

Completion Report for FDA Track Key Project: Rapid Screening of Pharmaceuticals

This project was funded through a FY08 CDER Critical Path project entitled “Rapid screening of pharmaceutical products and ingredients” submitted by the Office of Compliance and DPA. The goal of the project was to purchase 5 portable spectrometers of four types (Raman, Near Infra-Red, Ion Mobility and X-Ray Fluorescence) and to develop analytical methods including chemometric methods of analysis that can be deployed by ORA field laboratories and inspectors for the screening of dietary supplements, pharmaceutical ingredients and finished products.

Milestones:

1. Complete collaborative studies of initial CP proposal with ORA

In June of 2009, twelve months after receipt of funds, Division of Pharmaceutical Analysis (DPA) and Office of Regulatory Affairs (ORA) commenced collaborative studies of four analytical methods, one for each type of instrument purchased. The goals of the collaborative studies were to determine detection limits, assess potential problem areas associated with transferring methods and instruments to field and evaluate the robustness of instruments with respect to physically shipping them from one place to another. Two rounds of collaborative studies involving CDER’s DPA and 5 laboratories from ORA have been completed: the first round required 12 months of preparation; the second month required 3 months of preparation. Thus DPA met its goal of reducing the time required for method development. In all 10 methods were developed: (1) analysis of toxic metals by XRF, (2) analysis of residual catalysts by XRF, (3) analysis of sibutramine by IMS, (4) analysis of fluoxetine by IMS, (5) analysis of diethylene glycol in glycerin by Raman, (6) analysis of ethylene glycol in sorbitol by Raman, (7) analysis of ethylene glycol in glycerin by Raman, (8) analysis of diethylene glycol in propylene glycol by NIR, (9) analysis of ethylene glycol in propylene glycol by NIR and (10) analysis of melamine in lactose by NIR.

2. Finalize development of 10 methods

Feedback from ORA scientists who participated in the collaborative study was incorporated into final operating procedures for all methods. Other instrumental improvements identified by DPA scientists were also incorporated into the final operating procedures. Final protocols for all methods were ready for transfer to ORA by June of 2010, less than 2 years after receipt of funds.

3. Transfer instrumentation and methods to field laboratories

Training materials, operating procedures and instruments are now available to ORA and are being deployed per ORA’s FDA Track Key Project “Use of portable scientific applications to assist in regulatory decisions earlier in the supply chain”. Deployments scheduled to date by ORA have met their timelines as listed on FDA Track.

4. Release study report and develop publications

The following publications have been developed:

1. John F. Kauffman, Connie M. Gryniewicz-Ruzicka, Sergey Arzhantsev, Jamie D. Dunn, John A. Spencer, Steven Wolfgang, Xiang Li, Lindsey N. Pelster, Benjamin J.

Westenberger and Lucinda F. Buhse, **Pharmaceutical Surveillance with Rapid Spectroscopic Screening Technologies**, American Pharmaceutical Review (2010) 13 (1) 58-64

2. Connie M. Gryniewicz-Ruzicka, Sergey Arzhantsev, Lindsey N. Pelster, Benjamin J. Westenberger, Lucinda F. Buhse, and John F. Kauffman, **Multivariate Calibration Standardization Transfer Across Multiple Instruments for the Rapid Detection of Diethylene Glycol in Glycerin by Raman Spectroscopy**, Applied Spectroscopy (2010) Accepted
3. Jamie D. Dunn, Connie M. Gryniewicz-Ruzicka, John F. Kauffman, Benjamin J. Westenberger, Lucinda F. Buhse, **Using Portable Ion Mobility Spectrometer to Screen Dietary Supplements for Sibutramine**, Journal of Pharmaceutical and Biomedical Analysis, (2010) Accepted
4. Xiang Li, Sergey Arzhantsev, John F. Kauffman, John A. Spencer, **Detection of Diethylene Glycol Adulteration in Propylene Glycol – Method Validation through a Multi-Instrument Collaborative Study**, Journal of Pharmaceutical and Biomedical Analysis, (2010) Accepted
5. Sergey Arzhantsev, Xiang Li, and John Kauffman, **Rapid Limit Tests for Metal Impurities in Pharmaceutical Materials by X-ray Fluorescence Spectroscopy using the Continuous Wavelet Transform**, Analytical Chemistry (2010) In review

Conclusion:

The proof of concept for use of portable instruments to screen pharmaceutical ingredients and final products was shown with this key project. Validated methods and instruments are now ready for phased deployment by ORA.