSwab Plus
 - » Hygiena EnSure UltraSnap
 - » Kikkoman PD-30 LuciPac
- Four systems had signal decay rates as large as 97% per minute at some of the temperatures tested.
 - » Charm NovaLUM FieldSwab Plus
 - » Charm NovaLUM PocketSwab Plus
 - » Hygiena EnSure UltraSnap
 - » Neogen Accupoint Advanced Surface



Figure 1. Interpretation of Results

A: Stability/Consistency
 High - Acceptable results in all conditions
 Medium - Acceptable results in half or more conditions but not all
 Low - Acceptable results in less than half of conditions

B: Temperature
 10°C
 20°C
 35°C

Definitions of Stability and Consistency

Stability

An ATP hygiene monitoring system should be able to provide stable results over time and at different temperatures.

Consistency

An ATP hygiene monitoring system should be able to provide the same results for the same ATP sample consistently and repeatedly at each temperature.

Table 1: Percentage Signal Decay Per Minute

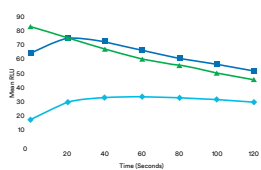
Hygiene Monitoring ATP Test System	Temperature Variable					
	10°C		20°C		35°C	
Time (Minutes)	1	2	1	2	1	2
3M™ Clean-Trace™ Hygiene Monitoring & Management System	+3.56%	+5.13%	-0.40%	-1.93%	-6.02%	-8.66%
BioControl LIGHTNING MVP ICON™ System	+19.73%	+18.23%	+5.57%	-11.68%	-31.41%	-52.17%
Charm NovaLUM FieldSwab®	-4.84%	-11.19%	-12.18%	-22.22%	-96.55%	-99.43%
Charm NovaLUM PocketSwab® Plus	+6.12%	+3.30%	-9.20%	-18.11%	-100.00%	-100.00%
Hygiena Ensure SuperSnap™	-55.41%	-65.84%	-53.62%	-76.08%	-74.28%	-92.50%
Hygiena Ensure™ UltraSnap™	+97.04%	+73.96%	+3.60%	-19.41%	-27.50%	-45.24%
Kikkoman® Lumitester PD-30	+3.85%	+4.57%	+3.42%	+1.18%	-9.75%	-14.33%
Neogen AccuPoint Advanced Access	+33.85%	-52.31%	-51.34%	-89.53%	-83.49%	-92.97%
Neogen AccuPoint Advanced Surface	-98.18%	-100.00%	-71.65%	-93.25%	-100.00%	-100.00%

Hygiena Ensure™ UltraSnap™



Low stability
High consistency

Decay Rate Over Time



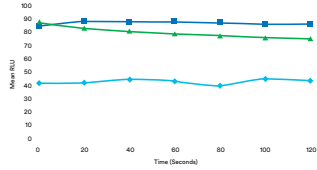
- Generates results that are time and temperature dependent
- Results vary 97% at 10°C within 1 minute with an increase in signal, and vary by 45% at 35°C within 2 minutes showing a decrease in signal
- Rapid signal changes may lead to false results

Kikkoman® Lumitester PD-30



Medium stability
Medium consistency

Decay Rate Over Time



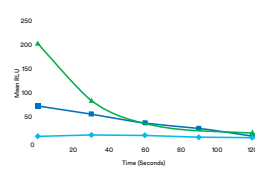
- Generates stable results consistently at most temperatures
- Results vary by a maximum of 14% at all temperatures within 2 minutes
- Process environment operating temperatures should be considered to ensure the validity and consistency of results

Neogen AccuPoint Advanced Access



Low stability
Low consistency

Decay Rate Over Time



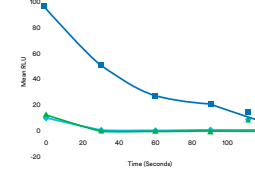
- Generates inconsistent and unstable results that are sensitive to changes in time and temperature
- At 20°C, the signal declined by >50% over the first 60 seconds, and 90% by 2 minutes
- Rapid signal decay may lead to inaccurate and unreliable cleaning verification results and actions

Neogen AccuPoint Advanced Surface



Low stability
Low consistency

Decay Rate Over Time



- Generates unstable and inconsistent results at all temperatures that are highly time dependent
- Results vary by a minimum of 72% at all temperatures within 1 minute
- Rapid signal decay may lead to inaccurate and unreliable cleaning verification results and actions

Conclusions

Nine ATP test systems for the monitoring of hygiene standards were evaluated. The study demonstrated that not all ATP systems provide the same quality of results. Three ATP testing systems produced unacceptable results at all temperatures. Five systems produced unstable results, with unacceptable results at some temperatures and acceptable results at other temperatures. Four systems had signal decay rates as large as 97% per minute at some of the temperatures tested. The only system that produced stable and consistent results across time and temperature was the 3M Clean-Trace Hygiene Monitoring and Management System.

In their report, the Zero2Five scientists stated **“It is paramount that the hygiene monitoring system provides reliable results. This will provide the manufacturing and hygiene teams with insight and information to manage the hygiene processes and practices within the organization effectively.”** They also warned that **“interpretation of inaccurate data may impact food safety and have a significant commercial impact on the business.”**

The ATP system you rely upon must produce results that are both stable and consistent so you can confidently make the high-risk decision to start food manufacturing and proactively manage risk in your operation.

Food Industry Centre
Cardiff Metropolitan University
ZERO2FIVE
Canolfan Diwydiant Bwyd
Prifysgol Metropolitan Caerdydd

For more information, please visit
www.3M.com/foodsafety

3M

3M Food Safety
3M Center, Building 275-5W-05
St. Paul, MN 55144-1000 USA

1-800-328-6553
www.3M.com/foodsafety

3M Canada
Post Office Box 5757
London, Ontario N6A 4T1
Canada

1-800-364-3577



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