A108 Surface-Enhanced Raman Analysis of 1,2-Triazolo-Benzodiazepines Using Gold and Silver Colloidal Dispersions

Erika L. Asselin, MS, Florida International University, CP 175, 11200 SouthWest 8th Street, Miami, FL 33199; and Bruce R. McCord, PhD, Department of Chemistry, Florida International University, University Park, Miami, FL 33199*

The goal of this presentation is to show the applicability of surface- enhanced Raman spectroscopy to the analysis and detection of trace quantities of benzodiazepines. The limits of this technique will also be discussed

This presentation will impact the forensic science community by providing a quick and easy method, surface-enhanced Raman spectroscpoy, for the analysis of trace quantites of benzodiazepines.

Forensic science drug laboratories are reporting a significant increase in the prevalence of benzodiazepines in submissions from drug- facilitated sexual assault cases. Due to the pharmacological properties of these drugs and their availability by prescription, their potential for abuse is high. Their physiological effects on the central nervous system, such as confusion, drowsiness, amnesia, and impaired coordination, are ideal for their use in the commission of these crimes.

Raman spectroscopy is a relatively new method to the field of forensic science. Due to major advances in the technique, analysis can be performed on trace quantities of materials in different mediums. Surfaced-enhanced Raman spectroscopy (SERS) overcomes the low sensitivity and quenches unwanted fluorescence effects that are seen with conventional Raman spectroscopy. SERS spectra are obtained by applying the analyte of interest onto a SERS-active metal substrate such as colloidal particles or metal films and then obtaining the Raman spectra.

Surface-enhanced Raman spectroscopy (SERS) is proposed as a technique for the analysis of trace quantities of 1,2-triazolo- benzodiazepines in aqueous samples. SERS provides a spectral “fingerprint” of small, Raman active molecules at trace concentrations. This technique is simple to use, utilizes easily prepared substrates and simple instrumentation, and has the ability to distinguish analytes which are structurally very similar due to the spectral information provided.

Aqueous colloidal dispersions of gold and silver nanoparticles were synthesized using a modified Lee Meisel method.Diluted benzodiazepine samples were added to the colloidal dispersions and SERS spectra were obtained. A comparison of the enhancement of the spectral characteristics observed using gold and silver colloidal dispersions as the SERS active substrate was performed. Detection limits for the various colloidal dispersions were also characterized. **Benzodiazepine, Surface-Enhanced Raman Spectroscopy, Drug Chemistry**

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