B34 The Detection of Bleach (Sodium Hypochlorite) in Dialysis Blood Lines and Syringes in a Serial Murder Investigation

S. Frank Platek, MS, US FDA, Forensic Chemistry Center, 6751 Steger Drive, Cincinnati, OH 45237-3097; John B. Crowe, BS, US FDA Forensic Chemistry Center, 6751 Steger Drive, Cincinnati, OH 45237; and David S. Jackson, BS, US FDA Forensic Chemistry Center, 6751 Steger Drive, Cincinnati, OH 45237*

After attending this presentation, attendees will understand what analytical techniques can be used to detect bleach (sodium hypochlorite) in difficult matrices and how this information was used in court to convict a serial murderer for assaulting and murdering several patients at a dialysis facility.

This presentation will impact the forensic science community by shedding light on bleach detection in difficult matrices and the possibility for identifying bleach even when all of its active ingredients have broken down.

After a series of unexplained deaths and adverse reactions of patients at an eastern Texas dialysis center over a one month period, the state initiated an investigation that led to the arrest of a licensed practical nurse who worked at the center. The nurse was accused of murdering five dialysis patients and injuring five additional patients by injecting their dialysis blood lines with bleach (sodium hypochlorite) during their treatments.

The detection of bleach is challenging because sodium hypochlorite rapidly degrades in matrices that can be oxidized. Methodology to characterize bleach and its breakdown products in product tampering investigations has been developed at the Forensic Chemistry Center (FCC). This has been used to determine bleach adulteration in product tamperings even when all of the active hypochlorite has degraded. This is accomplished using a combination of spot tests for oxidizing agents, iodometric titration to assay sodium hypochlorite content, and ion chromatographic analysis for chloride and chlorate (bleach degradation products). In addition, headspace Gas Chromatography/Mass Spectrometry (GC/MS) has been used in some cases to further characterize the interaction of bleach with the sample matrix.

Eight dialysis blood lines and numerous needles and syringes from suspected victims at the dialysis clinic were received at the FCC for analysis. Liquid collected from various sites on the blood lines, residue on discarded syringe needles, and contents of suspect syringes were all analyzed for bleach and bleach degradation products. In addition, Fourier Transform Infrared (FTIR) analysis was used to test crystalline residues from suspect syringes to detect sodium hypochlorite and chlorate. Puncture analyses were performed on selected dialysis line injection ports to determine the number of punctures and to characterize the puncture holes as an indication of tampering. The analysis results were presented in court; the accused was found guilty on five counts of capital murder and three counts of aggravated assault.

Bleach (Sodium Hypochlorite), Serial Murder, Dialysis

*Presenting Author