

# Microgram

## Bulletin

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MAY 2004

### - INTELLIGENCE ALERT -

#### “SPLIF” PEANUT BUTTER (CONTAINING TETRAHYDROCANNABINOL) NEAR LAREDO, TEXAS

The DEA South Central Laboratory (Dallas, Texas) recently received a jar of apparent peanut butter, suspected to contain  $\Delta^9$ -tetrahydrocannabinol (THC), with a label that is visually similar to the commercial peanut butter product Jif® (see Photo 1). The exhibit was seized from an individual at a U.S. Border Patrol checkpoint on IH-35, 16 miles north of Laredo, Texas. The labelling on the jar includes “Splif Peanut Butter”, “Choosy Patients Choose Splif”, a marijuana leaf logo with the word “Tainted”, and user instructions (see Photos 2 and 3, next page). The exhibit (total net mass not measured) had a strong odor both of peanut butter and marijuana. Analysis by color testing and GC/MS confirmed THC (not quantitated). This is believed to be the first such exhibit received by the laboratory.



Photo 1



Photo 2

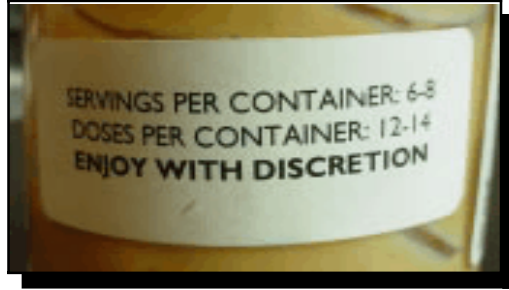


Photo 3

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**- INTELLIGENCE ALERT -**

**“SWEETART” CANDIES ADULTERATED WITH  
5-METHOXY-*ALPHA*-METHYLTRYPTAMINE IN LINCOLN, NEBRASKA**

The DEA North Central Laboratory (Chicago, Illinois) recently received 18 stained "Sweetart"® candies, suspected to contain lysergic acid diethylamide (LSD) (see Photo 4). The exhibits were seized pursuant to a traffic stop in Lincoln, Nebraska by the Nebraska State Patrol (18 of 36 candies submitted for analysis). Each candy was visibly stained on both the top and bottom surfaces. A cross section one of the candies demonstrated staining though the middle of the tablet, however, it was not possible to determine if the applied solution had soaked through the candy, or if the solution had been applied to both faces. The stained areas were more easily viewed with an ultraviolet light source (e.g., see Photo 5). Some of the candies fluoresced more intensely than others, suggesting that the drug strength varied significantly from tablet to tablet (ultraviolet light at 495 nanometers and an orange #56 filter exhibited the most contrast for photography). Analysis of the tablets (total net mass of 18 candies 30.3 grams) by GC/MS and UV/Vis identified not LSD but rather 5-methoxy-*alpha*-methyltryptamine (5-MeO-AMT) (not quantitated). This was the first seizure of this type submitted to the laboratory.



Photo 4

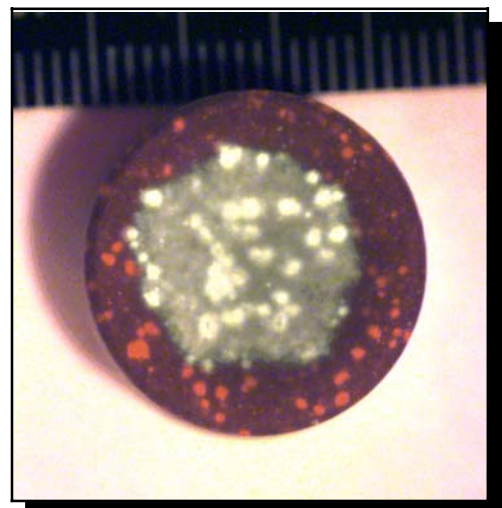


Photo 5

**- INTELLIGENCE ALERT -**

**“BLACK CRACK” IN ROANOKE, VIRGINIA**

The DEA Mid-Atlantic Laboratory (Largo, Maryland) recently received a submission of a brown/black rock-like material with a faint tar-like odor, suspected “crack” cocaine. The outer surface was speckled brown in color, while the inner portion of the material was black in color (see Photo 6). The exhibit was seized pursuant to a vehicle search in Roanoke, Virginia by the Roanoke City Police. Analysis of the exhibit (total net mass 0.32 grams) by GC/FID, GC/MS, and FT-IR confirmed 86 percent cocaine base. No adulterants or diluents were detected, and the coloring agent was not identified. This was the first submission of “Black Crack” received by the laboratory.



**Photo 6**

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**- INTELLIGENCE ALERT -**

**TRANSMISSION GEAR CONTAINING HEROIN FROM ECUADOR**

**UNKNOWN MACHINERY PART CONTAINING HEROIN FROM MEXICO**

The DEA Northeast Laboratory (New York, New York) recently received a sealed "transmission gear" (see Photo 7) containing a whitish powder. The exhibit (gross weight 17.7 kilograms, size 16 x 6 inches) originated from Ecuador and was seized by Customs inspectors at the Miami, Florida Express Mail Facility. Preliminary X-ray inspection (by the inspectors) indicated a dense area inside the gear. A drilled hole revealed a powder that field-tested positive for heroin. Analysis of the powder (total net mass 1.05 kilograms) by GC/FID, GC/MS and FTIR confirmed 93 percent heroin hydrochloride.



**Photo 7**

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The Laboratory also received a second exhibit from the Miami, Florida Express Mail Facility that consisted of a sealed metal cylinder (see Photo 8, next page) containing a powder. Despite

the presence of a detailed identification plate (see photo), the identity and function of the item could not be determined. An extensive examination by Customs inspectors resulted in recovery of a small amount of powder that field-tested positive for heroin. At the laboratory, metal cutting tools were required to access the interior. Analysis of the recovered powder (total net mass 1.05 kilograms) by GC/FID, GC/MS and FTIR confirmed 72 percent heroin hydrochloride.

The DEA Northeast Laboratory routinely receives heroin smuggled from throughout Central and South America in various types of containers (for another example of a large metal “gear”, see the December 2003 issue of *Microgram Bulletin*); however, these types of submissions are occurring with increased frequency.



**Photo 8**

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**- INTELLIGENCE ALERT -**

**ACRYLIC KEY CHAIN FOB CONTAINING APPARENT COCAINE AND AN APPARENT COCA LEAF IN COLLIER COUNTY, FLORIDA**

The Florida Department of Law Enforcement, Fort Myers Regional Laboratory (Fort Myers, Florida), recently received an acrylic key chain fob which included a leaf and a capsule of off-white powder, suspected to be a coca leaf and cocaine (see Photo 9). The item was seized by the Collier County Sheriff’s Office pursuant to a domestic disturbance (Collier County is south of Fort Myers, and includes the city of Naples). The fob measured 35 x 35 millimeters, weighed 20.2 grams, and had a thick, clear acrylic layer sealed onto a white acrylic base; it was marked “COCA” and “NO CONSUMA DROGA” (roughly: “Don’t Take Drugs”). Access to the powder was gained by drilling a hole above the capsule. Analysis of the powder (about ½ gram recovered) by color testing, GC, and GC/MS, however, indicated no controlled substances. The leaf (which appeared to be a genuine coca leaf) was not analyzed. This was the first such exhibit received by the laboratory.



**Photo 9**

**- INTELLIGENCE ALERT -**

**DOMINICAN TRAFFICKERS HIDING DRUGS IN REMOTE WOODED  
AREAS IN NORTH-CENTRAL MASSACHUSETTS**

[From the NDIC *Narcotics Digest Weekly* 2004;3(16):1  
Unclassified, Reprinted with Permission.]

On April 5, 2004, investigators with the North Worcester County Drug Task Force reported that Dominican criminal groups in north central Massachusetts increasingly are burying heroin and cocaine or concealing the drugs in false rocks in remote wooded areas for the purpose of short-term storage. The drugs usually are packaged in glassine bags and wrapped in plastic before being buried or hidden in false rocks. Investigators report that Dominican retail-level heroin and cocaine distributors - typically from Fitchburg, Gardner, and Leominster - often receive purchase requests via cellular phones and then drive to the wooded area to retrieve enough heroin or cocaine to complete the sale. The distributors then travel to a prearranged location, such as a public parking lot, to meet the buyer. The distributors typically retrieve between a half-bundle (5 glassine bags each containing approximately 50 to 100 milligrams of powder) to 1 bundle (10 glassine bags) of heroin or gram quantities of cocaine.

*NDIC Comment:* This concealment technique (first reported in 2002) has become common in north central Massachusetts. Previously, Dominican heroin and cocaine distributors in the area concealed stashes of heroin and cocaine inside residences. Investigators discovered this concealment method after noticing a decrease in the amount of drugs that distributors were storing at their residences.

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**- INTELLIGENCE BRIEF -**

**MDMA TABLETS WITH "BART SIMPSON" LOGOS  
IN OAKLAND, CALIFORNIA**

Over a recent three month time frame, the Oakland Police Department Criminalistics Laboratory (Oakland, California) received a variety of tablets bearing the Bart Simpson logo, all suspected Ecstasy. The tablets were all seized in Oakland, California, pursuant to four different enforcement actions by the Oakland Police Department. Two light-red colored tablets (net mass of one tablet 0.16 grams, diameter not measured) were part of a polydrug seizure pursuant to a traffic violation (photo not provided). A pink-salmon colored tablet (net mass 0.17 grams, diameter approximately 0.2 inches) was seized pursuant to a prostitution sting (see Photo 10). Three green tablets (net mass of one tablet 0.20 grams, diameter approximately 0.2 inches) were part of a polydrug seizure pursuant to a traffic



**Photo 10**



**Photo 11**



**Photo 12**

violation (see Photo 11). Finally, 10 speckled green tablets (net mass of one tablet 0.19 grams, diameter approximately 0.2 inches) were part of a polydrug seizure pursuant to the arrest of a street level dealer (see Photo 12). Analysis of the various seizures by three color/spot tests (not specified) and two microcrystalline tests (not specified) confirmed MDMA (not quantitated). These were the first submissions of “Bart Simpson” logo Ecstasy tablets to the laboratory.

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**- INTELLIGENCE BRIEF -**

**5-METHOXY-N,N-DIMETHYLTRYPTAMINE NEAR BROOKSVILLE, FLORIDA**

The Florida Department of Law Enforcement, Tampa Crime Laboratory (Tampa, Florida) recently received a small amount (less than 0.01 gram) of a white powder from the Hernando County Sheriff’s Department. The powder was seized by the Hernando County Sheriff’s Department pursuant to the investigation of a physical confrontation in Brooksville (approximately 60 miles north of Tampa), and field-tested negative for cocaine and methamphetamine. Analysis by GC and GC/MS indicated 5-methoxy-N,N-dimethyltryptamine (5MeO-DMT) (not quantitated). The suspect claimed to have synthesized the material himself; however, no clandestine laboratory was discovered as a result of the investigation. This is the first time the laboratory has encountered 5-MeO-DMT.

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**- INTELLIGENCE BRIEF -**

**POLYDRUG SEIZURE INCLUDING A LARGE QUANTITY OF GHB/GBL  
IN CANADIAN COUNTY, OKLAHOMA**

The Oklahoma State Bureau of Investigation’s Central Drug Lab (Oklahoma City, Oklahoma) recently received a polydrug seizure including four vials (one unlabelled, containing a white powder (suspected ketamine), two labelled nandrolone decanoate (1 milliliter each), and one labelled testosterone cypionate (10 milliliters)), six plastic one gallon jugs containing liquids (suspected GBL), a plastic bag of tan powder (suspected methamphetamine), and twenty-six bags of white, crystalline powder (suspected “Ice” methamphetamine) (see Photo 13, next page).



**Photo 13**

The exhibits were seized pursuant to a traffic stop by the Oklahoma Highway Patrol in Canadian County (approximately 30 miles west of Oklahoma City). The suspect claimed to be travelling from California to New York and Washington, DC. Analysis of the contents of labelled vials by GC and GC/MS confirmed nandrolone decanoate and testosterone cypionate. Analysis of the powder in the fourth vial (total net mass 0.3 grams) by GC and GC/MS confirmed ketamine. Analysis of the liquid contents of the jugs (total gross weight 56.5 pounds) by GC and GC/MS indicated a mixture of GHB and GBL (not quantitated). Analysis of the tan powder in the plastic bag (total net mass 89.7 grams) by GC, GC/MS, and HPLC confirmed 72.5 percent methamphetamine hydrochloride. Analysis of the white powders in the plastic bags (total net mass 1301 grams) by GC, GC/MS, and HPLC confirmed methamphetamine hydrochloride; however, the purities ranged from 58.3 to 73.4 percent, with an average of 65.2 percent (isomer not determined). Therefore, the exhibits were not “Ice”. The quantities of GHB/GBL and methamphetamine were unusually large submissions for the laboratory.

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**- INTELLIGENCE BRIEF -**

**MIS-LABELLED STEROID AMPULE IN LEWISVILLE, TEXAS**

The DEA South Central Laboratory (Dallas, Texas) recently received a submission of 281 ampules labelled as nandrolone decanoate (see Photo 14 and labelling information, next page). The exhibit was seized pursuant to a residential search by Customs agents in Lewisville, Texas (just north of Dallas/Fort Worth). Analysis by GC/MS, FTIR, and HPLC, however, indicated not nandrolone decanoate but rather testosterone enanthate 200 milligrams/milliliter in injectable oil (oil not identified). Because the amount (1 milliliter per ampule) and concentration matched

the labelling, it is suspected that this exhibit represented a licit product that was mislabelled. The laboratory has previously received exhibits of both nandrolone decanoate and testosterone enanthate, and has also previously received mislabelled steroids, both licit and counterfeit products.

Labelling Information

1mL  
Deca Durabolin  
200 mg/mL  
Nandroloni decanoas  
I.M. inject/inject. I.M.  
I.M. injekt.  
1 mL: 200 mg  
Nandrolon. Decanoat.  
Organon Europe  
Exp 09/2007  
Lot 00K25



Photo 14

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**- INTELLIGENCE BRIEF -**

**MDMA MIMIC TABLETS WITH CROSS LOGOS CONTAINING  
PHENCYCLIDINE (PCP) AT A CLANDESTINE METHAMPHETAMINE  
LABORATORY IN WALDORF, MARYLAND**

The DEA Mid-Atlantic Laboratory (Largo, Maryland) recently received 198 blue tablets with a cross logo on one side and a single score mark on the other, suspected Ecstasy (see Photo 15). The tablets were recovered at an iodine - red phosphorous methamphetamine clandestine laboratory in Waldorf by chemists from the Mid-Atlantic Laboratory and agents from the Washington, DC HIDTA Group (Waldorf is about 20 miles south-southwest of Washington, DC). The tablets were round, biconvex, approximately 10 millimeters in diameter, and weighed 256 milligrams each. Analysis by color testing, GC, FTIR, and GC/MS, however, indicated not MDMA but rather phencyclidine (PCP) (0.38 milligrams/tablet). This was the first submission to the laboratory of suspected Ecstasy tablets containing only PCP. There was no indication that PCP was being produced at the clandestine laboratory.



Photo 15



## CORRECTIONS, CLARIFICATIONS, AND UPDATES

### “COUNTERFEIT” METHYLPHENIDATE TABLETS CONTAINING OXYCODONE ARE A GENUINE OXYCODONE PREPARATION

[Editor's Preface: The April 2004 issue of *Microgram Bulletin* included an Intelligence Alert that reported an apparent methylphenidate tablet that actually contained oxycodone. In fact the tablet was almost certainly a genuine oxycodone preparation. The misidentification resulted from an error in the 2003 *Drug Identification Bible* - that in turn was likely caused because the manufacturer's (Mallinckrodt) five milligram methylphenidate tablet is highly similar in appearance to their five milligram oxycodone tablet (see Photos 16 and 17). Over 20 laboratories pointed out this error since the publication of the April 2004 issue. The following letter is representative of all the submissions concerning this issue. Thanks to everyone who submitted a correction.]

Sir: With regard to the April 2004 edition of *Microgram Bulletin*, and the Intelligence Alert on counterfeit methylphenidate tablets containing oxycodone, the Florida Department of Law Enforcement (Tampa Laboratory) has had several encounters with these tablets. The presence or absence of "scoring" is critical in the presumptive identification of these tablets. Unscored, "M5" tablets contain methylphenidate HCl 5 mg (NDC#00406-1121-01). Scored, "M5" tablets contain oxycodone HCl 5 mg (NDC# 00406-0552-01). The "5" is above the score. In each case the tablets are white, the "M" is inside a square and the "5" is on the opposite side. Both pharmaceuticals are manufactured by Mallinckrodt. Per a conversation with a Mallinckrodt pharmacist on 5/12/04, Mallinckrodt will be making changes to further distinguish these preparations. They can be viewed on the Mallinckrodt web page at: [www.mallinckrodt.com](http://www.mallinckrodt.com)

Anne J. Person  
Florida Department of Law Enforcement, Tampa Crime Laboratory



**Photo 16 - Methylphenidate**

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**Photo 17 - Oxycodone**

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## SELECTED REFERENCES

[Notes: Selected references are a compilation of recent publications of presumed interest to forensic chemists. Unless otherwise stated, all listed citations are published in English. If available, the email address for the primary author is provided as the contact information. Listed mailing address information (which is sometimes cryptic or incomplete) exactly duplicates that provided by the abstracting services. In addition, in order to prevent automated theft of email addresses off the Internet postings of *Microgram Bulletin*, unless otherwise requested by the corresponding author, all email addresses reported in the *Bulletin* have had the “@” character replaced by “-at-”; this will need to be converted back (by hand) before the address can be used.]

1. Rendle DF. **Use of X-rays in the United Kingdom Forensic Science Service.** *Advances in X-ray Analysis* 2003;46:17. [Editor's Notes: Presents four case studies, including the use of XRD in the analysis of “street drug seizures” (not specified in the abstract). Contact: Forensic Science Service, London Laboratory, London SE1 7LP, UK.]
2. Dongre VG, Kamble VW. **HPTLC detection and identification of heroin (diacetylmorphine) in forensic samples. Part III.** *Journal of Planar Chromatography - Modern TLC* 2003;16(6):458. [Editor's Notes: Presents a new spray reagent for detection of heroin and similar opium alkaloids after TLC elution. Contact: Department of Chemistry, Dr Babasaheb Ambedkar Marathwada University, Aurangabad 431 004, India.]
3. Hosokawa K, Shibata T, Nakamura I, Hishida A. **Discrimination among species of Papaver based on the plastid rp116 gene and the rp116-rp114 spacer sequence.** *Forensic Science International* 2004;139(2-3):195. [Editor's Notes: Five of six species of papaver were distinguishable using the title technique. Contact: Faculty of Health Sciences, Department of Nutritional Management, Hyogo University, 2301 Shinzaike, Hiraoka-cho, Kakogawa City, Hyogo 675-0101, Japan.]
4. Dal Cason TA, Franzosa ES. **Occurrences and forms of the hallucinogens.** *Hallucinogens* 2003;37. [Editor's Notes: A review, including LSD and its analogs, indoalkylamines, hallucinogenic phenethylamines, PCP and its analogs, ketamine, and *beta*-carbolines. Contact: The DEA North Central Laboratory, 536 S. Clark St., Room 800, Chicago, IL 60605. Note - No reprints available.]
5. Nugent KG, Saville BJ. **Forensic analysis of hallucinogenic fungi: A DNA-based approach.** *Forensic Science International* 2004;140(2-3):147. [Editor's Notes: Presents the title study. Contact: Department of Botany, University of Toronto at Mississauga, Mississauga Road North, Ont., Mississauga 3349, Can.]
6. Waddell RJH, NicDaeid N, Littlejohn D. **Classification of ecstasy tablets using trace metal analysis with the application of chemometric procedures and artificial neural network algorithms.** *Analyst* 2004;129(3):235. [Editor's Notes: Presents a study of the practicality of ICP-MS for sample-sample comparisons. Several statistical analyses are evaluated. Contact: Forensic Science Unit, Department of Pure and Applied Chemistry, University of Strathclyde, 204 George Street, Glasgow G1 1XW.]
7. Buryakov IA, Kolomiets YN. **Rapid determination of explosives and narcotics using a multicapillary-column gas chromatograph and an ion-mobility spectrometer.** *Journal of*

- Analytical Chemistry - Russia (translation of *Zhurnal Analiticheskoi Khimii*) 2003;58(10):944. [Editor's Notes: The title technique was applied to detection of heroin, cocaine HCl and cocaine base (crack). This article appears to be very similar or identical to that published by the primary author in the *Journal of Chromatography B - Analytical Technologies in the Biomedical and Life Sciences* 2004;800(1-2):75. Contact: Siberian Division, Design and Technological Institute of Instrument Making for Geophysics and Ecology, Russian Academy of Sciences, Novosibirsk, Russia 630090.]
8. EHeffnawey GB, ElHallag IS, Ghoneim EM, Ghoneim MM. **Voltammetric behavior and quantification of the sedative-hypnotic drug chlordiazepoxide in bulk form, pharmaceutical formulation, and human serum at a mercury electrode.** *Journal of Pharmaceutical and Biomedical Analysis* 2004;34(1):75. [Editor's Notes: Presents the title study, with comparison against existing methods. Contact: GB EHeffnawey, Tanta Univ, Fac Sci, Dept Chem, El Bahr St, Tanta 31572, Egypt.]
  9. Armellini S, Brenna E, Fronza G, Fuganti C, Pinciroli M, Serra S. **Establishing the synthetic origin of amphetamines by H-2 NMR spectroscopy.** *Analyst* 2004;129(2):130. [Editor's Notes: The title study was applied to nine samples of N-acetyl-MDA. Contact: E Brenna, Politecn Milan, Dipartimento Chim Mat Ingn Chim, Via Mancinelli 7, I-20133 Milan, Italy.]
  10. Zimmerman MM. **The identification of 5-methoxy-alpha-methyltryptamine.** *Microgram Journal* 2003;1(3-4):158. [Editor's Notes: Presents the title analysis (using color tests and GC/MS). Contact: [zimmermanmm-at-doj.state.wi.us](mailto:zimmermanmm-at-doj.state.wi.us) ]
  11. Chan KB, Chong YK, Nazarudin M. **The identification of N,N-dimethylamphetamine (DMA) in an exhibit in Malaysia.** *Microgram Journal* 2003;1(3-4):162. [Editor's Notes: Presents the title analysis, using color tests, GC/MS, FTIR, HPLC, melting point, and optical rotation. Contact: [kbchan-at-kimia.gov.my](mailto:kbchan-at-kimia.gov.my) ]
  12. Makino Y, Kurobane S, Miyasaka K, Nagano K. **Profiling of Ecstasy tablets seized in Japan.** *Microgram Journal* 2003;1(3-4):169. [Editor's Notes: Presents the title study, focusing on tablets seized during the first half of CY-2002. Several trends are reported. Contact: [ymakino-at-mbe.nifty.com](mailto:ymakino-at-mbe.nifty.com) ]
  13. Sarwar M, McDonald JL. **A rapid extraction and GC/MS methodology for the identification of psilocyn in mushroom/chocolate concoctions.** *Microgram Journal* 2003;1(3-4):177. [Editor's Notes: Presents the title study. Contact : [msarwar36-at-yahoo.com](mailto:msarwar36-at-yahoo.com) ]
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  15. Geer LC, Hays PA. **Letrozole (Femara®)** *Microgram Journal* 2003;1(3-4):190. [Editor's Notes: Presents analytical data (GC/MS, FTIR, and NMR) for the title compound. Contact: [lois.c.geer-at-usdoj.gov](mailto:lois.c.geer-at-usdoj.gov) ]
  16. Coyle HM, Palmbach T, Juliano N, Ladd C, Lee HC. **An overview of DNA methods for the identification and individualization of marijuana.** *Microgram Journal* 2003;1(3-4):196.

[Editor's Notes: Presents the title overview and review. Note that this article is an authorized reprint from the *Croatian Medical Journal* 2003;44(3):315. Contact: [c4ensic-at-yahoo.com](mailto:c4ensic-at-yahoo.com) ]

17. Bono JP. **Report of the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Conference (Montreal)**. *Microgram Journal* 2003;1(3-4):208. [Editor's Notes: Presents the collective results of the title conference. Contact: [jpbslmo@erols.com](mailto:jpbslmo@erols.com) ]

#### **Additional References of Possible Interest:**

1. Mi J-Q, Zhang X-X, Chang W-B. **Determination of morphine by capillary zone electrophoresis immunoassay combined with laser-induced fluorescence detection**. *Journal of Immunoassay & Immunochemistry* 2004;25(1):57. [Editor's Notes: Presents a competitive immunoassay for detecting morphine in biological samples. Contact: College of Chemistry and Molecular Engineering, Department of Chemical Biology, The Key Lab of Bioorganic Chemistry and Molecular Engineering, Peking University, Beijing.]
2. Murray RA, Doering PL, Boothby LA, Merves ML, McCuster RR, Chronister CW, Goldberger BA. **Putting an Ecstasy test kit to the test: Harm reduction or harm induction?** *Pharmacotherapy* 2003;23(10). [Editor's Notes: Presents a critical analysis and evaluation of the DanceSafe Complete Adulterant Screening Kit for Ecstasy®. Contact: Department of Pharmacy Practice, College of Pharmacy, University of Florida, Gainesville, FL, USA (zip code not provided.)]
3. Bravo DT, Harris DO, Parsons SM. **Reliable, sensitive, rapid, and quantitative enzyme-based assay for gamma-hydroxybutyric acid (GHB)**. *Journal of Forensic Sciences* 2004;49(2):379. [Editor's Notes: Several assays are presented for detection of GHB in beverages and urine. Contact: SM Parsons, Department of Chemistry and Biochemistry, University of California, Santa Barbara, CA 93106.]
4. Puschel K, Stein S, Stobbe S, Heinemann A. **Analysis of 683 drug packages seized from "body stuffers"**. *Forensic Science International* 2004;140(1):109. [Editor's Notes: Presents a short overview of the practice of internal carrying of controlled substances, with a discussion of packaging and drug types, as observed in Hamburg, Germany. Contact: [heinemann-at-uke.uni-hamburg.de](mailto:heinemann-at-uke.uni-hamburg.de) ]
5. Allen WC. **Method of analyzing the constituents of air extracted from the interior of a piece of luggage**. U.S. Pat. Appl. Publ. US 20040035185 A1 26 Feb 2004, 17 pp. CLASS: ICM: G01N033-22. NCL: 073031020; 073863810. APPLICATION: US 2002-224688 21 Aug 2002. [Editor's Notes: The title technique is presented. The primary application is for explosives, but the technique can be applied to drugs. Contact: USA (no further addressing information was provided.)]
6. Moeller MR. **Forensic conclusiveness and quality assurance of toxicological results**. *Research in Legal Medicine* 2003;30:55. [Editor's Notes: An overview of the legal consequences of toxicological analyses. This article is written in German. Contact: Institut fuer Rechtsmedizin, Universitaet des Saarlandes, Homburg 66421, Germany.]
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- 2004;140(2-3):175. [Editor's Notes: Reticuline was detected as its trimethylsilylethers, acetyl esters, and methyl ethers, in opium and in the urine of opium users. The results can be used to differentiate between opium and heroin users. Contact: Sharjah Police Forensic Science Laboratory, P.O. Box 29, Sharjah, United Arab Emirates.]
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  9. Brazier JS, Morris TE, Duerden BI. **Heat and acid tolerance of Clostridium novyi Type A spores and their survival prior to preparation of heroin for injection.** Anaerobe 2003;9(3):141. [Editor's Notes: Presents the title study. This study was in followup to the outbreak of clostridium illnesses and deaths in the United Kingdom as a result of the use of contaminated heroin. The results indicate that typical heroin preparation procedures are not adequate to kill the spores. Contact: Department of Medical Microbiology, PHLS Anaerobe Reference Unit, University Hospital of Wales, Heath Park, UK CF4 4XW.]
  10. Potter GR. **The growth of Cannabis growing: A study of urban Cannabis growers in the north of England.** Report Sheffield University 2002; No. 00189486; pp. 1 - 20. [Editor's Notes: Presents an overview of the homegrown commercial cannabis market in northern England. Contact: Department of Law, Sheffield University, Sheffield, UK.]
  11. Hough M, Warburton H, Few B, May T, Man LH, Witton J, Turnbull PJ. **A growing market. The domestic cultivation of cannabis.** Report Joseph Rowntree Foundation 2003; pp. 1 - 45. [Editor's Notes: Presents an overview of domestic cultivation of cannabis in England and Wales. Contact: Criminal Policy Research Unit, South Bank University, London, UK.]
  12. Palabiyik IM, Dinc E, Onur. **Simultaneous spectrophotometric determination of pseudoephedrine hydrochloride and ibuprofen in a pharmaceutical preparation using ratio spectra derivative spectrophotometry and multivariate calibration techniques.** Journal of Pharmaceutical and Biomedical Analysis 2004;34(3):473. [Editor's Notes: Presents a comparison of five different statistical evaluation methods for the title drug combination. Contact: F Onur, Ankara Univ, Fac Pharm, Dept Analyt Chem, TR-06100 Ankara, Turkey.]
  13. Stone HA, Stroock AD, Ajdari A. **Engineering flows in small devices: Microfluidics toward a lab-on-a-chip.** Annual Reviews in Fluid Mechanics 2004;36:381. [Editor's Notes: Presents an overview of the title topic. Contact: [has-at-deas.harvard.edu](mailto:has-at-deas.harvard.edu) ]

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## NEW EMAIL ADDRESSES NEEDED

The email addresses for the following organizations have returned rejection notices to the *Microgram* Editor for the past three issues of *Microgram Bulletin*, and will therefore be dropped from the subscription list unless a corrected email address is provided by the end of June 2004. Note that the errors include anti-spamming comments, mailbox full messages, and user not found or user unknown messages. The Editor requests your assistance in contacting these organizations, determining if they wish to remain on the *Microgram* subscription e-net, and if so asking them to provide a valid email

address to the Editor at: [microgram\\_editor-at-mailsnare.net](mailto:microgram_editor-at-mailsnare.net)

Corte Suprema de Justicia de la Nacion Argentina, Argentina CP1026

Franklin County Coroners Office, Colombus, Ohio

Probe Scientific, El Cerrito, California

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**The following organization (listed last month) was dropped on 4/30/04:**

Lothian and Borders Police, Edinburgh, Scotland

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## THE DEA FY - 2004 STATE AND LOCAL FORENSIC CHEMISTS SEMINAR SCHEDULE

The remaining FY - 2004 schedule for the DEA's State and Local Forensic Chemists Seminar is as follows:

June 14 - 18, 2004

September 20 - 24, 2004

Note that the school is open only to forensic chemists working for law enforcement agencies, and is intended for chemists who have completed their agency's internal training program and have also been working on the bench for at least one year. There is no tuition charge for this course. The course is held at the AmeriSuites Hotel in Sterling, Virginia (near the Washington/Dulles International Airport). A copy of the application form is appended onto the October 2003 issue of *Microgram Bulletin*, and should be mailed to the Special Testing and Research Laboratory (Attention: Pam Smith or Jennifer Kerlavage) at: 22624 Dulles Summit Court, Dulles, VA 20166. For additional information, call 703 668-3337.

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## EMPLOYMENT OPPORTUNITIES

### 1. Virginia Department of Criminal Justice Services

(Third and Final Posting)

**Position:** Forensic Scientist II

**Location:** Roanoke, VA

**Salary Range:** \$39,901 - \$65,540

**Application Deadline:** Open Until Filled

**Duties:** Incumbent will: 1) Use current state-of-the-art methodologies and instrumentation to analyze controlled substances; 2) Prepare Certificates of Analyses on findings for use by the criminal justice system; and 3) Testify in court as a qualified expert for the Commonwealth at criminal proceedings as to the results of laboratory findings. Position requires occasional overnight travel. Employee will provide own transportation as required.

**Qualifications:** Knowledge, skills and abilities: Knowledge of basic theoretical principles and applications of the instrumentation and methodologies used to analyze controlled substances required. Knowledge of laboratory safety procedures; quality assurance/quality control and laboratory practices; instrumental analysis (GC, GC/MS, FTIR, UV) and experience in

forensic drug analysis required. Successful completion of a documented training program and/or demonstration of competency is required. Experience presenting testimony in a court of law, as an expert witness is preferred. Must be able to analyze data, develop sound conclusions, maintain accurate records, and analyze, and solve technical problems. Ability to communicate effectively orally and in writing required. A baccalaureate degree in chemistry or other related science with sufficient chemistry courses is required; graduate degree is preferred. Valid driver's license and/or other means of reliable transportation required.

**Application Procedures:** Applicants must submit a state application (#10-012). Applications may be mailed to the Department of Criminal Justice Services, 805 East Broad Street, 10th Floor, Richmond, VA 23219, ATTN: Human Resource Office; emailed to: [gcolburn-at-dcjs.state.va.us](mailto:gcolburn-at-dcjs.state.va.us) or faxed to 804-786-6484. State application forms may be obtained by calling (804) 786-4246 or by downloading the form from the employment section of the DCJS web page at [www.dcjs.org](http://www.dcjs.org) For assistance, call Gene Colburn at (804) 786-6925.

AN EQUAL OPPORTUNITY EMPLOYER

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## SCIENTIFIC MEETINGS

**1. Title: 14<sup>th</sup> Annual CLIC Training Seminar** (First Posting)  
**Sponsoring Organization:** Clandestine Laboratory Investigating Chemists Association  
**Inclusive Dates:** September 8 - 11, 2004  
**Location:** Portland Marriott Downtown; Portland, OR  
**Contact Information:** Pam Smith, 703/668-3337, [auk.ling-at-verizon.net](mailto:auk.ling-at-verizon.net) and Roger Ely, 415/744-7051, [rogely-at-atdial.net](mailto:rogely-at-atdial.net)  
**Website:** [None]

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**2. Title: SWAFS Fall Conference** (Second Bimonthly Posting)  
**Sponsoring Organization:** Southwestern Association of Forensic Scientists  
**Inclusive Dates:** October 11 - 15, 2004  
**Location:** Oklahoma City, OK  
**Contact Information:** Brandy Reese, 405/425-3857, [brandyr-at-osbi.state.ok.us](mailto:brandyr-at-osbi.state.ok.us)  
**Website:** [[www.swafs.us](http://www.swafs.us)]

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**3. Title: Joint Meeting of the Southern Association of Forensic Scientists, the Midwestern Association of Forensic Scientists, the Mid-Atlantic Association of Forensic Scientists, and the Canadian Society of Forensic Science** (Second Bimonthly Posting)  
**Sponsoring Organization:** Southern Association of Forensic Scientists  
**Inclusive Dates:** September 19 - 24, 2004  
**Location:** Lake Buena Vista, FL  
**Contact Information:** David Baer, 407/650-5152, [davidb7818-at-aol.com](mailto:davidb7818-at-aol.com); Mike Healy 941/747-3011, Ext. 2280, [mike.healy-at-co.manatee.fl.us](mailto:mike.healy-at-co.manatee.fl.us)  
**Website:** [[www.southernforensic.org](http://www.southernforensic.org)]

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Proper scientific measurements include an estimate of precision. All instruments have measurable errors. For example, a balance may describe the weight of an item as 32.05 grams, plus or minus 0.01 grams. The first value is the measured weight and the second value is the range of uncertainty in that measurement. These estimates are usually based either on a manufacturer's testing, or a user's independent calibration against a series of documented standards. Knowing the estimate of error is "good science", since real world decisions are often based on both the measurement and its corresponding uncertainty.

As a forensic science discipline, Digital Evidence also needs to consider if individual measurements or the entire examination process have quantifiable estimates of uncertainty. As defined by the Scientific Working Group on Digital Evidence (SWGDE), Digital Evidence is "information of probative value that is stored or transmitted in binary form." Binary data is often described as opposite discrete states of magnetic flux, in other words, the proverbial "on/off" state. Therefore, there wouldn't appear to be any question or uncertainty in such measurements, and no apparent need to estimate uncertainty. However nothing in scientific measurement is simple

- and that includes the recording and copying of binary data.

Consider the following three issues:

First, all binary data is stored either as a magnetic flux (on hard drives, diskettes, and tapes) or optical reflectivity (on CD's, DVD's, and magnet-optical disks). Detection of these recorded states is an analog measurement made by a "read head", as dictated by its controller logic settings. Recognition of an "on" state is an analog electronic measurement, the criteria for which can vary from manufacturer to manufacturer. Additionally, magnetic flux deteriorates as a function of time (as many tape archivists can attest); this is the so-called magnetic hysteresis effect.

Second, hard drive read heads and optical laser read heads can themselves degrade over time. The decreasing sensitivity of the read head to detect or discriminate between an "on" from an "off" state diminishes the device's ability to consistently and accurately read stored data.

Third, a data storage controller logic circuit or operating system may detect a bad block of data at any time and declare the data storage area as invalid, thereby

eliminating it from all user access and computational activity. In other words, the data stored within the block marked as "bad" becomes inaccessible to the user. A "bad" sector may be the result of only one bit in one byte being undetectable by the read head. [If necessary, the remaining data in the block may be recovered using advanced recovery techniques.] Other blocks of data may be inherently inaccessible due to limits placed on the hard drive controller by the manufacturer. Access to such data storage areas, commonly referred to as "reserved or unreferenced" blocks, is possible but difficult. These blocks provide a relatively discrete area to hide data.

### **Data Copying Uncertainty Estimation**

Standard digital evidence examinations are usually preceded by the copying of the original evidence for both analysis and archive purposes. A technique known as hashing has been developed to establish if a copy is the same as the original from which it was made.

A hash is a summary output of a standardized mathematical equation or algorithm that is designed to compare the binary pattern in one object with the binary pattern in a second object. The entire binary content of the



object that is to be measured (sector, cluster, file, directory, partition or hard drive) is fed into the hash algorithm and a resulting summary value is produced. The assertion that a copy is authentic is based on comparing the hash value of the original data with the hash value of the copy. If the hash values are identical, the copy is considered to be an exact duplicate. Currently, most digital evidence examiners use a computer security industry standard hash algorithm known as MD-5 (developed in 1994 by Dr. Ronald L. Rivest of the Massachusetts Institute of Technology). This algorithm produces a 128-bit value as its output. Consequently, an assertion that a copy is authentic based on a MD-5 hash is actually a probabilistic assessment that the chance of two different data sets having the same hash value would be approximately 1 in  $2^{128}$  (i.e., an incredibly large number, meaning an incredibly small chance). An even more exacting hash algorithm is the SHA-1 algorithm, which calculates the hash value of the target binary data set to a value of  $2^{160}$ . SHA-1 was developed by the U.S. National Institute of Standards. DEA currently uses the MD-5 algorithm because the calculation times are shorter than SHA-1, and it is generally accepted as the present standard in digital evidence forensics.

The importance of hashing in the digital evidence acquisition process is to statistically demonstrate that it is virtually impossible to produce two sets of data having the same hash

value. Consequently, the probability estimates inherent in the hash algorithm define the estimate of uncertainty in the digital evidence duplication phase.

#### **Overall Examination Uncertainty Estimation**

Estimating the uncertainty for the digital evidence examination process is based on the software's performance and the examiner's knowledge, skills, and ability. The former is tested during: 1) Methods validation; 2) Use of examination controls; and 3) Instrument monitoring. The examiner expertise is also evaluated in numerous ways, including: 1) Peer review; 2) Technical and administrative reviews; and 3) Internal, external, and blind proficiency testing.

Quantitative estimates of both errors of omission as well as errors of commission need to be undertaken in order to enable courts and jurors to assess the merits of the digital data that is presented. To date, no such studies have been published. The discipline of digital evidence is still relatively new, and the scopes of examination differ widely, making a single estimate of uncertainty for the discipline a difficult undertaking. Both government and academia need to address this issue, as the importance of digital evidence as a forensic technique gains in acceptance by both investigators and the courts.

Questions or comments?  
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