Journal of
Regulatory Science

http://journalofregulatoryscience.org

Editorial

Critical Role of Reliable Measurement in Regulatory Science

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The focus of this issue is metrology: the study of validated methods, performance standards, and efficient contaminant identification strategies, the cornerstones of scientifically defensible regulatory science.

The article, the establishment of performance verification procedures for Fourier transform infrared spectrometers, by Lanzarotta et al. describes performance verification procedures for Fourier transform infrared spectrometers (FTIR). FTIR spectroscopy has been commonly used to characterize food samples and is widely available in many food analysis laboratories. In the scheme of validation and qualification of analytical procedures, verification of an instrument's performance level is crucial to ensure reliable data. Suitability for intended usage requires instrument verification and calibration. Although the instrumentation software packages allow limited automatic verification, a full evaluation requires more quality check points and manual verifications. Using several parameters, which can be easily evaluated on a daily basis, the study provides a procedure for acceptance criteria for an FTIR microscope operation and can serve as general reference for analytical laboratories.

A study on tattoo-related outbreaks of nontuberculous mycobacterial skin infection (Isolation and Identification of Nontuberculous Mycobacteria Associated with Tattoo-related Outbreaks) by Chou et al. details a two-step screening and classification procedure enabling time-sensitive identification of these bacteria. Isolates from environmental and water samples from tattoo parlors and from tattoo ink are matched with the species recovered from outbreak patients, providing strong evidence that the unsanitary manufacturing process might be the possible cause of the skin infection outbreaks. The screening and identification strategy can potentially serve as a model for future outbreak investigations.

Another study by Chamkasem et al. (Analysis of Pesticides in Olive Oil Using a Modified QuEChERS Method with LC-MS/MS and GC-MS/MS) reveals a modified sample processing QuEChERS method with liquid chromatography, mass spectrometry, and gas chromatography detection. Mass spectrometry identification offers a simple and high-throughput screening method for pesticide analysis in

olive oil. Pesticide maximum residue levels (MRL) present a trade barrier due to the absence of measurement tolerance limits. The application of QuEChERS to analyze pesticides in olive oil addresses the need for accurate measurement of pesticide residues, including those where MRL have not been established to assist risk management decisions. Methods for accurate measurement of pesticide residues further present economic value in standard development and trade.

The Food Safety Modernization Act (FSMA) has made prevention the cornerstone of a sustainable food safety system; therefore, a need exists for measurement tools to effectively monitor food for safety and quality. A preventive program requires reliable testing of all food products to ascertain the necessary protective steps to safeguard the food chain. Accordingly, the monitoring and surveillance systems need to be backed up by an effective, accurate, and task-specific measurement system. Metrology has highlighted two important features for reliable measurement, namely traceability and uncertainty. Fit-for-purpose analytical data are critical for regulatory decisions. Implementation and enforcement of regulations and standards require timely and reliable testing results. Regulatory risk managers recognize the important role of sound measurement in facilitating compliance and implementing enforcement actions. A critical feature in the use of analytical data for regulatory actions is scientific defensibility.

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