FACTORS IN SELECTING AN ATP HYGIENE MONITORING SYSTEM

By: Douglas Wright, President

What is ATP?

- It is a key component in the "energy transfer system" within hiring cells . Adenosine TriPhosphate (ATP) is a universal compound found in all organisms and organic matter. ATP monitoring systems utilize ATP as a useful indicator of poor or post cleaning contamination. When ATP is present, a biochemical luciferase (firefly) reaction takes place and an amount of light is emitted. This light is measured in a luminometer and provides a quantitative result within seconds. Measured as fertomole of ATP.

What is RLU?

- Relative Light Units (RLU) is the unit of measurement of ATP. RLU is not a Standard Measurement, such as length (inches/meters) but is specific to each manufacture/Device/Swab type. Each system varies in RLU output as it has its own reagent formulation and instrument design. Having larger RLU values does not therefore confer sensitivity or precision.
- Therefore, the presence of high ATP levels is a good indicator of Poor Hygiene and low ATP levels is an excellent indicator of Good Hygiene. If composed to lower levels on a truly clean surface.
- Common sense should also apply. If a surface looks dirty IT IS DIRTY and if the dirt is dead cells or non organic then the ATP count can be low, but a high count is a clear indication of POOR Hygiene.
- The ideal test is on a just cleaned surface as a means of verifying proper hygiene and sanitation practices.

What is the proper swabbing technique?

You should swab an area that is about 4 by 4 square inches (10 x 10 cm) or in the case of a hard-to-clean area, as much of the surface as possible. Do not let the swab come into contact with anything other than the test area to avoid contamination. Apply pressure to the swab to pick up surface residue and penetrate any biofilm that may be present. After collecting the sample, place the swab back in swab tube. The swab can be left inactivated for up to 4 hours, but once the device has been activated, it should be read in the SSP or Ensure Plus within 10-60 seconds.

Swabbing Techniques

- Proper and consistent swabbing technique is likely the most understated part of doing proper microbiological or ATP swabbing.
- Example: If you swab a recommended 4" x 4" area that equals 16 sq. inches.
- If you swab a smaller area 3" x 3" area that equals 9 sq. inches. (ALMOST ½ OF A 4"X 4" SWABBING)
- If you swab an area only 2"x 2" that equals 4 sq. inches (1/4 OF A 2"X2" ZONE)
- If the smallest area gave an RLU value of 10 that would be a pass, but the larger (3X3")area would by correlation give a 22.5 RLU which is a caution and the largest area (4X4") would give a reading of 40 RLU or a fail. All from the same surface!
- However, this is not the only factor. If the area is a critical factor then so also is the thoroughness of the swabbing. Try wetting a swab (glycol or fine oil is best –water evaporates too quickly) and swab a smooth black surface. Then note the actual % of the area swabbed. Almost no one does 100% but many are 50% or lower. So, with a smaller surface and poor technique the RLU can vary by >10 fold.
- SO, FOR GOOD REPEATABLE RESULTS MAKE SURE YOU SWAB THE SAME SURFACE AREA THOROUGHLY. With at least 90% of the area completely swabbed.
- For irregular surfaces it is critical to swab the same surface area each time. If the areas are smaller or larger than 4"x 4" then the RLU pass/fail thresholds can be adjusted.

ATP System Selection Factors

Each ATP Monitoring system varies in its technical performance because of the inherent difference in both the chemistry and mechanics of each one:

- **LINEARITY** This is the direct relationship between the ATP present on the swab and the RLU value shown by the instrument. The more linearity a system has the more reliable and meaningful the system is.
- **SENSITIVITY** This represents the lowest amount of ATP a system can pick up which is also described as limit of detection (LOD). The most sensitive system will demonstrate a reliable measurement at very low levels of ATP.
- **VARIATION** This is how the same swab readings intrinsically vary, even when all other factors are constant. It is a measure of precision and accuracy. The less variation a system has the more confidence a user can have in terms of both results obtained and data trending.
- **ATP RECOVERY** This is how much of the ATP picked up from the surface is actually measured by the system. Not all systems measure all the ATP they have collected. To give results which accurately represent the surface ATP recovery must be as close as possible to 100%.
- **EASE OF USE** A system needs to be straightforward and simple to use in terms of software, instrument and swabs. .

LINEARITY

- Systems with greater linearity are more reliable because there is a directly proportional increase in RLU to the amount of ATP on the swab. If there is 10 times the amount of ATP there should be exactly 10 times the RLU output reading.
- Scigiene ATP tests offers good linear response to ATP whereas other systems show linearity down to 10 fmoles then level off due to a lack of sensitivity. They lose sensitivity precisely where it's needed!

SENSITIVITY

What is LOD?

- Limit of detection (LOD) is the sensitivity of a system. The lower the limit of detection, the more sensitive and better the performance of a system will be. The extent of background interference, or noise, from general swab and instrument variation (in the absence of ATP) will determine what range of measurement is important. Having little background noise improves the sensitivity i.e., the most sensitive system will have very low background noise and will therefore be able to detect low ATP levels against the background noise.

Why is sensitivity important?

- It is increasingly important to be able to detect low levels of ATP, particularly in high care industries where invisible soils that cause contamination need to be identified.
- We can supply special SIDE-by-SIDE kits that contain serial dilutions of ATP that prove our Scigiene ATP meters are able to detect up to 5 times lower than any other system.

Benefits of low limit detection

- A system with a low limit of detection (LOD) allows for **better trending** and **no false negatives**. Some systems are not able to detect low levels of ATP below 10-100 fm ATP so can give a misleading "PASS" at around 10+ fm of ATP; 10fmol is still enough soil to effect contamination.

VARIATION; ACCURACY and PRECISION

- Scigiene Systems consistently stays between acceptable standard error limits (+ and – 10%). Other systems can vary by up to 130% (most are around 40%) which is highly imprecise and very inaccurate.

Benefits

- The benefit of having the least variable system is twofold; lack of false negatives/positives and more reliable results for trending purposes.

EASE OF USE

- While easy to forget when reviewing technical aspects of a product it is equally critical that the product is easy to use and meets to customers' needs.
- Our meters are lightweight, durable and simple to use.
- Yet they also use powerful programmable software to produce hundreds of custom reports to meet almost any need.

RECOVERY OF ATP

- In order to reliably detect contamination left behind after cleaning it is important to be able to recover as much ATP from the swab as possible so that RLU output is a true representation of what is present on the surface. The most reliable swab will recover up to 100% of ATP and show the smallest standard error.
- From tests we have proven Scigiene's swabs were able to consistently recover almost 100% of sample and therefore give the more reliable data. As a comparison some other systems can give much greater than 100% recovery! Clearly something cannot be right if your recovery is greater than 100%.
- **Scigiene ATP swabs have 92% recovery of ATP on swabs and the smallest standard error and therefore the most reliable representation of ATP on a surface.**

Trouble Free Usage

- After collecting swab sample as instructed insert into sleeve without any other surface contact to eliminate other ATP sources of contamination.
- Make sure Scigiene Luminometer is on and has finished its 60 second self calibration before activating the ATP swab.
- Do not activate ATP reagent bulb until ready to take reading, as this is a time sensitive reaction. Delayed readings = false reduced counts
- After activation immediately shake vigorously for 5 seconds.
- Insert ATP swabs completely and ensure lid is properly closed to ensure no stray light is entering Luminometer to cause interference
- Hold meter upright vertically to ensure reagent is in bottom of swab sleeve. Insert ATP swab into meter fully and in front of Luminometer sensor and then press OK to start 15 sec. meter countdown.
- Ensure batteries are good if getting strange results
- Ensure outside of ATP swabs and Luminometer are clean.
- Ensure interface port is properly in place (if not lid will not close properly).
- While our meter is the most rugged on the market, please take care of it and it will be nice to you also!

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