Fast Gas Chromatography Applications in Scheduled Drug Identification

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Abstract

This project assessed the large impact that Fast Gas Chromatography (Fast GC) holds for improvements in the sample throughput in drug identification and toxicology analysis involving gas chromatography when combined with hydrogen carrier gas. Forensic Sciences: Review of Status and Needs clearly defines the need for further technology transfer to the crime laboratory and specifically addresses the need for increased throughput in drug identification and toxicology. This project provided preliminary data to support this hypothesis, and in turn this data was instrumental in an award of a Federally-funded grant from the Midwest Forensics Resource Center of $50,224 for a one year study that includes implementation in the Wisconsin State Crime Laboratory-Milwaukee and the production of an asynchronous webinar that analysts and managers may access to better understand the benefits of Fast GC as well as H₂ carrier gases.

SAIF Results

This study generated data which demonstrated that Fast GC was compatible with the mass spectrometers used in current analysis throughout drug identification and toxicology sections of the nation’s crime laboratories. In addition the SAIF funding was used to analyze a small number of Scheduled compounds which demonstrated proof of concept for the full testing of the hypothesis.

The SAIF funding was instrumental in the successful award in the MFRC’s 2011 RFP with an award of $50,224. This project provided undergraduate research opportunities for two students and led to the full summer support of another student through the Federal funding. In addition, the monies were instrumental in the success of the project which will see the first implementation of this new technology in the Wisconsin State Crime Laboratory-Milwaukee. This is a rather significant achievement and will likely play a major role in reducing the backlog of illicit drugs awaiting analysis in Wisconsin.

Conclusions-Future Action

In conclusion, the SAIF award was very useful in several facets. First and foremost, the project work supported the hypothesis that Fast GC coupled with H₂ carrier gas would have a significant impact on improving the sample throughput and costs for crime laboratories’ drug identification units. Pedagogically, the benefit was enormous in that three students directly or indirectly benefited from this work. One of those students will be assisting the PI in the preparation of a manuscript for the Journal of Forensic Sciences and will present posters at the Midwest Association of Forensic Scientists (MAFS) annual meeting as well as the American Academy of Forensic Sciences (AAFS) annual meeting in Feb 2012.
Individual Benefits

This SAIF grant project has invigorated my teaching both directly and indirectly. The direct benefit is the inclusion of “real-world” examples into my General Chemistry, General Chemistry for Engineers, and Quantitative Analysis lectures. In addition, opportunities to work with and mentor undergraduate researchers are always exciting. This research helped to financially establish a research opportunity that educated three upperclassmen. There is an indirect benefit for teaching in that projects such as this investigation sustain a creative scholarly flow for the faculty member. From a professional development or scholarship aspect, this award has provided one of the key components need for a successful external grant. Furthermore, this work has opened doors nationally in terms of collaborations with crime laboratories.

Student Benefits

There were three undergraduate researchers working on this project during the 2010-2011 year. The project is to be presented regionally in the MAFS meeting in Fall 2011 and nationally in the AAFS meeting in Atlanta GA Spring 2012.

Department-College-University Benefits

The successful application to the MFRC program required a collaboration between an academic unit and an accredited crime laboratory. Given that Federal legislation born of the 2009 National Academy of Sciences report mandated better collaborations between these entities, this SAIF funding served the purpose as a spring board to a successful project that has been referred to as an example for other projects in the betterment of forensic science. The benefit here was that the UW-Platteville program’s notoriety increased within the forensic science community. Additionally the external award returned indirect costs of over $11,000 to the campus.

External Grants Awarded

*Fast Gas Chromatography Capabilities in Drug Identification* ($50,224) through the Midwest Forensics Resource Center; DOE, Ames, IA.