B93 The Transition From Research to Routine Use in the Forensic Chemistry Laboratory

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The goal of this presentation is to cover the scientific requirements, obstacles encountered, and collaborative spirit necessary to bring about the successful transition from the research laboratory to the routine operational laboratory.

This presentation will impact the forensic science community by assisting researchers to gain a perspective on the necessary operational requirements of forensic laboratories. Forensic laboratory personnel will learn what motivates researchers so both groups can better collaborate to bring research into routine usage.

The chemical analysis and comparison of a number of solid matrices of interest to forensic scientists are made possible by progression from fundamental research and method development, validation in several forensic laboratories, and the publication of international standards. The transition of high-sensitivity elemental analysis of materials, including glass from the research laboratory to adoption and routine use in a forensic laboratory is a slow and laborious process. This presentation will cover the scientific requirements, obstacles encountered, and collaborative spirit necessary to bring about the successful transition. Laser Ablation-Inductively Coupled Plasma/Mass Spectrometry (LA-ICP/MS) has been called the "gold" standard for solid-sampling and high-sensitivity elemental characterization of materials providing sub-ppm detection limits of elemental analytes encompassing almost 70% of the periodic table. In addition, LA-ICP/MS provides true *quantitative analysis* data that can be used in numerical/statistical hypothesis testing to determine "match" and also to populate databases that are useful to determine the probability of a match for a given elemental profile. Several forensic laboratories have collaborated on method development and optimization as reported by the European Union-funded Natural Isotopes and Trace Elements in Criminalistics and Environmental Forensics (NITECRIME) effort (2000-2005) and continued by the National Institute of Justice (NIJ) -funded Elemental Analysis Working Group (EAWG) effort (2008-2012).[1,2] The interlaboratory trials eventually resulted in high-quality performance of these methods for the analysis of glass in forensic laboratories and this effort culminated in the publication of international (American Society for Testing and Materials (ASTM)) analytical consensus standards for the examination of these materials.[3,4] More than 30 forensic laboratories around the world now routinely employ the use of LA-ICP/MS for materials characterization on every continent and the history of elemental analysis provides a good model on how forensic method development should progress from basic research to routine use and acceptance in the courtroom.

Reference(s):

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Basic Research, LA-ICP/MS, Standardization

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