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VENDOR SEMINAR:

QUALITY ASSURANCE FOR MYCOTOXIN MONITORING IN A HACCP BASED APPROACH - REFERENCE MATERIALS AND PROFICIENCY TESTING

Quality Assurance aspects of mycotoxin testing

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Mycotoxin testing poses some unique challenges for analytical laboratories. Using solid validated analytical methods are only part of the solution to providing the best analytical results possible. By utilizing some basic tools as part of the overall QA program, laboratories can build additional quality into their systems.

Understanding that sampling contributes more to variability of results than any other component of mycotoxin analysis is a critical concept. This is crucial for raw commodities such as grains. Mycotoxins are not evenly distributed PLUS they may be present at extremely low levels of contamination. Large samples of whole grains must be collected and subsampled properly, the entire probed sample should be ground finely and then mixed well before taking an analytical sample for testing. In addition, the appearance of commodities might be deceiving. Many times great looking grain can have substantial mycotoxin contamination, and likewise products that look like they would likely have substantial mycotoxin contamination may actually not contain much in the way of mycotoxins. A study on single kernels of corn shows this in great detail.

Next, knowledge of the type of samples is crucial. Samples submitted for mycotoxin analysis may be as simple as corn or wheat or as complex as nutraceuticals or complex animal feeds. Knowing your sample will give you insight on potential mycotoxins. For example wheat products are more commonly contaminated with DON and zearalenone and only in some unusual instances are aflatoxin and fumonisin detected. This knowledge can assist with determining which toxins to analyze for especially in samples associated with animal or human health issues. In addition evaluating the matrix that will be analyzed can help determine the best method for the analysis. Many simple matrices such as grains and simple feeds can be analyzed by test kits. In particular in the light of a HACCP based approach rapid test kits can play an important role. We will demonstrate the use of such a rapid test kit, the RIDA[®] QUICK lateral flow test in combination with the quantitative reader RIDA[®] QUICK SCAN for e.g. testing incoming grains.

Complex matrices typically require analytical methodology such as HPLC, LC/MS or GC and also require multiple steps to remove interferences so that a purified extract with minimal interferences can be utilized for analysis. This will help minimize the possibility of matrix interferences that could be falsely interpreted as the toxin. When unusual matrices are analyzed it is always good practice to analyze a matrix spike to confirm an acceptable toxin recovery through the method. This use of mycotoxin standards to prepare matrix spikes is an excellent tool to measure overall success of the method on an unusual matrix that may not have been specifically validated on any method. In these cases a matrix spike adds an extra quality parameter to the procedure.

Reference materials can serve as a cornerstone to build daily quality assurance data. Utilizing a reference material such as a naturally contaminated grain sample with each sample run provides valuable information about all of the method parameters. When reference materials are used from the extraction step all the way through the method, the reference material provides a complete check on the entire system. It insures extraction was efficient, technician techniques were solid, standards were accurate and instrumentation was running as it should be. Daily documentation of this reference material result can be graphed and used as acceptance criteria for every mycotoxin run.

Technician training and documentation is a critical part of any laboratory and reference materials can also be used as both a training tool and as an ongoing check on analyst capabilities. Reference materials are available in a wide variety of matrices and toxin combinations. Select the combination that most closely reflects the laboratories sample submissions. These reference materials can also be used when method validations need to be completed. These materials are helpful and can provide some real world uncertainty data on methods as they are validated.

Reference materials can be also used in proficiency testing. Trilogy Analytical Laboratory introduced a proficiency testing scheme, Double Check, which is an excellent tool in the quality assurance process of mycotoxin analysis. In this workshop we will demonstrate the use of the Trilogy Double Check proficiency testing.

Quality assurance in a mycotoxin analysis may be more challenging than for other compounds, however with some basic tools mentioned during this workshop the accuracy of the results reported can be assured.