

Precision and accuracy in ATP hygiene testing

ATP bioluminescence is a well established rapid method that gives instant results, and is used to measure cleanliness and hygiene. Advances in solid-state technology have enabled new instruments to be developed that deliver performance, convenience and robustness at low cost.

One such instrument is SystemSURE Plus (Hygiena International) which was recognised in Business Excellence Awards for Innovation in 2008, and has the following unique features:

- Low background that minimises signal to noise ratio which maximises sensitivity and enables reliable detections at low ATP levels, therefore reducing false positives.
- The output scale (Relative Light Units, RLU) is quantitative and 1 RLU = 1 fmol ATP (higher RLU numbers do not mean higher sensitivity).
- Self-calibration that significantly reduces service and maintenance costs, and the low voltage supply means that simple AA pen batteries can be used compared to expensive dedicated mains/re-chargeable systems.
- Secure data download to PC by either of two software options including advanced, simplified

trend analysis (Sure Trend) with pre-defined and customised report generation at the click of a button.

- Other features include sampling plans, re-test tag and trace function, on-screen statistical review of results without the need to download to PC.

All sampling devices have a simple snap and squeeze activation step with 12-months' shelf life and tolerance to ambient temperature abuse

The sample collection and testing devices are integrated all-in-one and ready-to-use, and contain a novel liquid-stable reagent formulation. These sampling/testing devices are available for solid surfaces (Ultrasnap), and for liquid samples (Aquasnap), such as CIP rinses and other water

samples. All sampling devices have a simple snap and squeeze activation step with 12-months' shelf life and tolerance to ambient temperature abuse. These devices are slim and lightweight, thus combining ease-of-use with reduced environmental impact because they contain fewer parts and are 50–60% lighter than comparable products.

Low background noise

One of the unique features of the systems is the very low background noise which means that the system can clearly differentiate between results at very low RLU values unlike other systems. This low background confers a high degree of precision and sensitivity to the system at low ATP levels.

Campden-BRI (the largest membership based food and drink research centre in the world) was commissioned to test the systemSURE Plus Instrument. While Campden-BRI does not

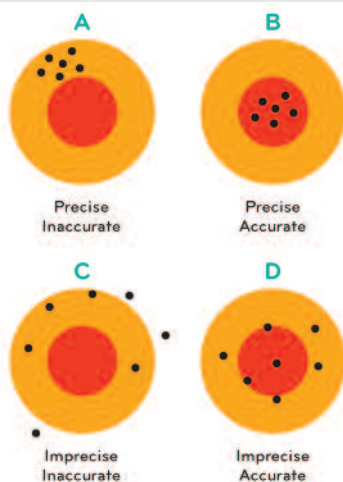


Figure 1: Schematic description of accuracy and precision

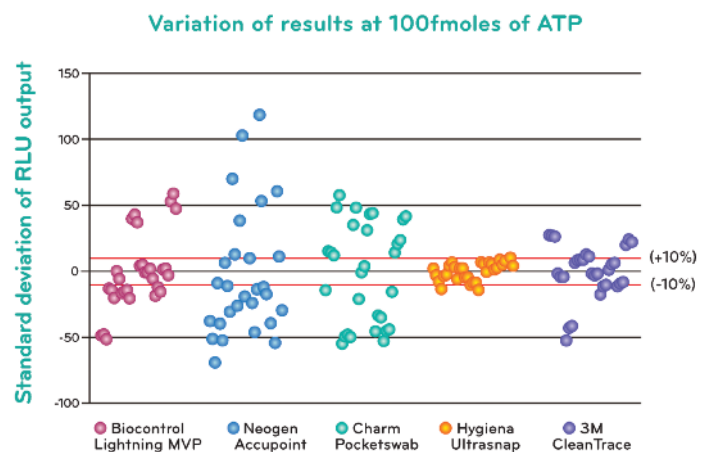


Figure 2: Variation of ATP detection systems

SystemSURE *Plus*

ATP Hygiene Monitoring System

Delivering **simplicity**
and **affordability**
through **innovation**

It has been claimed that not all ATP systems are equal... but some are more equal than others.

With more ATP systems sold per month than all other suppliers combined, call or visit us online at www.hygienea.net to see why the SystemSURE Plus is the new preferred ATP hygiene monitoring system around the world.

SystemSURE Plus and its Ultrasnap swab device are used by food, dairy and beverage processors to quickly access and monitor contamination on production surfaces in just a few seconds. Designed with state-of-the-art electronics and improved functionality, this palm-sized system is easy to use, sensitive and affordable.

To find out more about SystemSURE Plus or try the system out free for 30 days, call us or visit www.hygienea.net

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endorse specific products or services. Its conclusions were that SystemSURE Plus produces accurate and repeatable results. The ATP and the food residue detection experiments demonstrated the sensitivity and repeatability of the SystemSURE Plus system to detect ATP over a range of concentrations and for a range of food groups with reproducible results.

Accuracy and precision

Accuracy and precision are a consequence of the variation of a method (as shown in Figure 1). In an extensive study conducted by an independent international laboratory, accuracy and precision of different ATP systems were studied. Figure 2 shows the results from 30 replicate samples of ATP tested directly in five test systems by the same analyst. Hygiena SystemSURE Plus was shown to be the most accurate and precise ATP test system because results have an acceptable standard error limit of $\pm 10\%$. Other systems can vary up to 130%, which is highly imprecise and very inaccurate.

In addition, the Hygiena systemSURE recovered most ATP from the swab and with the least variation thus enabling reliable, precise and accurate sample collection (see Figure 3).

Continuous Improvement

Luciferase reagent preparations and their delivery devices for ATP detection vary from supplier to supplier and are optimised for each system. Each reagent system is a balanced cocktail of enzyme, co-factors, buffer and extractant.

The robustness and sensitivity of the ATP reagent preparations can be improved to meet the more stringent test requirements from harsh samples for a variety of different industrial applications. Hygiena has developed a new formula with more robustness and sensitivity that is incorporated into the Aquasnap and Supersnap devices. Both devices have more resilience against samples at extremes of pH and chemical interference, more light output per unit of ATP, and better extraction of ATP. These characteristics, combined with the low background to minimise the signal to noise ratio deliver enhanced detection of ATP (0.05fmols) in systemSURE Plus which is at least tenfold better than comparable systems.

Supersnap has a swab format for collecting surface samples for hygiene monitoring and uses the patented double-snap valve device. Aquasnap is a simple convenience device designed to collect and test liquid samples (0.1ml). For the food and beverage

industry, the application of Aquasnap is mainly the detection of product residues in rinse water samples. However, in certain situations it can be used to estimate microbial populations.

For industrial water samples eg cooling towers, the monitoring and control of biofilm and biomass is important for process efficiency, biocide dosage and the control of water borne risks such as Legionella. In these water treatment systems, ATP from organic sources is typically very low such that the main source of ATP is from microbial contamination and biofilm. Historically, the limit of detection for microbes in water using a direct ATP test on water was 10,000–100,000cfu/ml but Aquasnap and Supersnap can now detect 1000cfu/ml (see Figure 4).

Accordingly, SystemSURE Plus with its low background noise, consistent and reproducible reagent performance with excellent sample collection and recovery delivers the best performance of repeatable, accurate and precise results. ■

Martin Easter
General Manager
Hygiena International Ltd
www.hygiena.net

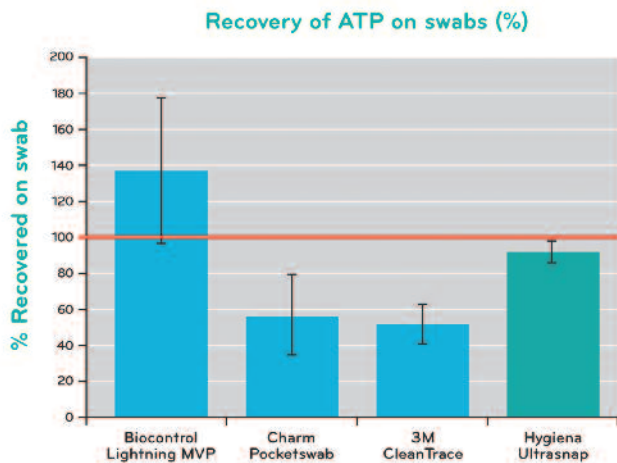
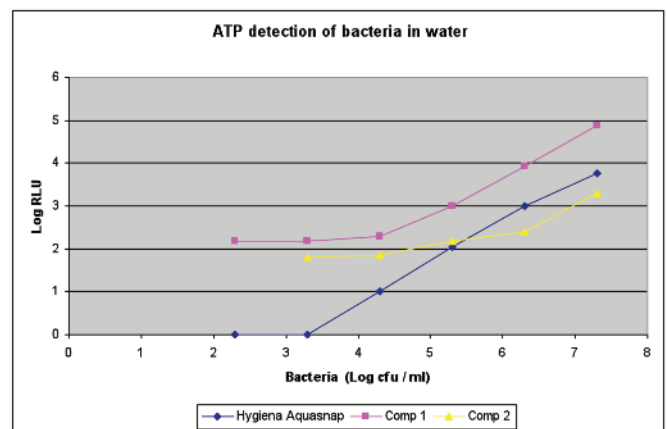


Figure 3: Recovery of ATP from the swab by different ATP detection systems



Comp 1 = Competitor system 1 Comp 2 = Competitor system 2

Figure 4: Microbial detection in water using ATP Bioluminescence.