



A87 Exploration of Cocaine Contamination of United States Currency – Continuing Studies

Thomas H. Jourdan, PhD*, Forensic Science Institute, University of Central Oklahoma, 100 North University Drive, Box 203, Edmond, OK 73034; Allison Veitenheimer, BS, 801 Northern Trace, Keller, TX 76248; and Jarrad R. Wagner, PhD, Department of Forensic Sciences, Oklahoma State University-CHS, 1111 West 17th Street, Tulsa, OK 74107

The goals of this presentation are to continue the development of the understanding of the contamination of U.S. currency resulting from illicit cocaine trafficking, as well as to introduce a survey of several foreign currencies for similar contamination; and to offer a mathematical model which seeks to assign a numerical probability of drawing from currency in general circulation bills contaminated at the levels quantitated in evidence submissions to the FBI Laboratory associated with forty criminal investigations involving drug trafficking and money laundering.

This presentation will impact the forensic science community by providing information on an analytical protocol developed for quantitation of loosely-bound cocaine residue levels on currency, and a mathematical model offered regarding the interpretation of the resulting values for U.S. currency.

This study, early results of which have been reported to the Academy (1997 and 2003), had its beginnings in response to a 1994 decision by the 9th Circuit Court of Appeals in the case of *U.S. v. U.S. Currency* (Alexander), 39 F.3d 1039, in which the court(s) acknowledged the wide-spread contamination of the U.S. currency supply by the illicit cocaine importation trade. The argument has been put forth and a former FBI Laboratory forensic examiner, successfully so during expert witness testimony in federal court on several occasions, that the absolute amount of the drug on currency, and not its mere presence, is probative.

The ink on U.S. currency never really dries. In effect, one can conceptualize currency as in a microscopic sense a "sticky" surface on to which, as it is circulated, various oils (e.g., human sebaceous) and miscellaneous environmental dirt and grime (including residue amounts of drugs of abuse) become attached. In the case of cocaine, a person who has handled the drug then handles currency transfers residue in the low hundreds of nanograms range to the bill(s), and that this amount over the course of subsequent circulation and manipulation is reduced to a steady state "background" level.

A study has recently been completed of the currency in general circulation in the U.S. Quantifiable levels of cocaine have been encountered on more than ninety percent of the bills thus far examined. Because it is unlikely that members of the illicit drug trade have actually physically handled this volume of bills, it was presented during a 1997 presentation to the Academy that some other agent is responsible for the extent of the distribution of the drug on currency in general circulation, in particular submitting that this agent is the mechanical currency counters which are universally employed in financial institutions have had a "homogenizing" effect on the currency supply.

The sampling aliquot for this study is \$1,860, which translates to ten bills of each common U.S. currency denomination (\$1, ... \$5, ... , \$100). Thus results are reported by location and by denomination. The initial screening is performed with a Barringer Instruments IONSCAN ion mobility spectrometer (IMS), an instrument with nanogram sensitivity for a number of the commonly encountered drugs of abuse, and cocaine in particular. Confirmation and quantitation is accomplished using liquid chromatography-mass spectrometry-mass spectrometry (LC/MS/MS) on an Applied Biosystems API4000Q instrument with Shimadzu LC. A deuterated internal standard is introduced in the extraction solvent in the initial step of the quantitation process so as to eliminate potential errors associated with subsequent manipulations. Currency aliquots from some 70 locations in 42 states have been surveyed (quantitated). In addition, currency from on the order of ten foreign countries has been similarly surveyed.

Following plotting of the background currency data (frequency as a function of contamination level in ng/bill) the equation of the resulting curve has been established and the function then normalized. Integration from zero to a particular contamination level, i.e., one from a given criminal case, with subsequent subtraction from 1.00, estimates the probability of drawing a bill from general circulation contaminated to that particular extent or higher.

Cocaine Residue Recovery, Quantitation of Cocaine on Currency, Interpretation of Cocaine Currency Contamination