



OTSC Quarterly Newsletter



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OTSC Partners w/the United Nations Food & Agriculture Organization in Delivering Online Education in Laboratory Quality Systems

The Office of the Texas State Chemist delivers online graduate level education courses in Regulatory Science. This past fall, the Laboratory Quality Systems course was offered to Texas A&M graduate students in the Professional Program for Biotechnology and for continuing education to 29 laboratorians in 24 developing countries. The continuing education program is part of an ongoing collaboration with the United Nations Food and Agriculture Organization that began in 2012.

A laboratory quality system (LQS) is a process approach to ensure accurate, defensible, and timely results. Quality standards including ISO/IEC 17025:2017 define steps toward achieving a LQS and provided the framework for this course. The course contained four units as follows: Unit 1 Quality System Structure, Unit 2 Quality Control Techniques, Unit 3 Method Validation and Unit 4 Laboratory Quality Management. As part of the course, participants interacted with the ISO stand-

ard to identify documents and records that form the backbone of a LQS. In addition, using the standard operating procedures (SOPs) and related documents from the OTSC's ISO accredited laboratory as a model, participants practiced developing their own SOPs. The availability of working documents offers course participants a window into the inner workings of an ISO accredited laboratory. Many of this year's course participants commented on how the course presentations, resource materials and readings provided a foundation towards implementation of their own LQS with the ultimate goal of accreditation.

Ensuring both public and private sector laboratories provide accurate and defensible results facilitates global commerce and food safety and provides either a direct or indirect benefit to Texans. OTSC collaborations with FAO and other international organizations assists laboratories that serve a population of approximately 4 billion individuals living in developing countries.

Nitrogen Stabilizer Analysis in Fertilizer

Nitrogen stabilizers, which help prevent leaching and denitrification of the fertilizers, are proven to optimize nitrogen use efficiency as well as to increase plant and crop yield. It is important to have an accurate and defensible analytical method to monitor the stabilizers in final product for quality control purpose and also to understand the stability of them under different environmental storage conditions. Office of the Texas State Chemist successfully developed a single method to quantify three major nitrogen stabilizers, N-(n-butyl) thiophosphoric triamide (NBPT), 3,4-Dimethylpyrazole Phosphate (DMPP), and dicyandiamide (DCD) performed on a triple quadrupole tandem mass spectrometer in multiple reaction monitoring (MRM) mode using positive mode of electrospray ionization (ESI+).

With optimized work conditions of LC-MS/MS, we achieved good linearity ($R^2 \geq 0.99$) of calibration curves in a broad calibration range and acceptable method limit of quantitation (LOQ=50

ppm) for each analyte. The developed method has been validated by spiking three levels of the nitrogen stabilizers in urea matrices. All recoveries range from 80% to 110% with RSDs less than 10%. Based on the validation data, the developed method could be satisfactorily applied as a routine procedure to identify and quantify NBPT/DMPP/DCD in urea fertilizer product in the Agricultural Analytical Service laboratory.



Dr. Ching-Jung (Amy) Tsai in front of LC-MS/MS

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Protects consumers & enhances Agri-Business through its Feed & Fertilizer Regulatory Compliance Program, surveillance & monitoring of Animal-Human health & environmental hazards, & preparedness planning.

OTSC Continues Outstanding Performance

OTSC continues to achieve outstanding performance in proficiency testing. Proficiency testing is a requirement for ISO-accredited labs and is used to verify and demonstrate a lab's quality control. OTSC participates in a number of these testing programs for feed and fertilizer. One program offered by the American Oil Chemists' Society (AOCS) awards top performers in their various testing series such as aflatoxin and feed microscopy. A series takes place over a year and includes performance on multiple analyses (between 6 and 8 samples). A number of labs participate in these series.



Cindy McCormick, who has been with OTSC since 1995, is a multiple award winner for aflatoxin analyses. Since 2007, when Ms. McCormick transitioned to mycotoxin analysis, she has received 1st place six times (three for test kit, three for HPLC) and four honorable mentions. Her outstanding work positioned her as a trainer for mycotoxin testing workshops held here and internationally. Ms. McCormick was part of a team that held multiple trainings on aflatoxin test kits in Central Africa. In addition to her analytical work, she is involved in the production of reference material which feeds directly into OTSC's own aflatoxin proficiency testing program.

Michael Olivarez has been with OTSC since 1989 and is a multiple award winner for feed microscopy. Mr. Olivarez trained under Mick Runyun and has been the primary analyst for feed microscopy since 2006. He has earned four honorable mentions, one 2nd place, and four 1st places. As part of OTSC's outreach, Mr. Olivarez served as a trainer for a microscopy workshop held in May of this year. The focus of the workshop was on the microscopic analysis of rendered products and was put together by OTSC for the Borlaug group from Mexico.



OTSC Welcomes New Employees

Dr. Ching-Jung (Amy) Tsai joined the OTSC in September of this year and is currently assigned to the elemental analysis team. She received a master's degree in horticulture from National Taiwan University and her doctorate in horticultural sciences from Texas A&M University. For her master's thesis, Dr. Tsai investigated the effects of liquid and slow-release fertilizer (N-P-K) on the growth and flowering of plants. Her PhD research involved the construction of a genetic linkage map in roses using simple sequence repeat (SSR) and amplified fragment length polymorphism (AFLP) markers. Results were presented at the International Rose Genomics Conference in France and at the American Society for Horticultural Science (ASHS) Annual Conference in the states. Her lab techniques include DNA extraction, polymerase chain reaction, electrophoresis, and sequencer data analysis. Amy enjoys being a mom to three young boys, and her leisure time activities include skiing, piano, and travel.

Jesse Sandoval joined the OTSC in September as an Analytical Chemist. He was born in Newark, New Jersey and raised in Katy, Texas. He attended Texas A&M University and received a Bachelor of Science in Chemistry with a Minor in Mathematics. As an undergraduate Jesse performed research for two and a half years with the Center for Chemical Characterization and Analysis (CCCA) lab at Texas A&M where he focused on nanoscale homogeneity analysis by massive cluster secondary ion mass spectrometry. For the OTSC he is analyzing the concentration of vitamins and antibiotics in feeds by high performance liquid chromatography. In his free time Jesse likes to play tennis, listen to music, and watch the Texas A&M football team BTHO everyone.

